

**Major Timber Trees of Guyana**  
**A Lens Key**

**CIP-DATA KONINKLIJKE BIBLIOTHEK, DEN HAAG**

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**MAJOR TIMBER TREES OF GUYANA**  
**A LENS KEY**

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**The Tropenbos Foundation**  
**Wageningen, The Netherlands**

**Swiss Federal Institute of Technology**  
**Chair of Wood Science, Zürich, Switzerland**

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## TROPENBOS SERIES

The **Tropenbos Series** presents the results of studies and research activities related to the conservation and wise utilization of forest lands in the humid tropics. The series continues and integrates the former Tropenbos Scientific and Technical Series. The studies published in this series have been carried out within the international Tropenbos programme. Occasionally, this series may present the results of other studies which contribute to the objectives of the Tropenbos programme.



Stichting Tropenbos  
Wageningen  
The Netherlands





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## FOREWORD

Wood anatomical atlases with photographs and descriptions of woods of different species are publications that are useful for many years. Atlases published in the 1930's are still used in the 1990's, and will continue to be valuable references for years to come. This publication is in the tradition of such atlases. In the 1990's there is an appreciation and a concern for conserving biodiversity, with particular emphasis on tropical forests. Proper utilization of wood and avoiding waste might be considered part of a conservation strategy. This book with its identification key to the woods of the major timber trees of Guyana is a contribution to such a strategy. The first step in the proper utilization of a wood is knowing what species it is, so that it will be correctly processed and an end-use appropriate for its properties will be chosen.

Hand lens keys are useful not only for professional wood scientists, but for anyone with a curiosity or need to know the identity of a piece of wood. The audience for hand lens keys includes not only professional wood scientists, but anyone, including carpenters and craftsmen. Hand lens identification does not require expensive equipment, but a good eye, and some attention to detail. Even though it is at times necessary to use microscopic features of wood for identification, when dealing with a limited number of species from a limited geographic area, macroscopic features, those features easily seen with a hand lens, often are sufficient for wood identification. Hand lens identification might be considered "low tech" because sample preparation is so easy. When this "low tech" approach is combined with the ready access to computers that now exists the result is an "improved" identification process, as computer-aided wood identification programs and databases speed the process of comparison. This work provides a detailed introduction to features useful for hand lens identification, and a useful computerized key for woods of the Guyanas. It is a thoughtfully constructed work that will benefit a wide audience. As many of the woods included in the key occur outside of Guyana, it is useful for anyone with an interest in woods from Central and South America.

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# 1 INTRODUCTION

The tropical rain forests are still being destroyed over immense areas by fire deforestation, felling and through road-building. The danger to the environment and the burden this destruction places upon it are comparable to the thinning of the ozone layer, the on-going extermination of diverse species of animal and plant life, and the insidious contamination of air, water and earth with chemicals. The widespread, common awareness of these problems in industrial nations is not more than two decades old. The problem of environmental destruction, on the other hand, is as old as civilization itself. Seemingly though, only tribal groups of indigenous people have been able to live in harmony with their environment by pursuing a natural sustainable growing cycle. The flowers of the Greek and Roman cultures, by contrast, were responsible for vast felling and climatical changes within the Mediterranean basin. The awareness of environmental problems - and, above all, the implementation of the necessary changes - have three prerequisites: peace, prosperity and insight. Armed conflicts this century clearly show that wars are ruthless vis-à-vis the environment, whether natural or cultural. Environmental problems are pushed aside wherever they infringe on the fulfilment of elementary needs such as food, clothing or housing, as is the case in many developing tropical countries. And finally, specialized knowledge is essential to successfully tackle the analysis of complex problems, and in order to find solutions to them.

The endangered tropical rain forests cannot be effectively protected with any single measure. While Forest Service, laws, satellite supervision and international conferences all have a part to play, more is needed. The prerequisites of peace, prosperity and insight must be striven for. In order to achieve these aims it is above all necessary to check the self-interest of the individual and that of nations; that of the former through society and of the latter through international organizations. We have to learn to share with others who are less fortunate. It is important that the value of the rain forests is raised in the estimation of the people of the countries concerned: one does not destroy that which one values highly. This, however, has to include an environmentally friendly use of the forest. If one starts to question all changes, one ends up by questioning civilization itself, as each school, hospital, road and railway built also means the loss of a piece of nature. Indeed, nature itself can be said to be in a state of "dynamic balance" which takes changes into account, such as the change from egg-laying dinosaurs to mammals 70 million years ago. In the same way, changes in the rain forests cannot be excluded. But the senseless destruction of the rain forests must stop in order to ensure their ultimate survival. This can only be achieved by applying fitting solutions to the problem and by a differentiated management system of the forest. A long-term and nature-friendly policy must be implemented which takes both the needs of a sustainable forest plantation and the legitimate needs of peopled reservations into account. The goal is clearly defined, the way is long, and time is running out. This book is a modest contribution to attaining that goal.

The project that led to this book was developed in 1989 within the framework of a multi-disciplinary research initiative of the Tropenbos Foundation. In the summer of that year, Mr. Ben J.H. ter Welle, then co-ordinator of Tropenbos Guyana, approached various research institutes, of which the Swiss Federal Institute of Technology in Zürich was one, with the proposal of sharing the administration of the project. After preliminary discussions and negotiations at the beginning of 1990, Prof. Dr. Hans Heinrich Bosshard, who at the time held the Chair of Wood Science and Wood Technology, agreed to undertake the part of the project labelled A 2.2. Prof. Dr. Ladislav J. Kucera was entrusted with working out a concept and led the project through all its phases. The definitive (i.e. already identified) samples were made available by Tropenbos (collection Marcel Polak); some additional samples

were supplied by Dr. Regis B. Miller, Madison, Wisconsin, U.S.A., as well as from our own Xylothek.

In a first step, Mrs. Teresa Geisinger tested ways and means of obtaining an optimal cross section cut; boiling and cutting with a special knife proved to be the better method as opposed to sanding. In years of painstaking work she also prepared all the samples. Mrs. Alice Hirzel was responsible for the macro pictures and carried out all the photographic work in the dark room. She also further developed our macro picture technique. The actual description of macroscopic features was the basis of an ETH diploma thesis from Mr. Matthias Brunner in 1992. An innovative part of this work was the development, together with Mr. Otmar Baumann, of a computer software programme for wood identification. Even though the diploma work was well done and well received, the head of the project decided on improvements and additions, which were consequently carried out by Mr. Matthias Brunner and Dr. Ernst Zürcher. Many useful suggestions came from Dr. Livia Bergamin Strotz and a former colleague, Dr. Karel Bensen, who actively supported the project at the beginning. The maps were drawn by Mr. H.R. Rypkema from the information collected by Dr. Marcel Polak, both of the Herbarium Division, University of Utrecht. Mrs. Ursula Stocker made up a meticulous register and Mrs. Angela Rast took care of the English translation. The authors wish to thank the above-mentioned people for their work and also those who - like Mrs. Stéphane Croptier - helped in testing the software, in collecting additional information from literature and in checking the data of the camera-ready manuscript. They also wish to thank all others who helped the project along with advice and suggestions, especially Mr. Frédéric Beaud for the design of the synoptic tables. The execution of the project was financed from the funds of the Chair of Wood Science of the Swiss Federal Institute of Technology in Zürich, except the maps with the geographic distribution of the species and the printing of the camera-ready manuscript.

This book serves as a handy tool in the identification of 115 of the most important wood species in Guyana. At the same time, it contains a lot of information on the geographical distribution, tree shape, structure and other characteristics of wood. In contrast to a microscopic examination, a macroscopic one is always more difficult and more uncertain. Nevertheless, it is useful in the field and does not require a lot of time or money. Users will find this book helpful in three ways:

- by being able to identify an unknown species, to gain more information on the tree and its wood,
- by being able to test and to confirm the identity of a species thought to be known and
- by ascertaining whether an unknown wood is one of the main Guyanese species.

Questions of this nature come from biologists, teachers, researchers, carpenters and craftsmen as well as from customs offices. The accompanying software enables a computer-aided description and identification, although many questions can be answered by consulting the book alone. The pack also includes a transparent scale grid for the determination of quantitative structural features. Apart from these things, the user will need at least one very sharp knife and a hand-held lens. The features and the work to be carried out are described step by step. One important feature of the book is that the user can supplement it with additional wood species. The authors wish the user success and would welcome any criticism or suggestions for improvement.

## 2 EXPLANATORY NOTES

### 2.1 Lens Key: Aims and Methods

What possibilities does this book offer? The identification key which has been constructed for this field guide is based on a computer programme. It is complemented by a synoptical key if a computer is not available.

The identification system is adaptable and allows specifications of the given descriptions, as well as additions of other species at any time. Because it depends not only on the sample but also on the user's knowledge and preferences, the sequence of features for description and identification is flexible (features can even be omitted!). Furthermore, the system works with different tolerances for errors which allow the user to take into account uncertainties of the descriptions. Apart from the identifying function, the system delivers information on the entered species, which can be viewed as a list on the screen or printed.

#### 2.1.1 Tools

A razor blade or sharp knife, a glass of water, the transparent scale grid with reference markings for measuring and evaluating different tissue types, a hand lens with a maximum magnification of 12 times, a pencil, the check-list with macroscopic features for field-work (the supplied form in the appendix is recommended to be used in copies), either a computer with the software "UniWoods 2.0" (see chapter 4.2), or the synoptic tables by species (see appendix). A printer and additional, specialized literature are of advantage but not absolutely essential.

#### 2.1.2 Preparing the sample

The raw wood sample is cut or split in such a way that it can be easily examined later with the hand lens. Most features can be examined during field work in a clean cross section. If possible, we recommend the preparation of a cube of about 2 cm edge. Cross, radial and tangential surfaces should be vertical to one another and the radial and transverse surfaces should be aligned to the rays. The sample should not consist of juvenile wood and, whenever possible, should be taken from the heartwood (necessary in determining the colour of the heartwood). If the species investigated is a light wood, the cross section of the cube can be cut with a very sharp knife so that the structure is clearly visible. With hard types of wood, we recommend that the cube is first soaked and then boiled in a solution of 1 part water to 1 part glycerine. The boiling lasts it depends from several hours to 5-6 days in the maximum. This procedure facilitates a clean cut across the grain.

#### 2.1.3 Features

The necessary features for description and determination are divided into two groups:

- Group 1: Features that have a code and are numbered from 1-95.
- Group 2: Features that have no code and therefore no number, but that nevertheless supply additional information important for the determination of the species.

Group	Information on	Features
Group 1	Vessels	Visibility, arrangement, inclusions, diameter, density, proportion of solitary vessels
	Axial parenchyma	Visibility, arrangement, parenchyma bands (absolute width, mutual distance, relative width)
	Ground fibre tissue	Proportion of area
	Rays	Visibility, relative width, absolute width, frequency, height
	Anatomical particularities	Growth rings, storied structures
	Physical properties	Density, heartwood colour, lustre, odour
Group 2	Additional features	Canals, included phloem, oil or mucilage cells, other features

### Programme structure

Information as to the goal, degree of difficulty, tools, surface to be examined, method of evaluation and classification is listed under each feature of chapter 4.1.

### Degree of difficulty

- Features with one rectangle are generally easy to determine and can usually be classified under measurable criteria. They are therefore burdened with relatively less uncertainty.
- Features with two rectangles are generally more difficult to determine and therefore more difficult to classify. They are burdened with relatively greater uncertainty.

### Classification

The classification codes use two different kinds of boundaries of classification: quantitative and qualitative. They are therefore either boundaries of dimension or boundaries that measure an abstract quality.

- Quantitative:

> (greater than), < (smaller than), <= (smaller or equal to).

For example: <= 0.1 mm (smaller than 0.1 mm or equal to 0.1 mm)

> 0.1 - 0.2 mm (greater than 0.1 mm but not more than 0.2 mm).

- Qualitative:

For example: "distinct" or "indistinct".

Only one classification of a feature can be chosen, unless stated otherwise under "Method".

### Illustrations

An effort was made to limit the use of scientific terms. For those not familiar with the terms used, typical pictures are used to visualize their meaning in chapter 4.1. Such visual comparisons are more efficient than long, written definitions and replace the explanations of a glossary. The depicted features are often marked with arrows and their size is occasionally compared with black bars and rectangles (Figs. 14-17, 42-43, 46, 54-56, 61-64) such as used with the transparent scale grid.

Specific information is given in the chapters 4.1 and 4.2.



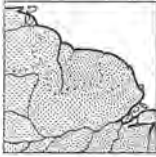
## 2.2 Description by Species


1 *Abarema jupunba* (Willd.) Britten & Killip Huruasa

**A** → Synonym: *Pithecellobium jupunba* (Willd.) Urban

**B** → Vernacular names:  
Huruasa (Ar), Klaijio (C), Kwatapuna (M), Kwatpain (W),  
Ortikorong (Ak), Soapwood (Cr)

**C** → Field characteristics and distribution:  
Tree -30 (-40) m tall, trunk -0.85 (-1.2) m in diameter.  
Occasional to frequent in (often secondary) seasonal forest and marsh forest. Occasional in Wallaba forest.



**E** → 

**F** → Physical properties and structural features:  
Lustrous wood of low to medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**  
Vessels distinct to naked eye. Extremely sparse to somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of different sizes and of 2-4 and > 4 vessels. Inclusions present. Diameter generally medium to large. Numerous solitary vessels. Axial parenchyma indistinct to naked eye, paratracheal vascentric. Proportion of ground tissue fibres large. Rays indistinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse to numerous rays per 5 mm, very low to low.

**G** → Numbers of features in the key:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

The different parts of the description are treated below in the same sequence as in the description itself.

### A) Synonyms

The synonyms are implemented from the Tropenbos Foundation and Polak (1992).

### B) Vernacular name(s)

The vernacular names are listed in alphabetical order, with an abbreviation for the language to which a given name belongs in parentheses. These are all Amerindian languages, except for the Creole language. The following abbreviations are used:

Ak = Akawaio  
An = Arecuna  
Ar = Arawak  
C = Carib  
Cr = Creole  
M = Macushi  
P = Patamona  
W = Wapisiana  
Wr = Warrau

The vernacular name most commonly used in Guyana is given on the right hand side of the top line of each page with a description of the species being referred to. Most vernacular names were taken from Mennega et al. (1988).

Knowledge of the vernacular names is of vital importance for communication with local experts in forest work. On the other hand, knowledge of scientific names is often indispensable when consulting botanical literature, Polak (1992).

#### C) Field characteristics and distribution

The information was excerpted from A.M. Polak, Major Timber Trees of Guyana, A Field Guide, 1992. Detailed information about the forest- and soil types is found in the same book. Concerning the informations about tree height:

e.g. "-30 m" means that the average tree of the pertinent species is 30 m high. "-30 (-40) m" means that the average tree is 30 m high and that the upper limit of height is ca. 40 m.

#### D) Map

The hatched drawings show the distribution of the pertinent species. They were executed and put at our disposal by Mr. H.R. Rypkema and Mr. A.M. Polak, University of Utrecht. The scale is ca. 1: 45'000'000.

#### E) Figures

The magnification scale is 10. The two photographs (40 x 60 mm each) show the cross section of different individuals of the pertinent species to emphasize the anatomical variability. Because of this fact and the limited number of samples available, there are - in a few cases - features given in the written description which cannot be seen on the photographs.

#### F) Written description

The description is split up into physical properties and structural features on the one hand, and anatomical features on the other hand.

Non occurring features of a pertinent species are not especially mentioned in the text (e.g. "no distinct odour" or "axial parenchyma/fibres not storied").

#### G) Numbers of features in the key

The numbers go from 1 to 95 and each number stands for a feature. A shaded number signalizes the occurrence of that particular feature. The numbers are the same as those used in the computerized key.

## 2.3 Indices

In order to facilitate the search for information on a particular species, indices are provided for both the scientific and the vernacular names of the species included in this field guide. These indices also serve as a dictionary for those who want to know the scientific equivalent of a local name, or vice versa. The legend of figures identifies the actual samples used throughout this work, particularly for the pictures.

## 2.4 Appendices

#### A) Synoptic tables by species

#### B) Check list with macroscopic features for field-work

#### C) Transparent scale grid

#### D) Floppy disk

The disk contains three files: ident2.exe (to identify an unknown sample), entry2.exe (to change or add data), and uniwoods.dat (comprises all the data; this file cannot be executed!). The software is explained in chapter 4.2.

### 3 LIST OF INCLUDED SPECIES

No	Species name	Family name	Vernacular name
1	<i>Abarema jupunba</i> (Willd.) Britton & Killip	Mimosaceae	Huruasa
2	<i>Acosmium praeclarum</i> (Sandw.) Yakovlev	Papilionaceae	Blackheart
3	<i>Alexa imperatricis</i> (Schomb.) Baillon	Papilionaceae	Haiariballi
3a	<i>Alexa leiopetala</i> Sandw.	Papilionaceae	Haiariballi
4	<i>Andira surinamensis</i> (Bondt) Splitg. ex Pulle	Papilionaceae	Koraro
4a	<i>Andira inermis</i> (Wright) DC.	Papilionaceae	Koraro
5	<i>Aniba hypoglauca</i> Sandw.	Lauraceae	Yellow silverballi
6	<i>Antonia ovata</i> Pohl	Loganiaceae	Inyak
7	<i>Aspidosperma cruentum</i> Woodson	Apocynaceae	Shibadan
7a	<i>Aspidosperma album</i> (Vahl) Benoist	Apocynaceae	Shibadan
8	<i>Aspidosperma vargasii</i> A. DC.	Apocynaceae	Currywood
9	<i>Astronium ulei</i> Mattick	Anacardiaceae	Bauwaua
10	<i>Bagassa guianensis</i> Aublet	Moraceae	Cow-wood
75a	<i>Buchenavia fanshawei</i> Exell & Maguire	Combretaceae	Fukadi
11	<i>Calophyllum lucidum</i> Benth.	Guttiferae	Kurahara
12	<i>Carapa guianensis</i> Aublet	Meliaceae	Crabwood
12a	<i>Carapa procera</i> A. DC.	Meliaceae	Crabwood
13	<i>Catostemma commune</i> Sandw.	Bombacaceae	Common baromalli
14	<i>Catostemma fragrans</i> Benth.	Bombacaceae	Sand baromalli
14a	<i>Catostemma altsonii</i> Sandw.	Bombacaceae	Baromalli
15	<i>Cedrela odorata</i> L.	Meliaceae	Red cedar
16	<i>Chlorocardium rodiei</i> (Schomb.) Rohwer, Richter & van der Werff	Lauraceae	Greenheart
17	<i>Chrysophyllum pomiferum</i> (Eyma) Penn.	Sapotaceae	Limonaballi, Paripiballi
18	<i>Clathrotropis macrocarpa</i> Ducke	Papilionaceae	Aromata
18a	<i>Clathrotropis brachypetala</i> (Tul.) Kleinh.	Papilionaceae	Aromata
19	<i>Couratari guianensis</i> Aublet	Lecythidaceae	Wadara
19a	<i>Couratari gloriosa</i> Sandw.	Lecythidaceae	Wadara
19b	<i>Couratari multiflora</i> (J.E. Smith) Eyma	Lecythidaceae	Smooth-leaf wadara
20	<i>Dimorphandra conjugata</i> (Splitg.) Sandw.	Caesalpiniaceae	Dakama
20a	<i>Dimorphandra polyandra</i> Benoist	Caesalpiniaceae	Huruhurudan
21	<i>Diploptropis purpurea</i> (Rich.) Amshoff	Papilionaceae	Tatabu
22	<i>Dipteryx odorata</i> (Aublet) Willd.	Papilionaceae	Tonka bean
23	<i>Eperua falcata</i> Aublet	Caesalpiniaceae	Soft wallaba
24	<i>Eperua grandiflora</i> (Aublet) Benth.	Caesalpiniaceae	Ituri wallaba
24a	<i>Eperua jenmanii</i> Oliver	Caesalpiniaceae	Ituri wallaba
24b	<i>Eperua schomburgkiana</i> Benth.	Caesalpiniaceae	Ituri wallaba
25	<i>Eperua rubiginosa</i> Miq.	Caesalpiniaceae	Watapa
26	<i>Eschweilera alata</i> A.C. Smith	Lecythidaceae	Guava-skin kakaralli

No	Species name	Family name	Vernacular name
27	<i>Eschweilera decolorans</i> Sandw.	Lecythidaceae	Smooth-leaf kakaralli
27a	<i>Eschweilera coriacea</i> (A. DC.) Mori	Lecythidaceae	Smooth-leaf kakaralli
27b	<i>Eschweilera parviflora</i> (Aublet) Miers	Lecythidaceae	Fine smooth-leaf kakaralli
27c	<i>Eschweilera wachenheimii</i> (Benoist) Sandw.	Lecythidaceae	Fine-leaf kakaralli
28	<i>Eschweilera sagotiana</i> Miers	Lecythidaceae	Common black kakaralli
28a	<i>Eschweilera pedicellata</i> (L.C. Rich.) S. Mori	Lecythidaceae	Kakaralli
28b	<i>Eschweilera subglandulosa</i> (Steudel ex O. Berg) Miers	Lecythidaceae	Black kakaralli
29	<i>Goupia glabra</i> Aublet	Celastraceae	Kabukalli
30	<i>Humiria balsamifera</i> (Aublet) A. St. Hil. var. <i>balsamifera</i>	Humiriaceae	Tauroniro
31	<i>Hyeronima alchorneoides</i> Allemão	Euphorbiaceae	Suradan
32	<i>Hymenaea courbaril</i> L.	Caesalpiniaceae	Locust
32a	<i>Hymenaea oblongifolia</i> Huber	Caesalpiniaceae	Locust
33	<i>Hymenolobium flavum</i> Kleinh.	Papilionaceae	Kororoballi
34	<i>Inga alba</i> (Sw.) Willd.	Mimosaceae	Maporokon
35	<i>Iryanthera lancifolia</i> Ducke	Myristicaceae	Kirikaua
35a	<i>Iryanthera macrophylla</i> Warb.	Myristicaceae	Kirikaua
36	<i>Jacaranda copaia</i> (Aublet) D. Don	Bignoniaceae	Futui
37	<i>Laetia procera</i> (Poeppig) Eichler	Flacourtiaceae	Warakairo
38	<i>Lecythis confertiflora</i> (A.C. Smith) S. Mori	Lecythidaceae	Wirimiri
39	<i>Lecythis corrugata</i> Poit.	Lecythidaceae	Wina
40	<i>Lecythis zabucajo</i> Aublet	Lecythidaceae	Monkey pot
41	<i>Licania alba</i> (Bernoulli) Cuatr.	Chrysobalanaceae	Kautaballi
41a	<i>Licania laxiflora</i> Fritsch	Chrysobalanaceae	Kauta
41b	<i>Licania majuscula</i> Sagot	Chrysobalanaceae	Kautaballi
42	<i>Licaria cannella</i> (Meisner) Kosterm.	Lauraceae	Brown silverballi
43	<i>Loxopterygium sagotii</i> Hook. f.	Anacardiaceae	Hububalli
44	<i>Manilkara bidentata</i> (A. DC.) Chev.	Sapotaceae	Bulletwood
45	<i>Mora excelsa</i> Benth.	Caesalpiniaceae	Mora
46	<i>Mora gonggrijpii</i> (Kleinh.) Sandw.	Caesalpiniaceae	Morabukea
47	<i>Moronobea coccinea</i> Aublet	Guttiferae	Manniballi
48	<i>Ocotea canaliculata</i> (Rich.) Mez	Lauraceae	White silverballi
48a	<i>Ocotea glomerata</i> (Nees) Mez	Lauraceae	Kurahara silverballi
48b	<i>Ocotea oblonga</i> (Meisner) Mez	Lauraceae	Soft kereti
48c	<i>Ocotea wachenheimii</i> Benoist	Lauraceae	Hard kereti
49	<i>Ocotea rubra</i> Mez	Lauraceae	Determa
50	<i>Ocotea tomentella</i> Sandw.	Lauraceae	Baradan
51	<i>Ormosia coccinea</i> (Aublet) B.D. Jackson	Papilionaceae	Barakaro
52	<i>Ormosia coutinhoi</i> Ducke	Papilionaceae	Korokororo
53	<i>Parahancornia fasciculata</i> (Lam.) Benoist	Apocynaceae	Dukali
54	<i>Parinari campestris</i> Aublet	Chrysobalanaceae	Burada
54a	<i>Parinari rodolphii</i> Huber	Chrysobalanaceae	Burada
55	<i>Peltogyne venosa</i> (Vahl) Benth.	Caesalpiniaceae	Purpleheart
56	<i>Platonia esculenta</i> (Arruda) Rickett & Stafleu	Guttiferae	Pakuri

No	Species name	Family name	Vernacular name
57	<i>Pouteria cuspidata</i> (A. DC.) Baehni	Sapotaceae	Kokoritiballi
58	<i>Pouteria guianensis</i> Aublet	Sapotaceae	Asepoko
59	<i>Pouteria speciosa</i> (Ducke) Baehni	Sapotaceae	Suya
60	<i>Protium decandrum</i> (Aublet) Marchand	Burseraceae	Kurokai
61	<i>Pterocarpus rohrii</i> Vahl	Papilionaceae	Hill corkwood
62	<i>Quassia simarouba</i> L.f.	Simaroubaceae	Simarupa
63	<i>Sacoglottis guianensis</i> Benth.	Humiriaceae	Sand dukuria
64	<i>Schefflera decaphylla</i> (Seemann) Harms	Araliaceae	Blunt-leaf karohoro
65	<i>Schefflera morototoni</i> (Aublet) Maguire, Steyerf. & Frodin	Araliaceae	Pointed-leaf karohoro
66	<i>Sclerolobium guianense</i> Benth.	Caesalpiniaceae	Kaditiri
66a	<i>Sclerolobium micropetalum</i> Ducke	Caesalpiniaceae	Thin-skin kaditiri
67	<i>Sterculia rugosa</i> R. Br.	Sterculiaceae	Rough-leaf maho
67a	<i>Sterculia pruriens</i> (Aublet) Schumann	Sterculiaceae	Smooth-leaf maho
68	<i>Swartzia benthamiana</i> Miq.	Papilionaceae	Itikiboroballi
68a	<i>Swartzia sprucei</i> Benth.	Papilionaceae	Itikiboroballi
68b	<i>Swartzia xanthopetala</i> Sandw.	Papilionaceae	Itikiboroballi
69	<i>Swartzia leiocalycina</i> Benth.	Papilionaceae	Wamara
70	<i>Symphonia globulifera</i> L.f.	Guttiferae	Manni
71	<i>Tabebuia insignis</i> (Miq.) Sandw. var. <i>monophylla</i> Sandw.	Bignoniaceae	White cedar
72	<i>Tabebuia serratifolia</i> (Vahl) Nicholson	Bignoniaceae	Hakia
73	<i>Talisia squarrosa</i> Radlk.	Sapindaceae	Moroballi
74	<i>Terminalia amazonia</i> (J.F. Gmelin) Exell	Combretaceae	Hill fukadi
75	<i>Terminalia dichotoma</i> G. Meyer	Combretaceae	Swamp fukadi
76	<i>Tetragastris altissima</i> (Aublet) Swart	Burseraceae	Haiawaballi
77	<i>Trattinickia rhoifolia</i> Willd.	Burseraceae	Ulu
77a	<i>Trattinickia demerarae</i> Sandw.	Burseraceae	Thick-skin ulu
78	<i>Vatairea guianensis</i> Aublet	Papilionaceae	Arisauro
79	<i>Virola michelii</i> Heckel	Myristicaceae	Hill dalli
80	<i>Virola surinamensis</i> (Rolander) Warb.	Myristicaceae	Swamp dalli
81	<i>Vitex stahelii</i> Mold.	Verbenaceae	Hakiaballi
82	<i>Vochysia surinamensis</i> Stafleu	Vochysiaceae	Iteballi
82a	<i>Vochysia schomburgkii</i> Warm.	Vochysiaceae	Iteballi
82b	<i>Vochysia tetraphylla</i> (G. Meyer) DC.	Vochysiaceae	Iteballi
83	<i>Vouacappoua macropetala</i> Sandw.	Caesalpiniaceae	Sarebebeballi



## 4 FEATURES AND TREATMENT OF DATA

### 4.1 Explanations and Illustrations of Features

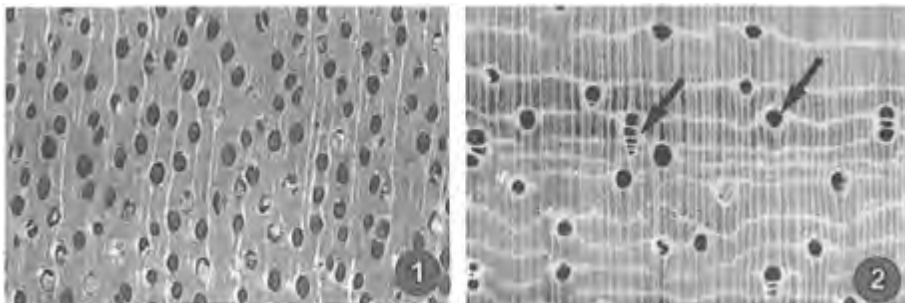
#### 1 Vessels

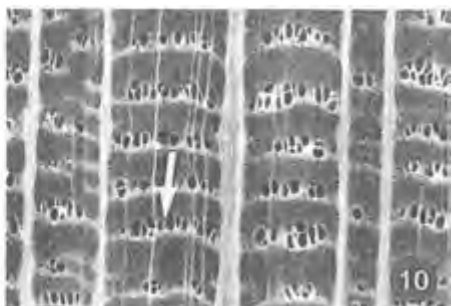
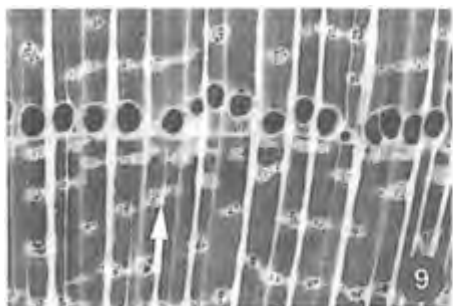
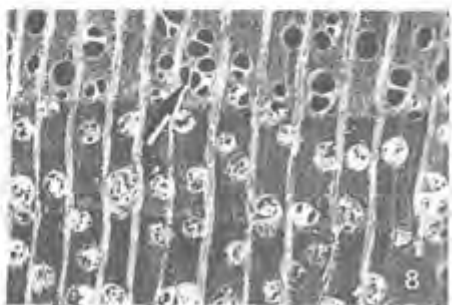
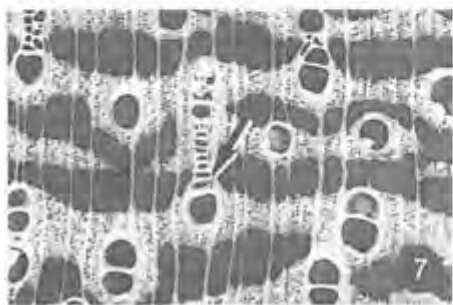
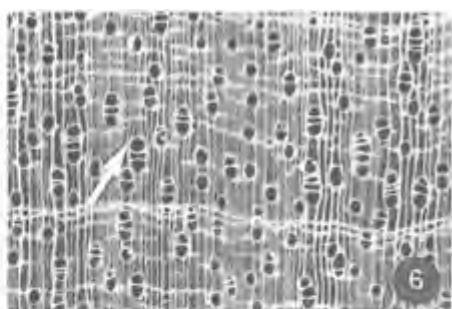
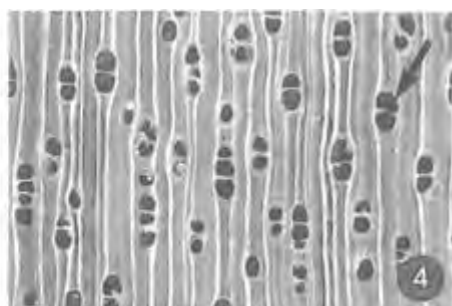
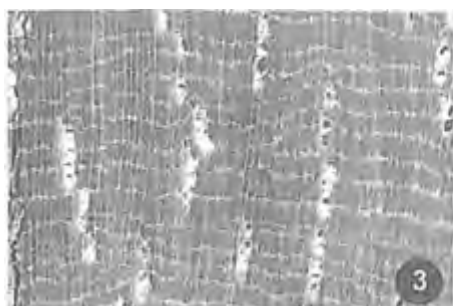
##### 1.1 Visibility

- Goal: to judge the differentiation of vessels from the surrounding tissue with the naked eye
- Degree of difficulty: difficult
- Tools: none
- Surface to be examined: cross section
  
- Method: Examine the sample closely. Bright daylight or an adequate source of artificial light is indispensable. Glasses or contact lenses should be worn, if appropriate. The sample can be moved slightly backwards and forwards. The contours of the vessels being examined and their outline must stand out clearly in order to be classified as "distinct".
  
- Classifications:
  - 1 distinct to naked eye
  - 2 indistinct to naked eye

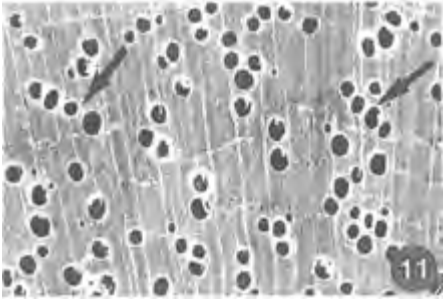
##### 1.2 Arrangement and pattern (part. ref. IAWA 1989)

- Goal: to judge the arrangement and pattern of the vessels
- Degree of difficulty: easy
- Tools: hand lens, illustrations
- Surface to be examined: cross section
  
- Method: Compare the arrangement of the vessels with the illustrations shown below. The dominant type is classified. More than one classification is possible.
  
- Classifications:
  - 3 exclusively solitary (Figure 1)
  - 4 solitary and radial multiples (Fig. 2) or clusters (Fig. 8/9)
  - 5 exclusively radial multiples (Fig. 3) or clusters (Fig. 8/9)
  - 6 radial multiples with individual vessels of the same diameter (Fig. 4)
  - 7 radial multiples with individual vessels of different diameter (Fig. 5)
  - 8 radial multiples of 2-4 vessels (Fig. 6)
  - 9 radial multiples of >4 vessels (Fig. 7)
  - 10 clusters of 2-4 vessels (Fig. 8)
  - 11 clusters of >4 vessels (Fig. 9)
  - 12 tangential pattern (Fig. 10)
  - 13 diagonal pattern (Fig. 11)









### 1.3 Inclusions

- Goal: to judge the contents of the vessels
- Degree of difficulty: difficult
- Tools: hand lens, illustrations
- Surface to be examined: cross section, tangential section, radial section

- Method: Compare the content of the vessels with the illustrations shown below.

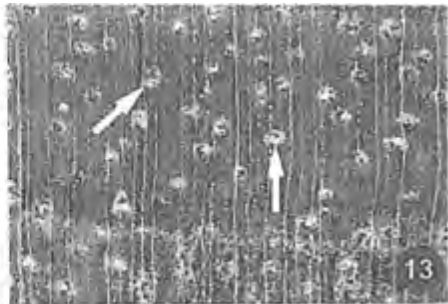
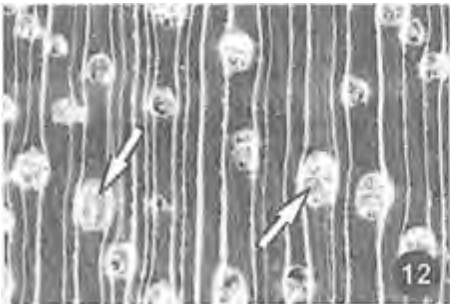
Explanations:

- Tyloses: light, often transparent tissue, with an appearance not unlike a cracked window-pane. Only found in heartwood and in non-conducting sapwood.
- Inclusions: can be either light or dark. (Warning: in the cross- and tangential sections, inclusions and tyloses look very similar and are easy to confuse).

More than one classification is possible.

- Classifications:
 

14	no vessel content
15	tyloses present (Fig. 12)
16	organic inclusions present (Fig. 13)

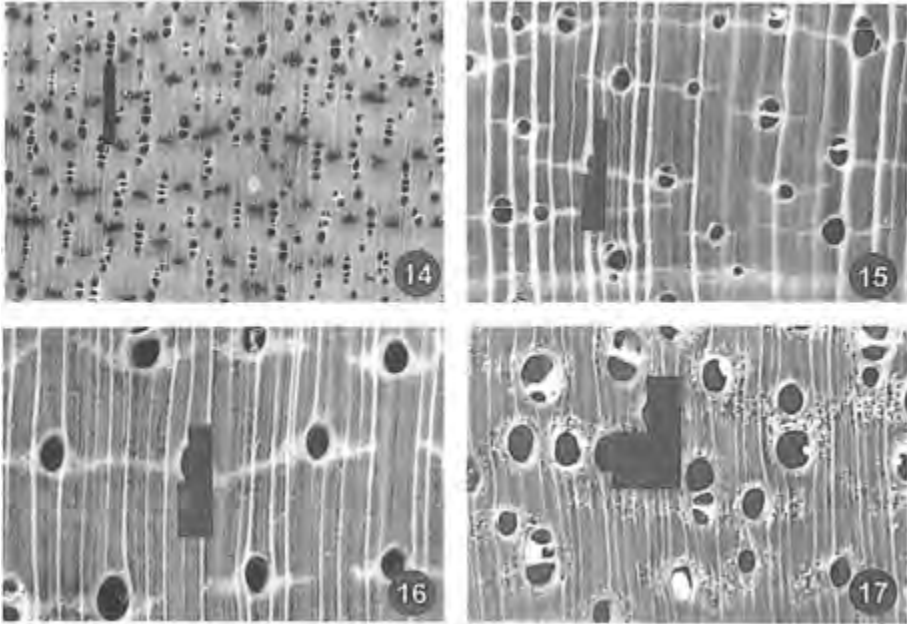


### 1.4 Diameter

- Goal: to determine the dimension of the largest vessels in mm
- Degree of difficulty: easy
- Tools: transparent scale grid, hand lens, illustrations
- Surface to be examined: cross section

- Measuring method: Measure the tangential diameter by holding the transparent scale grid parallel to the rays. The five largest vessels (solitary vessels or individual vessels in clusters and multiples) are measured. The most frequently occurring diameter-class determines the classification.

- Classifications:
- |    |                                  |
|----|----------------------------------|
| 17 | $\leq 0.1$ mm; small (Fig. 14)   |
| 18 | $>0.1-0.2$ mm; medium (Fig. 15)  |
| 19 | $>0.2-0.3$ mm; large (Fig. 16)   |
| 20 | $> 0.3$ mm; very large (Fig. 17) |

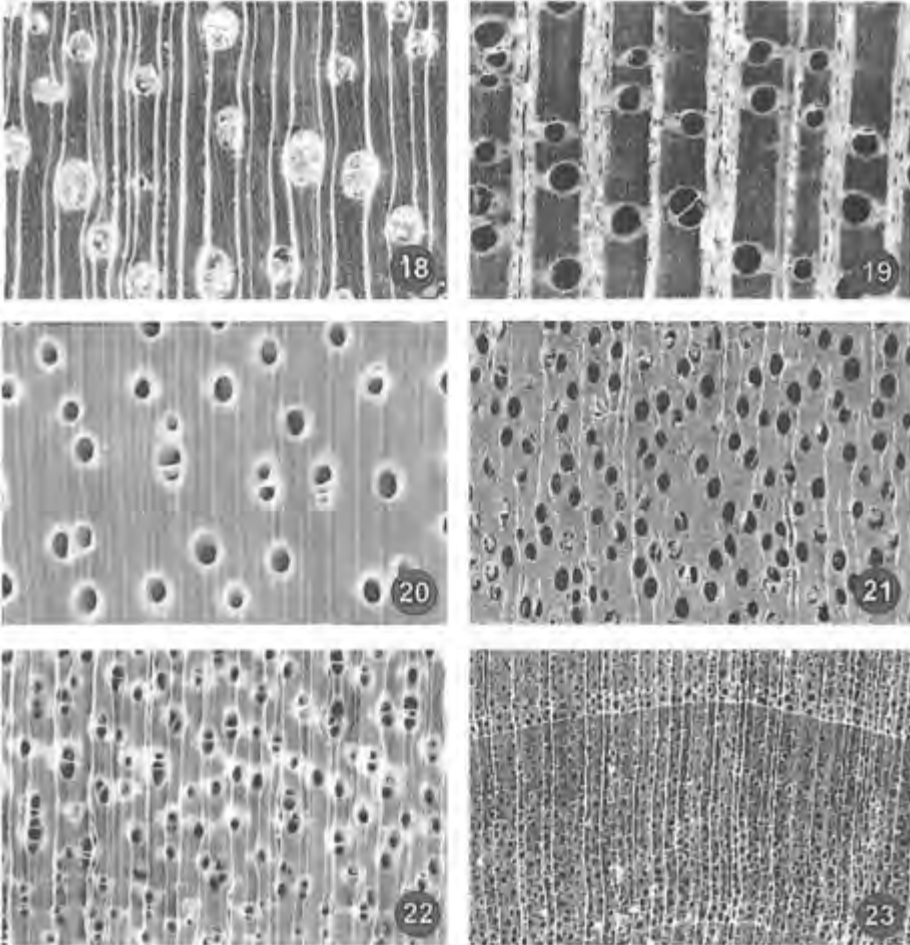


### 1.5 Vessels and vessel groups density (part. ref. Lindeman and Mennega 1963; Laming and Jutte 1977)

- Goal: to ascertain the average number of vessels, radial multiples or clusters per mm<sup>2</sup>
  - Degree of difficulty: easy
  - Tools: transparent scale grid, hand lens, illustrations
  - Surface to be examined: cross section
- Measuring method: Count the number of vessels on an area of either 3, 5 or 10 mm<sup>2</sup>. The area chosen should have at least 20 vessels. The counting of the vessels within the chosen area is carried out at five different points. Vessels which are partially within the left-hand or the top boundaries are counted, those partially within the right-hand or bottom boundary are ignored. In order to facilitate the counting radial multiples or clusters count as one vessel. The average of five counts is converted (reduced) to correspond to an area of 1 mm<sup>2</sup>. Fractions should be rounded up to the next whole number and then classified.

Note: In order to expedite the identification process, it is advisable to count the multiples at the same time (see 1.6 - Proportion of solitary vessels) and to calculate the percentage from the data obtained in 1.5 and 1.6.

- Classifications:
- |    |   |
|----|---|
| 21 | 0- 2/mm <sup>2</sup> ; extremely sparse (Fig. 18)   |
| 22 | 3- 5/mm <sup>2</sup> ; sparse (Fig. 19)             |
| 23 | 6-10/mm <sup>2</sup> ; somewhat sparse (Fig. 20)    |
| 24 | 11-20/mm <sup>2</sup> ; fairly numerous (Fig. 21)   |
| 25 | 21-40/mm <sup>2</sup> ; numerous (Fig. 22)          |
| 26 | > 40/mm <sup>2</sup> ; extremely numerous (Fig. 23) |

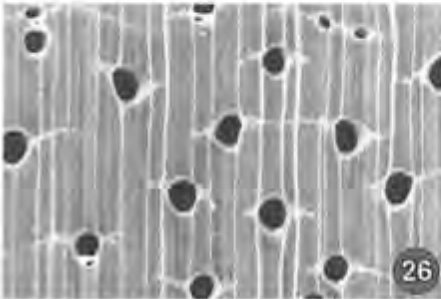
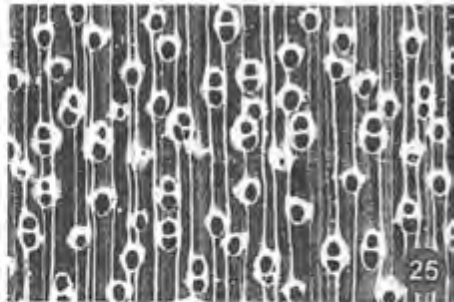
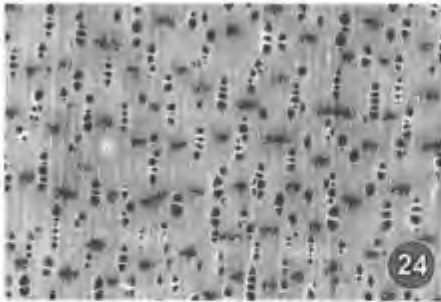


#### 1.6 Proportion of solitary vessels

- Goal: to determine the ratio between isolated vessels and the total number of vessels in %
- Degree of difficulty: easy
- Tools: transparent scale grid, hand lens, illustrations
- Surface to be examined: cross section

- Measuring method: The number of vessels on an area of either 3, 5 or 10 mm<sup>2</sup> is counted. The area chosen should have at least 20 vessels. The counting of the vessels within the chosen area is carried out at five different points. Vessels which are partially within the left-hand or the top boundaries are counted, those partially within the right-hand or bottom boundaries are ignored. The ratio of solitary vessels to the total number of vessels is calculated (%). The average of five countings is calculated and classified as follows:
- Classifications:
 

27	0- 33 %	solitary vessels; few (Fig. 24)
28	> 33- 66 %	solitary vessels; medium (Fig. 25)
29	> 66-100 %	solitary vessels; numerous (Fig. 26)



## 2 Axial parenchyma

### 2.1 Visibility

- Goal: to judge the differentiation of parenchyma from the surrounding tissue with the naked eye
- Degree of difficulty: difficult
- Tools: none
- Surface to be examined: cross section
- Method: Examine the sample closely. Again, bright daylight or an adequate source of artificial light is indispensable. Glasses or contact lenses should be worn, if appropriate. The sample can be moved slightly backwards and forwards. The contours of the parenchyma being examined must stand out clearly in order to be classified as "distinct".

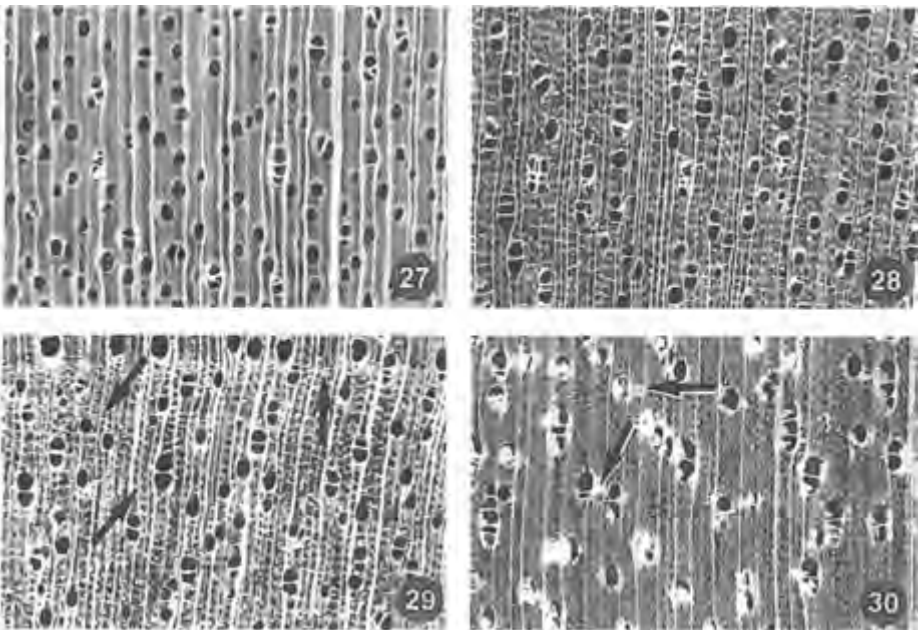
- Classifications: 30 distinct to naked eye
- 31 indistinct to the naked eye

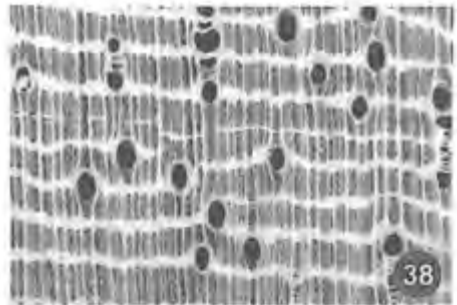
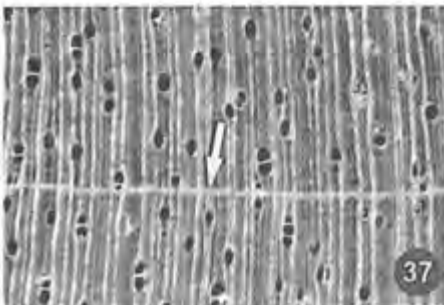
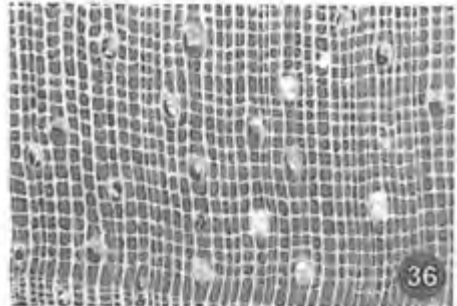
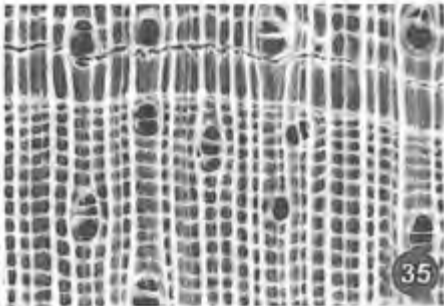
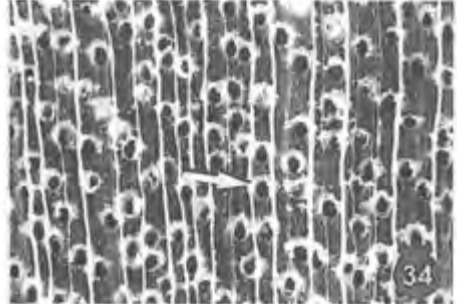
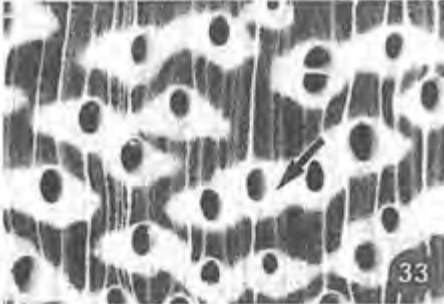
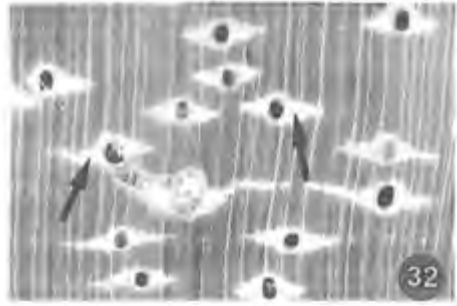
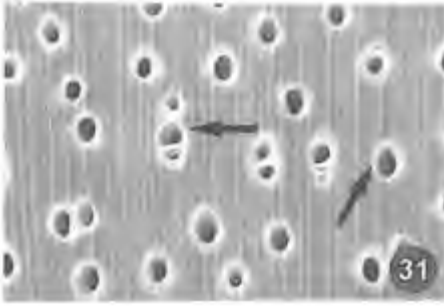
2.2 Arrangement (IAWA 1989)

- Goal: to judge qualitatively the disposition and arrangement of parenchyma as tissue
- Degree of difficulty: easy
- Tools: hand lens, illustrations
- Surface to be examined: cross section

- Method: Compare the arrangement of the parenchyma with the illustrations shown below. The dominant type is classified. More than one classification is possible.

- Classifications: 32 absent/not visible by lens (Fig. 27)
- 33 apotracheal axial parenchyma
- 34 diffuse (Fig. 28)
- 35 diffuse-in-aggregates (Fig. 29)
- 36 paratracheal axial parenchyma
- 37 scanty (Fig. 30)
- 38 vascentric (Fig. 31)
- 39 aliform (Fig. 32)
- 40 confluent (Fig. 33)
- 41 unilateral (Fig. 34)
- 42 banded parenchyma
- 43 scalariform (Fig. 35)
- 44 reticulate (Fig. 36)
- 45 marginal (Fig. 37)
- 46 not as above (Fig.38)





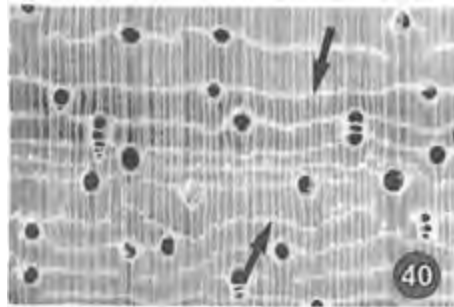
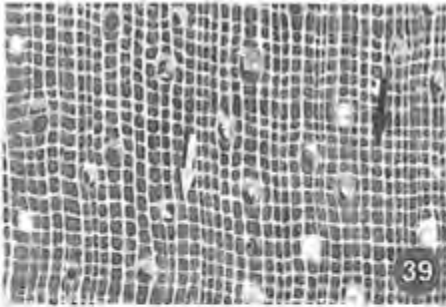
2.3 Parenchyma bands (precises description of the features 42-46)

47 Parenchyma bands absent (if absent, release features 48-54)

### 2.3.1 Width

- Goal: to ascertain the average width of the parenchyma bands in mm
- Degree of difficulty: easy
- Tools: transparent scale grid, hand lens, illustrations
- Surface to be examined: cross section
- Measuring method: Measure the parenchyma band widths in the radial direction by using the transparent scale grid. Measurements are taken at five different points. The width occurring most frequently is the determinant one.
- Classifications:

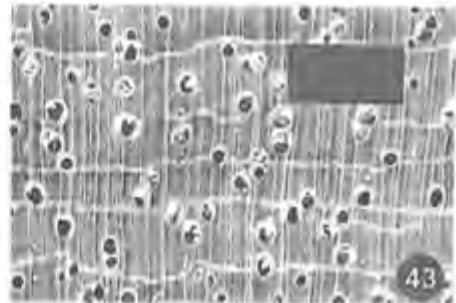
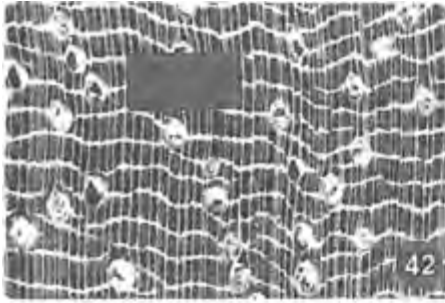
48	$\leq 0.1$ mm; narrow (Fig. 39)
49	$>0.1-0.2$ mm; medium (Fig. 40)
50	$> 0.2$ mm; wide (Fig. 41)



### 2.3.2 Distance

- Goal: to ascertain the average space between the parenchyma bands in mm
- Degree of difficulty: easy
- Tools: transparent scale grid, hand lens, illustrations
- Surface to be examined: cross section
- Measuring method: Measure the spaces between the parenchyma bands by using the transparent scale grid. Measurements are taken at five different points. The width of the space occurring most frequently is the determinant one.
- Classifications:

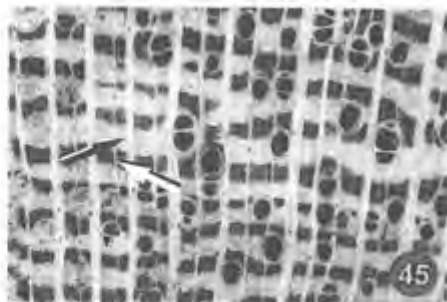
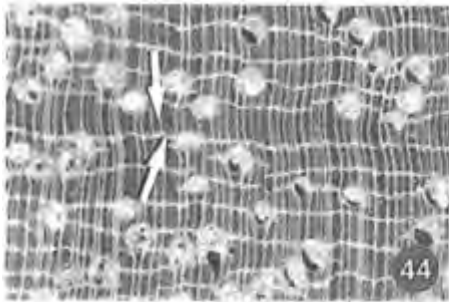
51	$\leq 0.5$ mm; small (Fig. 42)
52	$> 0.5$ mm; large (Fig. 43)



### 2.3.3 Width compared to fibre tissue

- Goal: to ascertain the width ratio between the parenchyma bands and the fibre tissue
- Degree of difficulty: easy
- Tools: transparent scale grid, hand lens, illustrations
- Surface to be examined: cross section
  
- Measuring method: Measure the widths of parenchyma bands and fibre tissue with the transparent scale grid. Five ratios of band width are determined. The ratio occurring most frequently is the determinant one.
  
- Classifications:
 

53	smaller than the fibre tissue bands (Fig. 44)
54	as wide as the fibre tissue bands or even wider (Fig. 45)



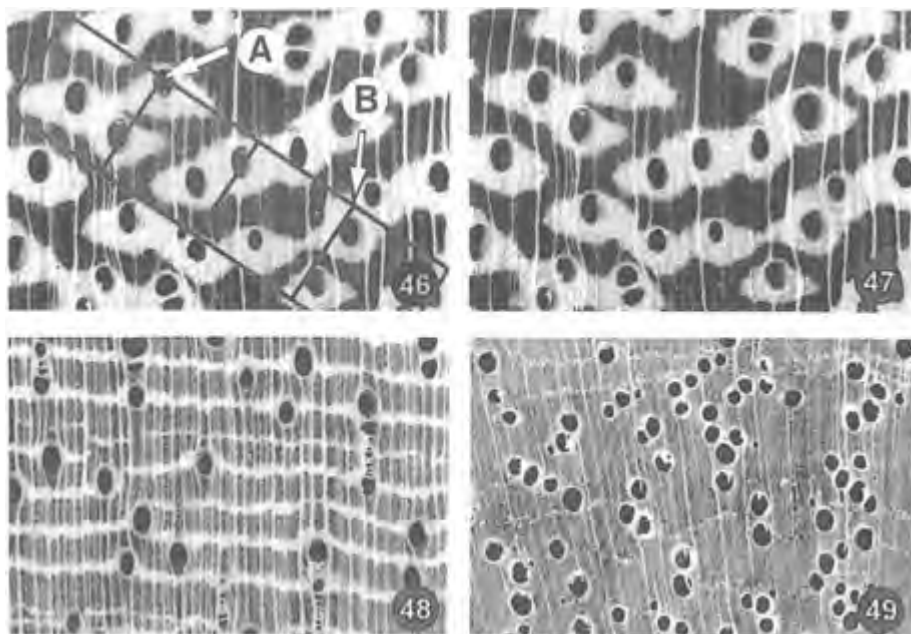
## 3 Ground tissue fibres

### 3.1 Proportion

- Goal: to ascertain the relative proportion of fibre tissue to a complete area
- Degree of difficulty: easy
- Tools: transparent scale grid, hand lens, illustrations
- Surface to be examined: cross section
  
- Measuring method: Count the intersections which cover either vessels or parenchyma on a grid with 22 intersections (10 mm<sup>2</sup>). This process is repeated 5 times. The most frequently counted number of relevant intersections (=occurrences) is of relevance for the classification. See figure 46, which illustrates the method. The arrows point either at vessels (A) or parenchyma (B).
  
- Classifications:
 

55	0- 33 % (15-22 occurrences); small (Fig. 47)
56	> 33- 66 % (8-14 occurrences); medium (Fig. 48)
57	> 66-100 % (0- 7 occurrences); large (Fig. 49)





#### 4 Rays

##### 4.1 Visibility

- Goal: to judge the differentiation of rays from the surrounding tissue with the naked eye
- Degree of difficulty: difficult
- Tools: none
- Surface to be examined: cross section

- Method: Examine the sample closely. Bright daylight or an adequate source of artificial light is indispensable. Glasses or contact lenses should be worn, if appropriate. The wood sample can be moved slightly backwards and forwards. The contours of the rays being examined must stand out clearly in order to be classified as "visible".

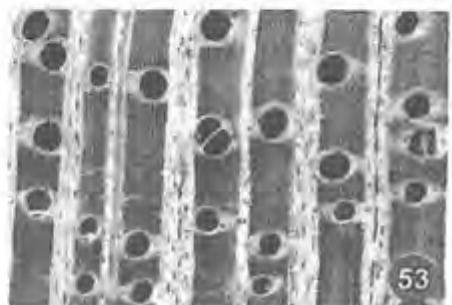
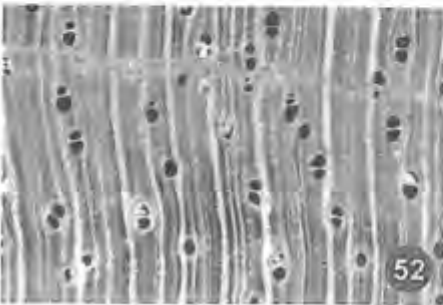
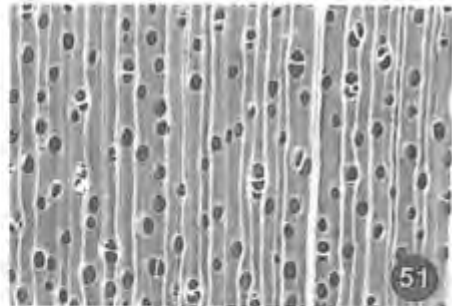
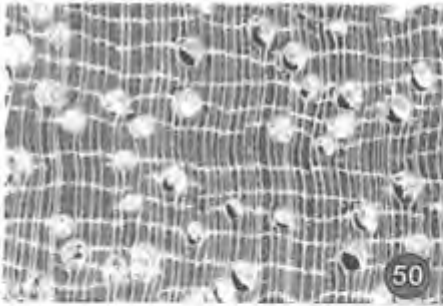
- Classifications: 58 distinct to naked eye  
59 indistinct to naked eye

##### 4.2 Width compared to the vessels (Anonymous 1960)

- Goal: to determine the ratio of the rays' width to the diameter of the vessels
- Degree of difficulty: difficult
- Tools: transparent scale grid, hand lens, illustrations
- Surface to be examined: cross section

- Measuring method: Evaluate authoritatively the width of rays in relation to vessel diameter. The 5 widest vessels and the widest rays are relevant to the evaluation. The most frequently occurring classification is the relevant one.

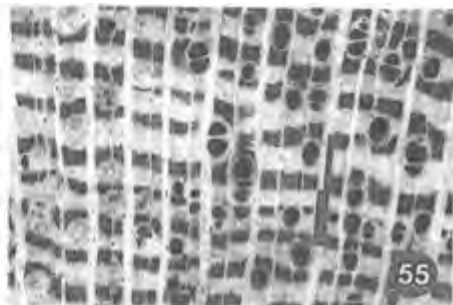
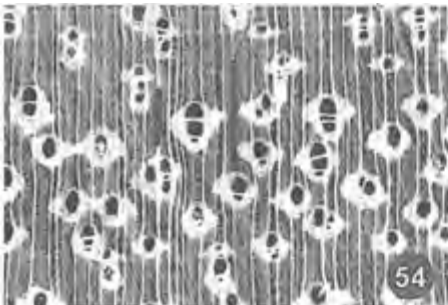
- Classifications: 60 narrower than  $\frac{1}{4}$  of vessel-size (Fig. 50)
- 61  $\frac{1}{4}$  to smaller than half of vessel-size (Fig. 51)
- 62 half of vessel-size to smaller than the vessels (Fig. 52)
- 63 as large as the vessels or even larger (Fig. 53)

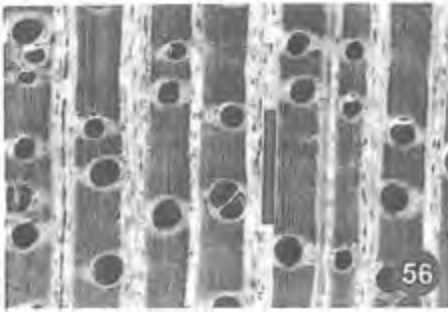


#### 4.3 Width

- Goal: to ascertain the maximum width of the rays in mm
- Degree of difficulty: easy
- Tools: transparent scale grid, hand lens, illustrations
- Surface to be examined: cross section
  
- Measuring method: Measure the 5 widest rays. The most frequently occurring diameter determines the classification.

- Classifications: 64  $\leq 0.05$  mm; narrow (Fig. 54)
- 65  $> 0.05-0.10$  mm; medium (Fig. 55)
- 66  $> 0.10$  mm; wide (Fig. 56)

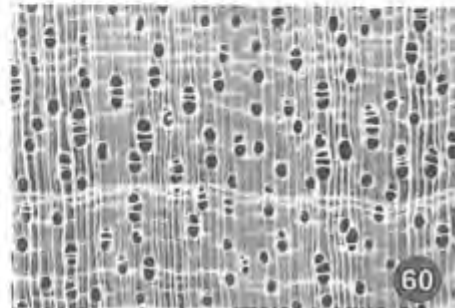
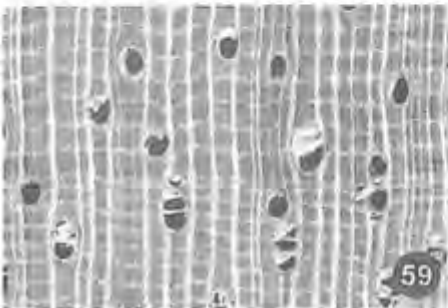
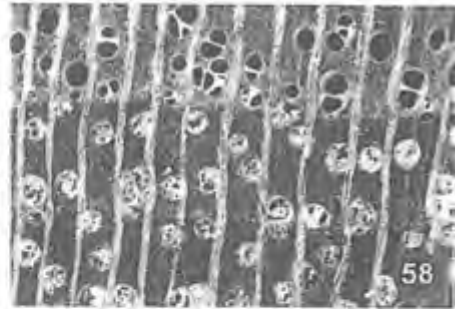
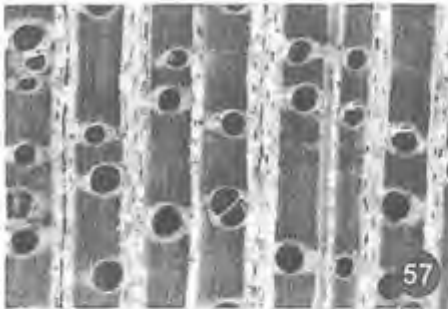




#### 4.4 Frequency

- Goal: to ascertain the number of rays per 5 mm in the tangential direction
- Degree of difficulty: easy
- Tools: transparent scale grid, hand lens, illustrations
- Surface to be examined: cross section
  
- Measuring method: Hold the transparent scale grid at right angles to the rays (tangential). With each measurement all rays that lie within a length of 5 mm are counted. The most frequently occurring number is relevant for the classification.
  
- Classifications:
 

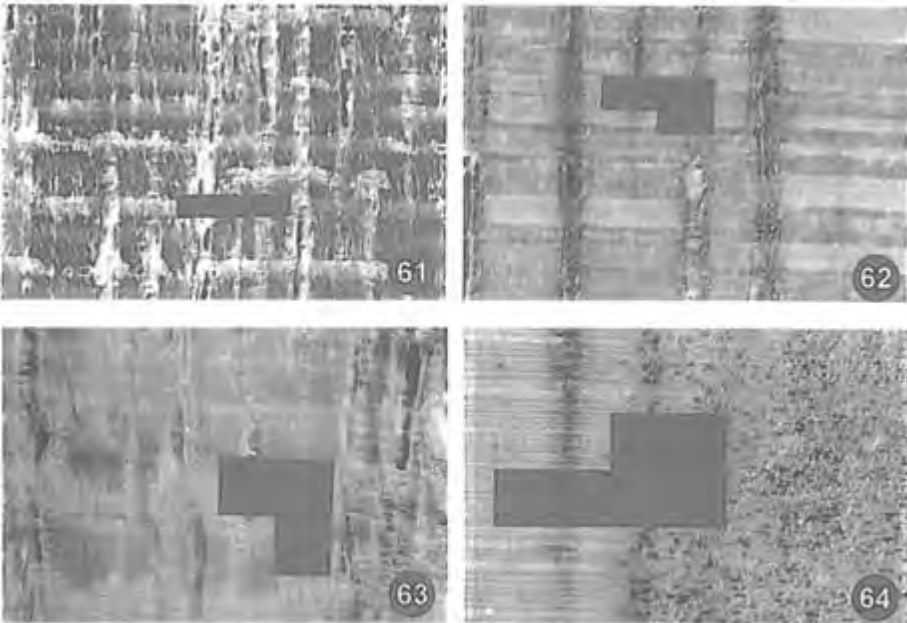
67	<= 15; extremely sparse (Fig. 57)
68	> 15-30; sparse (Fig. 58)
69	> 30-50; numerous (Fig. 59)
70	> 50; extremely numerous (Fig. 60)



#### 4.5 Height

- Goal: to assess the dimension of the rays in the axial direction in mm
- Degree of difficulty: difficult
- Tools: transparent scale grid, hand lens, illustrations
- Surface to be examined: tangential section, radial section
- Measuring method: Measure the height of the five highest rays. The most frequently occurring height is relevant for the classification. The visibility of the rays (lustre) can be heightened by a purposeful orientation to the light source.
- Classifications:

71	$\leq 0.2\text{mm}$ ; very low (Fig. 61)
72	$> 0.2\text{-}0.5\text{ mm}$ ; low (Fig. 62)
73	$> 0.5\text{-}1.0\text{mm}$ ; high (Fig. 63)
74	$> 1.0\text{mm}$ ; very high (Fig. 64)

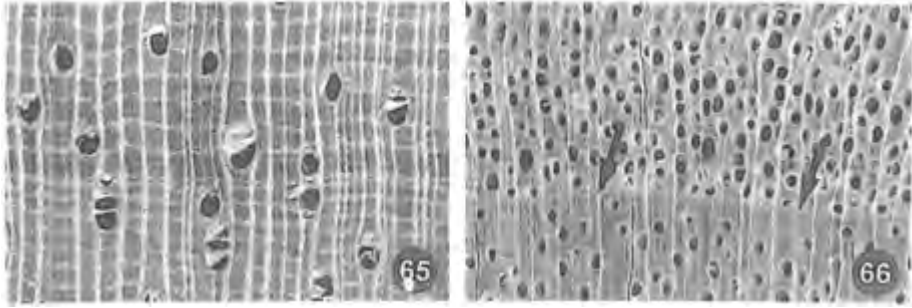


### 5 Anatomical particularities

#### 5.1 Growth rings (Anonymous 1960)

- Goal: to recognise concentric layering of types of growth tissue (particularly of vessels, but also of fibre tissue)
- Degree of difficulty: difficult
- Tools: hand lens, illustrations
- Surface to be examined: cross section
- Method: Compare the structure of the sample with those shown in the illustrations.

- Classifications: 75 growth ring boundaries indistinct or absent (Fig. 65)
- 76 growth ring boundaries distinct (Fig. 66)

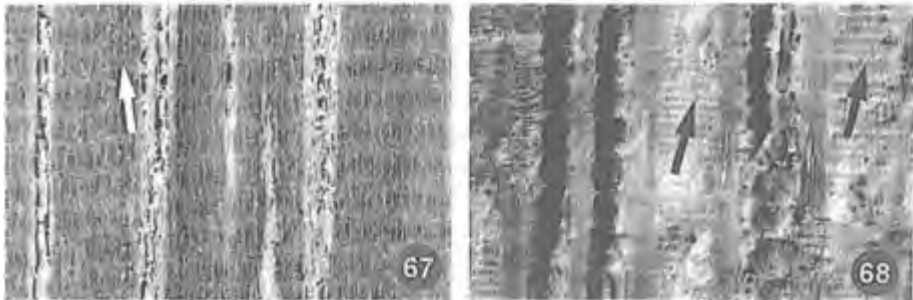


## 5.2 Storied structures (IAWA 1989)

- Goal: to recognise a repetitive vertical layering of rays, the parenchyma or the fibres
- Degree of difficulty: difficult
- Tools: hand lens, illustrations
- Surface to be examined: tangential section

- Method: Compare the structure of the sample with the illustrations. The surface being examined should be moved gently backwards and forwards so that the refraction of the light changes. More than one classification is possible.

- Classifications: 77 no storied structures
- 78 rays storied (Fig. 67)
- 79 axial parenchyma/fibres storied (Fig. 68)

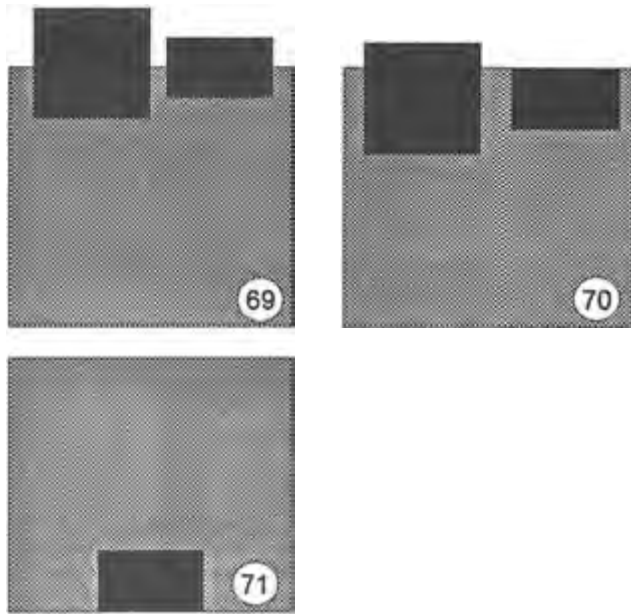


## 6 Physical properties

### 6.1 Density (Lignum 1963)

- Goal: to assess the approximate density of the wood in  $g/cm^3$
- Degree of difficulty: easy
- Tools: a glass of water, illustrations
- Surface to be examined: whole sample
- Method: Put the sample, which must be air-dried, into the water. The position of the sample after 5-10 seconds is compared to the illustrations.

- Classifications: 80 low (Fig. 69)
- 81 medium (Fig. 70)
- 82 high (Fig. 71)



Note: The density values denoted with "low", "medium", and "high" vary widely in the pertinent literature. With reference to the method developed from Hoadley's (1990) idea, three classifications emerge. Neither the effective average density of the wood nor the classification boundaries are of direct relevance to the determination. However, the definition of the average density makes the results of the examination comparable to the literature data. For this reason, the density of 30 samples was determined and placed in order of magnitude in the 3 classifications "low", "medium" or "high" (depending on the position of the sample in the water). The classification boundaries are as follows:

- low:  $\geq 0.60 \text{ g/cm}^3$
- medium:  $> 0.6-1.04 \text{ g/cm}^3$
- high:  $> 1.04 \text{ g/cm}^3$

## 6.2 Heartwood colour (IAWA 1989)

- Goal: to classify the colour of the heartwood
- Degree of difficulty: difficult
- Tools: none
- Surface to be examined: all sections
  
- Method: Examine the freshly-cut surface.  
More than one classification is possible.
  
- Classifications: 83 no difference between heart- and sapwood
- 84 heartwood darker than sapwood
- 85 basically brown or shades of brown
- 86 basically copper-coloured or shades of copper
- 87 basically red or shades of red

- 88 basically yellow or shades of yellow
- 89 basically white to grey
- 90 with streaks
- 91 none of the above

### 6.3 Lustre

- Goal: to judge the lustre of the freshly-split radial surface
- Degree of difficulty: difficult
- Tools: none
- Surface to be examined: radial section
  
- Method: Split the sample along the radial direction. Move the freshly-split sample backwards and forwards under a powerful source of light.
  
- Classifications:
  - 92 dull
  - 93 lustrous

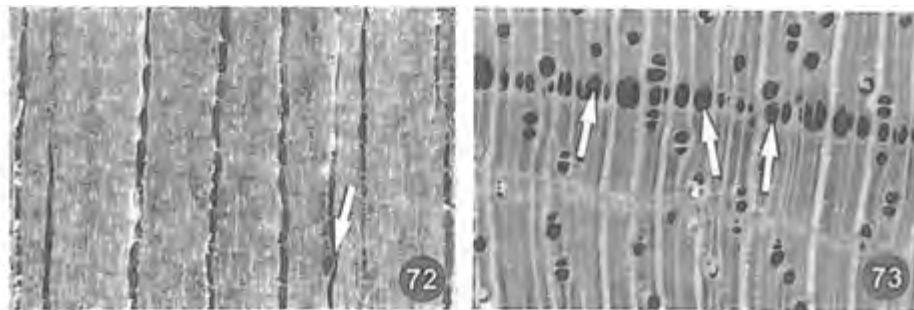
### 6.4 Odour (Venet et Keller 1986)

- Goal: to ascertain possible odour
- Degree of difficulty: easy
- Tools: none
- Surface to be examined: whole sample
  
- Method: First cut, and then breath upon the sample. A distinct odour could be e.g. nutty, rancid, aromatic, resinous, mouldy, citric, sour etc.
  
- Classifications:
  - 94 no distinct odour
  - 95 distinct odour

## 7 Additional features

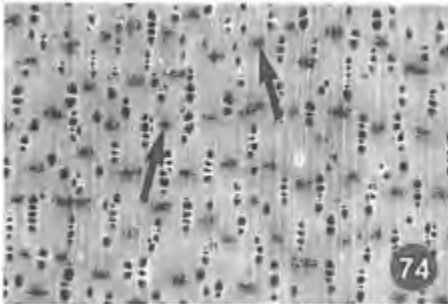
### 7.1 Canals

- Goal: to recognise resin or latex conducting canals in wood
- Degree of difficulty: difficult
- Tools: hand lens, illustrations
- Surface to be examined: cross section, tangential section
  
- Method: Compare the structure of the sample with the illustration.
  
- Classifications:
  - canals absent
  - canals present (Fig. 72, 73)



7.2 Included phloem (Anonymous 1960)

- Goal: to recognise phloem layers included in wood
- Degree of difficulty: difficult
- Tools: hand lens, illustration
- Surface to be examined: cross section
  
- Method: Judge the presence or absence of included phloem in bands or islands with the help of the illustration.
  
- Classifications: included phloem absent  
included phloem present (Fig. 74)



7.3 Oil or mucilage cells (IAWA 1989)

- Goal: to ascertain the presence of secretory cells at the margins of the rays
- Degree of difficulty: difficult
- Tools: hand lens, illustration
- Surface to be examined: tangential section
  
- Method: Judge the presence or absence of oil or mucilage cells with the help of the illustration.
  
- Classifications: Oil or mucilage cells absent  
Oil or mucilage cells present (Fig. 75)





## 4.2 "UniWoods 2.0" Software-Manual

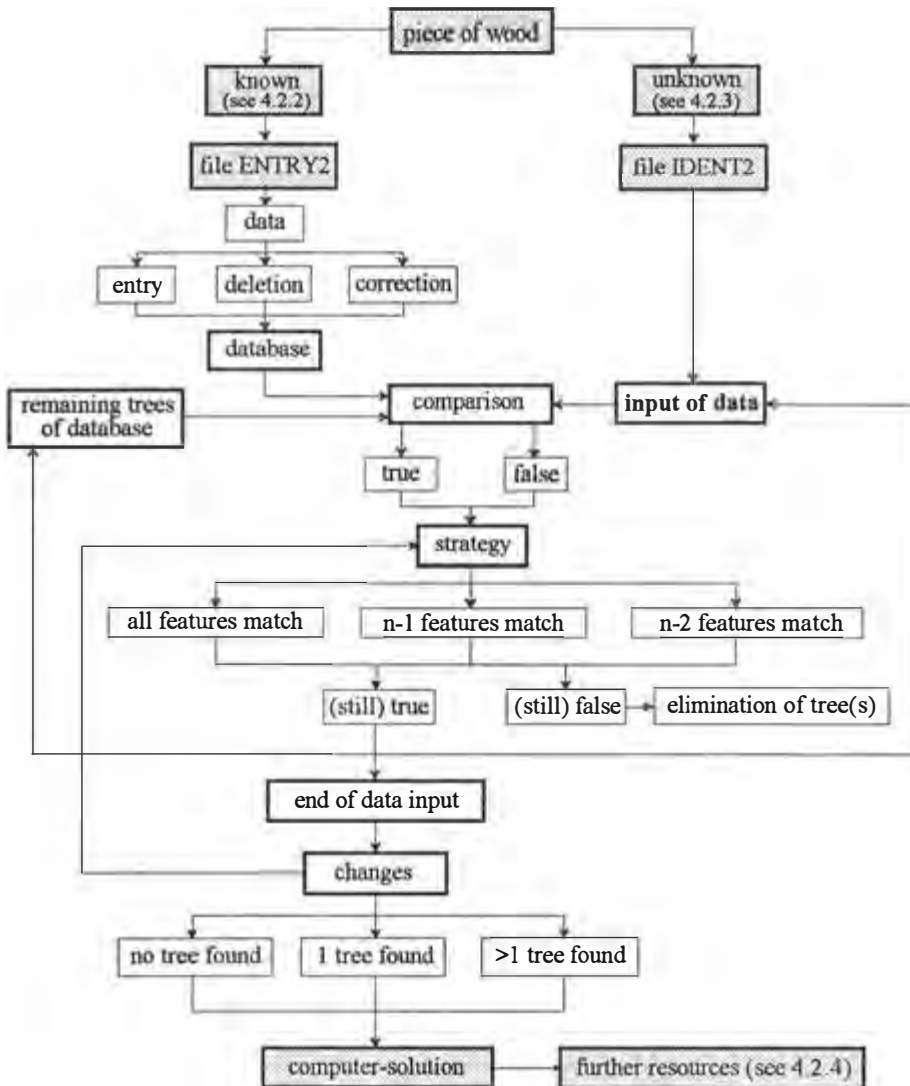
### 4.2.1 Information on the software

The software was programmed with the help of MODULA 2 with special emphasis placed on a user-friendly end-product. It runs on every computer desk station or lap-top which meet the minimum requirements of 640 kB RAM and MS DOS 3.0.

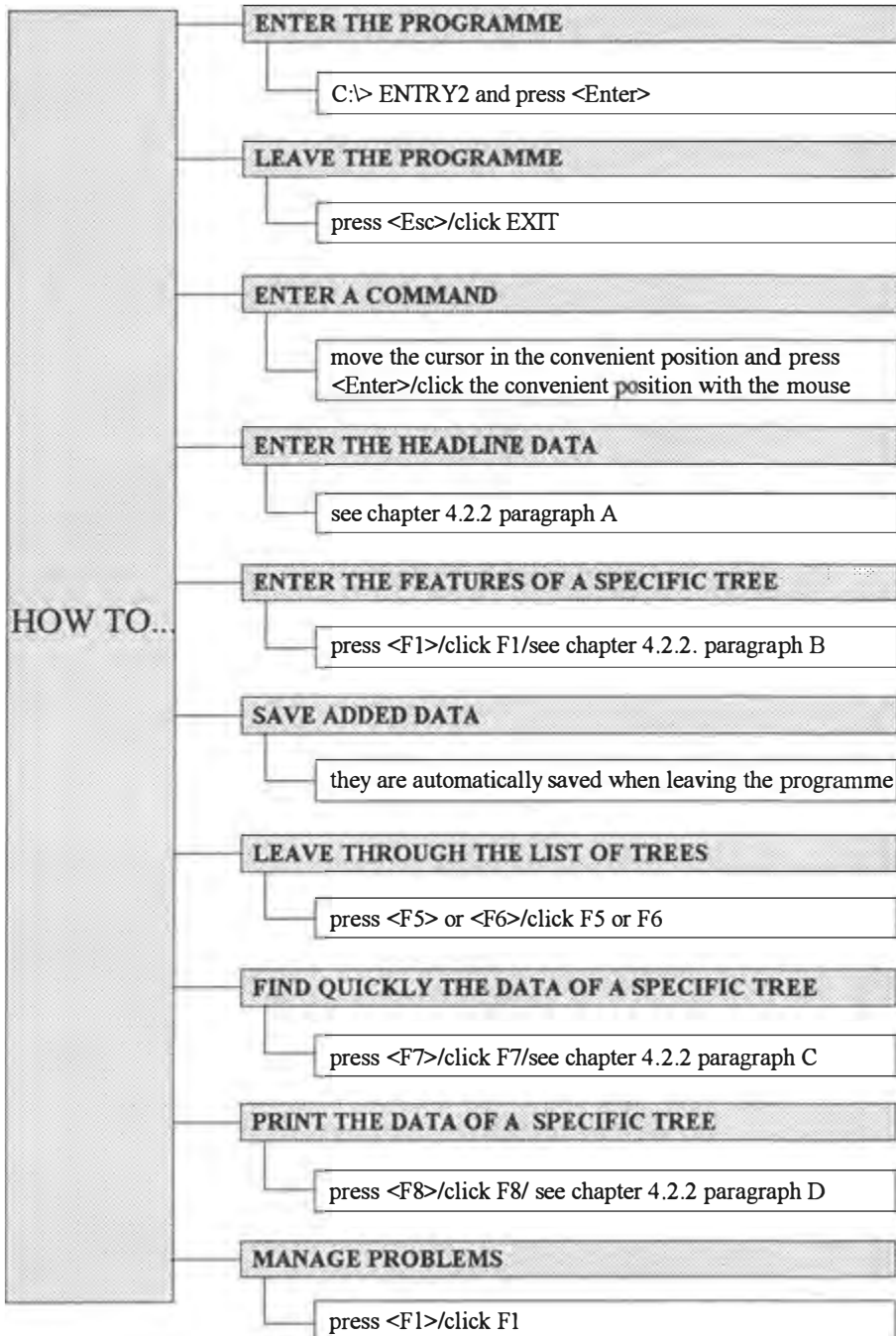
Function/flow-diagram

(the term "tree" is henceforth used for the name of a species)

**Flow-diagram of the computer-aided wood identification system UniWoods 2.0 SOFTWARE**



## 4.2.2 Data input for a known sample



**4.2.2 A How to enter the headline data**

Move the cursor to the position on top of the first page (the page number is indicated at the bottom on the left) or press <Home> or click the top of the frame with the mouse.

A new window appears in the upper part of the screen. There are four categories at your disposal: "species name", "family name", "vernacular name", "additional features".

```
species name      : 19 Couratari guianensis Aublet
family name       : Lecythidaceae
vernacular name   : Wadara
additional features: unpleasant, distinct odour

{v} 3 exclusively solitary
     4 solitary and radial multiples or clusters
     5 exclusively radial multiples or clusters
     6 radial multiples of one size
     7 radial multiples of different sizes
     8 radial multiples of 2 - 4 adjacent vessels
     9 radial multiples of > 4 adjacent vessels
    10 clusters of 2 - 4 vessels
    11 clusters of > 4 vessels
    12 tangential pattern
    13 diagonal pattern
** Vessel inclusions
{ } 14 no vessel content
{v} 15 tyloses present
{ } 16 organic inclusions present

page 1 of 7 — UniWoods 2.0 ————— Number of the tree: 26
```

"species name:" (Latin, genus and species) For example: <i>Couratari guianensis</i> Aublet A code or number can be given preparatory to the name which facilitates the search later. For example: 19	"family name:" (Latin) For example: <i>Lecythidaceae</i>
"vernacular name:" (Dialect, common name). For example: Wadara	"additional features:" The available lines can be used to list additional features which are not included in the standard list of features, or to make those that are included more precise. For example: unpleasant, distinct odour

**4.2.2 B How to enter the features of a specific tree**

Seven screen pages with a total of 95 features for each species stand at the user's disposal. The occurring features are entered.

EXIT Go to Tree F7    Next Tree F5    Previous Tree F6    Print F8    Help

```
3a Alexs leiopetala Sandw.            Halariballi
** Visibility of vessels
{v} 1 distinct to naked eye
     2 indistinct to naked eye
** Vessel arrangement
{v} 3 exclusively solitary
     4 solitary and radial multiples or clusters
     5 exclusively radial multiples or clusters
     6 radial multiples of one size
     7 radial multiples of different sizes
     8 radial multiples of 2 - 4 adjacent vessels
     9 radial multiples of > 4 adjacent vessels
{v} B 10 clusters of 2 - 4 vessels
     11 clusters of > 4 vessels
     12 tangential pattern
     13 diagonal pattern
** Vessel inclusions
{v} 14 no vessel content
     15 tyloses present
     16 organic inclusions present

page 1 of 7 — UniWoods 2.0 ————— Number of the tree: 4
```

Switch to another line:	<↑/↓>
Previous/next page of the tree on the screen:	<Page Up/Down> click with the mouse at the left frame of the window: - in the upper part: page up - in the lower part: page down
Switch to the headline/the last feature of a chosen tree in the mask:	<Home/End> click the top/bottom of the frame
Choose (A) or unchoose (B) a feature:	<.> click the appropriate feature key to the symbols used: ■ feature which is easy to determine ■■ feature which is more difficult to determine

To avoid wrong identification, only those features clearly visible from the wood sample should be selected. In case of uncertainty, do not enter a specific feature.

#### 4.2.2 C How to find quickly the data of a specific tree

This function is useful for greater leaps within the list of tree species because it saves leafing through pages and pages.

A new window appears which facilitates the search. There are three categories at your disposal: "Number and Species", "Family Name" and "Vernacular Name".

```
EXIT Go to Tree F7 Next Tree F5 Previous Tree F6 Print F8 Help
1 Abarema jupunba (Willd.) Britton & Killip
  Mimosaceae Huruasa
  ■ Visibility of vessels
  {✓} 1 distinct to naked eye
  { } 2 indistinct to naked eye
  Vessel arrangement
  {✓} 3 exclusively solitary
  { } 4
  { } 5
  {✓} 6
  { } 7
  {✓} 8
  {✓} 9 radial multiples of > 4 adjacent vessels
  { } 10 clusters of 2 - 4 vessels
  { } 11 clusters of > 4 vessels
  { } 12 tangential pattern
  { } 13 diagonal pattern
  ■ Vessel inclusions
  { } 14 no vessel content
  { } 15 tyloses present
  {✓} 16 organic inclusions present
page 1 of 7 — UniWoods 2.0 ————— Number of the tree: 1
```

Key to the symbols used: a typed "?" replaces one letter, a typed "\*" replaces one or more letters.

Example to search a tree: 29 *Goupia glabra* Aublet, Celastraceae, Kabukalli.  
This tree can be searched for example: (use either one, several or all categories)

"number and species:"	"family name:"	"vernacular name:"
29* <.> or *goupia* (or the full name) <.>	Celastraceae <.> (or to replace an unknown letter: ?elastraceae <.>)	Kabukalli <.>

In case of uncertainty or ignorance of a category press <.> to omit this line.

**4.2.2 D How to print the data of a specific tree**

A new window appears on the top right-hand side of the monitor. The required printout - either one or all trees - can be obtained.

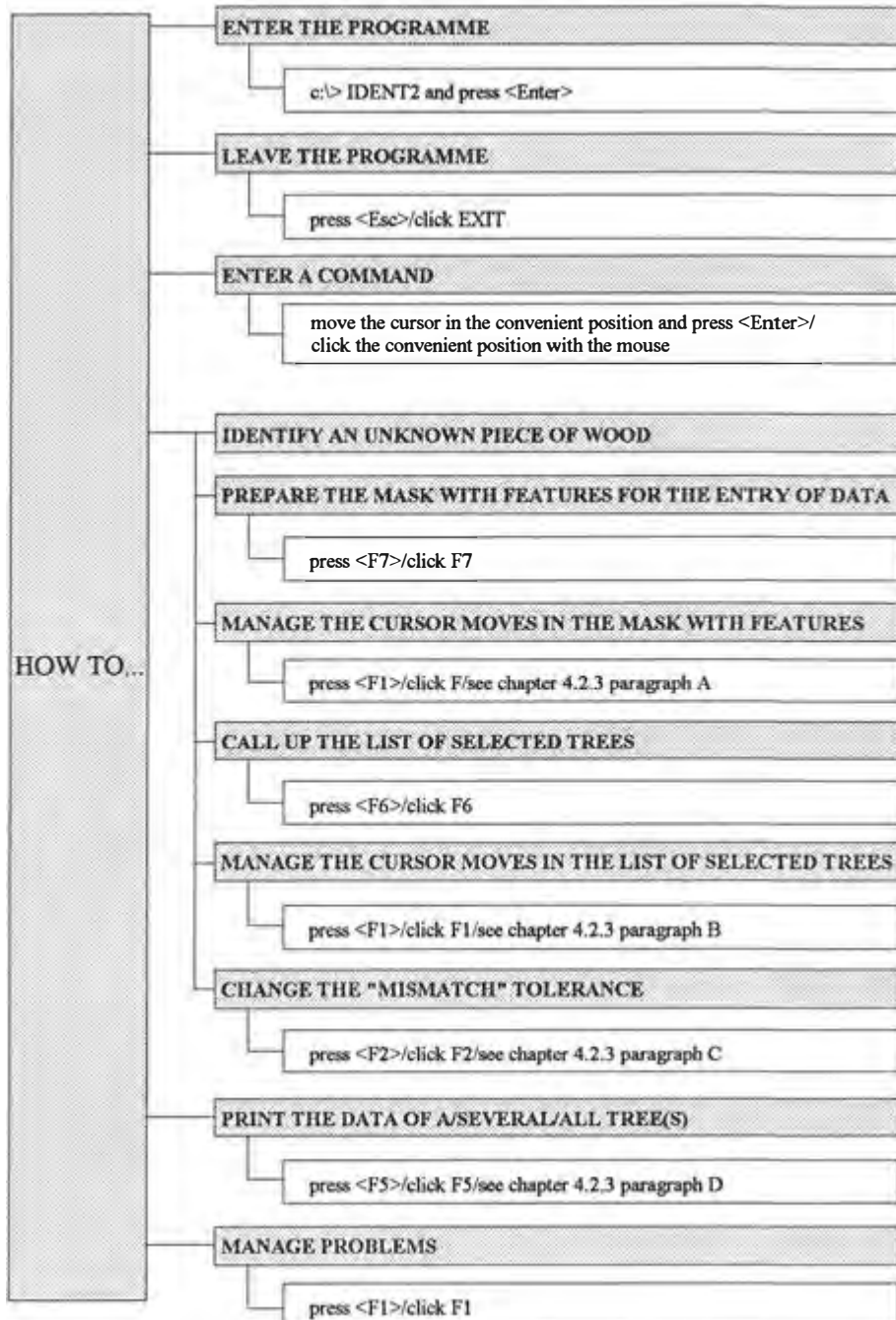
```
EXIT Go to Tree F7      Next Tree F5      Previous Tree F6      Print F8      Help
1  Abarema jupunba (Willd.) Britton & Killip
   Mimosaceae                      Huruasa
** Visibility of vessels
{v} 1  distinct to naked eye
    2  indistinct to naked eye
* Vessel arrangement
{v} 3  exclusively solitary
    4  solitary and radial multiples or clusters
    5  exclusively radial multiples or clusters
    6  radial multiples of one size
{v} 7  radial multiples of different sizes
{v} 8  radial multiples of 2 - 4 adjacent vessels
{v} 9  radial multiples of > 4 adjacent vessels
    10 clusters of 2 - 4 vessels
    11 clusters of > 4 vessels
    12 tangential pattern
    13 diagonal pattern
** Vessel inclusions
( ) 14 no vessel content
{ } 15 tyloses present
{v} 16 organic inclusions present

page 1 of 7 — UniWoods 2.0 _____ of the tree: 1
```

only this tree  
all trees

The printer must be loaded with the DOS-signs to ensure the correct printing of the keywords and symbols.

### 4.2.3 Data input for an unknown sample



**4.2.3 A How to manage the cursor moves in the mask with features**

The mask with features is on the left-hand side of the screen.

EXIT Clear Mask F7 Print F5 Search Tree F6 Strategy F2 Help

```

** Visibility of vessels
 1 distinct to naked eye
 2 indistinct to naked eye
Vessel arrangement
 3 exclusively solitary
 4 solitary and radial multiples or clusters
 5 exclusively radial multiples or clusters
 6 radial multiples of one size
 7 A radial multiples of different sizes
 8 radial multiples of 2 - 4 adjacent vessels
 9 B radial multiples of > 4 adjacent vessels
10 clusters of 2 - 4 vessels
11 clusters of > 4 vessels
12 tangential pattern
13 diagonal pattern
** Vessel inclusions
14 no vessel content
15 tyloses present
16 organic inclusions present
    
```

page 1 of 7 — UniWoods 2.0

Switch to another line of the same page:	<↑/↓>
Next page of the mask:	<Page Down> click the left lower part of the frame
Previous page of the mask:	<Page Up> click the left upper part of the frame
First feature:	<Home> click the top of the frame
Last feature:	<End> click the bottom of the frame
Select a feature:	<,> click the feature on (A)
Unselect a feature:	<,> click the feature off (B) key to the symbols used: ■ feature which is easy to determine ■ feature which is more difficult to determine

**4.2.3 B How to manage the cursor moves in the list of selected trees**

A window appears on the right-hand side of the screen.

EXIT Clear Mask F7 Print F5 Search Tree F6 Strategy F2 Help

```

3a Alexa leiopetala Sandw.
Papilionaceae Haiariballi
** Visibility of vessels
 1 distinct to naked eye
* Vessel arrangement
 4 solitary and radial multiples or clus
 7 radial multiples of different sizes
 9 radial multiples of > 4 adjacent vess
#10 clusters of 2 - 4 vessels
** Vessel inclusions
#14 no vessel content
 15 tyloses present
* Vessel diameter (mm)
 19 > 0.2 - 0.3
* Vessels and vessel groups per square mill
 21 0 - 2
    
```

About 27 features, you choosed 4  
but 2 features are not matching  
page 1 of 4 — UniWoods 2.0

Selected trees

- 1 Abarepa Jupunba (Willd.) Bri
- 2 Acosmium praeclarum (Sandw.)
- 3 Alexa imperatrix (Schomb.)
- 3a Alexa leiopetala Sandw.
- 4 Andira surinamensis (Bundt)
- 4a Andira inermis (Wright) DC.
- 5 Aniba hypoglauca Sandw.
- 6 Antonia bvata Pohl
- 9 Astronium ulei Mattick
- 10 Bucassa guianensis Aublet
- 10a Buchenavia tanshawai Exell &
- 11 Calophyllum lucidum Benth.
- 12 Carapa guianensis Aublet
- 12a Carapa procera A. DC.
- 13 Catostemma commune Sandw.
- 14 Catostemma fragrans Benth.
- 14a Catostemma hitsonii Sandw.
- 15 Cedrela odorata L.
- 16 Chlorocardium rodiei (Schom
- 17 Chrysophyllum posiferum (Eym

Call up the list of selected trees:	<F6> click F6
Switch from the mask with features to the list of selected trees or vice versa (necessary to enter the commands in the convenient window):	<Tab> click the right/left part of the screen
Switch to another tree:	<↑/↓> or <Page Up/Down> click the right upper/lower border of the frame or click a specific tree (the window on the left shows the features of the highlighted tree on the right) key to the symbols used: * is the selector for a corresponding keyword # is the selector for a non corresponding keyword
First/last tree:	<Home/End> click the top/bottom of the frame
Next page of features:	<Space> click the left frame of the window with the mask with features
Hide the list of selected trees:	<L> click the left frame of the window with the list of selected trees
Recall the list of selected trees:	<any key> click anywhere on the screen
Close the window on the right:	<F6> click F6

**4.2.3 C How to change the "mismatch" tolerance**

A window appears on the top right-hand side of the screen. Three categories are at your disposal: "all features match", "n-1 features match", "n-2 features match":

This function defines the mismatch tolerance which is taken into account by the comparison of the data from IDENT2 with those from ENTRY2.

```

EXIT  Clear Mask F7  Print F5  Search Tree F6  Strategy F2  Help
+ All features match
+ n-1 features match
+ n-2 features match
Br
{ } Visibility of vessels
1 distinct to naked eye
2 indistinct to naked eye
Vessel arrangement
3 exclusively solitary
4 solitary and radial multiples or c
5 exclusively radial multiples or cl
6 radial multiples of one size
7 radial multiples of different size
8 radial multiples of 2 - 4 adjacent
9 radial multiples of > 4 adjacent v
10 clusters of 2 - 4 vessels
11 clusters of > 4 vessels
12 tangential pattern
13 diagonal pattern
Vessel inclusions
{ } 14 no vessel content
15 tyloses present
} } 16 organic inclusions present

1 Ab
2 Ac
3 Alexa imperatricis (Schomb.)
3a Alexa leiopetala Sandw.
4 Andira surinamensis (Bondt)
4a Andira inermis (Wright) DC.
5 Aniba hypoglauca Sandw.
6 Antonia ovata Pohl
7 Aspidosperma cruentum Woods
7a Buchenavia fanshawei Exell
8 Aspidosperma vargasii A. DC.
9 Astronium ulei Mattick
10 Bagassa guianensis Aublet
11 Calophyllum lucidum Benth.
12 Carapa guianensis Aublet
12a Carapa procera A. DC.
13 Catostemma commune Sandw.
14 Catostemma fragrans Benth.
14a Catostemma altsonii Sandw.

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```

- "all features match": no mismatches are tolerated
- "n-1 features match": one mismatch is tolerated
- "n-2 features match": up to two mismatches are tolerated

- The strategy can be changed at any time and independently of the determination process.
- key for the strategy in action (in the above example: all features match)



**4.2.3 D How to print the data of one/several/all tree(s)**

A window appears in the middle of the top of the screen.

Four categories are at your disposal:

"show the keywords on print yes (no)", "print only this tree", "print all trees selected", "print all trees existing" (in the programme)

```

EXIT      Clear Mask F7      Print F5      Search Tree F6      Strategy F2      Help
7a  Aspidosperma album      show the keywords on print: yes
    Apocynaceae             print only this tree
** Visibility of vessel     print all trees selected
  1  distinct to nake       print all trees existing
  * Vessel arrangement
    3  exclusively solitary
    13 diagonal pattern
** Vessel inclusions
  15 tyloses present
  * Vessel diameter (mm)
    17 <= 0.1
  * Vessels and vessel groups per square mill
    23 6 - 10
    24 11 - 20

3a  Alexa leiopetala Sandw.
4   Andira surinamensis (Bondt)
4a  Andira inermis (Wright) DC.
5   Aniba hypoglauca Sandw.
6   Antonia ovata Pohl
7   Aspidosperma cruentum Woodson
7a  Aspidosperma album (Vahl) DC.
8   Aspidosperma yargasii A. DC.
9   Astronium ulei Mattick
10  Bagassa guianensis Aublet
75a Buchenavia fashawei Exell &
11  Calophyllum lucidum Benth.
12  Carapa guianensis Aublet
12a Carapa procera A. DC.
13  Catostemma commune Sandw.
14  Catostemma fragrans Benth.
14a Catostemma altsonii Sandw.

About 30 features, you choosed 0
page 1 of 4 — UniWoods 2.0

```

"show the keywords on print: yes (no)"	"print only this tree"
In connection with the features which follow them, the keywords have following meanings: * this feature coincides with the unknown sample # this feature does not coincide with the unknown sample (for hiding the keywords press <_> or click the command and vice versa)	This command can only be used if the cursor is in the activated window of the right-hand side of the screen (search tree F6) and a specific tree has been chosen. The printout contains the features of the highlighted tree.
"print all trees selected"	"print all trees existing" (in the programme)
This command prints all trees which at that time appear on the right-hand side of the screen together with their features.	This command prints all trees contained in the programme together with their features.

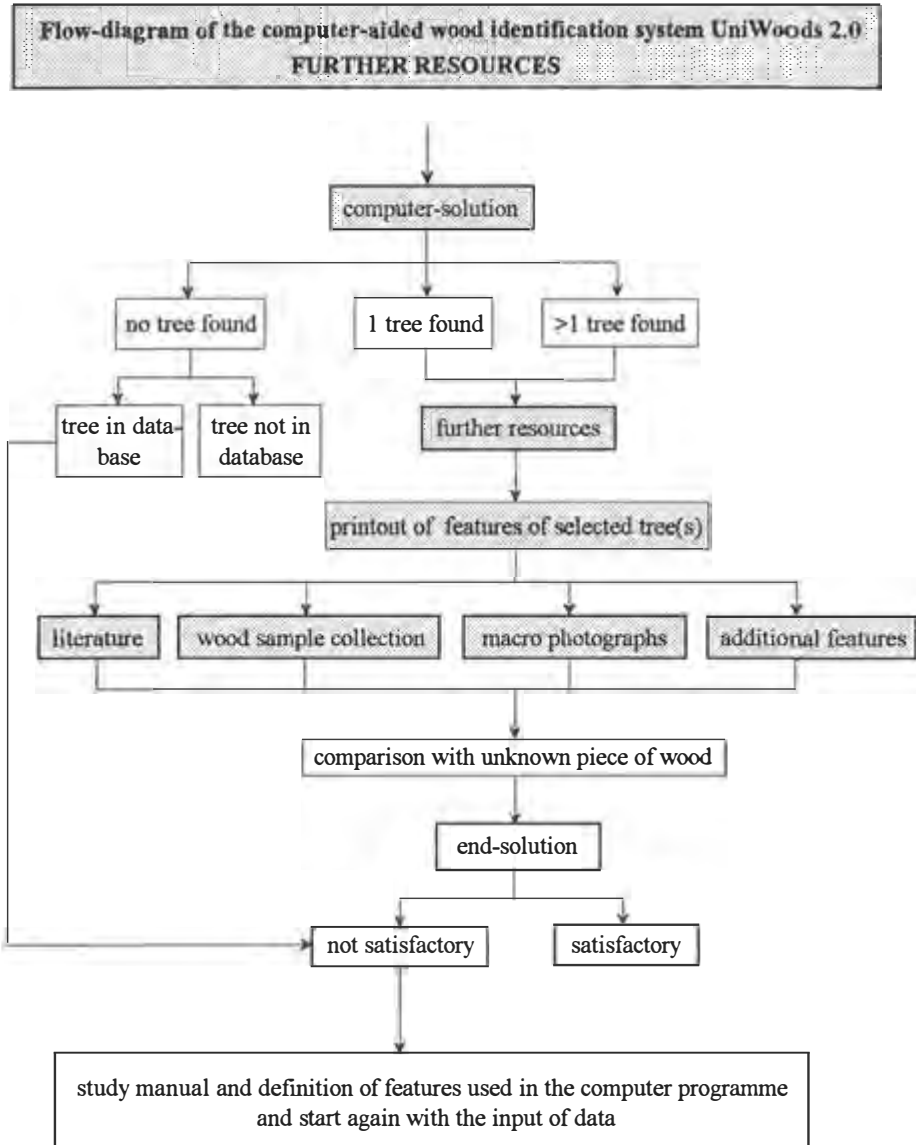
The printer must be loaded with the DOS-signs to ensure the correct printing of the keywords and symbols.

#### 4.2.4 Further resources

As a result of the search cycle, the computer proposes one or more species as a solution. In any case, the computer-solution is the basis of the end-solution.

Depending on the selected strategy, the proposed solution will have either exactly the same features as the wood sample, or it will be a solution within the given mismatch tolerance.

Neither the qualitative nor the quantitative range of the solution is definitive; they must be determined. Therefore the user needs further resources:



4.2.4	A	Printout of features of selected tree(s)
-------	---	--

The corresponding printouts are obtained with the commands "show the keywords on print: yes" and "print all trees selected". The unknown wood sample is then compared to the listed proposals (control). The same can be done by reading the information from the screen, but it is less easy to survey.

4.2.4	B	Additional features
-------	---	---------------------

Special features - if occurring - appear at the end of each list of features. They are a convenient resource for precise identification.

4.2.4	C	Macro photographs
-------	---	-------------------

The tree species proposal from the computer can also be visually compared with the unknown wood sample with the aid of the macrophotographs which are included in chapter 5.1.

4.2.4	D	Wood sample collection
-------	---	------------------------

The same can be done with a collection of wood samples which have been reliably identified, labelled and stored in a dust-free environment.

4.2.4	E	Literature
-------	---	------------

As only a limited selection of features is stored in the computer, additional specialized literature can be of help.

An adequate combination of computer-solution and further resources deliver a satisfactory identification (=end solution) for all practical purposes. Where this is unsuccessful, a microscopic examination of the wood becomes necessary - ideally with the help of an expert with special knowledge of wood anatomy.



## **5 DESCRIPTION BY SPECIES**

1 *Abarema jupunba* (Willd.) Britton & Killip

Huruasa

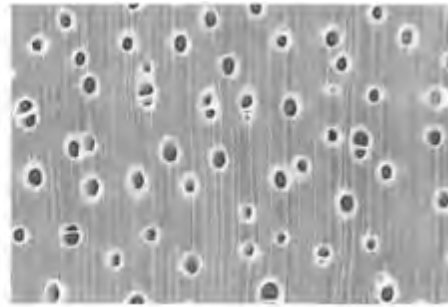
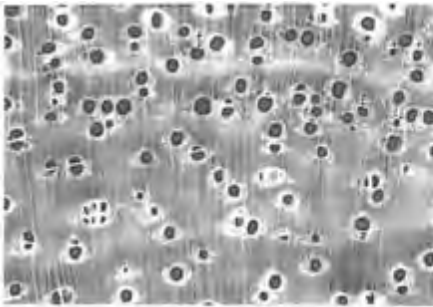
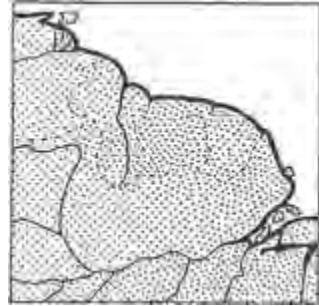
**Synonym:** *Pithecellobium jupunba* (Willd.) Urban

**Vernacular names:**

Huruasa (Ar), Klaipio (C), Kwatapuna (M), Kwatpain (W), Örukorong (Ak), Soapwood (Cr)

**Field characteristics and distribution:**

Tree -30 (-40) m tall, trunk -0.85 (-1.2) m in diameter. Occasional to frequent in (often secondary) seasonal forest and marsh forest. Occasional in Wallaba forest.



1 mm

**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of different sizes and of 2-4 and > 4 vessels. Inclusions present. Diameter generally medium to large. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, paratracheal vasicentric. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is 1/4 of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse to numerous rays per 5 mm, very low to low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

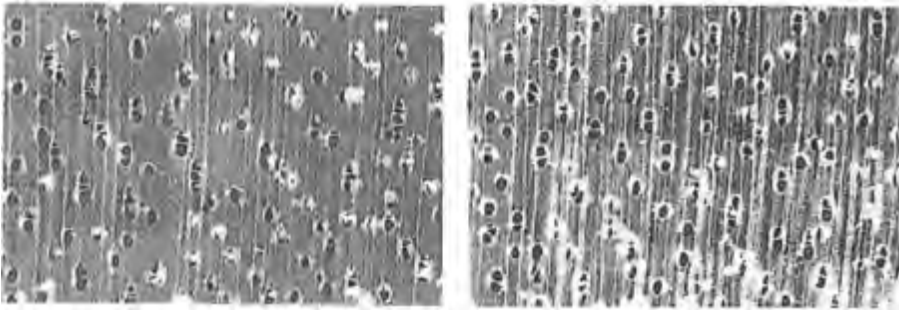
2 *Acosmium praeclarum* (Sandw.) Yakovlev

**Blackheart**

**Synonym:** *Sweetia praeclara* Sandw.

**Vernacular name:**  
Blackheart (Cr)

**Field characteristics and distribution:**  
Tree -35 m tall, trunk -0.45 m in diameter.  
Occasional to common in Wallaba forest, Mora forest, marsh forest and mixed forest. Occurring in central and north-central Guyana; only known from Guyana.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown (sometimes dark brown) and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Inclusions present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, scanty paratracheal, vasicentric and unilateral. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is 1/4 of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse rays per 5 mm, high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

3 *Alexa imperatricis* (Schomb.) Baillon

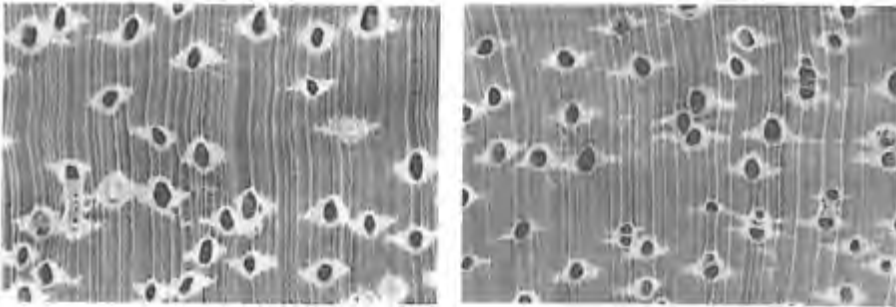
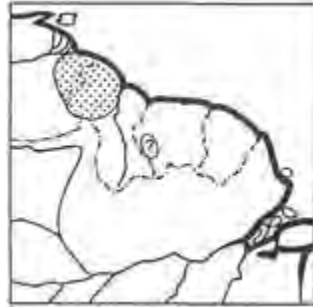
Haiariballi

**Vernacular names:**

Crook (Cr), Haiariballi (Ar), Kapai (Ak), Koatoi (Ak)

**Field characteristics and distribution:**

Tree 30-40 m tall, trunk -0.6 (-0.9) m in diameter. Locally dominant in mixed forest in north-west region, upper Mazaruni area and Pakaraima Mts.



1 mm

**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of different sizes and of 2-4 and >4 vessels. Diagonal pattern. Tyloses and inclusions present. Diameter generally medium to large. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, apotracheal diffuse-in-aggregates, paratracheal aliform and confluent. Parenchyma bands normally absent, very seldom of marginal type. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse rays per 5 mm, low to high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95



3a *Alexa leiopetala* Sandw.

Haiariballi

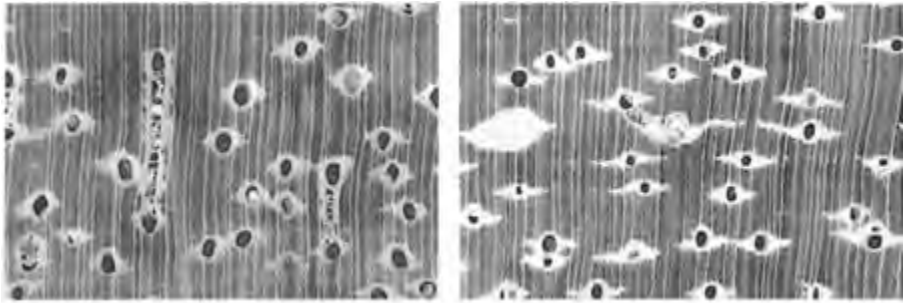
**Vernacular name:**

Haiariballi (Ar)

**Field characteristics and distribution:**

Tree -40 m tall, trunk -0.6 m in diameter.

Common near the interior, in Wallaba forest on white sand and in mixed forest on brown sand.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of different sizes and of >4 vessels. Tyloses present. Diameter generally large. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, apotracheal diffuse-in-aggregates, paratracheal aliform (very seldom confluent). Parenchyma bands normally absent, seldom of marginal type. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is 1/4 of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse rays per 5 mm, high.

**Numbers of features in the key:**

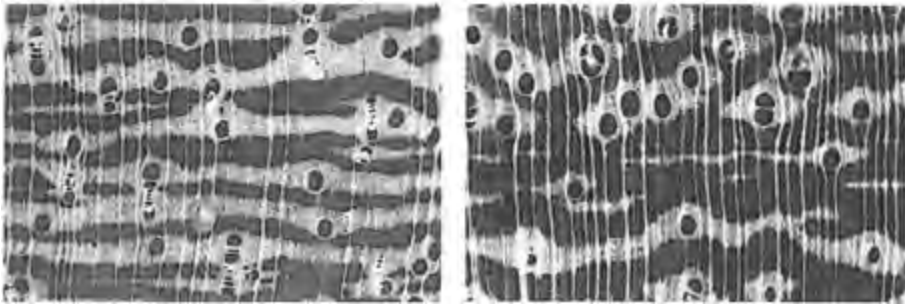
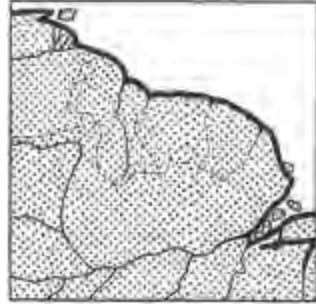
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Bat seed (Cr), Koraro (Ar), Maats (W)

**Field characteristics and distribution:**

Tree 20-35 m tall, trunk -0.7 (-1) m in diameter. Occasional in forests along rivers in north-central and north-eastern Guyana and the Rupununi district.



**Physical properties and structural features:**

Dull wood of medium density. Heartwood basically brown or shades of brown, red or shades of red with streaks and darker than the sapwood. Rays and axial parenchyma/fibres storied. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of different sizes and of 2-4 and sometimes >4 vessels. Diagonal pattern. Inclusions present. Diameter generally medium to large. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, paratracheal aliform and confluent, banded marginal. Wide parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands as wide as the fibre tissue bands or even wider. **Proportion of ground tissue fibres** small to medium. **Rays** distinct to naked eye. The width compared to the vessels is ¼ to of vessel-size smaller than half of vessel-size. Rays narrow. Sparse rays per 5 mm, low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

4a *Andira inermis* (Wright) DC.

Koraro

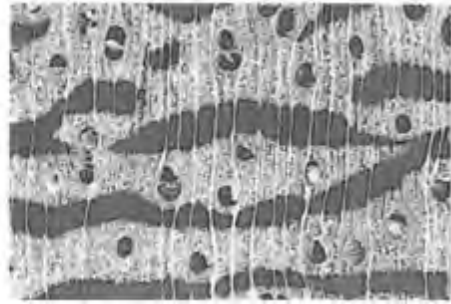
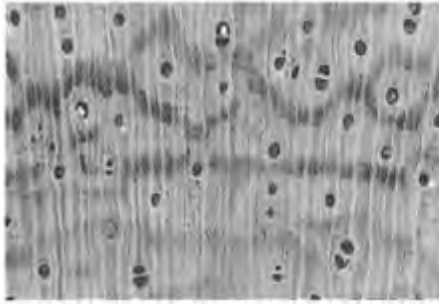
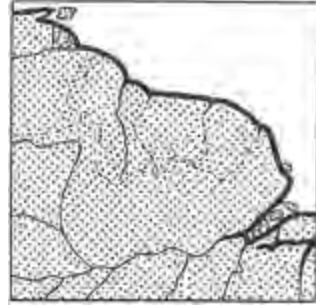
**Vernacular name:**

Koraro (Ar)

**Field characteristics and distribution:**

Tree -30 m tall, trunk -0.9 m in diameter.

Mainly occurring along the coastal plain, in swamp and marsh forest.



1 mm

**Physical properties and structural features:**

Dull wood of low density. Heartwood basically brown or shades of brown with streaks and darker than the sapwood. Axial parenchyma/fibres storied. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 and sometimes >4 vessels. Tyloses present. Diameter generally medium to large. Medium to numerous solitary vessels. **Axial parenchyma** distinct to naked eye, paratracheal aliform and confluent, banded irregular. Wide parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands as wide as the fibre tissue bands or even wider. **Proportion of ground tissue fibres** small to medium. **Rays** distinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than the vessels. Rays narrow. Sparse to numerous rays per 5 mm, low to high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

5 *Aniba hypoglauca* Sandw.

Yellow silverballi

**Synonym:** *Aniba ovalifolia* Kosterm.

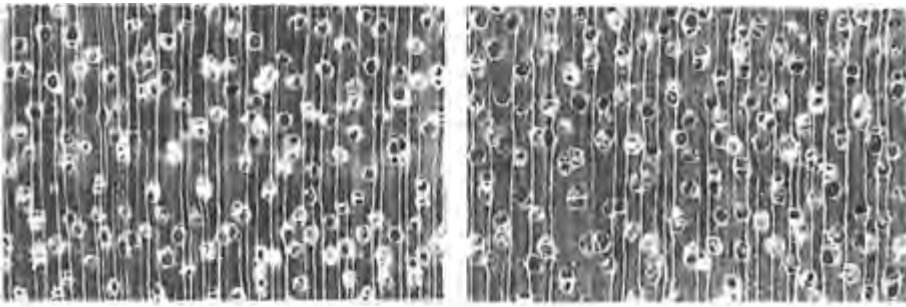
**Vernacular names:**

Kawioi (Ak), Kurero silverballi (Cr), Yellow silverballi (Cr)

**Field characteristics and distribution:**

Tree -30 m tall, trunk -0.75 m in diameter.

In Wallaba forest and in mixed forest. Occurring near the interior.



1 mm

**Physical properties and structural features:**

Lustrous wood of low density. Heartwood basically brown or shades of brown and darker than the sapwood. Distinct, pleasant, aromatic odour. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally medium. Medium solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse rays per 5 mm, low to high.

**Additional feature:**

Oil or mucilage cells present.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

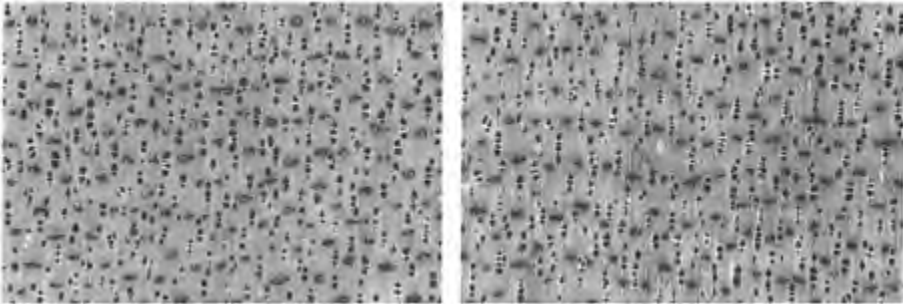
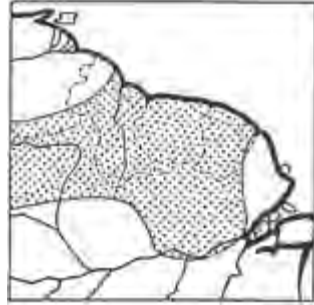
**Vernacular names:**

Inyak (W), Tamanokware (C)

**Field characteristics and distribution:**

Tree -25 m tall, trunk -0.45 m in diameter.

Tree of mixed, riverine forest on brown sand, occurring in east-central Guyana, but also occurring as a shrub in savannas in the Rupununi district.



1 mm

**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically white to grey and no difference between heart- and sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** indistinct to naked eye. Somewhat sparse to fairly numerous. Arrangement solitary and mainly radial multiples or clusters. Radial multiples of different sizes and of 2-4 and >4 vessels. Diameter generally small. Few to medium solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Numerous to extremely numerous rays per 5 mm, very low to low.

**Additional feature:**

Islands of included phloem present.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

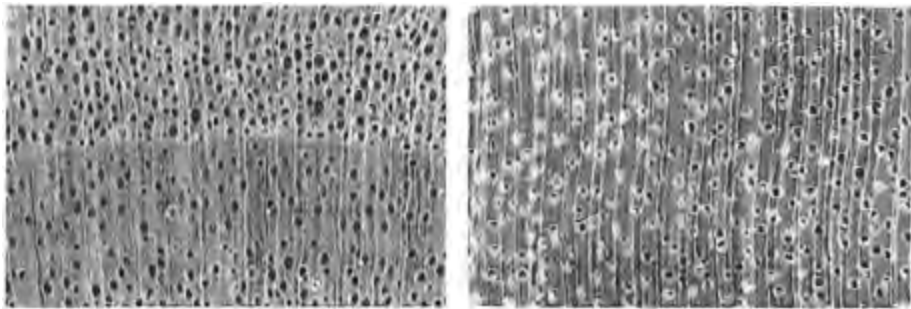
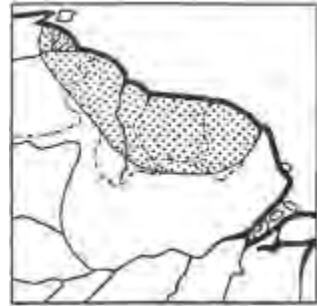
**Vernacular name:**

Shibadan (Ar)

**Field characteristics and distribution:**

Tree -35 m tall, trunk -0.6 m in diameter.

An occasional to common species in mixed forest in north-central and north-eastern Guyana and the Kanuku Mts.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown, darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Fairly numerous. Arrangement exclusively solitary, with diagonal pattern. Inclusions present. Diameter generally small to medium. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, scanty paratracheal vasicentric. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is  $\frac{1}{4}$  of vessel-size to smaller than half of vessel-size. Rays narrow. Numerous rays per 5 mm, low to high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

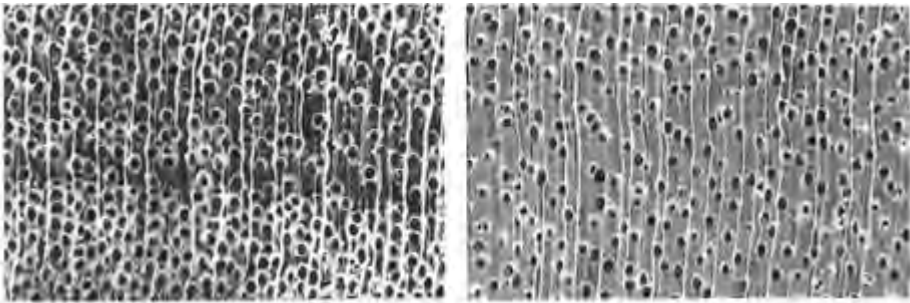
7a *Aspidosperma album* (Vahl) Benoist

Shibadan

**Vernacular name:**  
Shibadan (Ar)



**Field characteristics and distribution:**  
Tree 40 m tall, trunk -0.8 (-1) m in diameter.  
Widely distributed. Locally frequent in Wallaba, mixed, and seasonal forest on sandy soil.



1 mm

**Physical properties and structural features:**

Dull wood of medium density. Heartwood basically brown or shades of brown, darker than the sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Somewhat sparse to fairly numerous. Arrangement exclusively solitary with diagonal pattern. Tyloses present. Diameter generally small. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, paratracheal vasicentric and unilateral. **Proportion of ground tissue fibres** medium to large. **Rays** distinct to naked eye. The width compared to the vessels is  $\frac{1}{4}$  of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse to numerous rays per 5 mm, low to high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

8 *Aspidosperma vargasii* A. DC.

Currywood

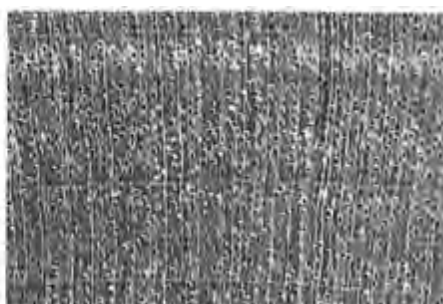
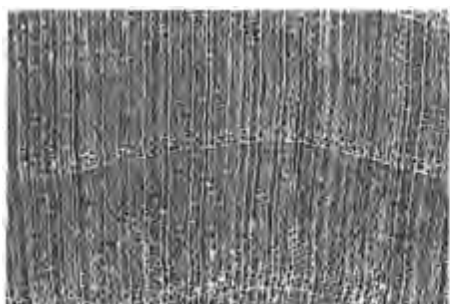
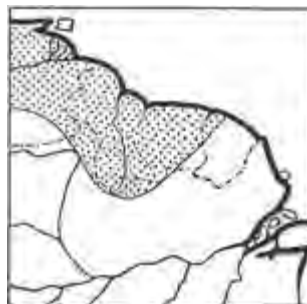
**Vernacular name:**

Currywood (Cr), Shibadan (Ar)

**Field characteristics and distribution:**

Tree -35 m tall, trunk -0.7 m in diameter.

Occurring in mixed forest in north-central Guyana and the Kanuku Mts.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown, darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** indistinct to naked eye. Extremely numerous. Arrangement exclusively solitary. Diameter generally small. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium. **Rays** indistinct to naked eye. The width compared to the vessels is  $\frac{1}{4}$  of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse to numerous rays per 5 mm, very low to low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

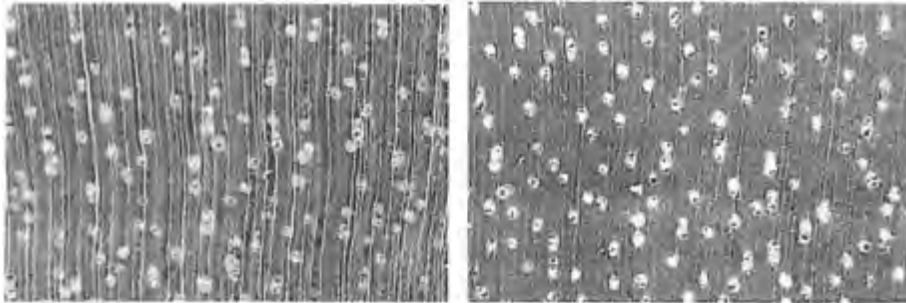
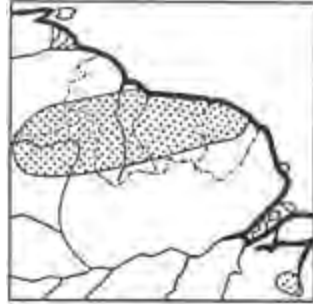


**Vernacular names:**

Bastard purpleheart (Cr), Bauwana (W), Bauwaua (M),

**Field characteristics and distribution:**

Tree -40 m tall, trunk -0.6 m in diameter.  
Occurring in eastern Guyana and the Rupununi district.



1 mm

**Physical properties and structural features:**

Lustrous wood of high density. Heartwood basically brown or shades of brown, darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse to somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses and inclusions present. Diameter generally medium. Medium solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse to numerous rays per 5 mm, low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

10 *Bagassa guianensis* Aublet

Cow-wood

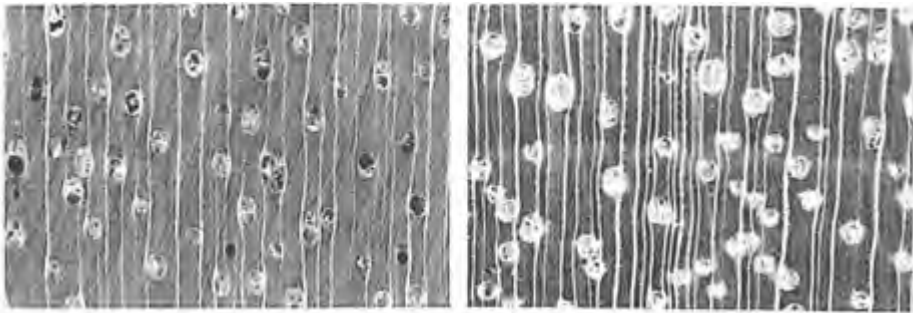
**Synonym:** *Bagassa tiliifolia* (Hamilton) Benoist

**Vernacular names:**

Cow-wood (Cr), Katowar (W), Tuwne (M), Yawahudan (Ar)

**Field characteristics and distribution:**

Tree -35 (-45) m tall, trunk -0.55 (-0.95) m in diameter.  
Occasional in mixed forest on brown sand and in marsh forest.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown, yellow or shades of yellow, darker than the sapwood and sometimes with streaks. Growth ring boundaries indistinct or absent.

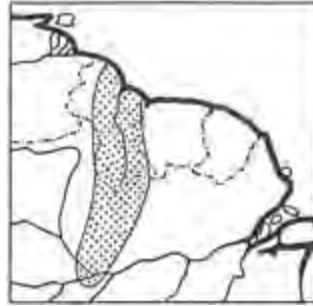
**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement mainly solitary and radial multiples or clusters, radial multiples both of the same and of different sizes with 2-4 vessels. Tyloses present. Diameter generally medium to large. Numerous solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Sparse rays per 5 mm, low to high.

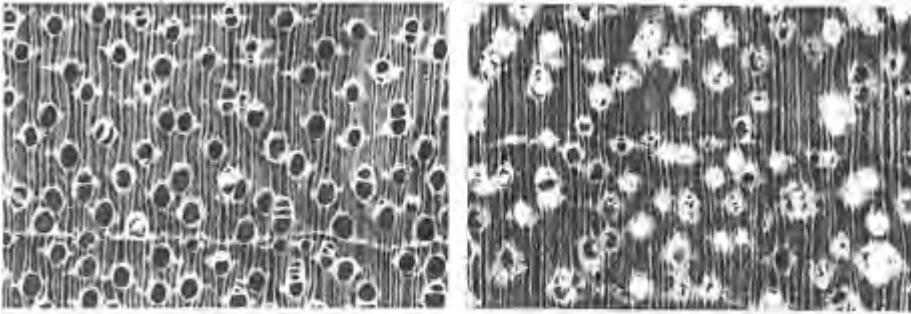
**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular name:**  
Fukadi (Ar)



**Field characteristics and distribution:**  
Tree -30 (-50) m tall, trunk -0.45 (-0.7) m in diameter.  
Widely distributed. Occasional in mixed, Mora, and river-ine forest on brown sand or sandy loam.



1 mm

**Physical properties and structural features:**  
Lustrous wood of medium density. Heartwood basically brown or shades of brown, sometimes darker than sapwood, sometimes without any difference to the sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**  
**Vessels** distinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of 2-4 vessels of the same size. Tyloses present. Diameter generally small to medium. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, paratracheal aliform and banded marginal. Narrow parenchyma bands. Large distance between the parenchyma bands. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. There are numerous rays per 5 mm, low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

11 *Calophyllum lucidum* Benth.

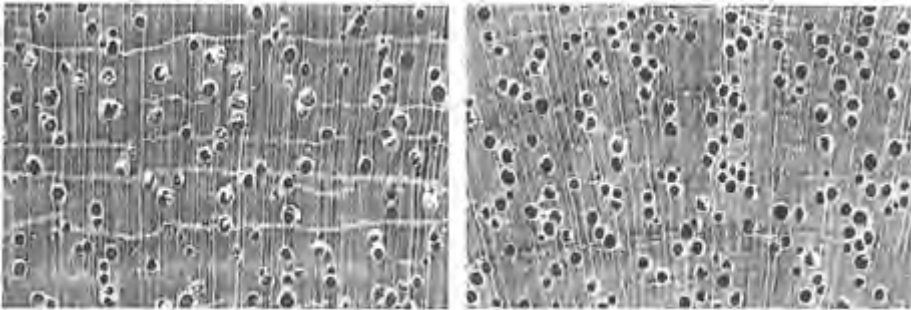
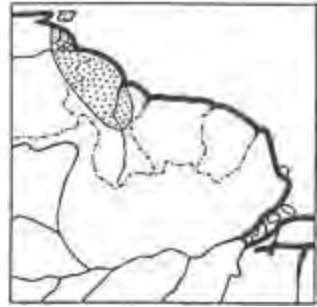
Kurahara

**Vernacular names:**

Kopó (Ak), Kurahara (Ar), Marawaro (Ak), Serena (M), Watschir (W)

**Field characteristics and distribution:**

Tree -35 (-45) m tall, trunk -0.8 (-1.8) m in diameter. Occasional in swamp forest and Wallaba forest near the interior, southeastern Guyana and the Kanuku Mts.



1 mm

**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically brown or shades of brown. and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** mostly indistinct to naked eye. Sparse to somewhat sparse. Arrangement exclusively solitary and clusters of 2-4 vessels. Diagonal pattern. Tyloses present. Diameter generally small to medium. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, banded irregular. Narrow parenchyma bands. Distance between the parenchyma bands sometimes small, sometimes large. Parenchyma bands smaller than the fibre tissue bands.

**Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Numerous rays per 5 mm, low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

## 12 *Carapa guianensis* Aublet

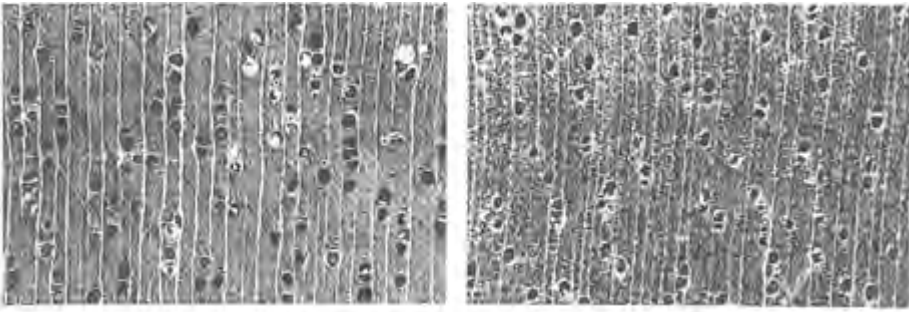
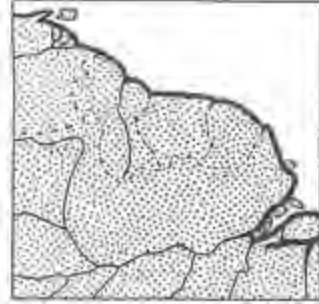
## Crabwood

### Vernacular names:

Crabwood (Cr), Karaba (Ar, P, Ak), , Karapa-yek (Ak), Karapai (Ak)

### Field characteristics and distribution:

Tree -35 (-55) m tall, trunk -0.95 (-1.8) m in diameter. Abundant in Mora forest. Frequent to locally common in marsh forest and riverine forest. Widely distributed near the interior.



1 mm

### Physical properties and structural features:

Lustrous wood of medium density. Heartwood basically brown or shades of brown, copper-coloured or shades of copper and darker than the sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

### Anatomical features:

**Vessels** distinct to naked eye. Sparse to somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses and inclusions present. Diameter generally small to medium. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, apotracheal diffuse, sometimes diffuse-in-aggregates, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** distinct or indistinct to naked eye. The width compared to the vessels is  $\frac{1}{4}$  of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse to numerous rays per 5 mm, high to very high.

### Numbers of features in the key:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

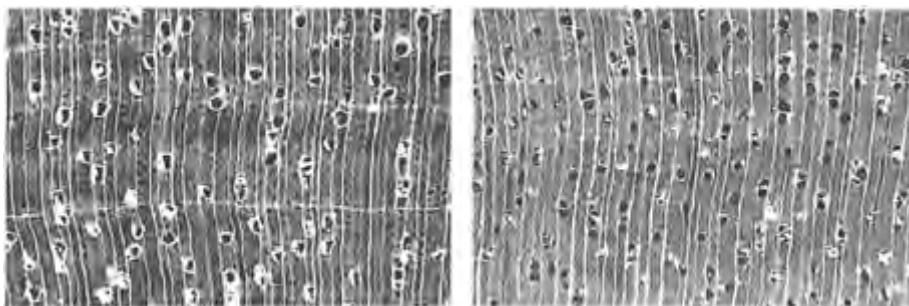
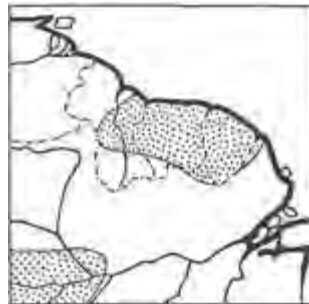
12a *Carapa procera* A. DC.

Crabwood

**Vernacular name:**  
Crabwood (Cr)

**Field characteristics and distribution:**

Tree -30 m tall, trunk -0.65 m in diameter.  
Locally frequent in central Guyana, in Mora forest and mixed forest on sandy or loamy soil.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Sparse to somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of different sizes and of 2-4 vessels. Tyloses and inclusions present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Numerous rays per 5 mm, low to high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

13 *Catostemma commune* Sandw.

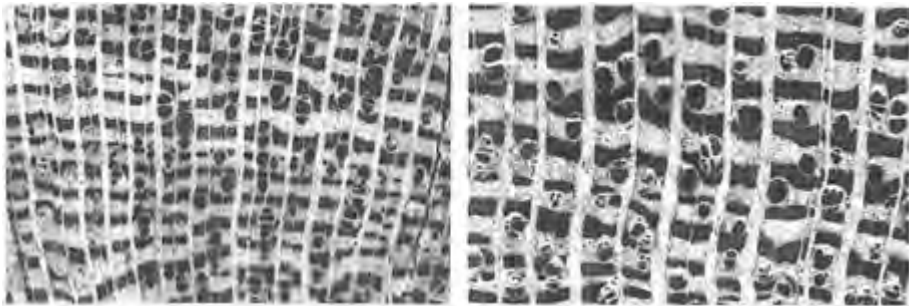
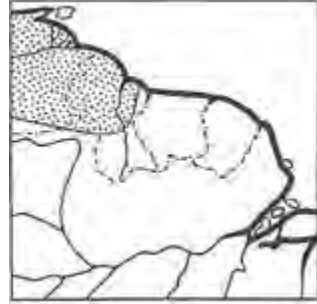
Common baromalli

**Vernacular names:**

Baramanni (Cr), Baromalli (Ar), Common baromalli (Cr), Katama (Ak), Paku (An), Simana (Ak)

**Field characteristics and distribution:**

Tree -45 (-50) m tall, trunk -70 (-1.5) m in diameter. Frequent to abundant in mixed forest and Mora forest. Occurs principally in the Essequibo and Cuyuni River basins.



1 mm

**Physical properties and structural features:**

Dull wood of low to medium density. Heartwood basically brown or shades of brown, without any difference to the sapwood. Axial parenchyma/fibres storied. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally medium to large. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, banded irregular. Parenchyma bands medium to wide. Distance between the parenchyma bands small. Parenchyma bands as wide as the fibre tissue bands or even wider. **Proportion of ground tissue fibres** small to medium. **Rays** distinct to naked eye. The width compared to the vessels is half of vessel-size to as large as the vessels or even larger. Rays medium. Extremely sparse to sparse rays per 5 mm, low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

14 *Catostemma fragrans* Benth.

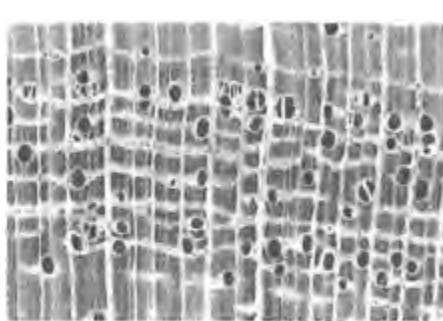
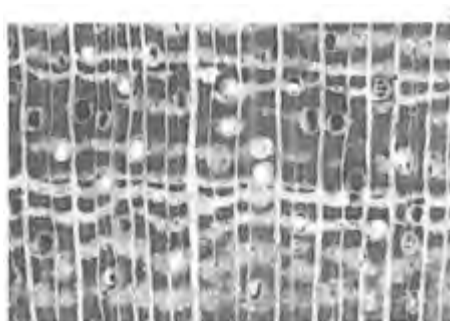
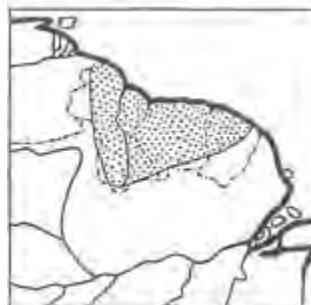
Sand baromalli

**Vernacular names:**

Adarouna (Ar), Baramanni (Cr), Baromalli (Ar), Kamatana (M), Koron (W), Paku (An), Sand baromalli (Cr), Simana (Ak)

**Field characteristics and distribution:**

Tree -30 (-35) m tall, trunk -0.5 (-1) m in diameter. Occasional to frequent in Wallaba forest on white sand and in evergreen seasonal forest. Widely distributed.



1 mm

**Physical properties and structural features:**

Dull wood of medium density. Heartwood basically brown or shades of brown, yellow or shades of yellow, sometimes even with streaks and without any difference to the sapwood. Axial parenchyma/fibres storied. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse. Arrangement solitary and radial multiples of the same size and of 2-4 vessels. Inclusions present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, apotracheal diffuse, paratracheal vasicentric and aliform, banded irregular. Width of parenchyma bands narrow to medium. Distance between the parenchyma bands small. Parenchyma bands sometimes smaller than the fibre tissue bands, sometimes as wide as the fibre tissue bands or even wider. **Proportion of ground tissue fibres** medium to large. **Rays** distinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than the vessels. Rays narrow. Sparse rays per 5 mm, very high.

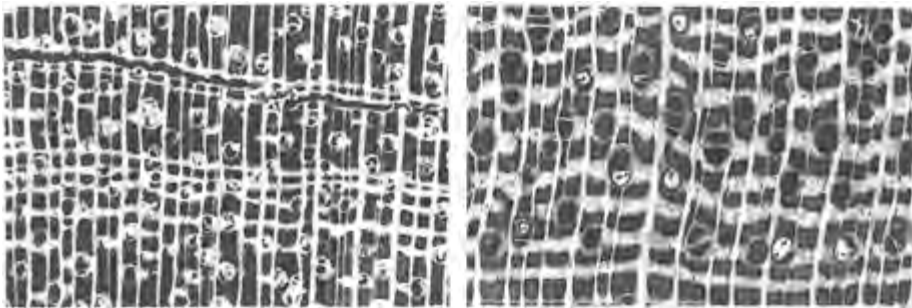
**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95



**Vernacular name:**  
Baromalli (Ar)

**Field characteristics and distribution:**  
Tree -45 m tall, trunk -0.6 m in diameter.  
Frequent to common in the Essequibo-Mazaruni divide, in mixed and Wallaba forest on sandy soil.



1 mm

**Physical properties and structural features:**  
Dull wood of medium density. Heartwood basically brown or shades of brown, sometimes even white to grey. Growth ring boundaries indistinct or absent.

**Anatomical features:**  
**Vessels** sometimes distinct, sometimes indistinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter small to large. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, banded scalariform, marginal and sometimes irregular. Width of parenchyma bands narrow to medium. Distance between the parenchyma bands small to large. Parenchyma bands smaller than the fibre tissue bands or as wide as the fibre tissue bands or even wider. **Proportion of ground tissue fibres** medium to large. **Rays** distinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow to medium. Sparse rays per 5 mm, very high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

15 *Cedrela odorata* L.

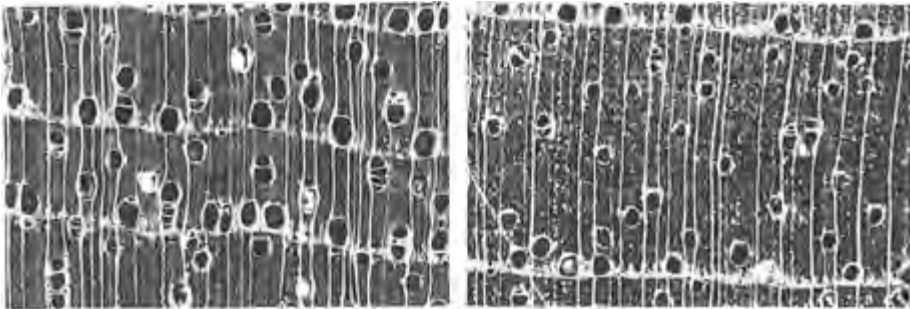
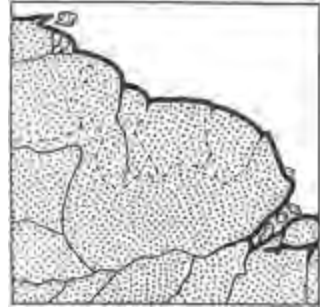
Red cedar

**Vernacular names:**

Akuyari (Ar), Atoreb (W), Koperi (Ak), Kurana (An), Parank (W), Paranka (M), Red cedar (Cr)

**Field characteristics and distribution:**

Tree -40 (-45) m tall, trunk -1.0 (-1.8) m in diameter. Rare to occasional in Mora forest, seasonal forest and in mixed forest. Occurring throughout the country.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown, copper-coloured or shades of copper and darker than the sapwood. Distinct cedar odour. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses and inclusions present. Diameter generally medium to large. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Extremely sparse to sparse rays per 5 mm, low.

**Additional feature:**

Occasional traumatic canals.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

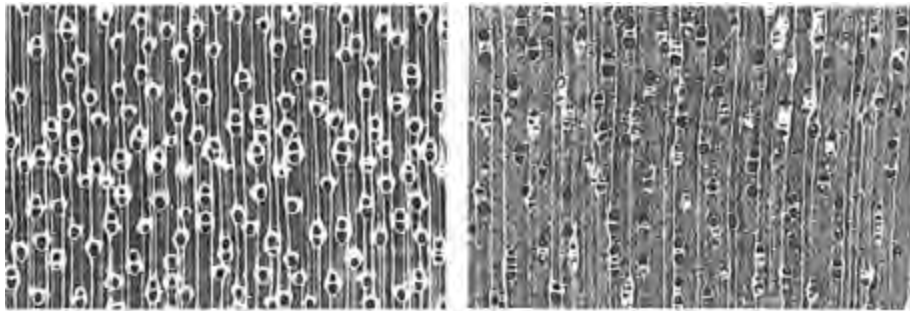
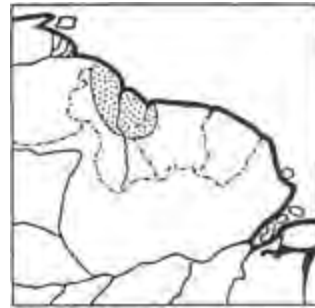
16 *Chlorocardium rodiei*  
(Schomb.) Rohwer, Richter & van der Werff

Greenheart

**Synonym:** *Ocotea rodiei* (Schomb.) Mez  
(usually misspelled "rodiaei")

**Vernacular names:**  
Bibiro/Biburu (Ar), Cogwood (Cr), Greenheart (Cr), Kut (Ak),  
Rora(-yek) (Ak), Sipiri (An), Sipu (C)

**Field characteristics and distribution:**  
Tree -45 (-53) m tall, trunk -0.6 (-1) m in diameter.  
Frequent in Greenheart forest on light sandy-loam soils.  
Occasional in Mora forest. Rare in Wallaba forest. Widely  
distributed, but rare in north-west-region.



1 mm

**Physical properties and structural features:**

Dull wood of high density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Sparse to somewhat sparse. Arrangement solitary and radial multiples or clusters, radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally small to medium. Medium solitary vessels. **Axial parenchyma** indistinct to naked eye, scanty paratracheal vasicentric and unilateral. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is  $\frac{1}{4}$  of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse to numerous rays per 5 mm, low to high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

17 *Chrysophyllum pomiferum*  
(Eyma) Penn.

Limonaballi/Paripiballi

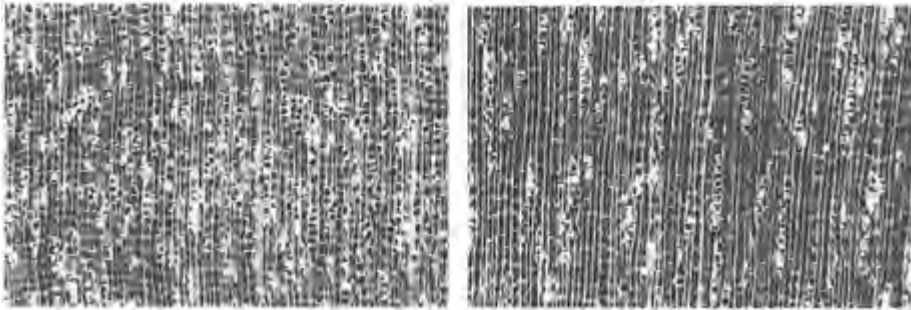
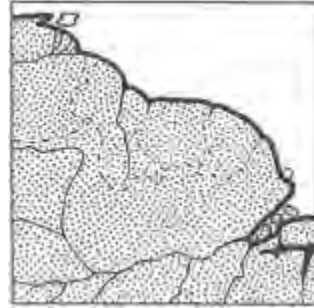
**Synonym:** *Achrouteria pomifera* Eyma

**Vernacular names:**

Aknon (Ak), Kwikpa (Ak), Limonaballi (Ar), Paripiballi (Ar)

**Field characteristics and distribution:**

Tree -40 m tall, trunk -0.9 m in diameter.  
Occasional to locally frequent in Morabukea and Green-heart forest. Found near the interior and Pakaraima Mts.



1 mm

**Physical properties and structural features:**

Dull wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** indistinct to naked eye. Fairly numerous to numerous. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 and >4 vessels. Diameter generally small. Few solitary vessels. **Axial parenchyma** indistinct to naked eye, banded reticulate. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Extremely numerous rays per 5 mm, low to high.

**Numbers of features in the key:**

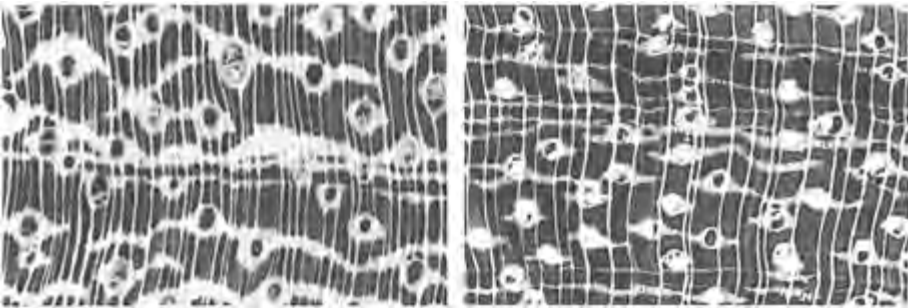
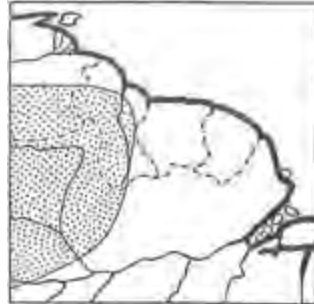
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Aromata (Ar), Kauwi (Ak), Koreko (C), Mutuwali (Ak)

**Field characteristics and distribution:**

Tree 20-30 m tall, trunk -0.5 (-0.6) m in diameter. Locally frequent in mixed forest, in the further near interior and Rupununi district.



1 mm

**Physical properties and structural features:**

Dull wood of medium to high density. Heartwood basically brown or shades of brown and darker than the sapwood, sometimes with streaks. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Diameter generally medium to large. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, apotracheal diffuse-in-aggregates, paratracheal aliform and confluent, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Numerous rays per 5 mm low to high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

18a *Clathrotropis brachypetala* (Tul.) Kleinh.

Aromata

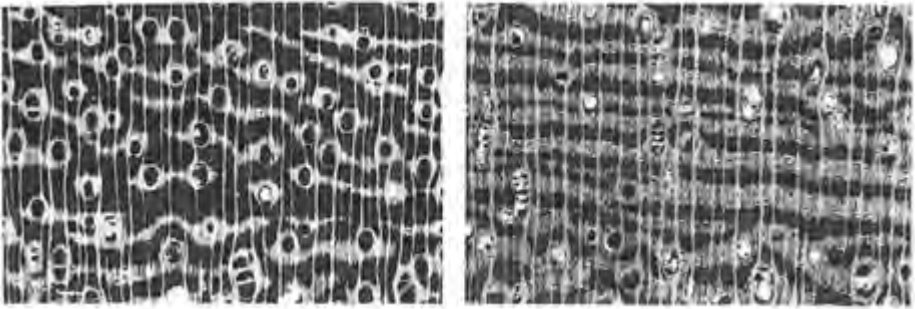
**Vernacular name:**

Aromata (Ar)

**Field characteristics and distribution:**

Tree -30 m tall, trunk 0.1 (-0.4) m in diameter.

Widely distributed. Frequent to common in Mora, marsh, and mixed forest on sand or sandy loam, particularly along creeks.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood, sometimes with streaks. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. No vessel content. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, paratracheal aliform and confluent, banded irregular. Medium parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands or as wide as the fibre tissue bands or even wider. **Proportion of ground tissue fibres** small to medium. **Proportion of ground tissue fibres** small to medium. **Rays** indistinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse to numerous rays per 5 mm, low to high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

19 *Couratari guianensis* Aublet

Wadara

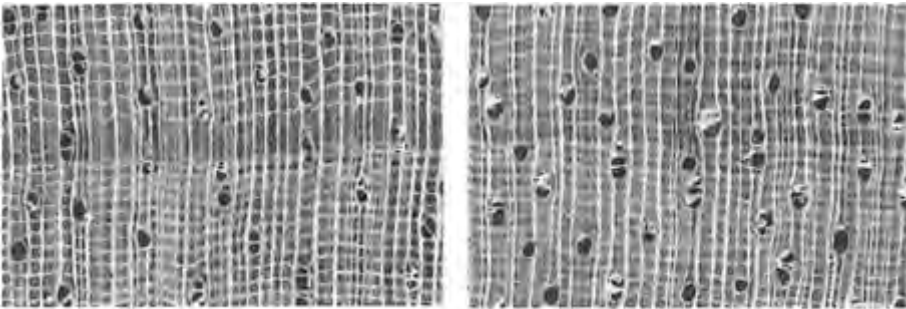
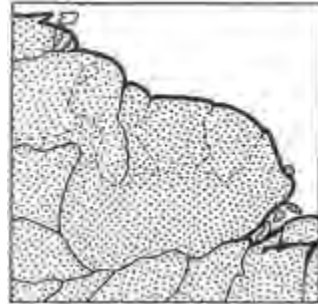
**Synonym:** *Couratari pulchra* Sandw.

**Vernacular names:**

Fine-leaf wadara (Cr), Irimariye (M), Irimiyar (W), Mari-mari (Wr), Urimari (C), Wadara (Ar), Waranaka (Ak)

**Field characteristics and distribution:**

Tree -50 m tall, trunk -0.80 m in diameter.  
Occasional in seasonal and mixed forest, sometimes in marsh forest often as emergents. Widely distributed.



1 mm

**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Distinct, unpleasant odour. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally medium. Medium solitary vessels. **Axial parenchyma** indistinct to naked eye, banded reticulate. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small to medium. **Rays** sometimes distinct sometimes indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Numerous rays per 5 mm, high to very high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

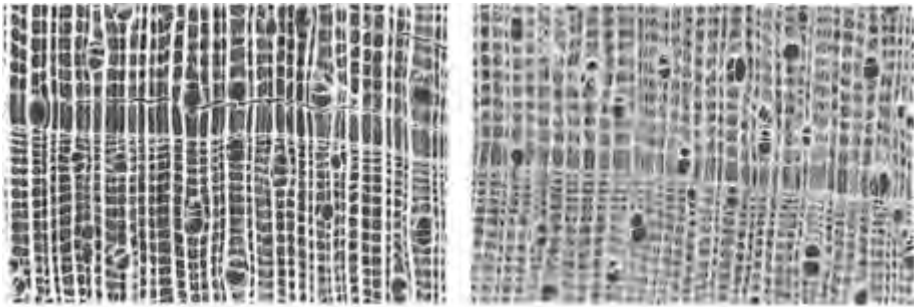
19a *Couratari gloriosa* Sandw.

Wadara

**Vernacular name:**  
Wadara (Ar)



**Field characteristics and distribution:**  
Tree -35 m tall, trunk -0.85 m in diameter.  
Locally common in north-central and central Guyana and the Rupununi district, in Mora, marsh, and riverine forest.



1 mm

**Physical properties and structural features:**  
Lustrous wood of medium density. Heartwood basically brown or shades of brown. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Diameter generally small to medium. Medium solitary vessels. **Axial parenchyma** sometimes distinct, sometimes indistinct to naked eye, banded scalariform. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small. **Rays** sometimes distinct sometimes indistinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Numerous rays per 5 mm, high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95



19b *Couratari multiflora* (J.E. Smith) Eyma

Smooth-leaf wadara

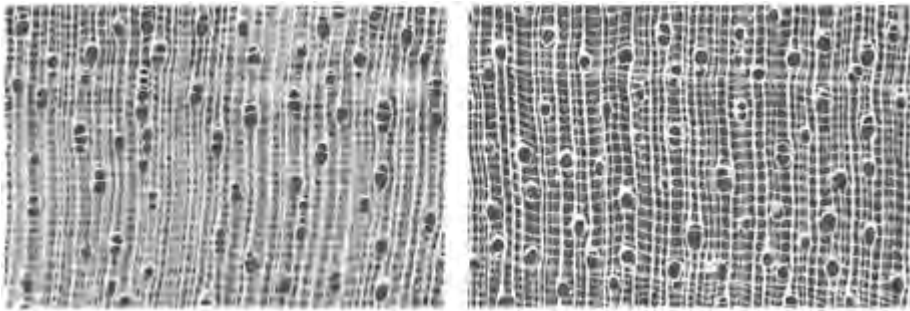
**Vernacular name:**

Smooth-leaf wadara (Cr)

**Field characteristics and distribution:**

Tree -35 m tall, trunk -0.6 (-1) m in diameter.

Common in northern and central Guyana, mainly west of the Essequibo River, in mixed forest on loamy sand or clay.



1 mm

**Physical properties and structural features:**

Lustrous wood of low density. Heartwood basically brown or shades of brown. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters, radial multiples of the same size and of 2-4 vessels. Diameter generally small. Medium to numerous solitary vessels. **Axial parenchyma** indistinct to naked eye. Distribution banded parenchyma of scalariform type. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small. **Rays** indistinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Numerous rays per 5 mm, high.

**Numbers of features in the key:**

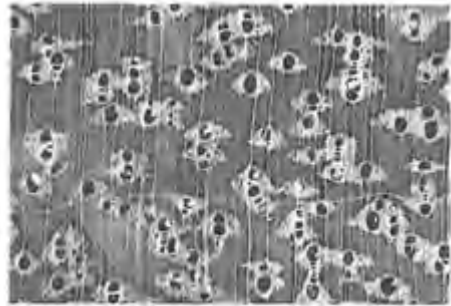
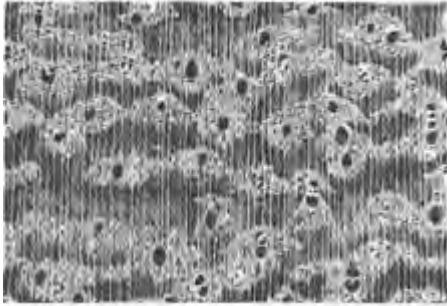
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Akayoran (C), Dakama (Ar)

**Field characteristics and distribution:**

Tree -25 m tall, trunk -0.5 m in diameter.  
In Wallaba forest on white sand. Occurring in north-central and central Guyana and Rupununi district.



1 mm

**Physical properties and structural features:**

Dull wood of medium density. Heartwood basically brown or shades of brown, red or shades of red sometimes with streaks and darker than the sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters, radial multiples of the same and of different sizes and with 2-4 vessels. Reddish inclusions present. Diameter generally small to medium. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, paratracheal aliform and confluent. **Proportion of ground tissue fibres** medium. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Sparse to numerous rays per 5 mm, low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

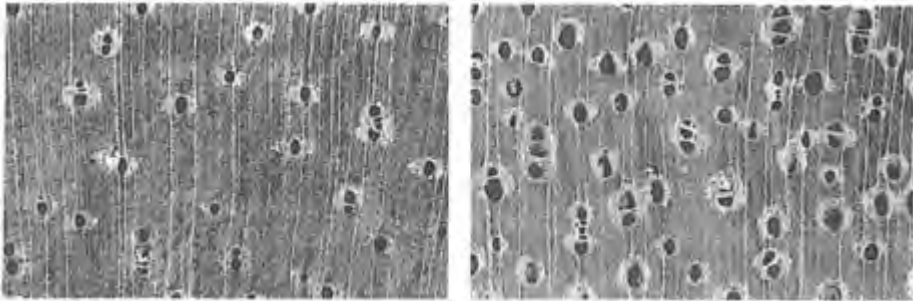
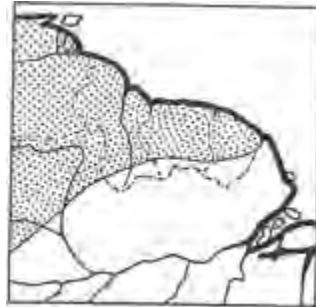
20a *Dimorphanthra polyandra* Benoist

Huruhurudan

**Vernacular name:**  
Huruhurudan (Ar)

**Field characteristics and distribution:**  
Tree -40 m tall, trunk -0.75 m in diameter.

Locally common in northern and central Guyana, in Wal-laba or Muri (*Humiria balsamifera* var. *guianensis*) forest on sandy soil.



1 mm

**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically brown or shades of brown, sometimes with streaks and darker than the sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters, radial multiples of the same and of different sizes and of 2-4 vessels. Diameter generally small to medium. Numerous solitary vessels. **Axial parenchyma** sometimes distinct, sometimes indistinct to naked eye, paratracheal vasicentric, aliform, unilateral and confluent. **Proportion of ground tissue fibres** medium to large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Sparse rays per 5 mm, very low to low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

21 *Diploporis purpurea* (Rich.) Amshoff

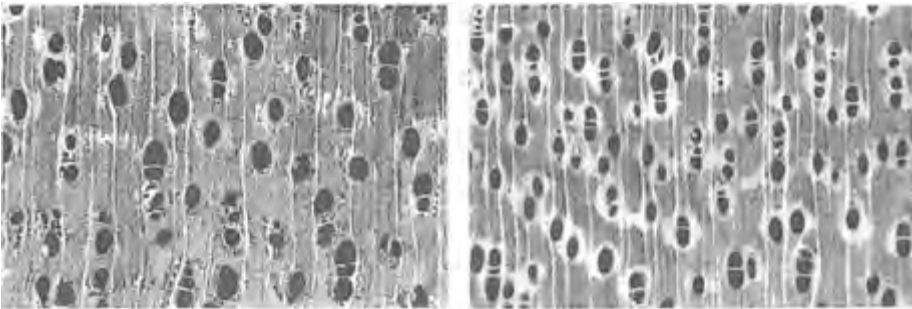
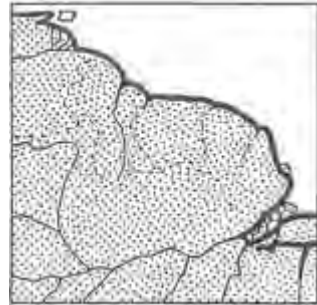
Tatabu

**Vernacular names:**

Konatopo (C), Ogoru (Ak), Olgoi (Ak), Tatabu (Ar)

**Field characteristics and distribution:**

Tree 40 m tall, trunk 0.6 (-1) m in diameter. Occasional in mixed forest and seasonal forest on brown sand near the interior and Rupununi district.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown, darker than the sapwood and sometimes with streaks. Growth ring boundaries indistinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of different sizes and of 2-4 vessels. Inclusions present. Diameter generally large to very large. Numerous solitary vessels. **Axial parenchyma** sometimes distinct and sometimes indistinct to naked eye, paratracheal vasicentric, aliform and unilateral. **Proportion of ground tissue fibres** medium to large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Extremely sparse to sparse rays per 5 mm, low to high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

22 *Dipteryx odorata* (Aublet) Willd.

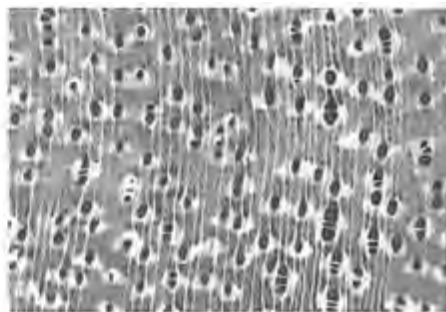
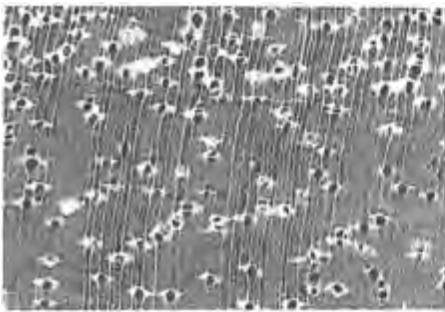
Tonka bean

**Vernacular names:**

Aipō (Ak), Krapabosi (C), Kumaru (Ar), Tonka bean (Cr)

**Field characteristics and distribution:**

Tree -35 (-48) m tall, trunk -0.75 (-2.5) m in diameter. Occasional in mixed and seasonal forest. Widely distributed near the interior.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium to high density. Heartwood basically brown or shades of brown and darker than the sapwood, sometimes with streaks. Rays storied. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Sparse to somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels with diagonal pattern. Tyloses present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, paratracheal aliform, confluent and unilateral, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium to large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Numerous rays per 5 mm, low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

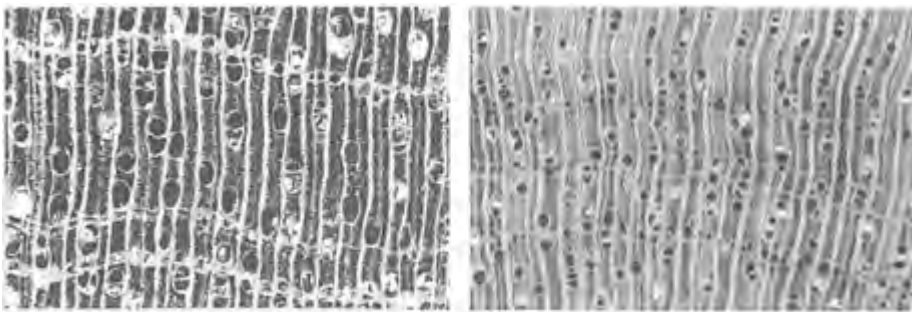
**Vernacular names:**

Parewe (C), Soft wallaba (Cr), White wallaba (Cr), Wopa (A)

**Field characteristics and distribution:**

Tree -30 (-40) m tall, trunk -0.80 m in diameter.

In Wallaba forest on white sand, in marsh and seasonal forest and sometimes in mixed forest. Widely distributed.



1 mm

**Physical properties and structural features:**

Sometimes lustrous, sometimes dull wood of medium density. Heartwood basically brown or shades of brown, red or shades of red sometimes with streaks and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Normally sparse, sometimes extremely sparse to somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same and of different sizes and of 2-4 vessels. Tyloses present. Inclusions present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, paratracheal vasicentric, banded irregular and sometimes marginal. Narrow to medium parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than the vessels. Rays narrow. Sparse to numerous rays per 5 mm, very high.

**Additional features:**

Wood sticky due to resins. Tangential bands of resin ducts present.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

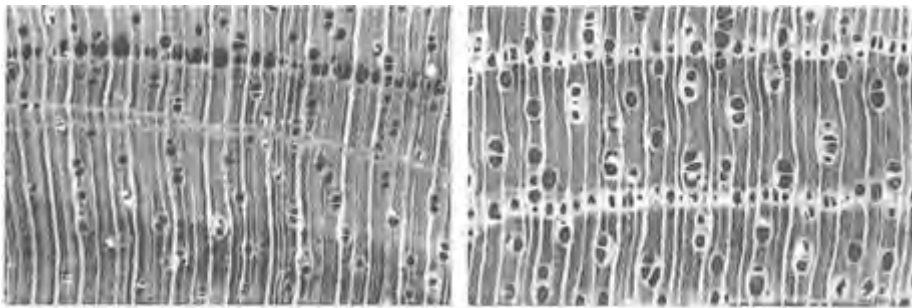
**Vernacular names:**

Ituri wallaba (Cr), Yoboko (Ar)



**Field characteristics and distribution:**

Tree -30 m tall; trunk -0.6 (-0.8) m in diameter.  
Gregarious in white sand areas and Wallaba forest.



1 mm

**Physical properties and structural features:**

Dull wood of medium density. Heartwood basically brown or shades of brown, red or shades of red sometimes with streaks, darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same and of different sizes and of 2-4 vessels. Inclusions present. Diameter generally small to medium. Medium to numerous solitary vessels. **Axial parenchyma** sometimes distinct, sometimes indistinct to naked eye, paratracheal vasicentric, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** sometimes distinct, sometimes indistinct to naked eye. The width compared to the vessels is  $\frac{1}{4}$  of vessel-size to smaller than the vessels. Rays narrow. Sparse rays per 5 mm, low to high.

**Additional features:**

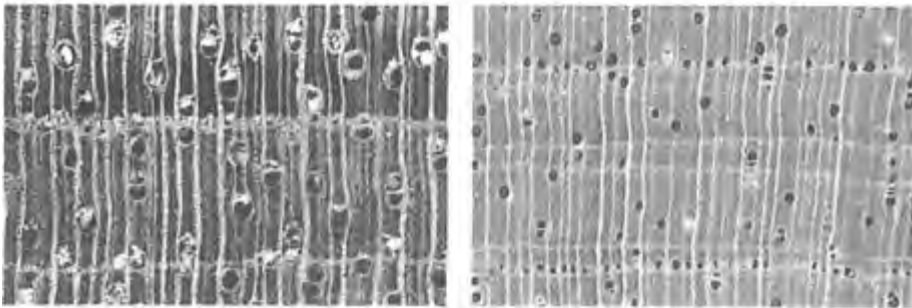
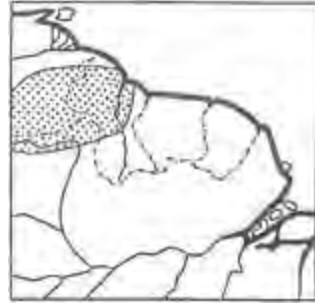
Wood sticky due to resins. Tangential bands of resin ducts present.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular name:**  
Ituri wallaba (Cr)

**Field characteristics and distribution:**  
Tree -35 m tall, trunk -0.7 m in diameter.  
Common in north-central Guyana, the north-west district, and the Pakaraima Mts., in mixed, Mora, riverine, and Wallaba forest on brown or white sand.



1 mm

**Physical properties and structural features:**

Sometimes lustrous, sometimes dull wood of medium density. Heartwood basically brown or shades of brown, red or shades of red and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same and of different sizes and of 2-4 vessels. Dark inclusions present. Diameter generally small. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse rays per 5 mm, high to very high.

**Additional feature:**

Tangential bands of resin ducts present.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95



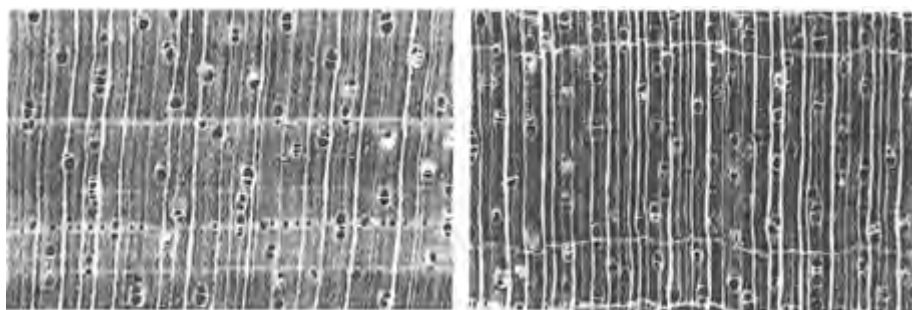
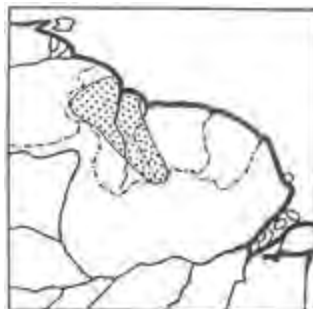
**Vernacular names:**

Ituri wallaba (Cr), Water wallaba (Cr)

**Field characteristics and distribution:**

Tree -36 m tall, trunk -0.5 m in diameter.

Locally common in northern and central Guyana, and the Pakaraima Mts., in riverine and Mora forest on sandy soil.



1 mm

**Physical properties and structural features:**

Sometimes lustrous, sometimes dull wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** indistinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same and of different sizes and of 2-4 vessels. Inclusions present (red gums). Diameter generally small. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands small to large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is  $\frac{1}{4}$  of vessel-size to smaller than half of vessel-size. Rays narrow. Numerous rays per 5 mm, low to high.

**Additional feature:**

Tangential bands of resin ducts present.

**Numbers of features in the key:**

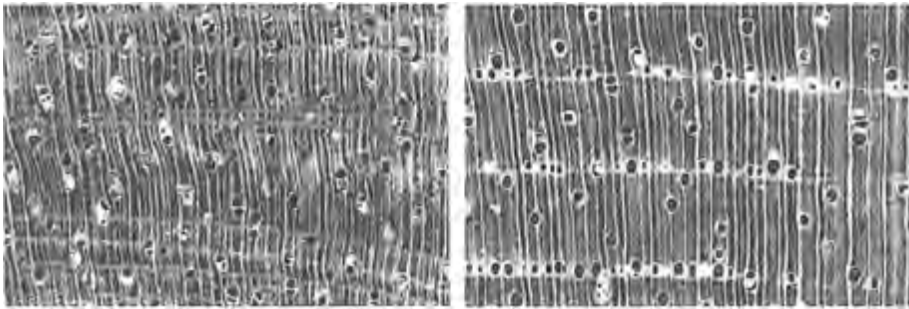
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Watafa (Ar), Watapa (Ar), Water wallaba (Cr)

**Field characteristics and distribution:**

Tree -30 m tall, trunk -0.9 m in diameter.  
Dominant to frequent in mixed forest along rivers and creeks on white sand. Occurring in central Guyana.



1 mm

**Physical properties and structural features:**

Dull wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters, radial multiples of the same size and of 2-4 vessels. Tyloses and inclusions present. Diameter generally small to medium. Numerous solitary vessels. **Axial parenchyma** sometimes distinct, sometimes indistinct to naked eye, paratracheal vasicentric, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands small to large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** sometimes distinct sometimes indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Numerous rays per 5 mm, low to high.

**Additional features:**

Wood sticky due to resins. Tangential bands of resin ducts present.

**Numbers of features in the key:**

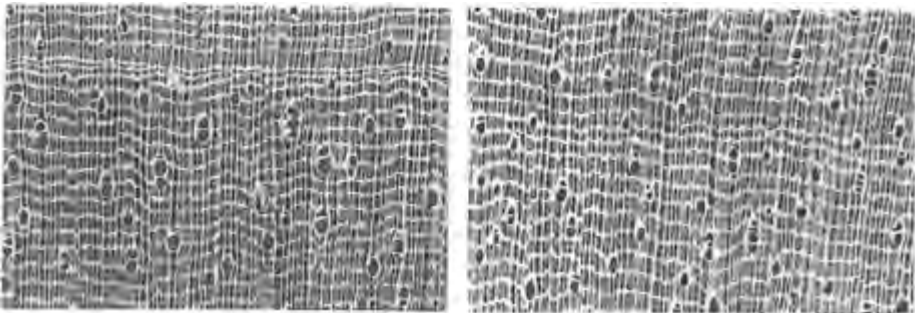
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58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Guava-skin (kakaralli) (Cr), Kakaralli (Ar), Okoromai (Ak), Tekröma (Ak)

**Field characteristics and distribution:**

Tree -30 m tall, trunk -0.4 m in diameter. In mixed forest, particularly Morabukea forest, on brown sand. Occurring mainly near the interior.



1 mm

**Physical properties and structural features:**

Dull wood of medium to high density. Heartwood basically brown or shades of brown, red or shades of red and darker than the sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** indistinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters, radial multiples normally of the same, sometimes of different sizes and of 2-4 vessels. Tyloses present. Diameter generally small to medium. Medium to numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, scanty paratracheal, banded reticulate and irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Numerous to extremely numerous rays per 5 mm, high.

**Numbers of features in the key:**

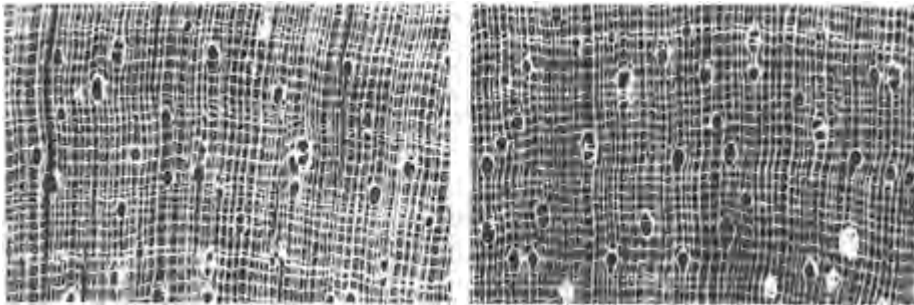
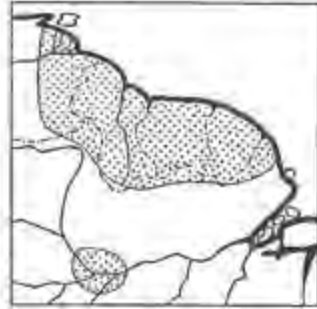
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39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Akurima (Ak), Kwateri (C), Kwatru (M), Smooth-leaf kakaralli (Cr)

**Field characteristics and distribution:**

Tree -35 m tall; trunk -0.6 m in diameter.  
Occasional to common in mixed forest and Mora forest west of Demerara River and in the Kanuku Mts.



1 mm

**Physical properties and structural features:**

Dull wood of medium to high density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same and of different sizes and of 2-4 vessels. Tyloses present. Diameter generally small to medium. Numerous solitary vessels. **Axial parenchyma** sometimes distinct, sometimes indistinct to naked eye, paratracheal vasicentric, banded reticulate. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Extremely numerous rays per 5 mm, high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

27a *Eschweilera coriacea* (A. DC.)  
Mori

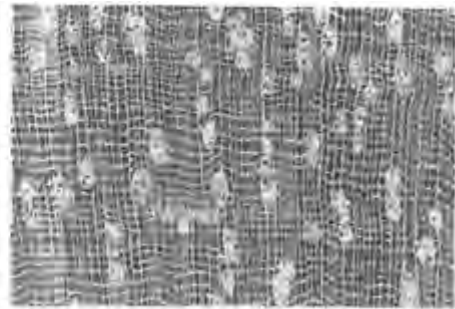
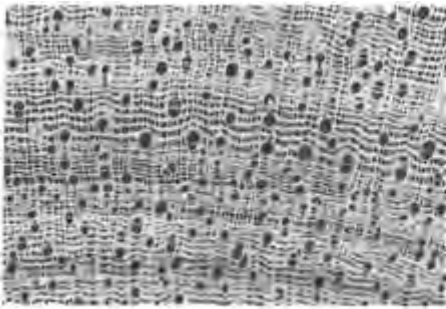
Smooth-leaf kakaralli

**Vernacular name:**

Smooth-leaf kakaralli (Cr)

**Field characteristics and distribution:**

Tree -37 m tall, trunk -0.6 m in diameter.  
Frequent to common in north-central and central Guyana, and the Pakaraima Mts., in mixed, Clump wallaba, Morabukea and riverine forest, on sandy loam, brown sand, or laterite.



1 mm

**Physical properties and structural features:**

Dull wood of medium to high density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse to somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same and of different sizes and of 2-4 and >4 vessels. Tyloses present. Diameter generally small. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, banded reticulate irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Extremely numerous rays per 5 mm, high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

27b *Eschweilera parviflora*  
(Aublet) Miers

Fine smooth-leaf kakaralli

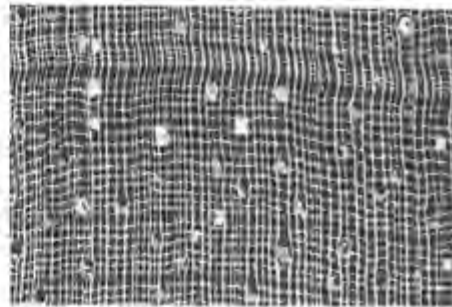
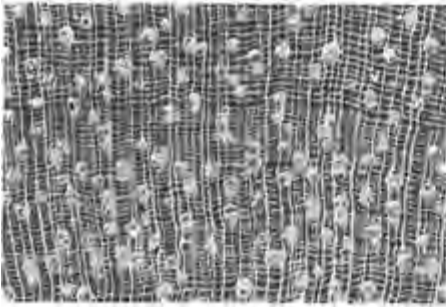
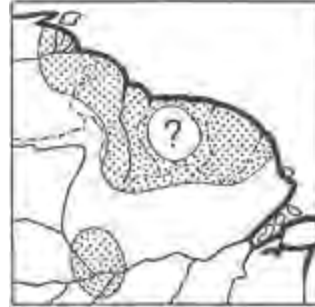
**Vernacular name:**

Fine smooth-leaf kakaralli (Cr)

**Field characteristics and distribution:**

Tree -33 m tall, trunk -0.3 m in diameter.

Locally common in the North-West district, and north-central and southern Guyana, in mixed forest on brown sand.



1 mm

**Physical properties and structural features:**

Dull wood of medium to high density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse to somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally small. Medium to numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, banded reticulate. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small. **Rays** sometimes distinct, sometimes indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Numerous to extremely numerous rays per 5 mm, high.

**Numbers of features in the key:**

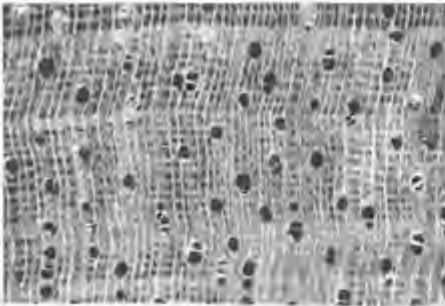
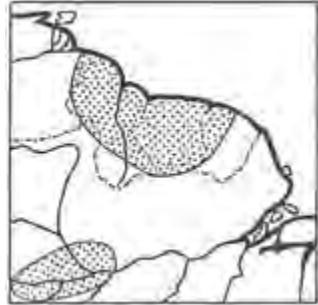
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58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

27c *Eschweilera wachenheimii*  
(Benoist) Sandw.

Fine-leaf kakaralli

**Vernacular name:**  
Fine-leaf kakaralli (Cr)

**Field characteristics and distribution:**  
Tree -28 m tall, trunk -0.3 m in diameter.  
Widely distributed. Common in mixed, Morabukea, and Mora forest, on sand or laterite.



1 mm

**Physical properties and structural features:**  
Dull wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** sometimes distinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same and of different sizes and of 2-4 vessels. Tyloses present. Diameter generally small. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, banded reticulate. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Numerous to extremely numerous rays per 5 mm, high to very high.

**Numbers of features in the key:**

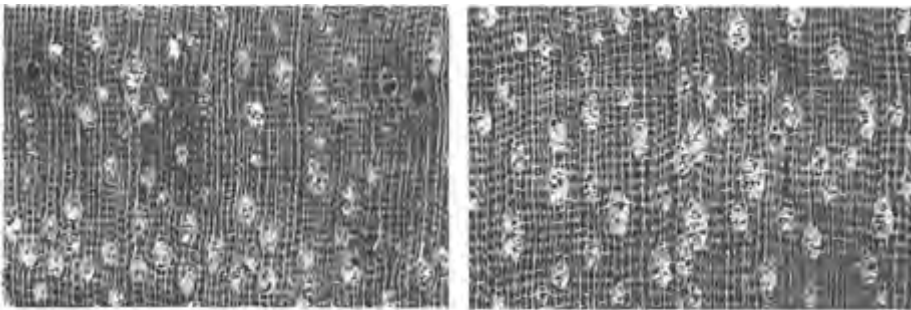
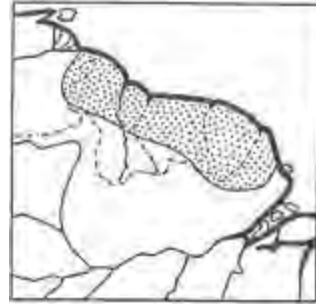
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58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

(Common) black kakaralli (Cr), Kwateri (C), Kwatru (M), Pökö (Ak), Prukoi (P), Tamad (W)

**Field characteristics and distribution:**

Tree -30 (-40) m tall; trunk -0.6 m in diameter. Gregarious in mixed forest, particularly on laterite, and Mora forest. Widely distributed.



1 mm

**Physical properties and structural features:**

Sometimes dull, sometimes lustrous wood of medium to high density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

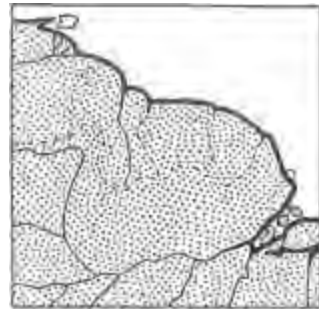
**Vessels** indistinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, banded reticulate. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Numerous to extremely numerous rays per 5 mm, high to very high.

**Numbers of features in the key:**

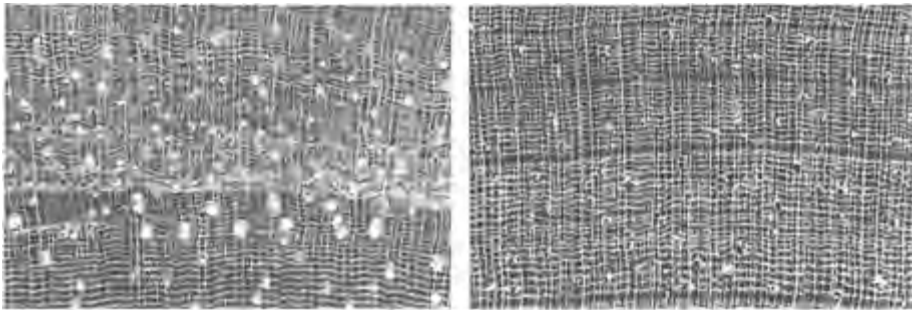
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58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95



**Vernacular name:**  
Kakaralli (Cr)



**Field characteristics and distribution:**  
Tree -20 (-30) m tall, trunk -0.3 m in diameter.  
Widely distributed. Common in riverine forest, also occurring in mixed and Mora forest, on sand or laterite.



1 mm

**Physical properties and structural features:**  
Dull wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 and >4 vessels. Tyloses present. Diameter generally small to medium. Medium solitary vessels. **Axial parenchyma** indistinct to naked eye, banded reticulate, marginal and irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller and as wide as the fibre tissue bands or even wider. **Proportion of ground tissue fibres** small. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Numerous to extremely numerous rays per 5 mm, low.

**Numbers of features in the key:**

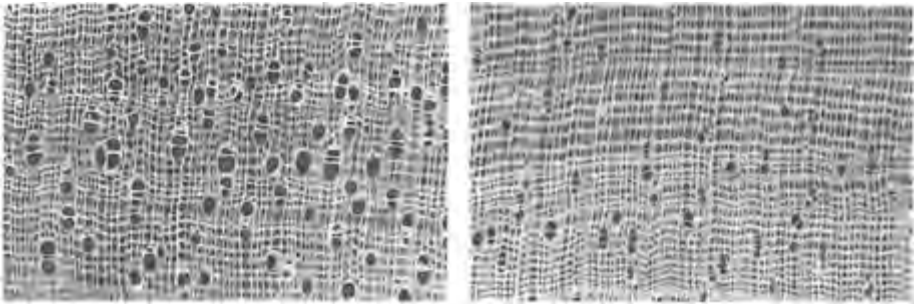
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39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

28b *Eschweilera subglandulosa*  
(Steudel ex O. Berg) Miers

**Black kakaralli**

**Vernacular name:**  
Black kakaralli (Cr)

**Field characteristics and distribution:**  
Tree -40 m tall, trunk -0.6 (-1) m in diameter.  
Widely distributed. Common in mixed and riverine forest,  
on laterite and sand.



1 mm

**Physical properties and structural features:**  
Dull wood of medium to high density. Heartwood basically brown or shades of brown, sometimes white to grey and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**  
**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses and inclusions present. Diameter generally small to medium. Medium solitary vessels. **Axial parenchyma** indistinct to naked eye, banded irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Extremely numerous rays per 5 mm, low to high.

**Numbers of features in the key:**

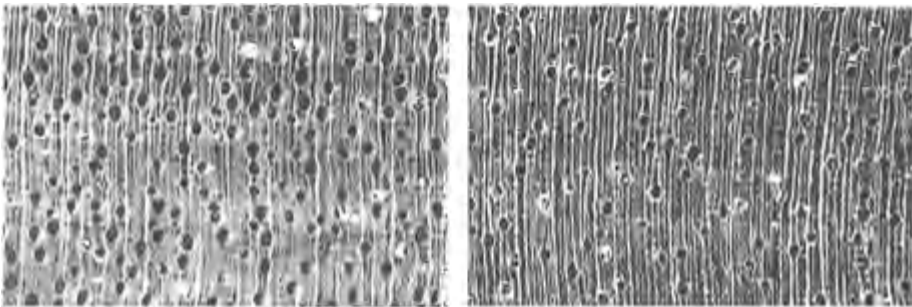
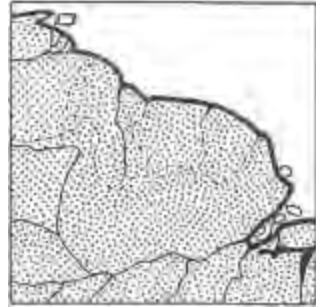
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58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Goupi (Cr), Kabiuk (Ak), Kabukalli (Ar), Kupiye (C), Stinkwood (Cr), Waramai (Ak)

**Field characteristics and distribution:**

Tree -35 (-40) m tall, trunk -0.9 m in diameter. Dominant in seasonal forest in eastern Guyana. Occasional in Mora forest. Frequent to occasional in mixed forests on sandy soil.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown, sometimes copper-coloured or shades of copper, red or shades of red, with streaks and darker than the sapwood. Distinct, sour and unpleasant odour. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Somewhat sparse. Arrangement exclusively solitary. Inclusions present (red brown deposits). Diameter generally small to medium. Numerous solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size to smaller than half of vessel-size. Rays narrow. Numerous rays per 5 mm, high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

30 *Humiria balsamifera* (Aublet) A. St. Hil.  
var. *balsamifera*

Tauroniro

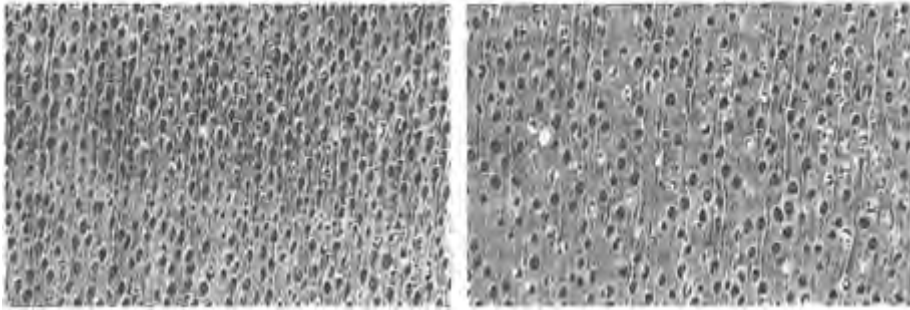
**Synonym:** *Humiria floribunda* Mart.

**Vernacular names:**

Bastard bulletwood (Cr), Meri (Cr), Tauranru (Ar), Tauroniro (Cr)

**Field characteristics and distribution:**

Tree ~40 m tall, trunk ~0.9 (-1.2) m in diameter. Occasional to frequent in Wallaba forest or marsh forest on (white) sand. Occasional in seasonal forest on brown sand.



1 mm

**Physical properties and structural features:**

Dull wood of medium density. Heartwood basically brown or shades of brown, red or shades of red and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Fairly numerous. Arrangement exclusively solitary with diagonal pattern. Inclusions present. Diameter generally small to medium. Numerous solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** medium to large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. There are numerous rays per 5 mm, high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

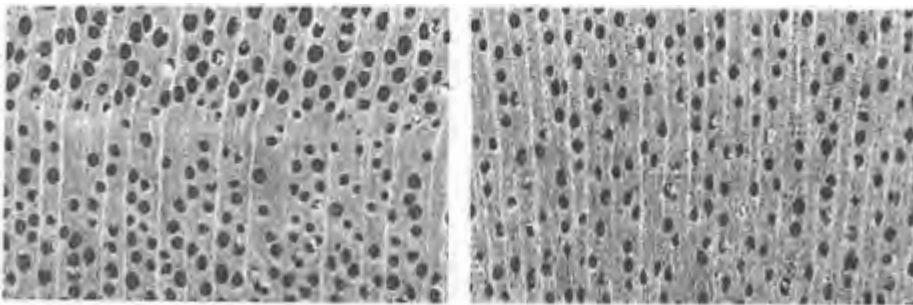
**Synonym:** *Hyeronima laxiflora* (Tul.) Muell. Arg.

**Vernacular names:**

Napo (Ak), Suradan (Ar)

**Field characteristics and distribution:**

Tree -35 m tall, trunk -0.7 (-0.9) m in diameter. Occasional in mixed forest, more frequent in secondary forest on laterite, loam or brown sand. Occurring mainly along rivers and streams or in swampy forest. Occurring near the interior and the Rupununi district.



1 mm

**Physical properties and structural features:**

Dull wood of low to medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Somewhat sparse to fairly numerous. Arrangement exclusively solitary with diagonal pattern. Tyloses and inclusions present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays medium. Sparse rays per 5 mm, high to very high.

**Numbers of features in the key:**

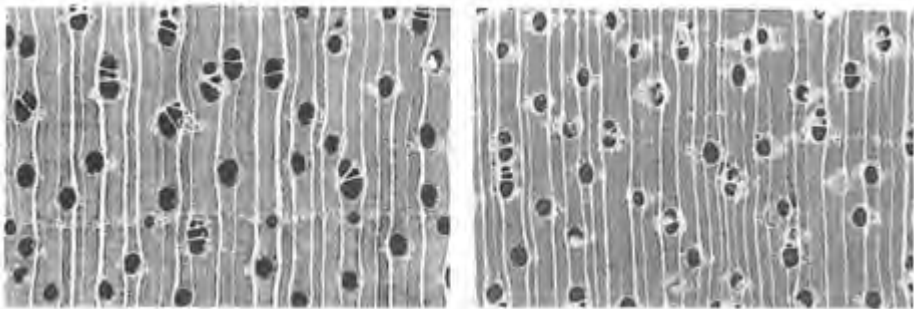
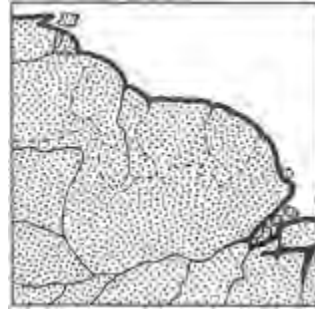
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20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
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58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Kawanari (Ar), Locust (Cr), Moire (M), Not (W), Stinking toe (Cr)

**Field characteristics and distribution:**

Tree -45 (-50) m tall, bole -1 (-2) m in diameter. Occasional along rivers in mixed and Mora forest, also in marsh forest. Widely distributed, particularly common in eastern Guyana.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown, sometimes red or shades of red, with streaks and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Inclusions present. Diameter generally medium to large. Numerous solitary vessels. **Axial parenchyma** sometimes distinct, sometimes indistinct to naked eye, paratracheal vasicentric, aliform and confluent, banded marginal and irregular. Narrow to medium parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse to numerous rays per 5 mm, low to high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

32a *Hymenaea oblongifolia* Huber

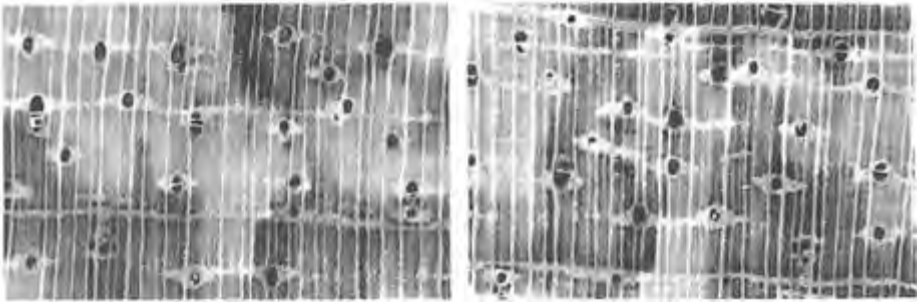
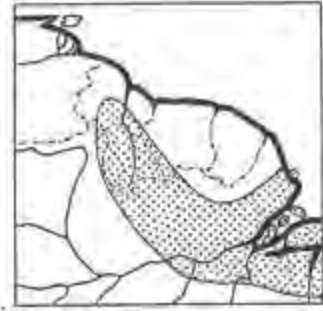
Locust

**Vernacular names:**

Simiri (Ar), Locust (Cr)

**Field characteristics and distribution:**

Tree -40 m tall, trunk -0.85 m in diameter. Occasional to locally common in northern central Guyana in Wallaba forest on white sand, and in southern Guyana in mixed, marsh, and riverine forest.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown sometimes red or shades of red and darker than the sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Dark inclusions present. Diameter generally medium to large. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, paratracheal aliform, confluent and unilateral, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is 1/4 of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse rays per 5 mm, high.

**Numbers of features in the key:**

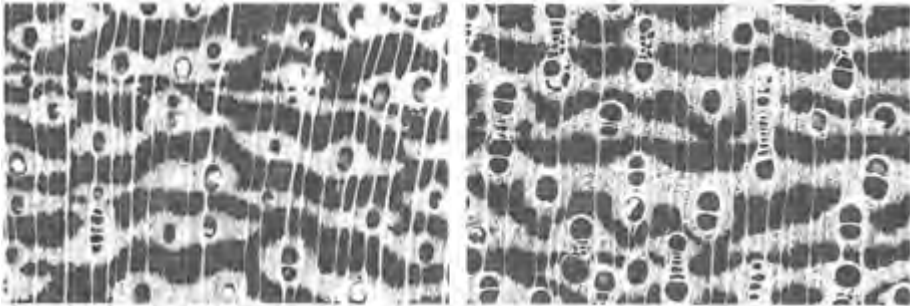
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Atoritan (W), Darina (Ar), Kaserena (M), Koraroballi (Ar), Kotik (Ak), Mabinanero (Ak)

**Field characteristics and distribution:**

Tree -35 (-50) m tall, trunk -0.65 (-1) m in diameter. Occasional in mixed and seasonal forest near the interior and Kanuku Mts.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Axial parenchyma and fibres storied. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of different sizes and of 2-4 and of >4 vessels. Inclusions present. Diameter generally large. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, paratracheal aliform and confluent, banded irregular. Medium parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium. **Rays** distinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse rays per 5 mm, low to high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

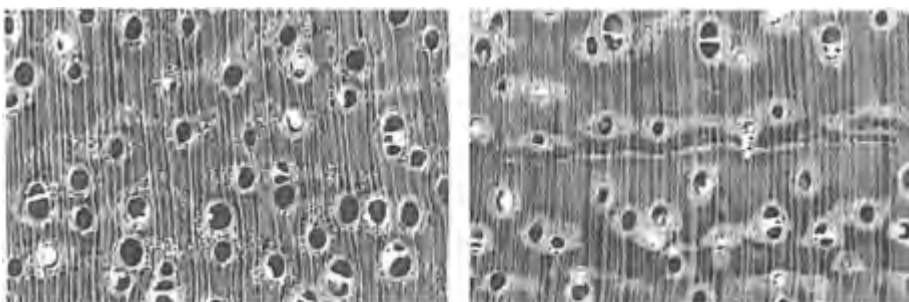
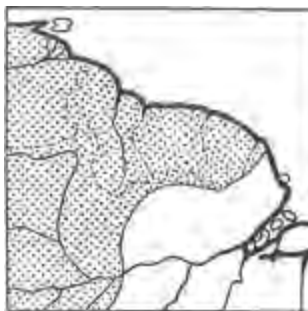


**Vernacular names:**

Kurang (Ak), Kwari (Ak), Kwariye (M), Maporokon(i) (Ar), Yokar (W)

**Field characteristics and distribution:**

Tree -35 m tall, trunk -0.75 m in diameter. Frequent in mixed forest on brown sand, both in primary and secondary forest. Widely distributed.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown and slightly darker than the sapwood, sometimes with streaks. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses and inclusions present. Diameter generally large to very large. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, paratracheal aliform and confluent, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Sparse to numerous rays per 5 mm, low.

**Numbers of features in the key:**

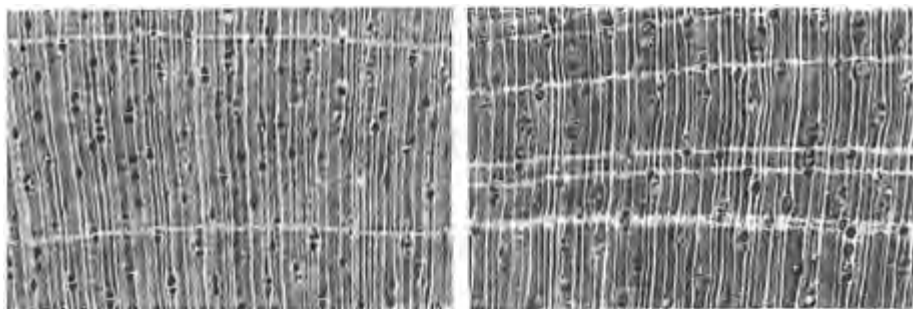
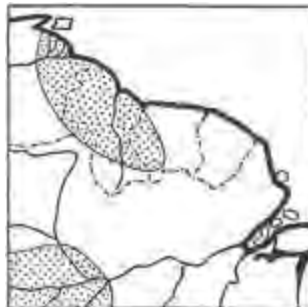
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Kirikaua (Ar), Marbuk (Ak), Swamp kirikaua (Cr), Weputana (C)

**Field characteristics and distribution:**

Tree -27 m tall, trunk -0.6m in diameter.  
Abundant in palm marsh forest, occasional to frequent in other types of marsh and swamp forest. Widely distributed.



1 mm

**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** indistinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally small to medium. Medium to numerous solitary vessels. **Axial parenchyma** distinct to naked eye, paratracheal scanty, banded marginal and irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than the vessels. Rays narrow. Numerous to extremely numerous rays per 5 mm, low to high.

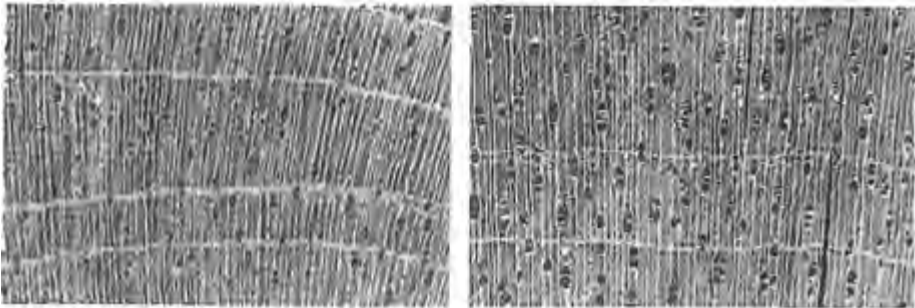
**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular name:**  
Kirikaua (Ar)



**Field characteristics and distribution:**  
Tree 5-17 m tall, trunk 0.1-0.2(-0.4) m in diameter.  
Possibly occurring in the north-west district, in mixed forest.



1 mm

**Physical properties and structural features:**  
Lustrous wood of low to medium density. Heartwood basically brown or shades of brown, with streaks and darker than the sapwood. Growth ring boundaries indistinct or absent.

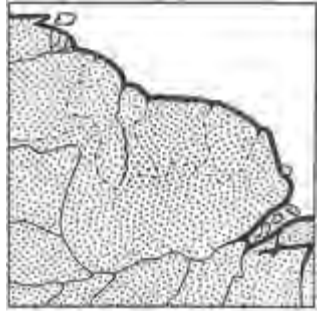
**Anatomical features:**  
**Vessels** indistinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses and dark inclusions present. Diameter generally small to medium. Medium to numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, scanty paratracheal and banded irregular. Narrow parenchyma bands. Distance between the parenchyma bands small to large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium to large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Numerous to extremely numerous rays per 5 mm, high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

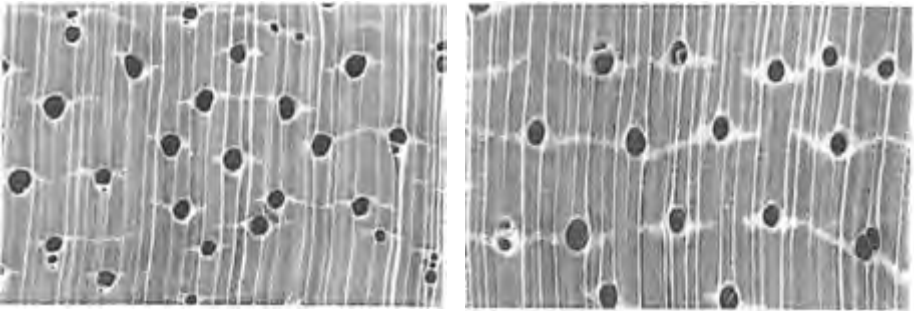
Aku (Ak), Futui (Ar), Kopaia (C), Pasa (Ak), Phootee (Cr)



**Field characteristics and distribution:**

Tree -30 (-43) m tall; trunk -0.8 (-1) m in diameter.

Occurring sometimes in seasonal forest, sometimes in (secondary) Wallaba forest.



1 mm

**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically brown or shades of brown, red or shades of red, yellow or shades of yellow, white to grey, with streaks and no difference between heart- and sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same and of different sizes and of 2-4 vessels. Diameter generally medium to large. Numerous solitary vessels. **Axial parenchyma** sometimes distinct sometimes indistinct to naked eye, paratracheal aliform and confluent. **Proportion of ground tissue fibres** large. **Rays** sometimes distinct, sometimes indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Sparse to numerous rays per 5 mm, low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

37 *Laetia procera* (Poeppig) Eichler

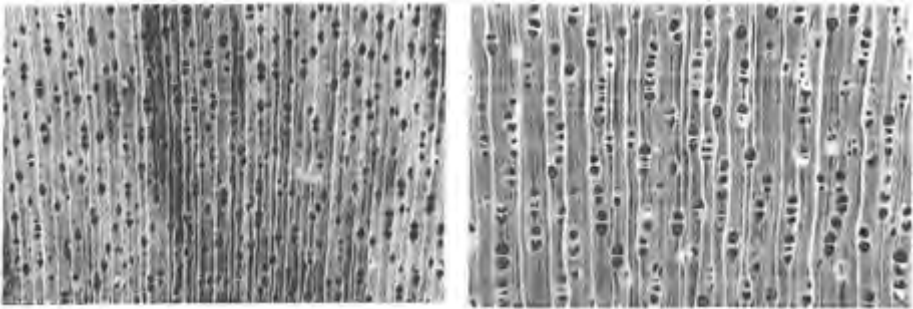
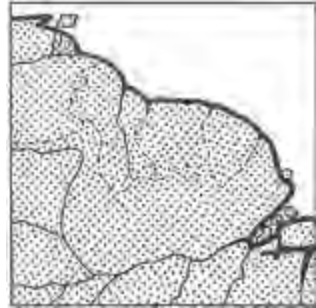
Warakairo

**Vernacular names:**

Bastard kabukalli (Cr), Murewa (C), Warakai(o)ro (Ar), Watuwai (Ak)

**Field characteristics and distribution:**

Tree -30 (-40) m tall, trunk -0.8 m in diameter. Occasional to locally frequent in primary and secondary mixed forest, on sandy soil. Widely distributed.



1 mm

**Physical properties and structural features:**

Dull wood of medium density. Heartwood basically yellow or shades of yellow and no difference between heart- and sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** indistinct to naked eye. Sparse to somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Diameter generally medium. Medium solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow to medium. Sparse rays per 5 mm, high to very high.

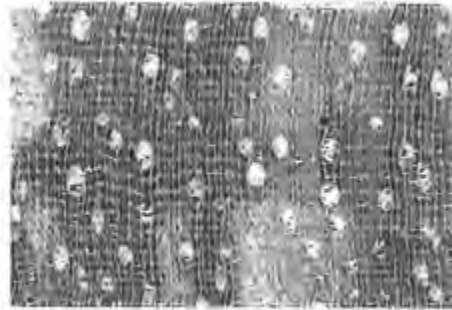
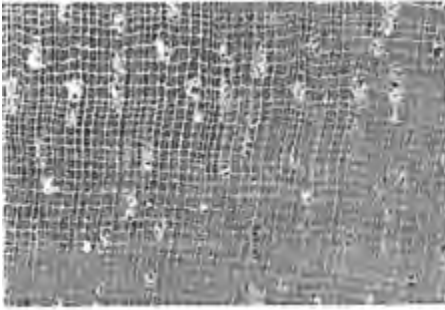
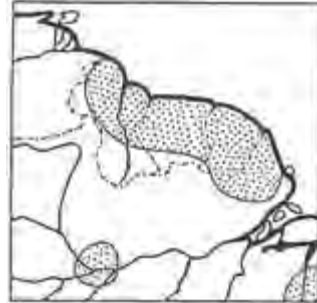
**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Synonym:** *Eschweilera confertiflora* A.C. Smith

**Vernacular name:**  
Wirimiri (Ar)

**Field characteristics and distribution:**  
Tree -35 m tall, trunk -0.7 m in diameter.  
Occasional to frequent in mixed forest on brown sand and on laterite. Mostly in further interior.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium to high density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** indistinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same and of different sizes and of 2-4 and >4 vessels. Tyloses and dark inclusions present. Diameter generally small to medium. Medium to numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, banded irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium to large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Numerous rays per 5 mm, low to high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

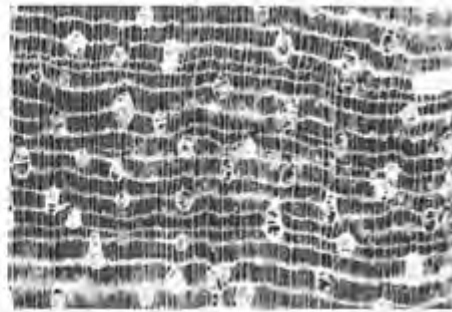
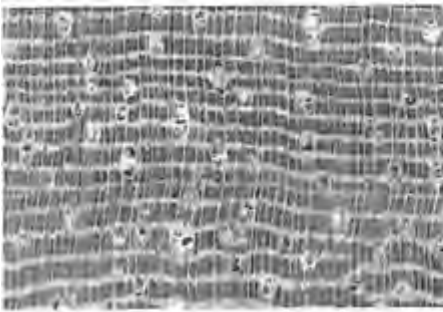
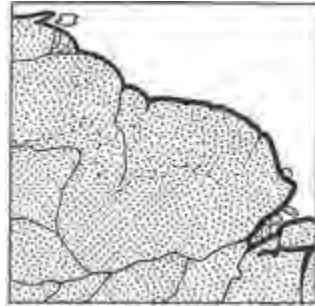
39 *Lecythis corrugata* Poit.

Wina

Synonym: *Eschweilera corrugata* (Poit.) Miers

Vernacular name:  
Wina (Ar)

Field characteristics and distribution:  
Tree -35 m tall, trunk -0.9 m in diameter.  
Found in Wallaba forest, sometimes in marsh forest. Frequent to occasional in near interior, southeastern Guyana and Rupununi district.



1 mm

Physical properties and structural features:

Dull to lustrous wood of low to medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries indistinct or absent.

Anatomical features:

**Vessels** indistinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses and dark inclusions present. Diameter generally medium. Medium to numerous solitary vessels. **Axial parenchyma** distinct to naked eye, banded irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small to medium. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. There are numerous rays per 5 mm, low.

Numbers of features in the key:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

41a *Licania laxiflora* Fritsch

Kauta

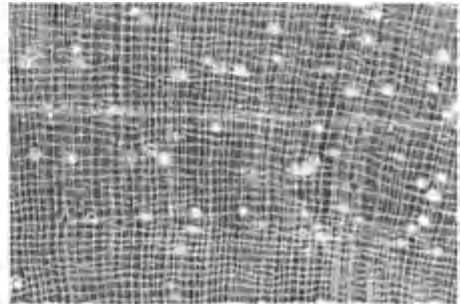
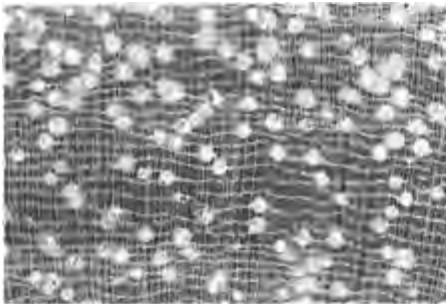
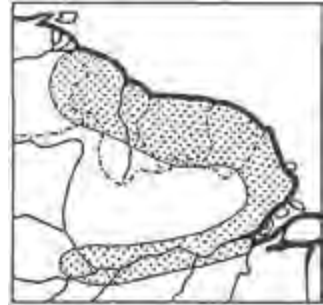
**Vernacular name:**

Kauta (Ar)

**Field characteristics and distribution:**

Tree -35 m tall, trunk -0.6 m in diameter.

Occasional to common in northern and central Guyana, in mixed, Wallaba, and Morabukea forest on sand or laterite.



1 mm

**Physical properties and structural features:**

Dull wood of high density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse to somewhat sparse. Arrangement exclusively solitary. Tyloses and inclusions present. Diameter generally small to medium. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, banded irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Extremely numerous rays per 5 mm, high.

**Numbers of features in the key:**

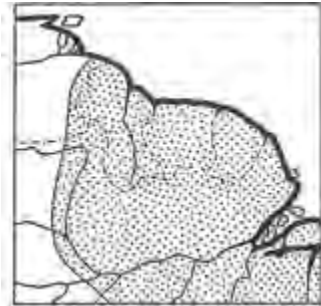
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20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
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58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95



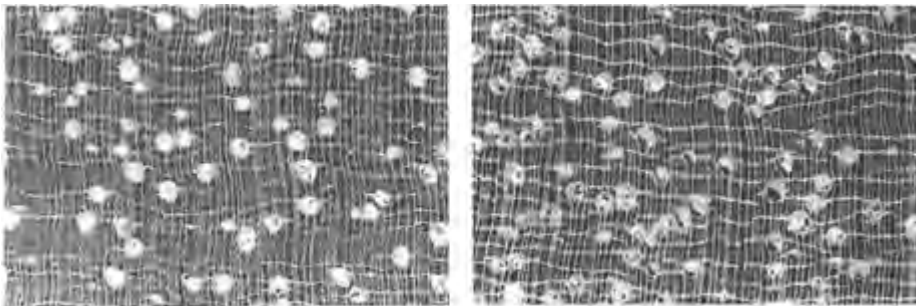
41b *Licania majuscula* Sagot

Kautaballi

**Vernacular name:**  
Kautaballi (Ar)



**Field characteristics and distribution:**  
Tree -30 m tall, trunk -0.55 m in diameter.  
Widely distributed. Common in mixed and Clump wallaba forest on sandy soil.



1 mm

**Physical properties and structural features:**  
Dull wood of high density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse. Arrangement exclusively solitary. Tyloses and dark inclusions present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, banded irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Extremely numerous rays per 5 mm, high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

42 *Licaria cannella* (Meisner) Kosterm.

**Brown silverballi**

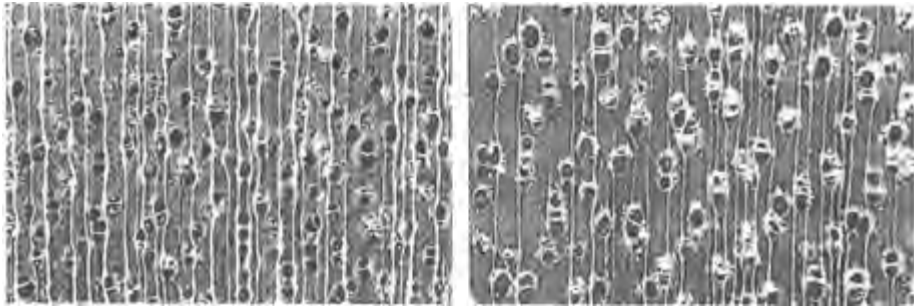
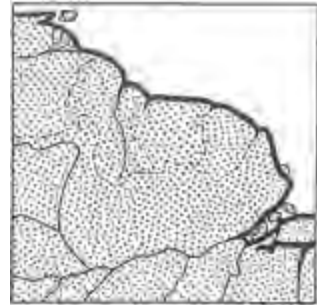
**Synonyms:** *Acrodiclidium cannella* (Meisner);  
*Licaria cayennensis* (Meisner) Kosterm.

**Vernacular names:**

Brown silverballi (Cr), Itik (Ak), Kamarai (Ak), Khare-  
mero shiruaballi (Ar), Tiniari (C), Wabaima (Ar)

**Field characteristics and distribution:**

Tree -35 m tall; trunk -0.75 m in diameter.  
Occasional in mixed forest and in Wallaba forest. Occur-  
ring near the interior and the Rupununi district.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium to high density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally medium. Sparse to somewhat sparse. Medium solitary vessels. **Axial parenchyma** indistinct to naked eye, paratracheal scanty, vasicentric and unilateral. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse rays per 5 mm, low to high.

**Additional feature:**

Oil or mucilage cells present.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

43 *Loxopterygium sagotii* Hook. f.

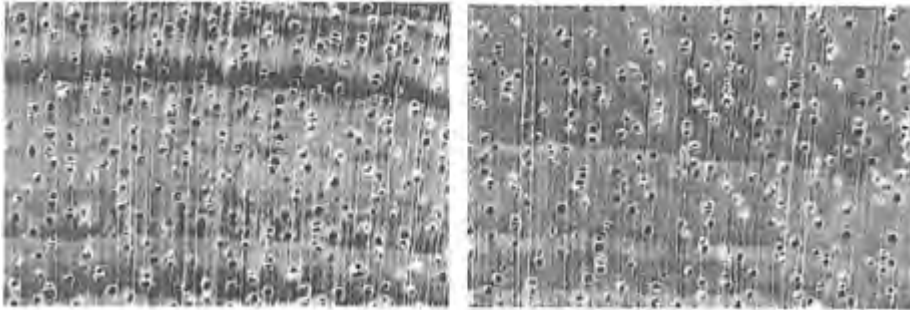
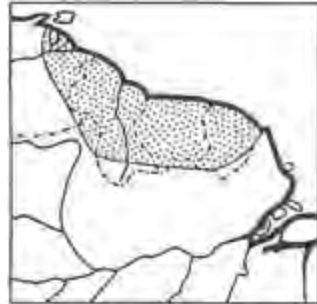
Hububalli

**Vernacular names:**

Apar (W), Hububalli (Ar), Kwipari (C), Kwipariye (M)

**Field characteristics and distribution:**

Tree -35 (-40) m tall, trunk -0.75 m in diameter.  
Frequent to common in seasonal forest, occasional in secondary mixed forest and Wallaba forest (particularly in the Pomeroun-Supenaam-area).



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood sometimes with streaks. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Somewhat sparse to fairly numerous. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** large. **Rays** sometimes distinct, sometimes indistinct to naked eye. The width compared to the vessels is 1/4 of vessel-size to smaller than the vessels. Rays narrow to medium. Sparse to numerous rays per 5 mm, low.

**Additional feature:**

Radial canals in the rays present.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

44 *Manilkara bidentata* (A. DC.) Chev.

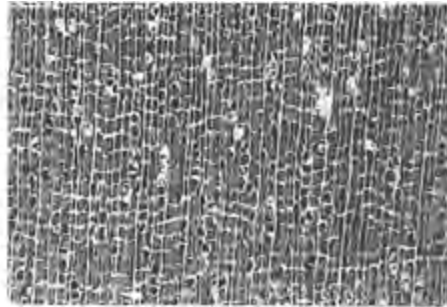
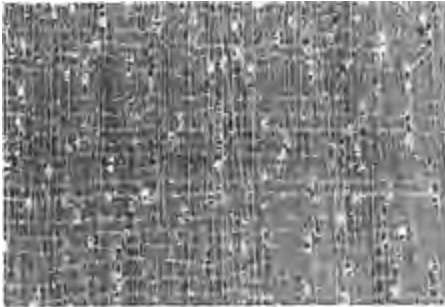
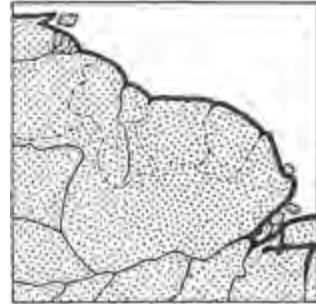
Bulletwood

**Vernacular names:**

Balata (P), Balata burue (Ar), Beefwood (Cr), Bulletwood (Cr), Bully tree (Cr), Iriar (W), Kobero (Wr), Purue (M)

**Field characteristics and distribution:**

Tree -40 (-50) m tall, trunk -0.9 (-1.5) m in diameter. Dominant in seasonal forest in eastern districts. Occasional to locally common in Wallaba, mixed and marsh forest.



1 mm

**Physical properties and structural features:**

Dull wood of high density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** indistinct to naked eye. Somewhat sparse to fairly numerous. Arrangement exclusively radial multiples or clusters. Radial multiples of the same size and of 2-4 and >4 vessels. Diagonal pattern. Tyloses present. Diameter generally small to medium. Few solitary vessels. **Axial parenchyma** indistinct to naked eye, banded reticulate. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size to smaller than half of vessel-size. Rays narrow. Numerous rays per 5 mm, low to high.

**Numbers of features in the key:**

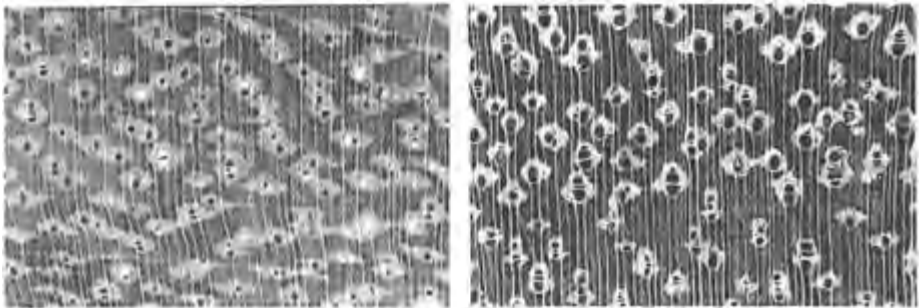
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39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Mora (Ak, Ar), Mora-yek (Ak), Parakaua (C)

**Field characteristics and distribution:**

Tree -40 (-50) m tall, trunk -0.9 (-1.2) m in diameter. Growing on moist to wet places. Locally abundant to dominant (Mora forest) along rivers and creeks. Occasional in marsh and swamp forest.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium to high density. Heartwood basically brown or shades of brown, red or shades of red and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse to somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses and inclusions present. Diameter generally small to medium. Medium to numerous solitary vessels. **Axial parenchyma** sometimes distinct, sometimes indistinct to naked eye, paratracheal aliform, confluent and sometimes unilateral, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Numerous rays per 5 mm, very low to low.

**Numbers of features in the key:**

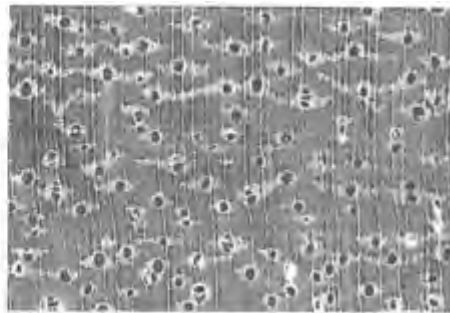
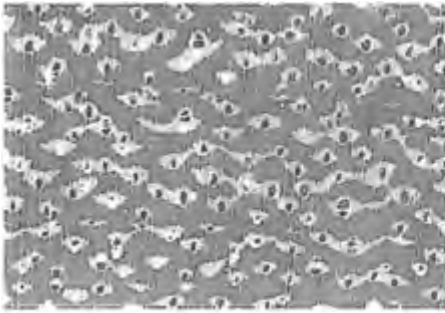
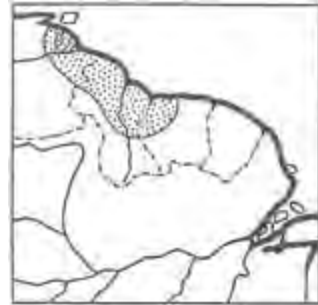
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39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Morabukea (Ar), Parakwai (Ak)

**Field characteristics and distribution:**

Tree 45 (-50) m tall, trunk 0.8 (-1.5) m in diameter.  
 General near the interior, but rare in the north-west-district and Courantyne River area.



1 mm

**Physical properties and structural features:**

Sometimes dull, sometimes lustrous wood of high density. Heartwood basically brown or shades of brown, red or shades of red and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse to somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of different sizes. Clusters of 2-4 vessels. Tyloses and light and dark inclusions present. Diameter small to medium. Numerous solitary vessels. **Axial parenchyma** sometimes distinct, sometimes indistinct to naked eye, paratracheal aliform and confluent, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands small to large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Numerous rays per 5 mm, low.

**Numbers of features in the key:**

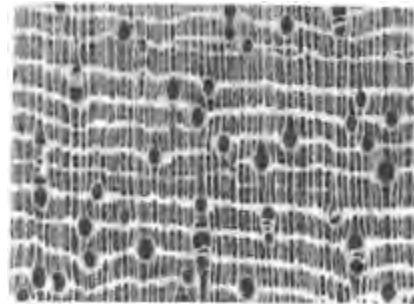
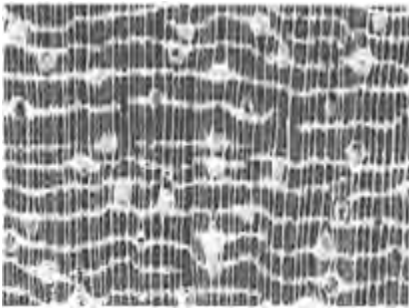
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39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Manniballi (Ar), Morombo-rai (Ak)

**Field characteristics and distribution:**

Tree -40 m tall, trunk -0.8 m in diameter. Locally frequent in mixed forest, occasional in Mora forest, rare in Wallaba forest. Occurring in north-central and central Guyana and in Pakaraima Mts.



1 mm

**Physical properties and structural features:**

Sometimes dull, sometimes lustrous wood of medium density. Heartwood basically brown or shades of brown, red or shades of red, yellow or shades of yellow and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of different sizes and of 2-4 and >4 vessels. Tyloses present. Diameter generally medium to large. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, banded irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Extremely numerous rays per 5 mm, high to very high.

**Numbers of features in the key:**

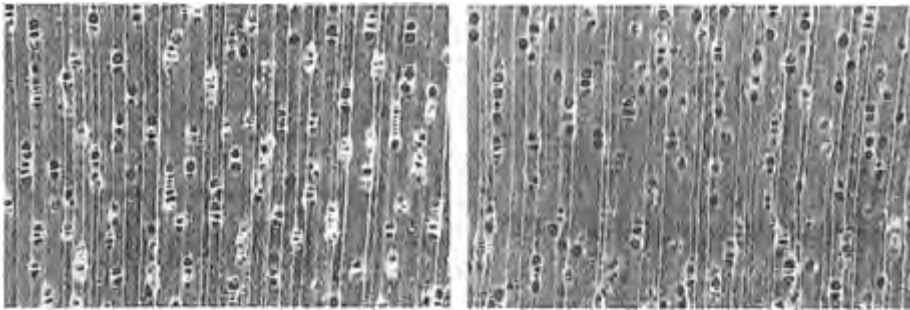
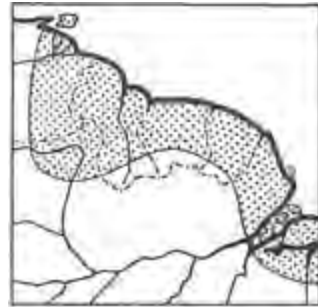
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20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Hariraro shiruaballi (Ar), Heburu (W), Ileng (Ak),  
Sawariskin silverballi (Cr), White silverballi (Cr)

**Field characteristics and distribution:**

Tree -35 m tall, trunk -0.5 (-1.2) m in diameter.  
Rare to locally frequent, usually in mixed forest, rarely in  
Wallaba forest. Occurring in near the interior. Rupununi  
district, southeastern Guyana and Pakaraima Mts.



1 mm

**Physical properties and structural features:**

Lustrous wood of low density. Heartwood basically brown or shades of brown, copper-coloured or shades of copper and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** indistinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same and of different sizes and of 2-4 and >4 vessels. Tyloses present. Diameter generally small to medium. Few to medium solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is  $\frac{1}{4}$  of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse rays per 5 mm, low.

**Additional feature:**

Oil or mucilage cells present.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95



48a *Ocotea glomerata* (Nees) Mez

**Kurahara silverballi**

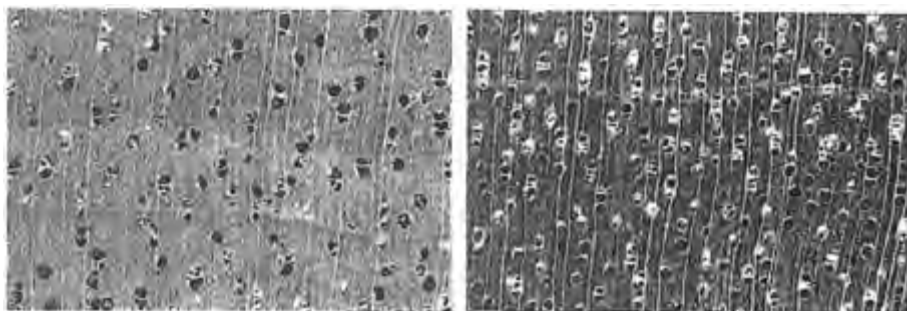
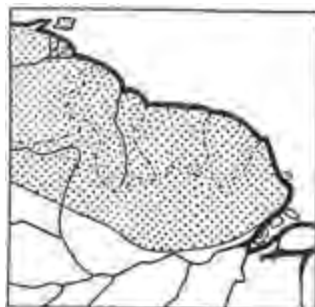
**Vernacular name:**

Kurahara silverballi (Cr)

**Field characteristics and distribution:**

Tree -32 m tall, trunk -0.6 m in diameter.

Widely distributed. Occasional to frequent in primary and secondary mixed forest on brown sand.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown, copper-coloured or shades of copper and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Sparse to somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Extremely sparse to sparse rays per 5 mm, low.

**Additional feature:**

Oil or mucilage cells present.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

48b *Ocotea oblonga* (Meisner) Mez

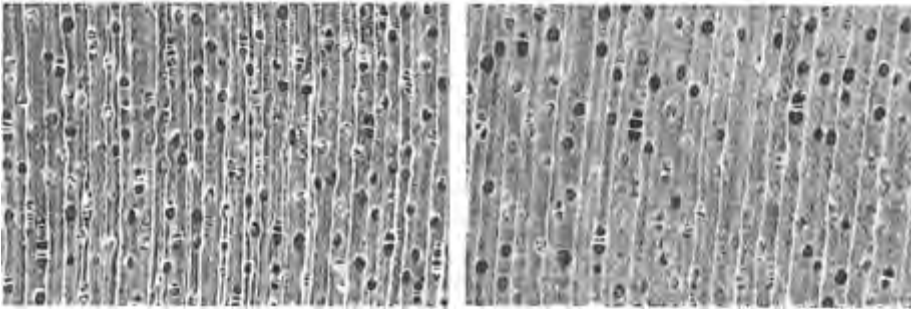
Soft kereti

**Vernacular name:**

Soft kereti (Cr)

**Field characteristics and distribution:**

Tree -30 m tall, trunk -0.5 m in diameter.  
Common near the interior, in primary or secondary mixed forest on brown sand.



1 mm

**Physical properties and structural features:**

Lustrous wood of low density. Heartwood basically brown or shades of brown, copper-coloured or shades of copper and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** indistinct to naked eye. Sparse to somewhat Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally medium. sparse. Numerous solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** large. **Rays** sometimes distinct, sometimes indistinct to naked eye. The width compared to the vessels is  $\frac{1}{4}$  of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse rays per 5 mm, low.

**Additional feature:**

Oil or mucilage cells present.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

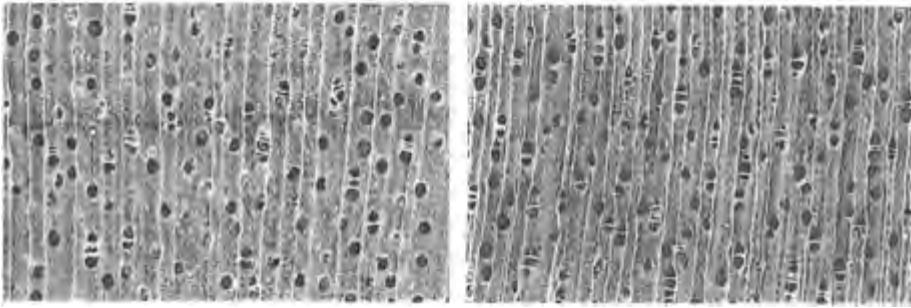
**Vernacular names:**

Hard kereti (Cr)

**Field characteristics and distribution:**

Tree -33 m tall, trunk -0.65 m in diameter.

Occasional to common near the interior, in mixed forest on sand, sandy clay, or laterite.



1 mm

**Physical properties and structural features:**

Lustrous wood of low density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** indistinct to naked eye. Sparse to somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally medium. Medium to numerous solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** large. **Rays** sometimes distinct sometimes indistinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse to numerous rays per 5 mm, low to high.

**Additional feature:**

Oil or mucilage cells present.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
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58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

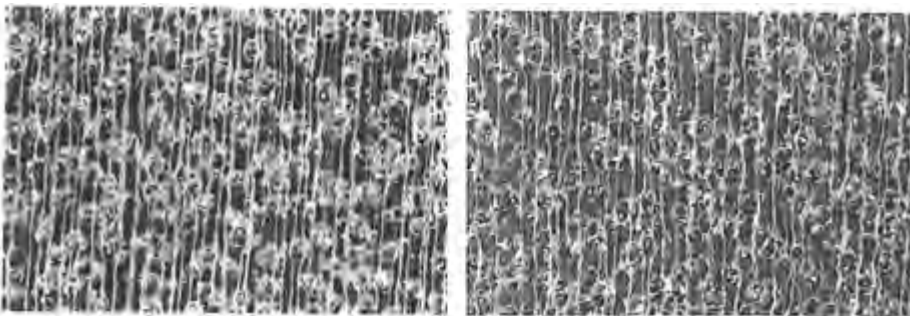
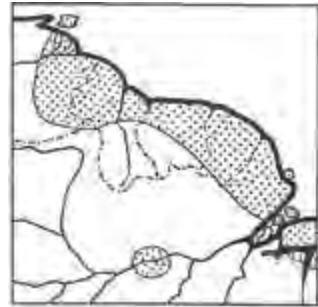
**Synonym:** *Nectandra rubra* (Mez) Allen

**Vernacular names:**

Determa (Cr), Teteruma (Ar), Wanu (C)

**Field characteristics and distribution:**

Tree -40 (-50) m tall, trunk -1 (-1.5) m in diameter.  
 Locally frequent in mixed forest (e.g. Greenheart forest).  
 Found chiefly east of the Essequibo River.



1 mm

**Physical properties and structural features:**

Dull wood of low density. Heartwood basically brown or shades of brown, copper or copper-coloured and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels with diagonal pattern. Tyloses present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, paratracheal scanty, vasicentric and unilateral. **Proportion of ground tissue fibres** medium. **Rays** sometimes distinct, sometimes indistinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse to numerous rays per 5 mm, high.

**Additional feature:**

Oil or mucilage cells present.

**Numbers of features in the key:**

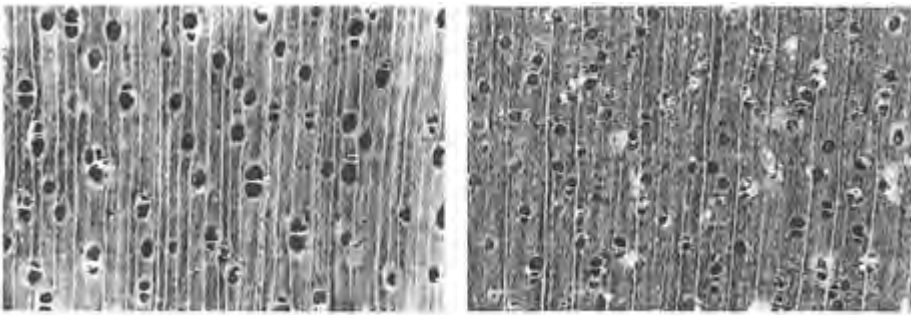
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58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Baradan (Ar), Yanéau (Ak)

**Field characteristics and distribution:**

Tree -40 (-45) m tall, trunk 0.8 (-1.2) m in diameter.  
Occasional to locally frequent in mixed forest.  
Occurring in the Lower Cuyuni River basin, north-west-district and Rupununi district.



1 mm

**Physical properties and structural features:**

Lustrous wood of low density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally medium to large. Numerous solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse rays per 5 mm, low to high.

**Additional feature:**

Oil or mucilage cells present.

**Numbers of features in the key:**

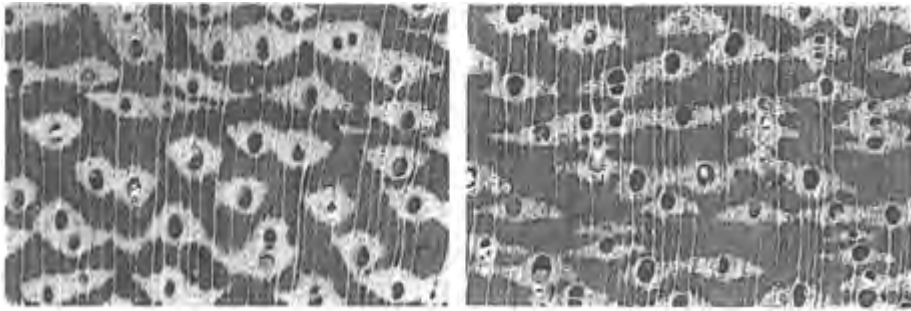
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Barakaro (Ar), Epik rik (Ak), Jumbi bead tree (Cr), Lucky seed (Cr)

**Field characteristics and distribution:**

Tree -35 m tall, trunk -0,9 m in diameter.  
 Locally dominant in evergreen seasonal forest, rare to occasional in mixed forest.  
 Occurring near the interior and Pakaraima Mts.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown, copper-coloured or shades of copper and darker than the sapwood. Axial parenchyma/fibres storied. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of different sizes and of >4 vessels with tangential and diagonal pattern. Tyloses and inclusions present. Diameter medium to large. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, paratracheal aliform and confluent. **Proportion of ground tissue fibres** medium. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse rays per 5 mm, low to high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

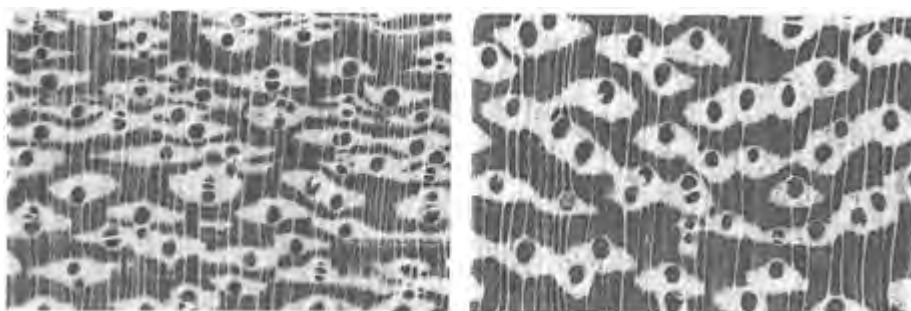
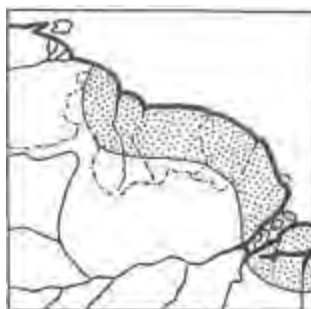
**Vernacular names:**

Crook (Cr), Horse-eye (Cr), Korokororo (Ar), Korongpin-biu (Ak), Wanaka (M)

**Field characteristics and distribution:**

Tree -35(-60) m tall, trunk -0.75 m in diameter.

Occasional to frequent in Wallaba forest and in marsh forest in central Guyana. In Wallaba forest often near creeks.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Axial parenchyma/fibres storied. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of different sizes and of 2-4 and >4 vessels with tangential and diagonal pattern. Inclusions present. Diameter generally medium to large. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, paratracheal aliform and confluent. **Proportion of ground tissue fibres** small to medium. **Rays** distinct to naked eye. The width compared to the vessels is smaller than  $\frac{1}{4}$  of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse rays per 5 mm, low to high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
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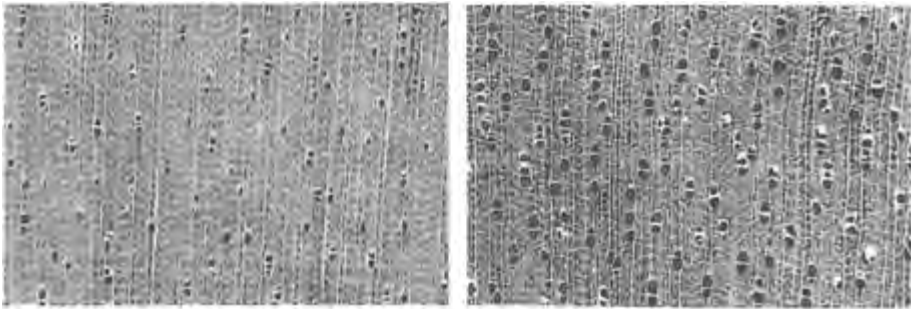
**Synonyms:** *Parahancornia amapa* (Huber) Ducke;  
*Parahancornia fasciculata* (Poir.) Benoist

**Vernacular name:**

Dukali (Ar)

**Field characteristics and distribution:**

Tree -25 (-40) m tall, trunk -0.45 (-1) m in diameter.  
 Occasional in Mora forest and Wallaba forest. Rare to occasional in mixed forest and marsh forest. Occurring near the interior and southeastern Guyana.



1 mm

**Physical properties and structural features:**

Lustrous wood of low density. Heartwood basically brown or shades of brown, red or shades of red, yellow or shades of yellow and no difference between heart- and sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** indistinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 and >4 vessels. Inclusions present. Diameter generally small. Medium solitary vessels. **Axial parenchyma** indistinct to naked eye, apotracheal diffuse and diffuse-in-aggregates, banded scalariform and reticulate. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Numerous rays per 5 mm, low.

**Additional feature:**

Radial canals present.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
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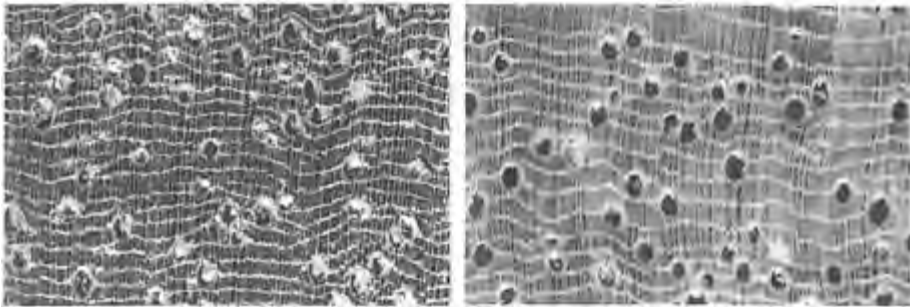
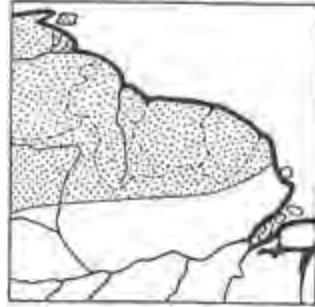


**Vernacular names:**

Broad-leaved burada (Cr), Bu(hu)rada (Ar), Candlewood (Cr), Kupisini (C), Mahaicabali (Ar), Makarai (Ak), Wamuk (W), Wamuku (M)

**Field characteristics and distribution:**

Tree -35 m tall, trunk -0.7 (-1.2) m in diameter. Frequent to locally dominant in evergreen seasonal forest near the interior. Occasional to frequent in Mora forest and marsh forest. Occasional in Wallaba forest. Also occurring as a shrub in savanna. Widely distributed.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown, yellow or shades of yellow and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Sparse. Arrangement exclusively solitary. Tyloses present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, banded irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Extremely numerous rays per 5 mm, high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

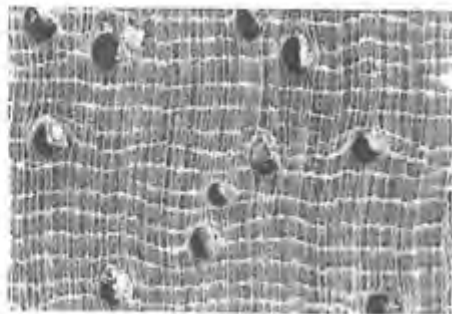
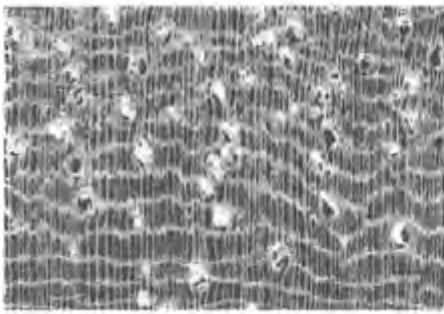
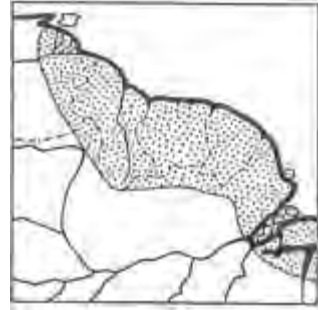
**Vernacular name:**

Burada (Ar)

**Field characteristics and distribution:**

Tree -40 m tall, trunk -1.5 m in diameter.

Occasional in east-central and southern Guyana, in riverine forest.



1 mm

**Physical properties and structural features:**

Dull wood of medium to high density. Heartwood basically brown or shades of brown, darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement exclusively solitary. Tyloses present. Diameter generally medium to large. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, banded irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Numerous to extremely numerous rays per 5 mm, low to high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

55 *Peltogyne venosa* (Vahl) Benth.

Purpleheart

**Vernacular names:**

Purpleheart (Cr).

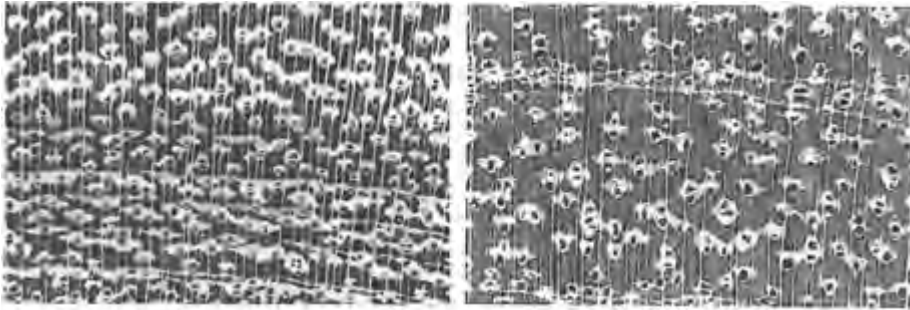
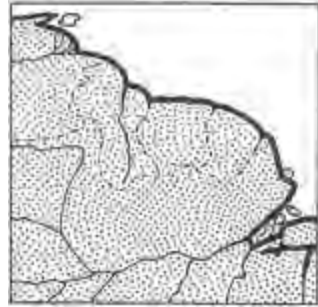
For subsp. *densiflora*: Karawai (Ak), Koroboreli (Ar), Marako (C), Mök (Ak).

For subsp. *venosa*: Kukwi (Ak), Saka (Ar)

**Field characteristics and distribution:**

Tree -35 (-55) m tall, trunk -0.9 (-1.5) m in diameter.

Locally frequent, often along rivers, in mixed forest, seasonal forest and Mora forest. Widely distributed.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown, red or shades of red and darker than the sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** indistinct to naked eye. Somewhat sparse. Arrangement mainly solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Dark inclusions present. Diameter generally small. Numerous solitary vessels. **Axial parenchyma** sometimes distinct, sometimes indistinct to naked eye, paratracheal aliform, confluent and unilateral, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** small to medium. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size to half of vessel-size to smaller than the vessels. Rays narrow. Sparse to numerous rays per 5 mm, low.

**Numbers of features in the key:**

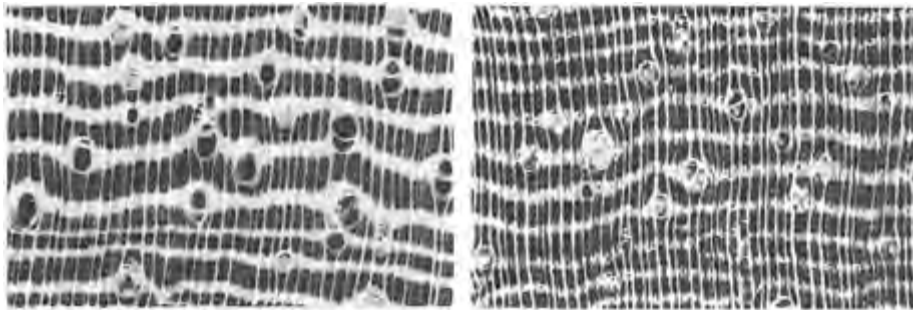
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20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Pakuri (Ar), Wild mammee apple (Cr)

**Field characteristics and distribution:**

Tree -35 m tall, trunk -0.8 (-1.2) m in diameter.  
Locally frequent in mixed forest and in Wallaba forest.  
Common near the interior.



1 mm

**Physical properties and structural features:**

Dull wood of medium density. Heartwood basically brown or shades of brown, yellow or shades of yellow and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Extremely sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses and inclusions present. Diameter generally large. Medium to numerous solitary vessels. **Axial parenchyma** distinct to naked eye. Distribution banded parenchyma of irregular type. Medium parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands and as wide as the fibre tissue bands or even wider. **Proportion of ground tissue fibres** small to medium. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Numerous rays per 5 mm, high to very high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

57 *Pouteria cuspidata* (A. DC.) Baehni

Kokoritiballi

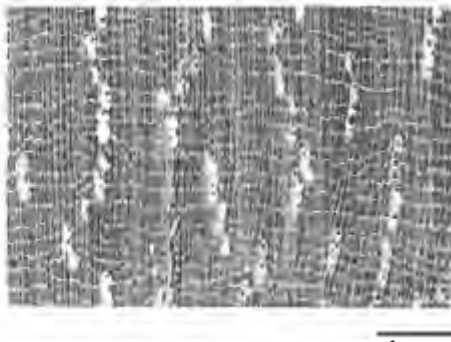
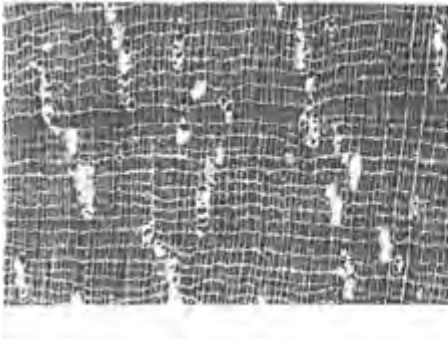
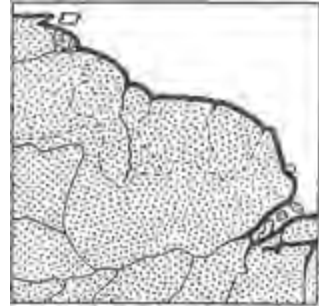
**Synonyms:** *Pouteria dura* Eyma; *Neoxythece dura* (Eyma) Aubr. & Pellegr.  
(both for *Pouteria cuspidata* (A. DC.) Baehni)  
subsp. *dura* (Eyma) Penn.)

**Vernacular names:**

Bastard kokoritiballi (Cr), Kokoritiballi (Ar)

**Field characteristics and distribution:**

Tree -35 m tall, trunk -0.6 m in diameter.  
In mixed forest, particularly along rivers (subsp. *cuspidata*)  
or in Wallaba forest (subsp. *dura*). General near the interior.



1 mm

**Physical properties and structural features:**

Dull wood of heavy density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** indistinct to naked eye. Extremely sparse to sparse. Arrangement solitary and mainly in radial multiples or clusters. Sometimes even exclusively radial multiples. Radial multiples of the same size and of > 4 vessels. Tyloses present. Diameter generally medium. Few solitary vessels. **Axial parenchyma** indistinct to naked eye, banded reticulate. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Extremely numerous rays per 5 mm, low to high.

**Numbers of features in the key:**

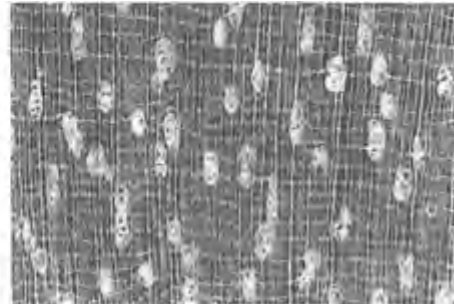
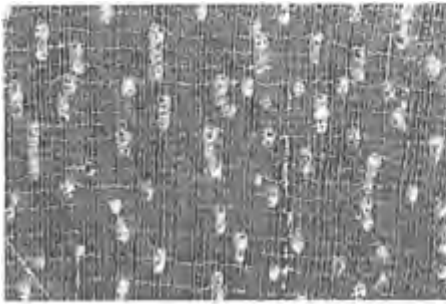
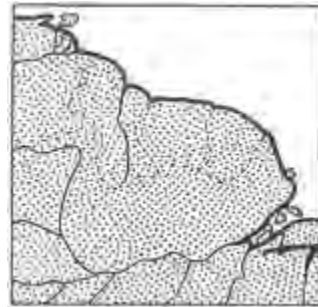
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39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Asepoko (Ar), Common asepoko (Cr), Marapasmukri (M), Pöyak (Ak)

**Field characteristics and distribution:**

Tree -35 (-40) m tall, trunk -0.9 m in diameter. Occasional to common in mixed forest near the interior, but less frequent in northeastern Guyana. Occasional in Mora forest in southeastern Guyana.



1 mm

**Physical properties and structural features:**

Dull wood of high density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** indistinct to naked eye. Extremely sparse to sparse. Arrangement solitary and mainly in radial multiples or clusters. Radial multiples of the same size and of >4 vessels. Tyloses present. Diameter generally medium. Few solitary vessels. **Axial parenchyma** indistinct to naked eye, banded reticulate. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Extremely numerous rays per 5 mm, low to high.

**Numbers of features in the key:**

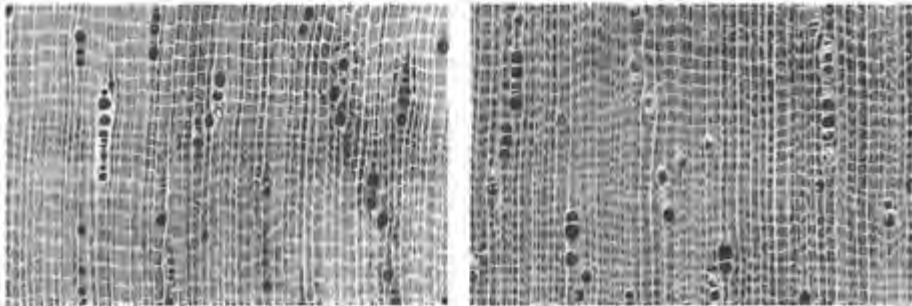
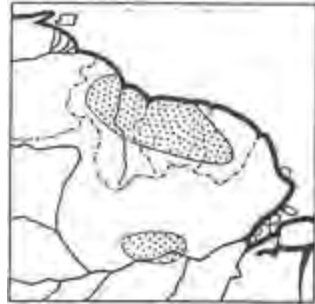
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39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Chuya (M), Durban pine (Cr), Por (W), Suya (Cr)

**Field characteristics and distribution:**

Tree -35 (-45) m tall, trunk -0.9 (-1.2) m in diameter. Locally common in mixed and seasonal forest, in hilly terrain near the interior, Rupununi district and the Kanuku Mts.



1 mm

**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically brown or shades of brown, red or shades of red without any difference between heart- and sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and mainly in radial multiples or clusters. Radial multiples of different sizes and of >4 vessels. Tyloses present. Diameter generally medium. Few solitary vessels. **Axial parenchyma** sometimes distinct, sometimes indistinct to naked eye, banded reticulate. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Numerous rays per 5 mm, low to high.

**Numbers of features in the key:**

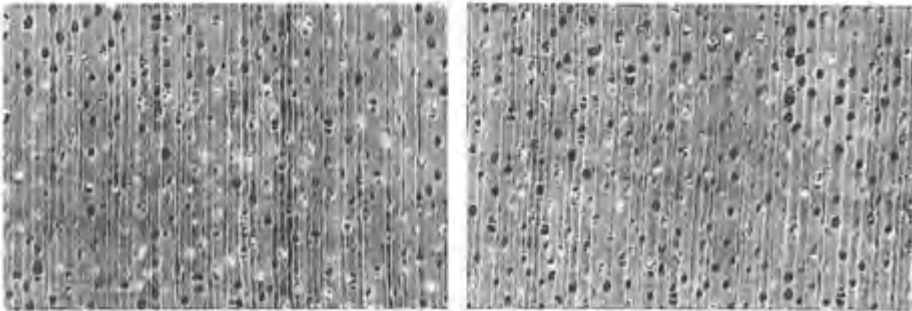
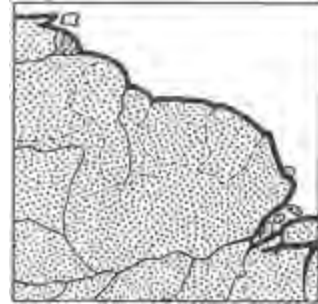
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39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Common kurokai (Cr), Kurokai (Ar), Maruwa (Ak), Porokai (Ar), Waruwai (Ak)

**Field characteristics and distribution:**

Tree -25 (-40) m tall, trunk -0.7 m in diameter. Occurring frequently in mixed, Mora and marsh forest. Widely distributed, except in northeastern Guyana.



**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically brown or shades of brown without any difference between heart- and sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** indistinct to naked eye. Fairly numerous. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses and dark inclusions present. Diameter generally small. Numerous solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** medium to large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Numerous rays per 5 mm, low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95



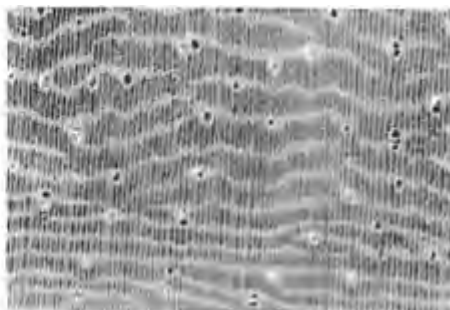
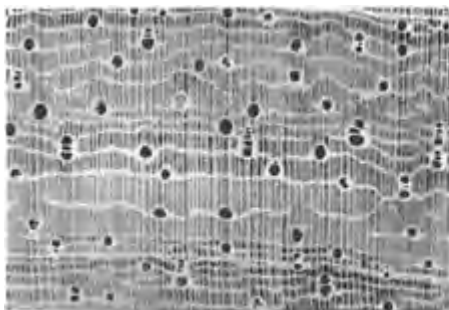
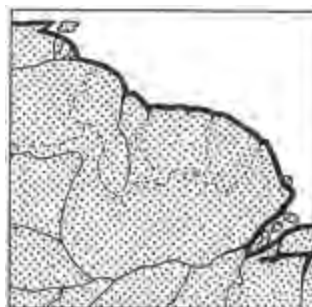
**Vernacular names:**

Hill corkwood (Cr), Itikiboro (Ar), Mutushi (C)

**Field characteristics and distribution:**

Tree -35 m tall, trunk -1 m in diameter.

Occasional to locally frequent in (dry) mixed forest near the interior, Kanuku Mts. and Rupununi district.



1 mm

**Physical properties and structural features:**

Dull wood of low density. Heartwood basically white to grey, without any difference between heart- and sapwood. Rays and axial parenchyma storied. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** indistinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally small to medium. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, paratracheal aliform, banded marginal and irregular. Narrow to medium parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium to large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Extremely numerous rays per 5 mm, very low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

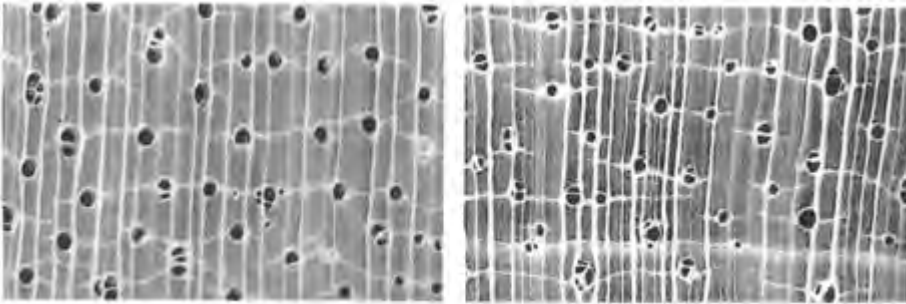
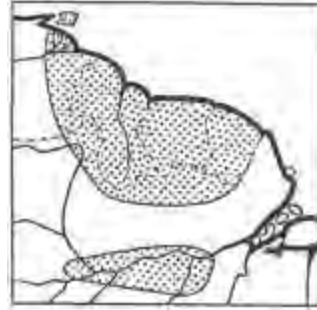
**Synonym:** *Simarouba amara* Aublet

**Vernacular names:**

Aku (Ak), Bitter ash (Cr), Shirima (M), Simarupa (Ar, C), Simere (W), Yaku (Ar)

**Field characteristics and distribution:**

Tree -35 (-45) m tall, trunk -0.75 m in diameter. Frequent in evergreen seasonal forest. Occasional in mixed forest and Wallaba forest. Widely distributed.



1 mm

**Physical properties and structural features:**

Lustrous wood of low density. Heartwood brown or shades of brown, yellow or shades of yellow and without any difference between heart- and sapwood. Distinct odour. Rays storied. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Clusters of 2-4 vessels. Tyloses and dark inclusions present. Diameter generally medium. Medium to numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, paratracheal aliform and confluent. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse to numerous rays per 5 mm, low.

**Additional features:**

Occasionally vertical canals surrounded by parenchyma bands. Wood with bitter taste.

**Numbers of features in the key:**

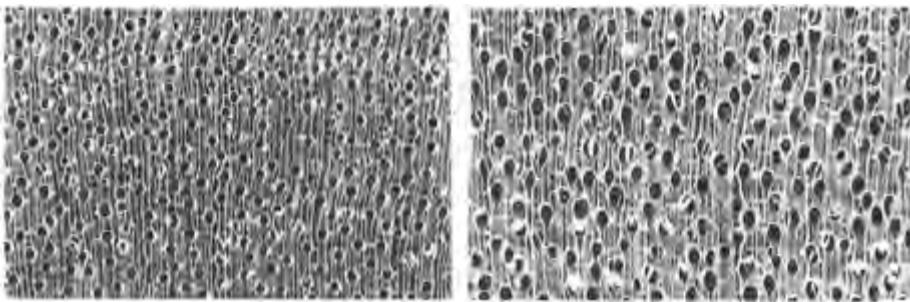
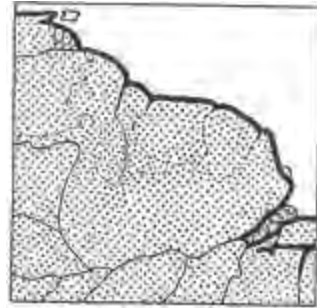
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
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58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Dukuria (Ar), Kötöre (Ak), Puire (M), Sand dukuria (Cr), Yapopari (C)

**Field characteristics and distribution:**

Tree -30 m tall, trunk -0.6 (-0.8) m in diameter. Occasional in mixed forest, Wallaba forest and savanna. General near the interior, Rupununi district and southeastern Guyana.



1 mm

**Physical properties and structural features:**

Dull wood of medium density. Heartwood basically brown or shades of brown, red or shades of red and slightly darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Somewhat sparse to fairly numerous. Arrangement exclusively solitary. Diameter generally small. Numerous solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** medium to large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Numerous rays per 5 mm, high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

64 *Schefflera decaphylla*  
(Seemann) Harms

Blunt-leaf karohoro

**Synonym:** *Schefflera paraensis* Huber ex Ducke

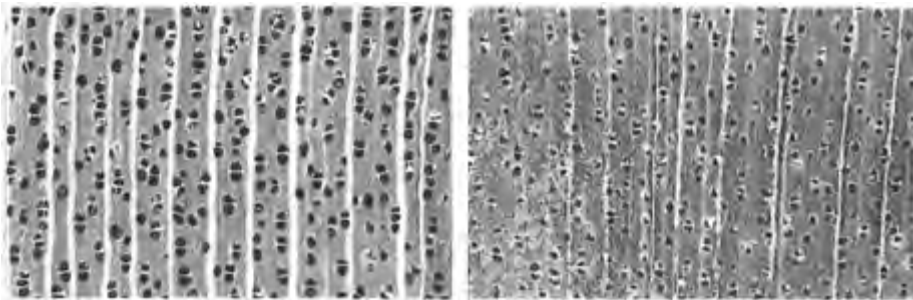
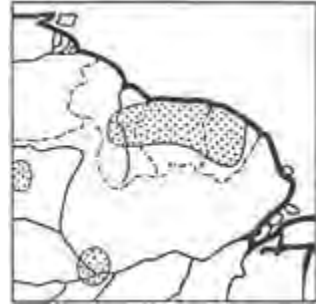
**Vernacular names:**

Blunt-leaf karohoro (Cr), Karohoro (Ar), Matchwood (Cr)

**Field characteristics and distribution:**

Tree -30 m tall, trunk -0.55 m in diameter.

Occasional in Wallaba forest, rare in mixed forest and Mora forest. A common species near the interior, Rupununi district and southeastern Guyana



1 mm

**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically brown or shades of brown, yellow or shades of yellow, white to grey without any difference between heart- and sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** indistinct to naked eye. Somewhat sparse to fairly numerous. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Clusters of 2-4 vessels. Diameter generally small. Medium to numerous solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is  $\frac{1}{4}$  of vessel-size to smaller than the vessels. Rays narrow to medium. Extremely sparse to sparse rays per 5 mm, low to high.

**Additional feature:**

Radial canals present.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

65 *Schefflera morototoni*  
(Aublet) Maguire, Steyer. & Frodin

Pointed-leaf karohoro

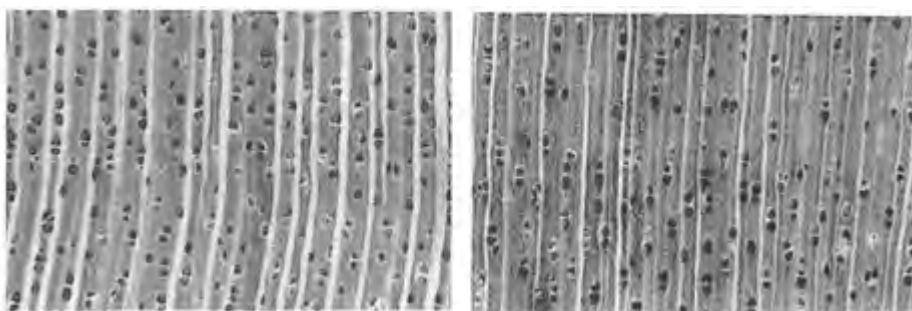
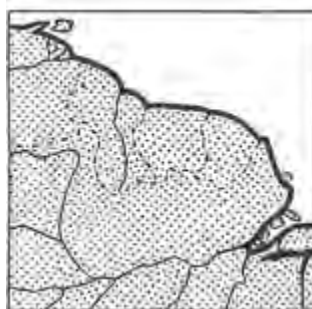
**Synonym:** *Didymopanax morototoni* Aublet

**Vernacular names:**

Karohoro (Ar), Matchwood (Cr), Morototo (C), Pi (W),  
Pointed-leaf karohoro (Cr), Pöрмаi (Ak), Puna (M)

**Field characteristics and distribution:**

Tree -35 m tall, trunk -0.8 m in diameter.  
Occurring in primary and secondary mixed forest and in  
Mora forest. An occasional, but widely distributed species.



1 mm

**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically brown or shades of brown, yellow or shades of yellow, white to grey and without any difference between heart- and sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** indistinct to naked eye. Somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Diameter generally small. Medium solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** medium to large. **Rays** distinct to naked eye. The width compared to the vessels is half of vessel-size to smaller than the vessels. Rays narrow to medium. Extremely sparse to sparse rays per 5 mm, high.

**Numbers of features in the key:**

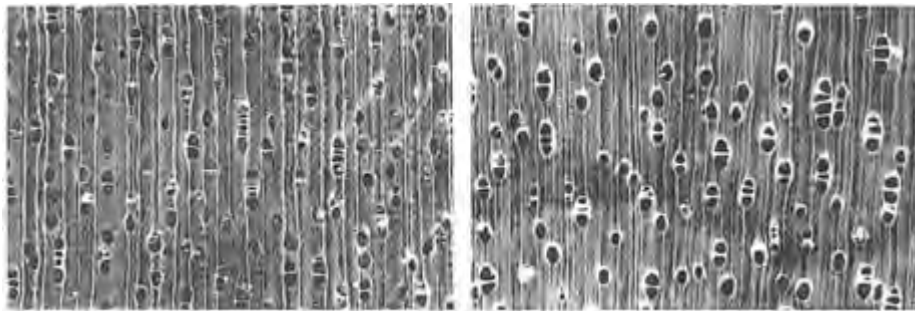
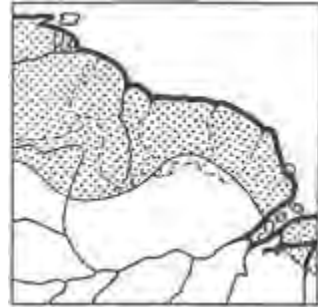
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20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Araurama (C), Kaditiri (Ar), Kalili (W), Kata (M), Thick-skin kaditiri (Cr), Wamkoam (W), Warabari (Ak), Ya-wardan (Ar)

**Field characteristics and distribution:**

Tree -40 m tall, trunk -0.65 (-0.9) m in diameter. Occasional to frequent in mixed forest, rare in Wallaba forest. Widely distributed near the interior.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium to high density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse to somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Diameter generally small to medium. Numerous solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** medium to large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Numerous rays per 5 mm, very low.

**Numbers of features in the key:**

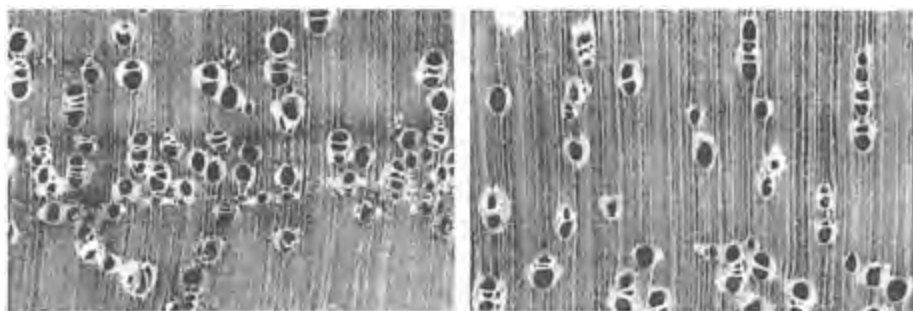
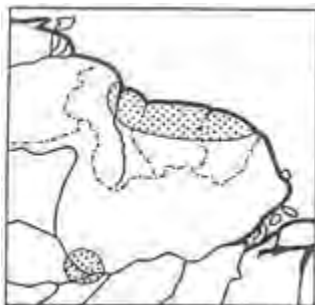
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39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Kaditiri (Ar), Thin-skin kaditiri (Ar)

**Field characteristics and distribution:**

Tree -42 m tall, trunk -0.7 m in diameter.  
Occasional in north-central Guyana, in mixed and marsh forest, on sand or sandy loam.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of different sizes and of 2-4 and >4 vessels. Clusters of 2-4 vessels. Diameter generally medium. Medium solitary vessels. **Axial parenchyma** indistinct to naked eye, scanty paratracheal and vasicentric. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Width of rays narrow. Numerous rays per 5 mm, very low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Synonym:** *Xylosterculia rugosa* (R. Br.) Kosterm.

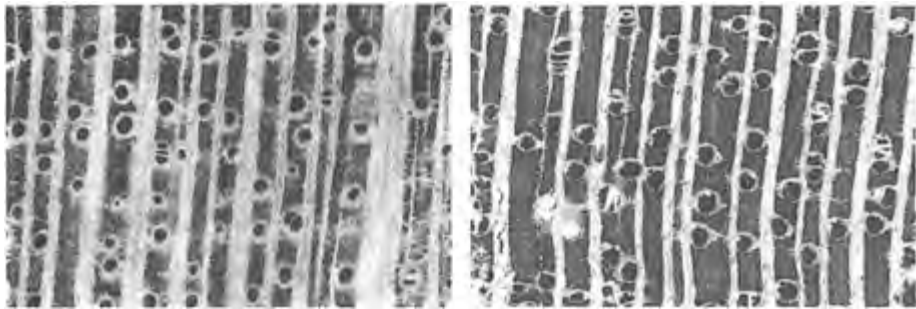
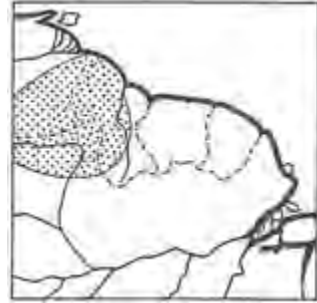
**Vernacular names:**

Kara (M), Maho (Ar), Ranai (W), Rough-leaf maho (Cr), Saraurai (Ak), Sekerau (Ak), Yahu (Ar)

**Field characteristics and distribution:**

Tree -40 m tall, trunk -0.9 m in diameter.

Frequent to occasional in mixed forest. Occasional in Mora forest. Occurring near the interior.



1 mm

**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically brown or shades of brown, white to grey and without any difference between heart- and sapwood. Axial parenchyma/fibres storied. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same and of different sizes and of 2-4 and >4 vessels. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, apotracheal diffuse and diffuse-in-aggregates, paratracheal vascentric, occasionally banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands small to large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is as large as the vessels or even larger. Rays wide. Extremely sparse rays per 5 mm, very high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

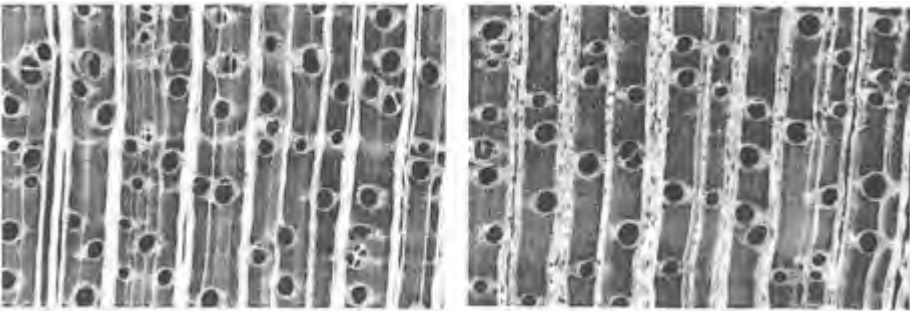


67a *Sterculia pruriens* (Aublet) Schumann

Smooth-leaf maho

**Vernacular name:**  
Smooth-leaf maho (Cr)

**Field characteristics and distribution:**  
Tree -35 m tall, trunk -0.7 m in diameter.  
Widely distributed. Common in mixed and riverine forest, occasional in marsh forest, on sandy soil.



1 mm

**Physical properties and structural features:**

Lustrous wood of low density. Heartwood basically brown or shades of brown, red or shades of red, white to grey and darker than the sapwood. Axial parenchyma/fibres storied. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same and of different sizes and of 2-4 vessels. Diameter generally medium to large. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, apotracheal diffuse and diffuse-in-aggregates, paratracheal vascentric, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** distinct to naked eye. The width compared to the vessels is half of vessel-size to smaller than the vessels. Rays medium to wide. Extremely sparse to sparse rays per 5 mm, very high.

**Numbers of features in the key:**

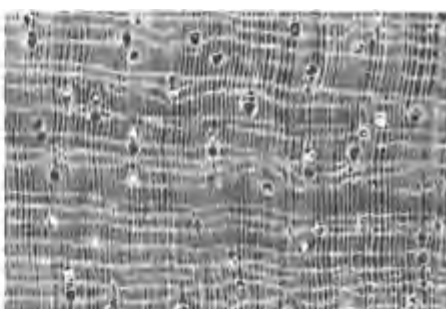
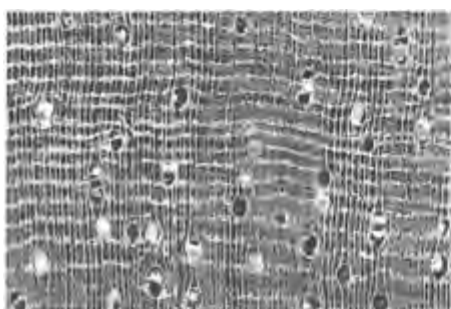
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39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Itikiboroballi (Ar), Morompo (M), Okraprabu (Ak)

**Field characteristics and distribution:**

Tree -30 m tall, trunk -0.6 m in diameter. Occasional in Wallaba forest, rare in mixed forest. Occurring in north-central and northeastern Guyana, and in the Pakaraima Mts.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Distinct odour. Rays storied. Growth ring boundaries distinct.

**Anatomical features:**

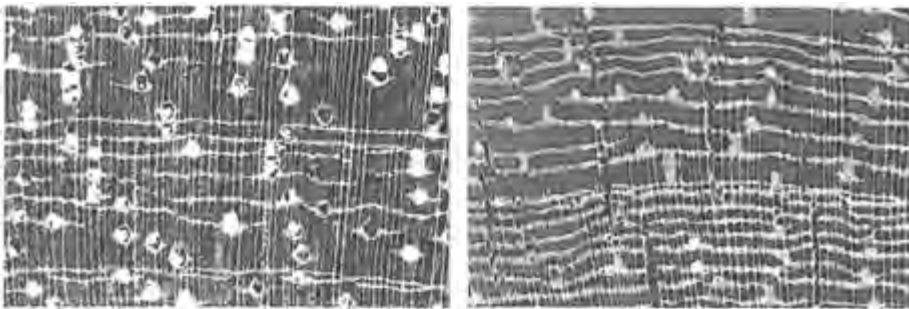
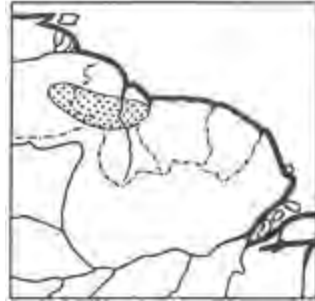
**Vessels** sometimes distinct, sometimes indistinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of different sizes and of 2-4 vessels. Tyloses and inclusions present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye. Distribution banded parenchyma of marginal and irregular type. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Numerous to extremely numerous rays per 5 mm, low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular name:**  
Itikiboroballi (Ar)

**Field characteristics and distribution:**  
Tree -30 m tall, trunk -0.5 m in diameter.  
Occasional to locally frequent in central Guyana and the Pakaraima Mts., in mixed, Mora, and riverine forest on sandy soil.



1 mm

**Physical properties and structural features:**  
Lustrous wood of high density. Heartwood basically brown or shades of brown and darker than the sapwood. Rays storied. Growth ring boundaries indistinct or absent.

**Anatomical features:**  
**Vessels** distinct to naked eye. Extremely sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of different sizes and of 2-4 and >4 vessels. Tyloses and inclusions present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, apotracheal diffuse-in-aggregates, banded marginal and irregular. Narrow parenchyma bands. Distance between the parenchyma bands small to large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Extremely numerous rays per 5 mm, low.

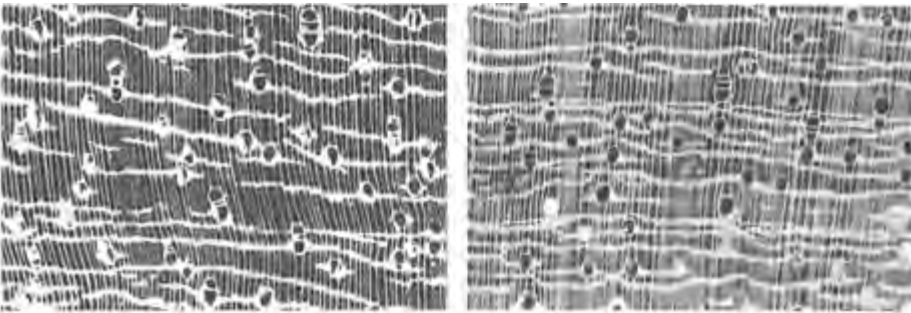
**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular name:**  
Itikiboroballi (Ar)

**Field characteristics and distribution:**

Tree 12-30 m tall, trunk 0.1-0.4 m in diameter.  
Rare to occasional in north-central and central Guyana and the eastern part of the Pakaraima Mts., in Wallaba or mixed forest on white or brown sand.



1 mm

**Physical properties and structural features:**

Dull wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Rays and axial parenchyma/fibres storied. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, banded marginal and irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than  $\frac{1}{4}$  of vessel-size. Rays narrow. Extremely numerous rays per 5 mm, low.

**Numbers of features in the key:**

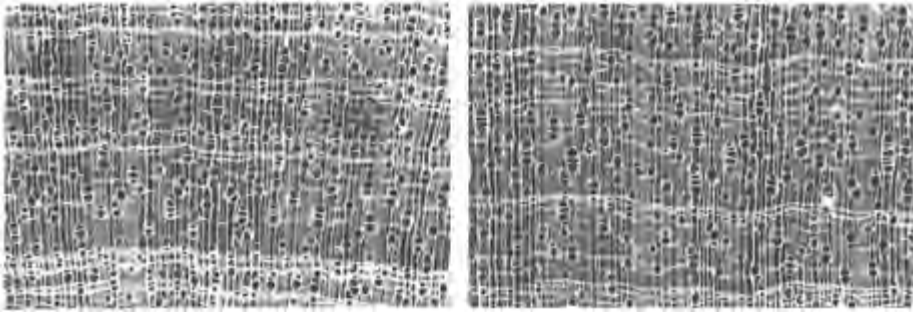
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
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58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Awartu (M), Brown ebony (Cr), Clubwood (Cr), Ironwood (Cr), Shiraip (W), Wamara (Ar)

**Field characteristics and distribution:**

Tree -35 (-45) m tall, trunk -0.75 m in diameter. Dominant in seasonal forest. Frequent in other types of seasonal forest and in mixed forest, occasional in Mora forest. Widely distributed, except in parts of the north-west-district; apparently endemic to Guyana.



1 mm

**Physical properties and structural features:**

Dull wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Rays storied. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** indistinct to naked eye. Somewhat sparse to fairly numerous. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally medium. Medium solitary vessels. **Axial parenchyma** distinct to naked eye, apotracheal diffuse-in-aggregates, paratracheal aliform and confluent, banded marginal and irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow. Extremely numerous rays per 5 mm, low.

**Numbers of features in the key:**

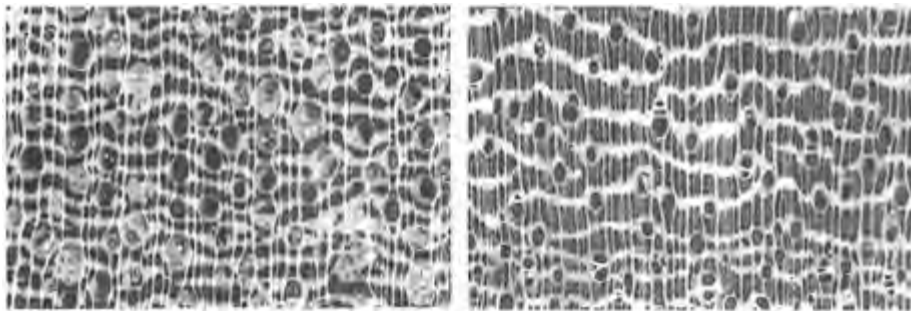
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20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Buckwax tree (Cr), Karamanni (M), Maitakin (Ak), Manni (Ar)

**Field characteristics and distribution:**

Tree -25 (-40) m tall, trunk -0.55 (-1.2) m in diameter. Dominant to common in swamp and marsh forest. Less frequent in mixed forest, mainly near creeks. Occasional in Mora forest, rare in Wallaba forest.



1 mm

**Physical properties and structural features:**

Dull to lustrous wood of low to medium density. Heartwood basically brown or shades of brown, yellow or shades of yellow, white to grey and darker than the sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same and of different sizes and of 2-4 and >4 vessels. Tyloses present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, banded irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands or as wide as the fibre tissue bands or even wider. **Proportion of ground tissue fibres** small to medium. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Numerous rays per 5 mm, high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

71 *Tabebuia insignis* (Miq.) Sandw.  
var. *monophylla* Sandw.

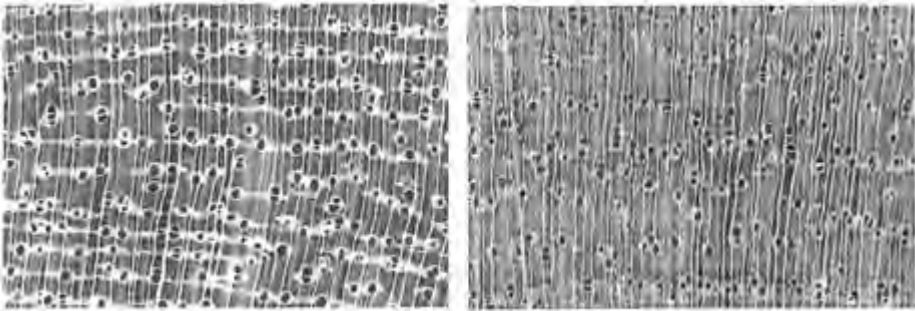
White cedar

**Vernacular names:**

Panda (C), Warakuri (Ar), White cedar (Cr)

**Field characteristics and distribution:**

Tree -30 (-40) m tall, trunk -0.5 (-1) m in diameter. Occurring abundantly in marsh forest. Occasional to frequent on boggy savanna as a shrub or small tree. Widely distributed near the interior, the Rupununi district and southeastern Guyana. Preferring sandy soils.



1 mm

**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically brown or shades of brown and without any difference between heart- and sapwood. Rays and axial parenchyma/fibres sometimes storied sometimes not storied. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** indistinct to naked eye. Somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Clusters of 2-4 vessels. Diameter generally small. Numerous solitary vessels. **Axial parenchyma** sometimes distinct, sometimes indistinct to naked eye, paratracheal aliform and confluent, banded marginal and irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Numerous rays per 5 mm, low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

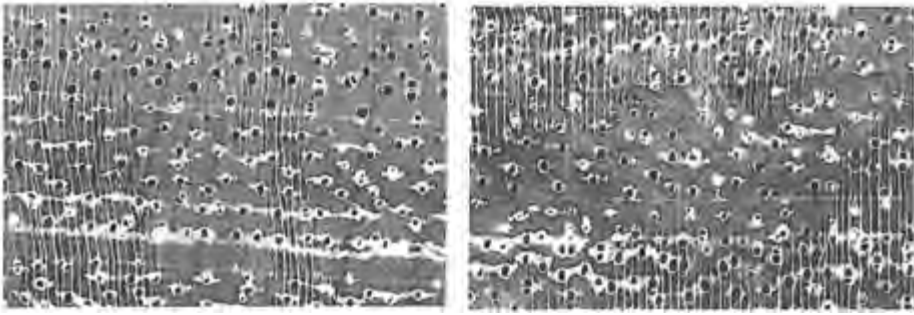
**Vernacular names:**

Arawnig (Ak), Aruain (Ak), Hakia (Ar), Ironwood (Cr), Konawadranup (W), Ranoi (M)

**Field characteristics and distribution:**

Tree -30 (-40) m tall, trunk -1 m in diameter.

Occasional in mixed forest, sometimes in marsh forest and Mora forest. General near the interior and southeastern Guyana.



1 mm

**Physical properties and structural features:**

Dull to lustrous wood of high density. Heartwood basically brown or shades of brown, red or shades of red, with streaks and darker than the sapwood. Rays and axial parenchyma/fibres storied. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** indistinct to naked eye. Somewhat sparse. Arrangement mainly solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses and inclusions present. Diameter generally small. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, paratracheal aliform, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Numerous rays per 5 mm, very low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
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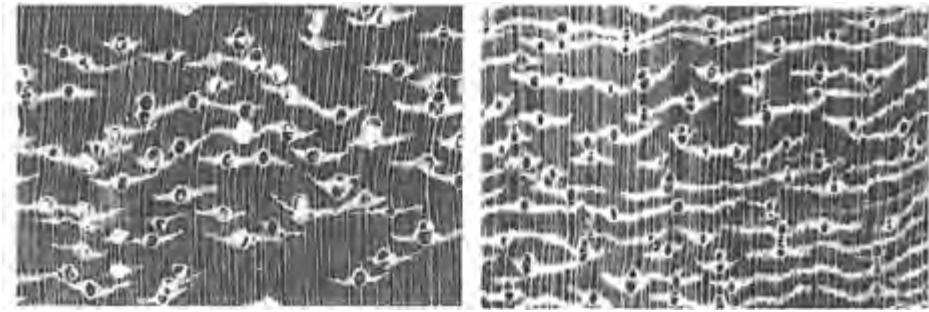


**Vernacular names:**

Candlewood (Cr), Karimora(-yek) (Ak), Moroballi (Ar), Sand mora (Cr)

**Field characteristics and distribution:**

Tree -35 m tall, trunk 0.6 (-0.75) m in diameter. Frequent in Wallaba forest. Occasional in mixed forest and in Clump wallaba forest. Occurring near the interior (but rare in the north-west-district) and the Pakaraima Mts.



1 mm

**Physical properties and structural features:**

Dull wood of high density. Heartwood basically brown or shades of brown and darker than the sapwood sometimes with streaks. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses and inclusions present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, paratracheal aliform and confluent, banded irregular. Narrow parenchyma bands. Distance between the parenchyma bands small. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Numerous to extremely numerous rays per 5 mm, low to high.

**Numbers of features in the key:**

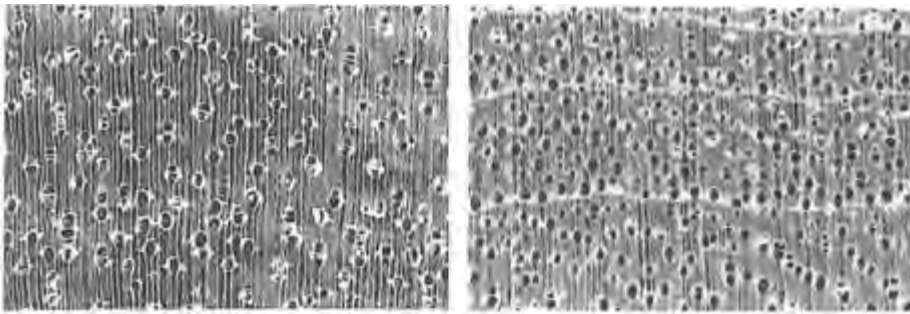
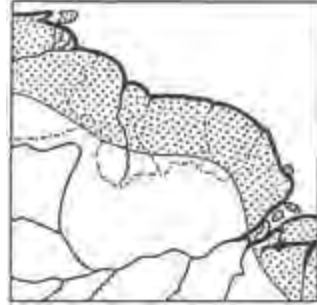
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20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Fukadi (Ar), Hill fukadi (Cr), Kwai (C), Matora (M), Tamarotan (W)

**Field characteristics and distribution:**

Tree -35 (-50) m tall, trunk -0.75 (-1.2) m in diameter. Common in evergreen seasonal forest and Wallaba forest. Occasional to frequent in mixed forest. General near the interior, the Rupununi, southeastern Guyana, and the Kanuku Mts.



1 mm

**Physical properties and structural features:**

Lustrous to dull wood of medium density. Heartwood basically brown or shades of brown, yellow or shades of yellow, with streaks and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** indistinct to naked eye. Somewhat sparse to fairly numerous. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Diagonal pattern. Tyloses present. Diameter generally small. Medium to numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, apotracheal diffuse, paratracheal aliform, confluent and unilateral, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. Numerous rays per 5 mm, low.

**Numbers of features in the key:**

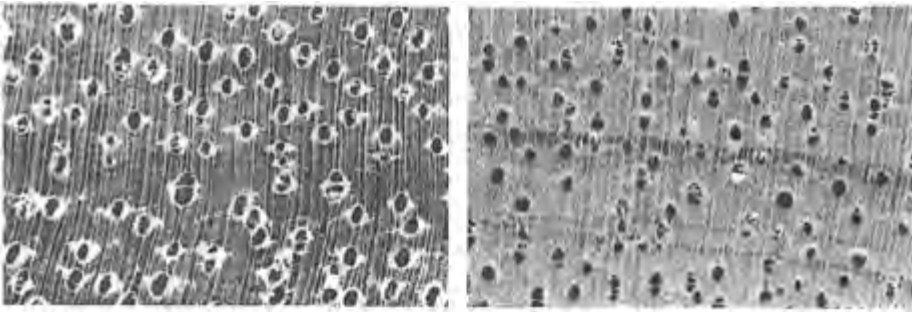
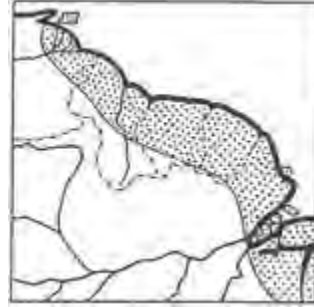
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20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Alasoabo (Ar), Coffee mortar (Cr), Cokerwood (Cr), Fukadi (Ar), Naharu (Cr), Simia chimi (Ak), Swamp fukadi (Cr)

**Field characteristics and distribution:**

Tree -35 (-45) m tall, trunk -1 m in diameter. Frequent in Mora forest. Occasional in mixed forest and marsh forest. Widely distributed species near the interior, the Rupununi district and the Kanuku Mts.



1 mm

**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically brown or shades of brown, yellow or shades of yellow, with streaks, darker than sapwood or without any difference between heart- and sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 and >4 vessels. Clusters of >4 vessels. Tyloses present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, paratracheal vasicentric and aliform. **Proportion of ground tissue fibres** medium to large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size to smaller than half of vessel-size. Rays narrow. Sparse to numerous rays per 5 mm, low.

**Numbers of features in the key:**

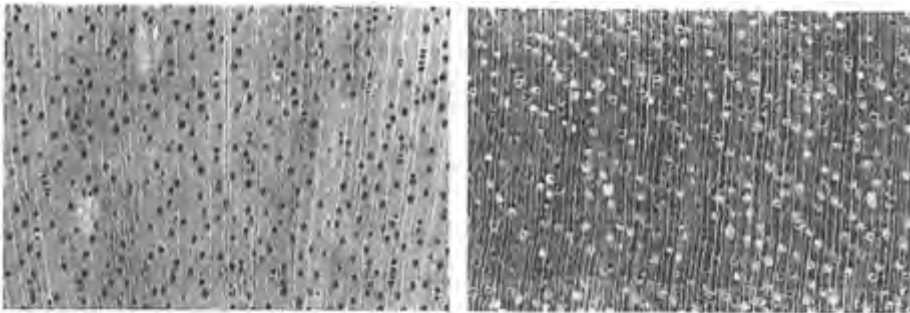
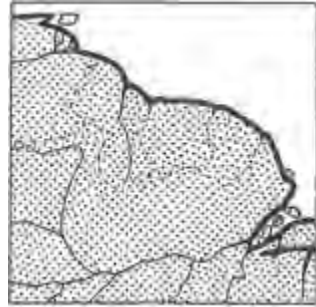
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20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Asau (W), Haiawaballi (Ar), Kamaragwa (M)

**Field characteristics and distribution:**

Tree -30 m tall, trunk -0.6 (-1) m in diameter.  
In mixed forest. Occurring in the north-west-district and the further interior.



1 mm

**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically brown or shades of brown, red or shades of red and darker than the sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** indistinct to naked eye. Numerous: Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally small. Numerous solitary vessels. **Axial parenchyma** absent/not visible by lens.

**Proportion of ground tissue fibres** medium. **Rays** indistinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than the vessels. Rays narrow. Numerous rays per 5 mm, low.

**Additional feature:**

Radial canals present.

**Numbers of features in the key:**

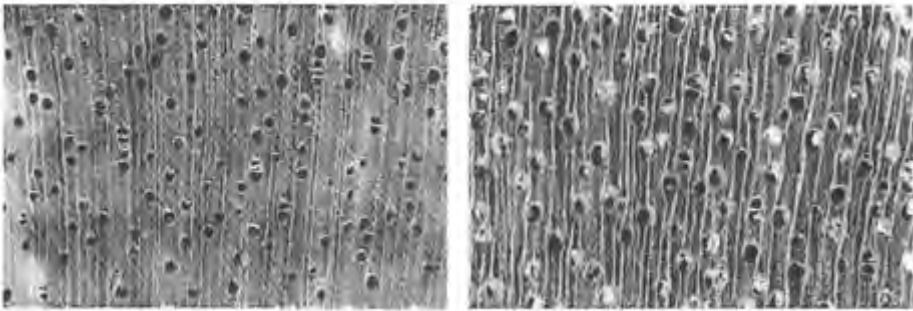
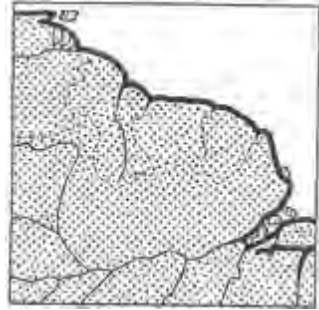
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20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Bastard kurokai (Cr), Thin-skin ulu (Cr), Ulu (Ar), Wayama (Ak)

**Field characteristics and distribution:**

Tree -30 (-40) m tall, trunk 0.4 - 1 m in diameter. Occasional in mixed and seasonal forest. Widely distributed.



1 mm

**Physical properties and structural features:**

Lustrous wood of low density. Heartwood basically brown or shades of brown, copper-coloured or shades of copper and without any difference between heart- and sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Sparse to somewhat sparse. Arrangement mainly solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally small to medium. Numerous solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** medium to large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Sparse rays per 5 mm, low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

77a *Trattinickia demerarae* Sandw.

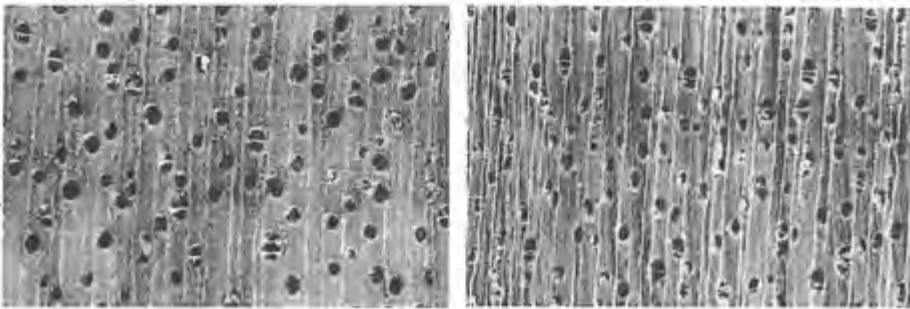
Thick-skin ulu

**Vernacular names:**

Thick-skin ulu (Cr), Ulu (Ar)

**Field characteristics and distribution:**

Tree -40 m tall, trunk -0.9 m in diameter.  
Occasional to common near the interior, in mixed, ever-green seasonal, Wallaba, and Mora forest, on sand or sandy loam.



1 mm

**Physical properties and structural features:**

Lustrous wood of low density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Sparse. Arrangement mainly solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally medium. Numerous solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Sparse rays per 5 mm, low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

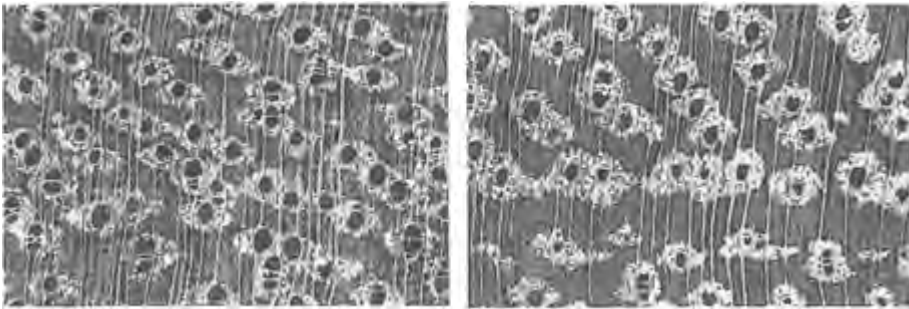
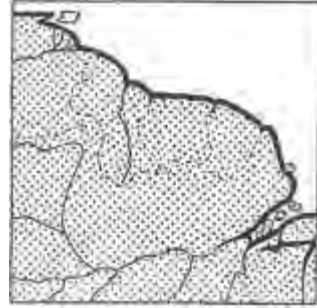
**Synonym:** *Vatairea surinamensis* Kleinh.

**Vernacular names:**

Arakaka(-yek) (Ak), Arisauro (Ar)

**Field characteristics and distribution:**

Tree -30 m tall, trunk -0.5 (-0.7) m in diameter.  
Frequent in swamp forest, marsh forest and Mora forest.  
General near the interior.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of different sizes and of 2-4 vessels with diagonal pattern. Diameter generally medium to large. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, paratracheal aliform and confluent, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than 1/4 of vessel-size. Rays narrow. Sparse rays per 5 mm, low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Synonym:** *Virola melinonii* (Benoist) A.C. Smith

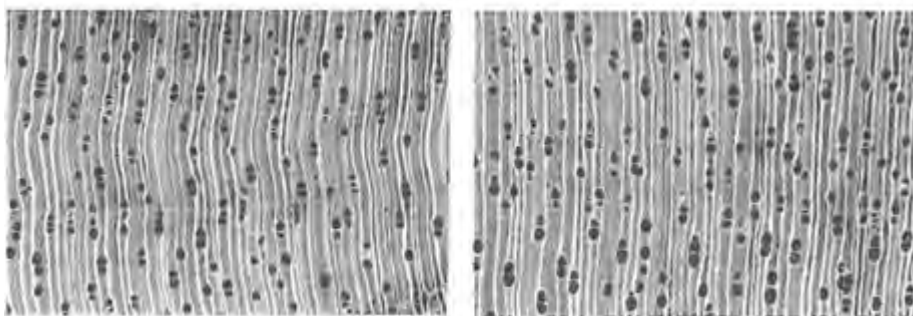
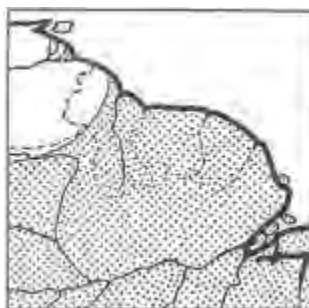
**Vernacular names:**

Dalli (Ar), Hill dalli (Cr), Irikwa (M, W)

**Field characteristics and distribution:**

Tree -35 m tall, trunk -0.6 (-1) m in diameter.

Locally occasional in mixed forest. Occurring in north-central and northeastern Guyana, Rupununi district and the Kanuku Mts.



1 mm

**Physical properties and structural features:**

Lustrous wood of low density. Heartwood basically brown or shades of brown, red or shades of red and without any difference between heart- and sapwood. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** indistinct to naked eye. Somewhat sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Diameter generally small. Medium solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is  $\frac{1}{4}$  of vessel-size to smaller than the vessels. Rays narrow. Numerous rays per 5 mm, high.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

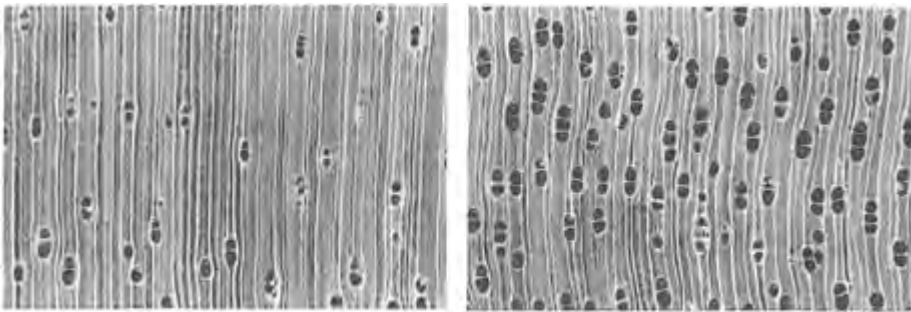


**Vernacular names:**

Baboonwood (Cr), Dalli (Ar), Dollywood (Cr), Irikwa (M, W), Swamp dalli (Cr), Warishi (C), We (Ak)

**Field characteristics and distribution:**

Tree -25 (-40) m tall, trunk -0.8 (-1.5) m in diameter. Abundant to frequent in marsh forest, Mora forest, and swamp forest. Rare in Greenheart forest. Occurring near the interior and Rupununi district.



1 mm

**Physical properties and structural features:**

Lustrous wood of low density. Heartwood basically brown or shades of brown and without any difference between heart- and sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Diameter generally medium. Few to medium solitary vessels. **Axial parenchyma** normally absent/not visible by lens. Occasionally banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than  $\frac{1}{4}$  of vessel-size. Rays narrow. Numerous rays per 5 mm, high.

**Additional feature:**

Radial canals sometimes present.

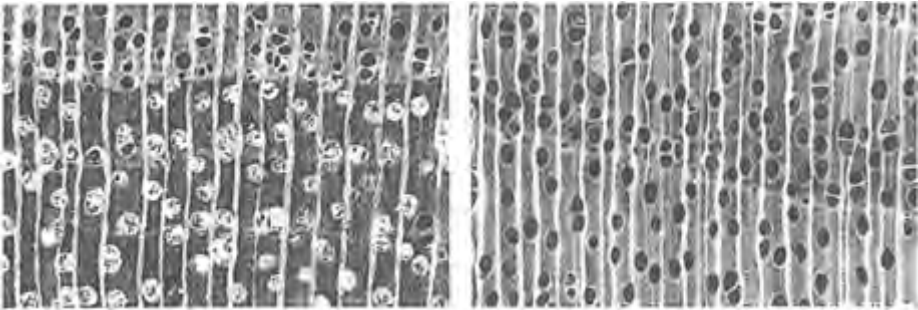
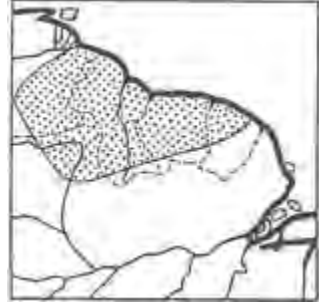
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58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular name:**  
Hakiaballi (Ar)

**Field characteristics and distribution:**

Tree -40 (-45) m tall, trunk -0.6 m in diameter.  
Occasional in mixed forest. Occurring near the interior and the Rupununi district.



1 mm

**Physical properties and structural features:**

Lustrous wood of low to medium density. Heartwood basically brown or shades of brown, yellow or shades of yellow and darker than the sapwood. Growth ring boundaries sometimes indistinct, sometimes distinct.

**Anatomical features:**

**Vessels** sometimes distinct, sometimes indistinct to naked eye. Somewhat sparse. Arrangement mainly solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Clusters of 2-4 vessels. Tyloses present. Diameter generally small to medium. Numerous solitary vessels. **Axial parenchyma** absent/not visible by lens. **Proportion of ground tissue fibres** medium to large. **Rays** distinct to naked eye. The width compared to the vessels is smaller than  $\frac{1}{4}$  of vessel-size to smaller than half of vessel-size. Rays narrow to medium. Sparse rays per 5 mm, high to very high.

**Numbers of features in the key:**

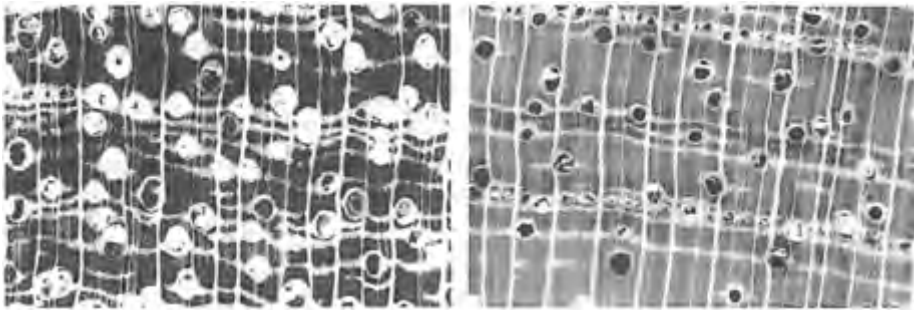
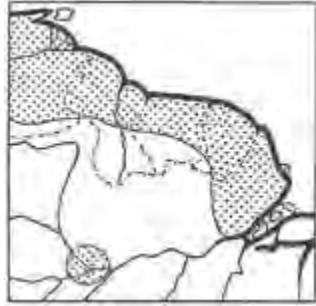
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39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular names:**

Deokunud (W), Hill iteballi (Cr), Iteballi (Ar)

**Field characteristics and distribution:**

Tree -30 (-40) m tall, trunk -0.55 (-0.9) m in diameter. Locally frequent in seasonal forest, occasional in mixed forest, rare in Morabukea forest. Occurring in north-central and eastern Guyana (east of Essequibo R.), Kanuku Mts. and in further interior.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** distinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally large to very large. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, paratracheal aliform and confluent, banded irregular. Narrow to medium parenchyma bands. Distance between the parenchyma bands small to large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium. **Rays** distinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays medium. Extremely sparse to sparse rays per 5 mm, high.

**Additional feature:**

Axial canals present.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

82a *Vochysia schomburgkii* Warm.

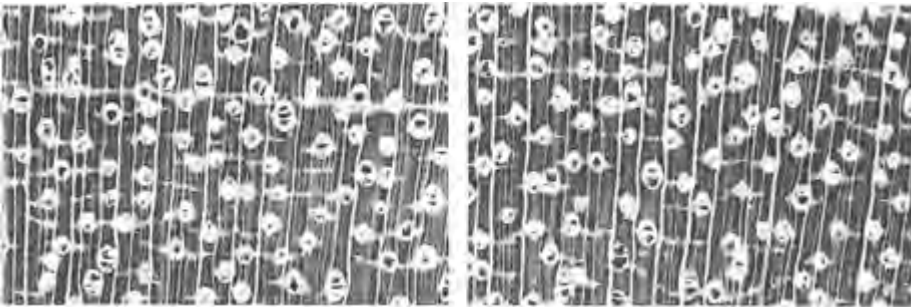
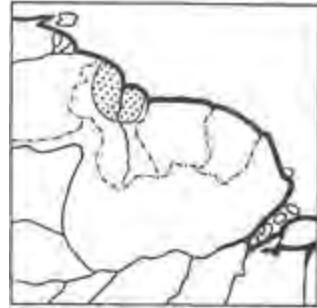
Iteballi

**Vernacular name:**

Iteballi (Ar)

**Field characteristics and distribution:**

Tree 10-20 m tall, trunk 0.2-0.35 m in diameter. Occasional in north-central Guyana, in Ite (*Mauritia flexuosa*) swamp forest and riverine forest.



1 mm

**Physical properties and structural features:**

Lustrous wood of medium density. Heartwood basically brown or shades of brown, red or shades of red. Growth ring boundaries indistinct or absent.

**Anatomical features:**

**Vessels** distinct to naked eye. Sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Tyloses present. Diameter generally large. Numerous solitary vessels. **Axial parenchyma** indistinct to naked eye, paratracheal aliform and confluent, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** large. **Rays** indistinct to naked eye. The width compared to the vessels is ¼ of vessel-size to smaller than half of vessel-size. Rays narrow to medium. Sparse rays per 5 mm, high to very high.

**Additional feature:**

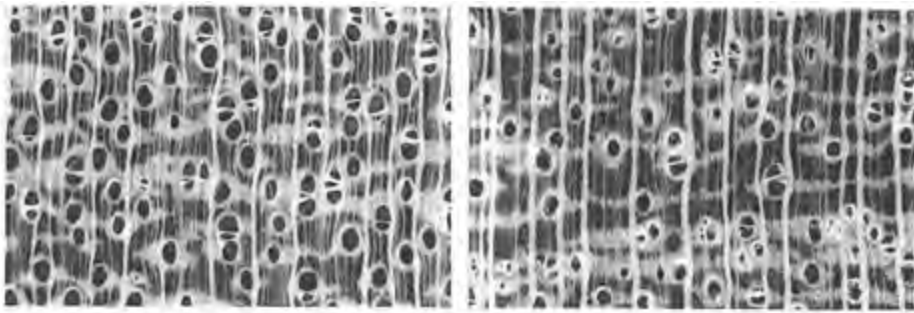
Axial canals present.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular name:**  
Iteballi (Ar)

**Field characteristics and distribution:**  
Tree (6-) 20-40 m tall, trunk 0.2-1 m in diameter.  
Widely distributed. Frequent to common in riverine, Mora, and marsh forest, sometimes in bush islands in savanna, on sand or sandy loam.



1 mm

**Physical properties and structural features:**  
Lustrous wood of low density. Heartwood basically brown or shades of brown and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**  
**Vessels** distinct to naked eye. Extremely sparse to sparse. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels Tyloses present. Diameter generally large to very large. Numerous solitary vessels. **Axial parenchyma** distinct to naked eye, paratracheal aliform and confluent, banded marginal. Wide parenchyma bands. Distance between the parenchyma bands large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium. **Rays** distinct to naked eye. The width compared to the vessels is half of vessel-size to smaller than the vessels. Rays wide. Extremely sparse rays per 5 mm, high to very high.

**Additional feature:**  
Axial canals present.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

**Vernacular name(s):**

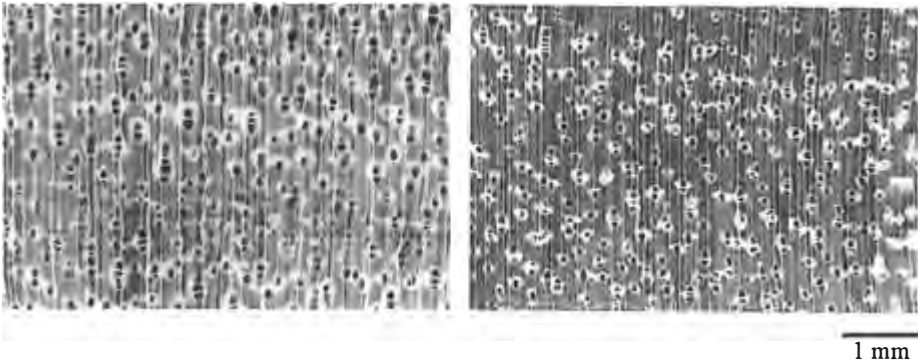
Sarebebeballi (Ar)

**Field characteristics and distribution:**

Tree -30 m tall, trunk -0.6 m in diameter.

Locally common in mixed forest near the interior and in swamp forest on alluvial flats in southeastern Guyana.

Occasional in Kakaralli-Clump wallaba forest near the interior.



**Physical properties and structural features:**

Lustrous wood of low to high density. Heartwood basically brown or shades of brown, yellow or shades of yellow and darker than the sapwood. Growth ring boundaries distinct.

**Anatomical features:**

**Vessels** indistinct to naked eye. Somewhat sparse to numerous. Arrangement solitary and radial multiples or clusters. Radial multiples of the same size and of 2-4 vessels. Diameter generally small. Medium solitary vessels. **Axial parenchyma** indistinct to naked eye, paratracheal aliform and confluent, banded marginal. Narrow parenchyma bands. Distance between the parenchyma bands small to large. Parenchyma bands smaller than the fibre tissue bands. **Proportion of ground tissue fibres** medium. **Rays** indistinct to naked eye. The width compared to the vessels is smaller than ¼ of vessel-size. Rays narrow. There are numerous rays per 5 mm, low.

**Numbers of features in the key:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

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Aruain (Ak)	<i>Tabebuia serratifolia</i>	150
Asau (W)	<i>Tetragastris altissima</i>	154
Asepoko (Ar)	<i>Pouteria guianensis</i>	132
Atoreb (W)	<i>Cedrela odorata</i>	70
Atoritan (W)	<i>Hymenolobium</i> spp.	100
Aupar (W)	<i>Loxopterygium sagotii</i>	113
Awartu (M)	<i>Swartzia leiocalycina</i>	147
Baboonwood (Cr)	<i>Virola surinamensis</i>	159
Balata (P)	<i>Manilkara bidentata</i>	114
Balata burue (Ar)	<i>Manilkara bidentata</i>	114
Baradan (Ar)	<i>Ocotea tomentella</i>	123
Barakaro (Ar)	<i>Ormosia coccinea</i>	124
Baramanni (Cr)	<i>Catostemma commune</i>	67
Baramanni (Cr)	<i>Catostemma fragrans</i>	68
Baromalli (Ar)	<i>Catostemma altonii</i>	69
Baromalli (Ar)	<i>Catostemma commune</i>	67
Baromalli (Ar)	<i>Catostemma fragrans</i>	68
Bastard bulletwood (Cr)	<i>Humiria balsamifera</i>	96
Bastard kabukalli (Cr)	<i>Laetia procera</i>	105
Bastard kokoritiballi (Cr)	<i>Pouteria cuspidata</i>	131
Bastard kurokai (Cr)	<i>Trattinickia rhoifolia</i>	155
Bastard purpleheart (Cr)	<i>Astronium ulei</i>	61
Bat seed (Cr)	<i>Andira surinamensis</i>	54
Bauwana (W)	<i>Astronium ulei</i>	61
Bauwaua (M)	<i>Astronium ulei</i>	61
Beefwood (Cr)	<i>Manilkara bidentata</i>	114
Bibiro (Ar)	<i>Chlorocardium rodiei</i>	71
Biburu (Ar)	<i>Chlorocardium rodiei</i>	71
Bitter ash (Cr)	<i>Quassia simarouba</i>	136
Black kakaralli (Cr)	<i>Eschweilera sagotiana</i>	92
Black kakaralli (Cr)	<i>Eschweilera subglandulosa</i>	94
Blackheart (Cr)	<i>Acosmium praeclarum</i>	51
Blunt-leaf karohoro (Cr)	<i>Schefflera decaphylla</i>	138

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Broad-leaved burada (Cr)	<i>Parinari campestris</i>	127
Brown ebony (Cr)	<i>Swartzia leiocalycina</i>	147
Brown silverballi (Cr)	<i>Licaria cannella</i>	112
Buckwax tree (Cr)	<i>Symphonia globulifera</i>	148
Buhurada (Ar)	<i>Parinari campestris</i>	127
Bulletwood (Cr)	<i>Manilkara bidentata</i>	114
Bully tree (Cr)	<i>Manilkara bidentata</i>	114
Burada (Ar)	<i>Parinari campestris</i>	127
Burada (Ar)	<i>Parinari rodolphii</i>	128
Candlewood (Cr)	<i>Parinari campestris</i>	127
Candlewood (Cr)	<i>Talisia squarrosa</i>	151
Chuya (M)	<i>Pouteria speciosa</i>	133
Clubwood (Cr)	<i>Swartzia leiocalycina</i>	147
Coffee mortar (Cr)	<i>Terminalia dichotoma</i>	153
Cogwood (Cr)	<i>Chlorocardium rodiei</i>	71
Common asepokoi (Cr)	<i>Pouteria guianensis</i>	132
Common baromalli (Cr)	<i>Catostemma commune</i>	67
Common black kakaralli (Cr)	<i>Eschweilera sagotiana</i>	92
Common kurokai (Cr)	<i>Protium decandrum</i>	134
Cookerwood (Cr)	<i>Terminalia dichotoma</i>	153
Countaballi (Cr)	<i>Licania alba</i>	109
Counter (Cr)	<i>Licania alba</i>	109
Cow-wood (Cr)	<i>Bagassa guianensis</i>	62
Crabwood (Cr)	<i>Carapa guianensis</i>	65
Crabwood (Cr)	<i>Carapa procera</i>	66
Crook (Cr)	<i>Alexa imperatricis</i>	52
Crook (Cr)	<i>Ormosia coutinhoi</i>	125
Currywood (Cr)	<i>Aspidosperma vargasii</i>	60
Dakama (Ar)	<i>Dimorphandra conjugata</i>	78
Dalli (Ar)	<i>Virola</i> spp.	158
Darina (Ar)	<i>Hymenobium</i> spp.	100
Deokunud (W)	<i>Vochysia surinamensis</i>	161
Determa (Cr)	<i>Ocotea rubra</i>	122
Dollywood (Cr)	<i>Virola surinamensis</i>	159
Dukali (Ar)	<i>Parahancornia fasciculata</i>	126
Dukuria (Ar)	<i>Sacoglottis guianensis</i>	137
Durban pine (Cr)	<i>Pouteria speciosa</i>	133
Epik rik (Ak)	<i>Ormosia coccinea</i>	124
Fine smooth-leaf kakaralli (Cr)	<i>Eschweilera parviflora</i>	90
Fine-leaf kakaralli (Cr)	<i>Eschweilera wachenheimii</i>	91
Fine-leaf wadara (Cr)	<i>Couratari guianensis</i>	75
Fukadi (Ar)	<i>Buchenavia fanshawei</i>	63
Fukadi (Ar)	<i>Terminalia amazonia</i>	152
Fukadi (Ar)	<i>Terminalia dichotoma</i>	153
Futui (Ar)	<i>Jacaranda copaia</i>	104
Goupi (Cr)	<i>Goupia glabra</i>	95
Greenheart (Cr)	<i>Chlorocardium rodiei</i>	71
Guava-skin (kakaralli) (Cr)	<i>Eschweilera alata</i>	87

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Haiariballi (Ar)	<i>Alexa leiopetala</i>	53
Haiawaballi (Ar)	<i>Tetragastris altissima</i>	154
Hakia (Ar)	<i>Tabebuia serratifolia</i>	150
Hakiaballi (Ar)	<i>Vitex stahelii</i>	160
Hard kereti (Cr)	<i>Ocotea wachenheimii</i>	121
Hariraro shiruaballi (Ar)	<i>Ocotea canaliculata</i>	118
Heburu (W)	<i>Ocotea canaliculata</i>	118
Hill corkwood (Cr)	<i>Pterocarpus rohrii</i>	135
Hill dalli (Cr)	<i>Virola michelii</i>	158
Hill fukadi (Cr)	<i>Terminalia amazonia</i>	152
Hill iteballi (Cr)	<i>Vochysia surinamensis</i>	161
Horse-eye (Cr)	<i>Ormosia coutinhoi</i>	125
Hububalli (Ar)	<i>Loxopterygium sagotii</i>	113
Huruasa (Ar)	<i>Abarema jupunba</i>	50
Huruhurudan (Ar)	<i>Dimorphandra polyandra</i>	79
Ileng (Ak)	<i>Ocotea canaliculata</i>	118
Inyak (W)	<i>Antonia ovata</i>	57
Iriar (W)	<i>Manilkara bidentata</i>	114
Irikwa (M, W)	<i>Virola michelii</i>	158
Irikwa (M, W)	<i>Virola surinamensis</i>	159
Irimariye (M)	<i>Couratari guianensis</i>	75
Irimiyar (W)	<i>Couratari guianensis</i>	75
Ironwood (Cr)	<i>Swartzia leiocalycina</i>	147
Ironwood (Cr)	<i>Tabebuia serratifolia</i>	150
Iteballi (Ar)	<i>Vochysia schomburgkii</i>	162
Iteballi (Ar)	<i>Vochysia surinamensis</i>	161
Iteballi (Ar)	<i>Vochysia tetraphylla</i>	163
Itik (Ak)	<i>Licaria cannella</i>	112
Itikiboro (Ar)	<i>Pterocarpus rohrii</i>	135
Itikiboroballi (Ar)	<i>Swartzia benthamiana</i>	144
Itikiboroballi (Ar)	<i>Swartzia sprucei</i>	145
Itikiboroballi (Ar)	<i>Swartzia xanthopetala</i>	146
Ituri wallaba (Cr)	<i>Eperua grandiflora</i>	83
Ituri wallaba (Cr)	<i>Eperua jenmanii</i>	84
Ituri wallaba (Cr)	<i>Eperua schomburgkiana</i>	85
Jumbi bead tree (Cr)	<i>Ormosia coccinea</i>	124
Kabiuk (Ak)	<i>Goupia glabra</i>	95
Kabukalli (Ar)	<i>Goupia glabra</i>	95
Kaditiri (Ar)	<i>Sclerolobium guianense</i>	140
Kaditiri (Ar)	<i>Sclerolobium micropetalum</i>	141
Kakaralli (Ar)	<i>Eschweilera alata</i>	87
Kakaralli (Cr)	<i>Eschweilera pedicellata</i>	93
Kalili (W)	<i>Sclerolobium guianense</i>	140
Kamaragwa (M)	<i>Tetragastris altissima</i>	154
Kamarai (Ak)	<i>Licaria cannella</i>	112
Kamatana (M)	<i>Catostemma fragrans</i>	68
Kapai (Ak)	<i>Alexa imperatricis</i>	52
Kara (M)	<i>Sterculia rugosa</i>	142
Karaba (Ar, P, Ak)	<i>Carapa guianensis</i>	65

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Karamanni (M)	<i>Symphonia globulifera</i>	148
Karapa-yek (Ak)	<i>Carapa guianensis</i>	65
Karapai (Ak)	<i>Carapa guianensis</i>	65
Karawai (Ak)	<i>Peltogyne venosa</i> subsp. <i>densiflora</i>	129
Karimora(-yek) (Ak)	<i>Talisia squarrosa</i>	151
Karohoro (Ar)	<i>Schefflera decaphylla</i>	138
Karohoro (Ar)	<i>Schefflera morototoni</i>	139
Kaserena (M)	<i>Hymenolobium</i> spp.	100
Kata (M)	<i>Sclerobium guianense</i>	140
Katama (Ak)	<i>Catostemma commune</i>	67
Katowar (W)	<i>Bagassa guianensis</i>	62
Kauada (M)	<i>Licania alba</i>	109
Kaudanaro (Ar)	<i>Licania alba</i>	109
Kauta (Ar)	<i>Licania laxiflora</i>	110
Kautaballi (Ar)	<i>Licania alba</i>	109
Kautaballi (Ar)	<i>Licania majuscula</i>	111
Kauwi (Ak)	<i>Clathrotropis macrocarpa</i>	73
Kawanari (Ar)	<i>Hymenaea courbaril</i>	99
Kawioi (Ak)	<i>Aniba hypoglauca</i>	56
Kharemero shiruaballi (Ar)	<i>Licaria cannella</i>	112
Kirikaua (Ar)	<i>Iryanthera lancifolia</i>	102
Kirikaua (Ar)	<i>Iryanthera macrophylla</i>	103
Klaipio (C)	<i>Abarema jupunba</i>	50
Koatoi (Ak)	<i>Alexa imperatricis</i>	52
Kobero (Wr)	<i>Manilkara bidentata</i>	114
Kokoritiballi (Ar)	<i>Pouteria cuspidata</i>	131
Konatopo (C)	<i>Diplotropis purpurea</i>	80
Konawadranup (W)	<i>Tabebuia serratifolia</i>	150
Kopaia (C)	<i>Jacaranda copaia</i>	104
Koperi (Ak)	<i>Cedrela odorata</i>	70
Kopö (Ak)	<i>Calophyllum lucidum</i>	64
Koraro (Ar)	<i>Andira inermis</i>	55
Koraro (Ar)	<i>Andira surinamensis</i>	54
Koraroballi (Ar)	<i>Hymenolobium flavum</i>	100
Koreko (C)	<i>Clathrotropis macrocarpa</i>	73
Koroboreli (Ar)	<i>Peltogyne venosa</i> subsp. <i>densiflora</i>	129
Korokororo (Ar)	<i>Ormosia coutinhoi</i>	125
Koron (W)	<i>Catostemma fragrans</i>	68
Korongpinbiu (Ak)	<i>Ormosia coutinhoi</i>	125
Kotik (Ak)	<i>Hymenolobium</i> spp.	100
Kötöre (Ak)	<i>Sacoglottis guianensis</i>	137
Krapabosi (C)	<i>Dipteryx odorata</i>	81
Kukwi (Ak)	<i>Peltogyne venosa</i> subsp. <i>venosa</i>	129
Kumaru (Ar)	<i>Dipteryx odorata</i>	81
Kume (Ak)	<i>Lecythis zabucajo</i>	108
Kupisini (C)	<i>Parinari campestris</i>	127
Kupiye (C)	<i>Goupia glabra</i>	95
Kurahara (Ar)	<i>Calophyllum lucidum</i>	64
Kurahara silverballi (Cr)	<i>Ocotea glomerata</i>	119
Kurana (An)	<i>Cedrela odorata</i>	70

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Kurang (Ak)	<i>Inga alba</i>	101
Kurero silverballi (Cr)	<i>Aniba hypoglauca</i>	56
Kurokai (Ar)	<i>Protium decandrum</i>	134
Kut (Ak)	<i>Chlorocardium rodiei</i>	71
Kwai (C)	<i>Terminalia amazonia</i>	152
Kwari (Ak)	<i>Inga alba</i>	101
Kwariye (M)	<i>Inga alba</i>	101
Kwatapuna (M)	<i>Abarema jupunba</i>	50
Kwateri (C)	<i>Eschweilera decolorans</i>	88
Kwateri (C)	<i>Eschweilera sagotiana</i>	92
Kwatpain (W)	<i>Abarema jupunba</i>	50
Kwawru (M)	<i>Eschweilera decolorans</i>	88
Kwtru (M)	<i>Eschweilera sagotiana</i>	92
Kwikpa (Ak)	<i>Chrysophyllum pomiferum</i>	72
Kwipari (C)	<i>Loxopterygium sagotii</i>	113
Kwipariye (M)	<i>Loxopterygium sagotii</i>	113
Limonaballi (Ar)	<i>Chrysophyllum pomiferum</i>	72
Locust (Cr)	<i>Hymenaea courbaril</i>	98
Locust (Cr)	<i>Hymenaea oblongifolia</i>	99
Lucky seed (Cr)	<i>Ormosia coccinea</i>	124
Maats (W)	<i>Andira surinamensis</i>	54
Mabinanero (Ak)	<i>Hymenolobium</i> spp.	100
Mahaicaballi (Ar)	<i>Parinari campestris</i>	127
Maho (Ar)	<i>Sterculia rugosa</i>	142
Maitakin (Ak)	<i>Symphonia globulifera</i>	148
Maiuarai (Ak)	<i>Licania alba</i>	109
Makarai (Ak)	<i>Parinari campestris</i>	127
Manni (Ar)	<i>Symphonia globulifera</i>	148
Manniballi (Ar)	<i>Moronobea coccinea</i>	117
Maporokon(i) (Ar)	<i>Inga alba</i>	101
Marako (C)	<i>Peltogyne venosa</i> subsp. <i>densiflora</i>	129
Marapasmukri (M)	<i>Pouteria guianensis</i>	132
Marawaro (Ak)	<i>Calophyllum lucidum</i>	64
Marbuk (Ak)	<i>Iryanthera lancifolia</i>	102
Marimari (Wr)	<i>Couratari guianensis</i>	75
Maruwa (Ak)	<i>Protium decandrum</i>	134
Matchwood (Cr)	<i>Schefflera decaphylla</i>	138
Matchwood (Cr)	<i>Schefflera morototoni</i>	139
Matora (M)	<i>Terminalia amazonia</i>	152
Meri (Cr)	<i>Humiria balsamifera</i>	96
Moire (M)	<i>Hymenaea courbaril</i>	98
Mök (Ak)	<i>Peltogyne venosa</i> subsp. <i>densiflora</i>	129
Monkey pot (Cr)	<i>Lecythis zabucajo</i>	108
Mora (Ak, Ar)	<i>Mora excelsa</i>	115
Mora-yek (Ak)	<i>Mora excelsa</i>	115
Morabukea (Ar)	<i>Mora gonggrijpii</i>	116
Moroballi (Ar)	<i>Talisia squarrosa</i>	151
Morombo-rai (Ak)	<i>Moronobea coccinea</i>	117
Morompo (M)	<i>Swartzia benthamiana</i>	144



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Morototo (C)	<i>Schefflera morototoni</i>	139
Murewa (C)	<i>Laetia procera</i>	105
Mutushi (C)	<i>Pterocarpus rohrii</i>	135
Mutuwali (Ak)	<i>Clathrotropis macrocarpa</i>	73
Naharu (Cr)	<i>Terminalia dichotoma</i>	153
Napo (Ak)	<i>Hyeronima alchorneoides</i>	97
Not (W)	<i>Hymenaea courbaril</i>	98
Ogoru (Ak)	<i>Diploptropis purpurea</i>	80
Okoromai (Ak)	<i>Eschweilera alata</i>	87
Okraprabu (Ak)	<i>Swartzia benthamiana</i>	144
Olgoi (Ak)	<i>Diploptropis purpurea</i>	80
Örükörong (Ak)	<i>Abarema jupunba</i>	50
Paku (An)	<i>Catostemma commune</i>	67
Paku (An)	<i>Catostemma fragrans</i>	68
Pakuri (Ar)	<i>Platonia esculenta</i>	130
Panda (C)	<i>Tabebuia insignis</i>	149
Parakaua (C)	<i>Mora excelsa</i>	115
Parakwai (Ak)	<i>Mora gonggrijpii</i>	116
Parank (W)	<i>Cedrela odorata</i>	70
Paranka (M)	<i>Cedrela odorata</i>	70
Parewe (C)	<i>Eperua falcata</i>	82
Paripiballi (Ar)	<i>Chrysophyllum pomiferum</i>	72
Pasa (Ak)	<i>Jacaranda copaia</i>	104
Phootee (Cr)	<i>Jacaranda copaia</i>	104
Pi (W)	<i>Schefflera morototoni</i>	139
Pointed-leaf karohoro (Cr)	<i>Schefflera morototoni</i>	139
Pökö (Ak)	<i>Eschweilera sagotiana</i>	92
Por (W)	<i>Pouteria speciosa</i>	133
Pörnai (Ak)	<i>Schefflera morototoni</i>	139
Porokai (Ar)	<i>Protium decandrum</i>	134
Pöyak (Ak)	<i>Pouteria guianensis</i>	132
Prukoi (P)	<i>Eschweilera sagotiana</i>	92
Puire (M)	<i>Sacoglottis guianensis</i>	137
Puna (M)	<i>Schefflera morototoni</i>	139
Purpleheart (Cr)	<i>Peltogyne venosa</i>	129
Purue (M)	<i>Manilkara bidentata</i>	114
Ranai (W)	<i>Sterculia rugosa</i>	142
Ranoi (M)	<i>Tabebuia serratifolia</i>	150
Red cedar (Cr)	<i>Cedrela odorata</i>	70
Rora(-yek) (Ak)	<i>Chlorocardium rodiei</i>	71
Rough-leaf maho (Cr)	<i>Sterculia rugosa</i>	142
Saka (Ar)	<i>Peltogyne venosa</i> subsp. <i>venosa</i>	129
Sand baromalli (Cr)	<i>Catostemma fragrans</i>	68
Sand dukuria (Cr)	<i>Sacoglottis guianensis</i>	137
Sand mora (Cr)	<i>Talisia squarrosa</i>	151
Sauraurai (Ak)	<i>Sterculia rugosa</i>	142
Sarebeballi (Ar)	<i>Vouacapoua macropetala</i>	164

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Sawariskin silverballi (Cr)	Ocotea canaliculata	118
Sekerau (Ak)	Sterculia rugosa	142
Serena (M)	Calophyllum lucidum	64
Shibadan (Ar)	Aspidosperma album	59
Shibadan (Ar)	Aspidosperma cruentum	58
Shibadan (Ar)	Aspidosperma vargasii	60
Shiraip (W)	Swartzia leiocalycina	147
Shirima (M)	Quassia simarouba	136
Simana (Ak)	Catostemma commune	67
Simana (Ak)	Catostemma fragrans	68
Simarupa (Ar, C)	Quassia simarouba	136
Simere (W)	Quassia simarouba	136
Simia chimi (Ak)	Terminalia dichotoma	153
Simiri (Ar)	Hymenaea oblongifolia	98
Sipiri (An)	Chlorocardium rodiei	71
Sipu (C)	Chlorocardium rodiei	71
Smooth-leaf kakaralli (Cr)	Eschweilera coriacea	89
Smooth-leaf kakaralli (Cr)	Eschweilera decolorans	88
Smooth-leaf maho (Cr)	Sterculia pruriens	143
Smooth-leaf wadara (Cr)	Couratari multiflora	77
Soapwood (Cr)	Abarema jupunba	50
Soft kereti (Cr)	Ocotea oblonga	120
Soft wallaba (Cr)	Eperua falcata	82
Stinking toe (Cr)	Hymenaea courbaril	98
Stinkwood (Cr)	Goupia glabra	95
Suradan (Ar)	Hyeronima alchorneoides	97
Suya (Cr)	Pouteria speciosa	133
Swamp dalli (Cr)	Virola surinamensis	159
Swamp fukadi (Cr)	Terminalia dichotoma	153
Swamp kirikaua (Cr)	Iryanthera lancifolia	102
Tamad (W)	Eschweilera sagotiana	92
Tamanokware (C)	Antonia ovata	57
Tamarotan (W)	Terminalia amazonia	152
Tatabu (Ar)	Diploptropis purpurea	80
Tauaranru (Ar)	Humiria balsamifera	96
Tauroniro (Cr)	Humiria balsamifera	96
Teḷōma (Ak)	Eschweilera alata	87
Teteruma (Ar)	Ocotea rubra	122
Thick-skin kaditiri (Cr)	Sclerobium guianense	140
Thick-skin ulu (Cr)	Trattinickia demerarae	156
Thin-skin kaditiri (Ar)	Sclerobium micropetalum	141
Thin-skin ulu (Cr)	Trattinickia rhoifolia	155
Tiniari (C)	Licaria cannella	112
Toker (W)	Licania alba	109
Tonka bean (Cr)	Dipteryx odorata	81
Tuwne (M)	Bagassa guianensis	62
Ulu (Ar)	Trattinickia demerarae	156
Ulu (Ar)	Trattinickia rhoifolia	155
Urimari (C)	Couratari guianensis	75
Wabaima (Ar)	Licaria cannella	112

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Wadaduri (Ar)	<i>Lecythis zabucajo</i>	108
Wadara (Ar)	<i>Couratari gloriosa</i>	76
Wadara (Ar)	<i>Couratari guianensis</i>	75
Wamara (Ar)	<i>Swartzia leiocalycina</i>	147
Wamkoam (W)	<i>Sclerolobium guianense</i>	140
Wamuk (W)	<i>Parinari campestris</i>	127
Wamuku (M)	<i>Parinari campestris</i>	127
Wanaka (M)	<i>Ormosia coutinhoi</i>	125
Wanu (C)	<i>Ocotea rubra</i>	122
Warabari (Ak)	<i>Sclerolobium guianense</i>	140
Warakai(o)ro (Ar)	<i>Laetia procera</i>	105
Warakuri (Ar)	<i>Tabeuia insignis</i> var. <i>monophylla</i>	149
Waramai (Ak)	<i>Goupia glabra</i>	95
Waranaka (Ak)	<i>Couratari guianensis</i>	75
Warishi (C)	<i>Virola surinamensis</i>	159
Waruwai (Ak)	<i>Protium decandrum</i>	134
Watafa (Ar)	<i>Eperua rubiginosa</i>	86
Watapa (Ar)	<i>Eperua rubiginosa</i>	86
Water wallaba (Cr)	<i>Eperua rubiginosa</i>	86
Water wallaba (Cr)	<i>Eperua schomburgkiana</i>	85
Watschir (W)	<i>Calophyllum lucidum</i>	64
Watuwai (Ak)	<i>Laetia procera</i>	105
Wayama (Ak)	<i>Trattinickia rhoifolia</i>	155
We (Ak)	<i>Virola surinamensis</i>	159
Weputana (C)	<i>Iryanthera lancifolia</i>	102
White cedar (Cr)	<i>Tabeuia insignis</i> var. <i>monophylla</i>	149
White silverballi (Cr)	<i>Ocotea canaliculata</i>	118
White wallaba (Cr)	<i>Eperua falcata</i>	82
Wild mammee apple (Cr)	<i>Platonia esculenta</i>	130
Wina (Ar)	<i>Lecythis corrugata</i>	107
Wirimiri (Ar)	<i>Lecythis confertiflora</i>	106
Wopa (A)	<i>Eperua falcata</i>	82
Yahu (Ar)	<i>Sterculia rugosa</i>	142
Yaku (Ar)	<i>Quassia simarouba</i>	136
Yanéau (Ak)	<i>Ocotea tomentella</i>	123
Yapopari (C)	<i>Sacoglottis guianensis</i>	137
Ya wahudan (Ar)	<i>Bagassa guianensis</i>	62
Yawaredan (Ar)	<i>Sclerolobium guianense</i>	140
Yellow silverballi (Cr)	<i>Aniba hypoglauca</i>	56
Yoboko (Ar)	<i>Eperua grandiflora</i>	83
Yokar (W)	<i>Inga alba</i>	101

## LEGEND OF FIGURES

### 4.1 Explanations and Illustrations of Features

Number of figure	Species	Number of wood sample
1	<i>Humiria balsamifera</i>	U 11391
2	<i>Pterocarpus rohrii</i>	U 694
3	<i>Pouteria cuspidata</i>	MAD 32967
4	<i>Virola surinamensis</i>	U 573
5	<i>Andira surinamensis</i>	U 57
6	<i>Swartzia leiocalycina</i>	U 20716
7	<i>Hymenolobium flavum</i>	GFC 3047
8	<i>Vitex stahelii</i>	MAD 8450
9	<i>Ailanthus altissima</i>	ETH L 30.W 2233
10	<i>Knightia excelsa</i>	ETH 30749
11	<i>Calophyllum lucidum</i>	MAD 30513
12	<i>Bagassa guianensis</i>	5790
13	<i>Astronium ulei</i>	MAD 2963
14	<i>Antonia ovata</i>	U 34234
15	<i>Quassia simarouba</i>	STR 35726
16	<i>Jacaranda copaia</i>	ETH 30271
17	<i>Inga alba</i>	PK U 635
18	<i>Bagassa guianensis</i>	U 5790
19	<i>Sterculia pruriens</i>	U 34222
20	<i>Abarema jupunba</i>	U 34122
21	<i>Humiria balsamifera</i>	U 11391
22	<i>Vouacapoua macropetala</i>	STR 46478
23	<i>Aspidosperma Vargasii</i>	MAD 27110
24	<i>Antonia ovata</i>	U 34234
25	<i>Chlorocardium rodiei</i>	U 11235
26	<i>Jacaranda copaia</i>	U 788
27	<i>Loxopterygium sagotii</i>	U 752
28	<i>Parahancornia fasciculata</i>	STR 50911
29	<i>Hymenodictyon sp.</i>	ETH 4354
30	<i>Acosmium praeclarum</i>	MAD 5632
31	<i>Abarema jupunba</i>	U 34122
32	<i>Alexa leiopetala</i>	STR 43680
33	<i>Ormosia coutinhoi</i>	U 5225
34	<i>Aspidosperma album</i>	U 6790
35	<i>Couratari gloriosa</i>	S 33766
36	<i>Eschweilera parviflora</i>	U 12174
37	<i>Iryanthera lancifolia</i>	PK U 2642
38	<i>Moronobea coccinea</i>	U 5531
39	<i>Eschweilera parviflora</i>	U 12174
40	<i>Pterocarpus rohrii</i>	U 694
41	<i>Andira surinamensis</i>	U 57
42	<i>Licania alba</i>	U 34075
43	<i>Calophyllum lucidum</i>	ETH 30260
44	<i>Licania majuscula</i>	U 15336
45	<i>Catostemma commune</i>	U 800
46	<i>Ormosia coutinhoi</i>	U 5225

<b>Number of figure</b>	<b>Species</b>	<b>Number of wood sample</b>
47	<i>Ormosia coutinhoi</i>	U 5225
48	<i>Moronobea coccinea</i>	U 5531
49	<i>Calophyllum lucidum</i>	MAD 30513
50	<i>Licania majuscula</i>	U 15336
51	<i>Loxopterygium sagotii</i>	U 752
52	<i>Eperua grandiflora</i>	U 821
53	<i>Sterculia pruriens</i>	U 34222
54	<i>Mora excelsa</i>	U 536
55	<i>Catostemma commune</i>	U 800
56	<i>Sterculia pruriens</i>	U 34222
57	<i>Sterculia pruriens</i>	U 34222
58	<i>Vitex stahelii</i>	MAD 8450
59	<i>Couratari guianensis</i>	U 2008
60	<i>Swartzia leiocalycina</i>	U 20716
61	<i>Tabebuia serratifolia</i>	MAD 5639
62	<i>Tabebuia insignis</i>	U 720
63	<i>Symphonia globulifera</i>	U 34100
64	<i>Sterculia pruriens</i>	U 34222
65	<i>Couratari guianensis</i>	U 2008
66	<i>Aspidosperma cruentum</i>	U 778
67	<i>Tabebuia serratifolia</i>	STR 32915
68	<i>Catostemma commune</i>	U 12256
72	<i>Tetragastris altissima</i>	U 2745
73	<i>Eperua grandiflora</i>	PKU 821
74	<i>Antonia ovata</i>	U34234
75	<i>Ocotea tomentella</i>	U5786

## 5 Description by Species

<b>Number of Species</b>	<b>Figure on the left hand side</b>	<b>Figure on the right hand side</b>
1	U 34106	U 34122
2	MAD 5632	MAD 5632
3	U 20702	ETH 30931
3a	ETH 226	STR 43680
4	U 57	U 642
4a	U 109a	U 459
5	U 34164	STR 50092
6	U 34234	U 34234
7	U 778	U 163
7a	STR 24816	U 31642
8	MAD 27110	STR 42644
9	PK 34224	GFC 2156
10	U 10826	U 5790
75a	STR 43602	U 34322
11	ETH 30260	MAD 30513
12	30/4 L 18.3	UW 947

<b>Number of Species</b>	<b>Figure on the left hand side</b>	<b>Figure on the right hand side</b>
12a	U 665	U 30875
13	U 800	U 12256
14	U 11214	U 33089
14a	U 799	MAD 37911
15	U 948	ETH 1a3
16	U 11235	U 20712
17	U 34085	STR 43560
18	PK 34160	U 34168
18a	PK 1021	UW 6496
19	U 633	U 2008
19a	S 33766	S 33766
19b	U 4875	U 44
20	ETH2286	STR 46446
20a	U 818	U 5099
21	U 20704	U 641
22	U 1024	11539
23	U 11542	U 27673
24	U 821	U 9605
24a	U 822	U 24828
24b	U 824	U 30742
25	U 17926	U 34143
26	U 34109	U 34109
27	U 1704	U 1704
27a	U 27653	U 136a
27b	U 913	U 12174
27c	U 916	U 4672
28	U 5741	U 5191
28a	U 32112	U32112
28b	U 911	U 30572
29	ETH U 30276	U 20713
30	U 5734	U 11391
31	ETH L 30730	U 5299
32	ETH 2348	U 639
32a	STR 36597	STR 36597
33	U 5723	GFC 3047
34	U 635	ETH 2124
35	U 2642	U 34115
35a	STR 21107	STR 21108
36	U 788	ETH 30271
37	U 1103	U 124
38	STR 35448	STR 43894
39	U 628	U 5168
40	U 918	U 5237
41	U 11801	U 34075
41a	U 1064	U 1931
41b	U 20706	U 15336
42	U 10	U 34220
43	U 34230	U 34227
44	U 600	U 34229
45	U 704	U 536
46	U 2099	U 192
47	U 882	U 5531

<b>Number of Species</b>	<b>Figure on the left hand side</b>	<b>Figure on the right hand side</b>
48	U 527	U 1203
48a	U 905	UW 5359
48b	U 11180	U 24154
48c	U 2051	U 5275
49	STR 45684	STR 45685
50	U 534	U 5786
51	U 357	U 5349
52	U 251	U 5225
53	MAD 20180	STR 50911
54	U 682	U 5267
54a	STR 35901	STR 43668
55	U 32506	U 650
56	U 648	U 5100
57	MAD 32946	MAD 32967
58	U 4897	U 11636
59	U 34067	U 34171
60	U 20705	U 20705
61	U 694	U 5579
62	U 34228	STR 35726
63	U 894	U 710
64	U 15	U 5265
65	U 32164	U 12299
66	U 833	U 34137
66a	U 3687	U 2098
67	U 8663	STR 43704
67a	ETH 258 A	U 34222
68	U 837	U 4961
68a	STR 43716	U 34242
68b	MAD 5627	STR 43583
69	U 27385	U 20716
70	ETH 30262	U 34100
71	U 791	U 720
72	STR 32915	MAD 5639
73	U 1112	U 20717
74	U 93	U 5192
75	U855	U 363
76	U 2745	U 11775
77	U 509	U 629
77a	U 508	U 34235
78	U 1036	ETH 30119
79	U 32158	STR 47632
80	U 32276	U 573
81	MAD 8450	MAD 24028
82	U 34219	UW 4997
82a	MAD 8460	MAD 8460
82b	U 32285	U 5348
83	STR 46478	GFC 2460

## LIST OF ABBREVIATIONS

Ak	Akawaio
An	Arecuna
Ar	Arawak
C	Carib
Cr	Creole
ETH	Eidgenössische Technische Hochschule
IAWA	International Association of Wood Anatomists
M	Macushi
P	Pa tamona
W	Wapisiana
Wr	Warrau



## **APPENDICES**

**Synoptic Tables by Species**

**Check List with Macroscopic Features for Field-Work**

**Transparent Scale Grid**

**Floppy Disk**

























		40	41	41a	41b	42	43	44	45	46	47	48	48a	48b	48c	49	50	51	52	53	54	54a	55	56	57	58	59	60	61	62		
		Lecythis zabuajo	Licania alba	Licania laxiflora	Licania majuscula	Licania cannella	Loxopterygium sugotii	Manilkara bidentata	Mora excelsa	Mora gonggrijpii	Moronobea coccinea	Ocotea canaliculata	Ocotea glomerata	Ocotea oblonga	Ocotea wachemheimii	Ocotea rubra	Ocotea tomentella	Ormosia coccinea	Ormosia coutinhoi	Parshancornia fasciculata	Parinari campestris	Parinari rodolphii	Peltogyne venosa	Platonia insignis	Pouteria cuspidata	Pouteria guianensis	Pouteria speciosa	Protium decandrum	Pterocarpus rohrii	Quassia simarouba		
Ray frequency	≤ 15	67																														67
	> 15 - 30	68																														68
	> 30 - 50	69																														69
	> 50	70																														70
	Ray height [mm]	≤ 0.2	71																													
	> 0.2 - 0.5	72																														72
	> 0.5 - 1.0	73																														73
	> 1.0	74																														74
Growth rings	boundaries indistinct or absent	75																														75
	boundaries distinct	76																														76
Storied structures	no storied structures	77																														77
	rays storied	78																														78
	axial parenchyma/fibres storied	79																														79
Density [g/cm3]	low	80																														80
	medium	81																														81
	high	82																														82
Heartwood colour	no difference between heart- and sapwood	83																														83
	heartwood darker than sapwood	84																														84
	basically brown or shades of brown	85																														85
	basically copper-coloured or shades of copper	86																														86
	basically red or shades of red	87																														87
	basically yellow or shades of yellow	88																														88
	basically white to grey	89																														89
	with streaks	90																														90
	none of the above	91																														91
Lustre	dull	92																														92
	lustrous	93																														93
Odour	no distinct odour	94																														94
	distinct odour	95																														95
Additional features	canals present																															
	included phloem present																															
	oil or mucilage cells present																															
	dark inclusions present																															
	light inclusions present																															
	wood sticky due to resins																															
	wood with bitter taste																															

	63	64	65	66	66a	67	67a	68	68a	68b	69	70	71	72	73	74	75	76	77	77a	78	79	80	81	82	82a	82b	83			
	Sacoglottis guianensis	Schefflera decaphylla	Schefflera morototoni	Sclerolobium guianense	Sclerolobium micropetalum	Sterculia rugosa	Sterculia pruriens	Swartzia benthamiana	Swartzia sprucei	Swartzia xanthopetala	Swartzia leiocalycina	Symphonia globulifera	Tabebuia insignis	Tabebuia serratifolia	Talisia squarrosa	Terminalia amazonia	Terminalia dichotoma	Tetragastris altissima	Tratinnickia rhoifolia	Tratinnickia demerarae	Vatairea guianensis	Virola michelii	Virola surinamensis	Vitex stabelii	Vochysia surinamensis	Vochysia schomburgkii	Vochysia tetraphylla	Vouacapoua macropetala			
	67																													67	
	68																														68
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	90																														90
	91																														91
	92																														



**MAJOR TIMBER TREES OF GUYANA Check list with macroscopic features for field-work**

Unknown sample, date and signature:

<b>Vessel visibility</b>	
1	distinct to naked eye
2	indistinct to naked eye
<b>Vessel arrangement</b>	
3	exclusively solitary
4	solitary and radial multiples or clusters
5	exclusively radial multiples or clusters
6	radial multiples of one size
7	radial multiples of different sizes
8	radial multiples of 2-4 vessels
9	radial multiples of >4 vessels
10	clusters of 2-4 vessels
11	clusters of >4 vessels
12	tangential pattern
13	diagonal pattern
<b>Vessel content</b>	
14	no vessel content
15	tyloses present
16	inclusions present
<b>Vessel diameter (mm)</b>	
17	<=0.1
18	>0.1-0.2
19	>0.2-0.3
20	>0.3
<b>Vessels and vessel groups per square millimetre</b>	
size of area: 3/5/10 mm <sup>2</sup>	average:
21	0-2
22	3-5
23	6-10
24	11-20
25	21-40
26	>40
<b>Proportion of solitary vessels (%)</b>	
results	average:
27	0-33
28	>33-66
29	>66-100
<b>Axial parenchyma visibility</b>	
30	distinct to naked eye
31	indistinct to naked eye
<b>Axial parenchyma distribution</b>	
32	absent/not visible by lens
33	apotracheal axial parenchyma
34	diffuse
35	diffuse-in-aggregates
36	paratracheal axial parenchyma
37	scanty
38	vasicentric
39	aliform
40	confluent
41	unilateral
42	banded parenchyma
43	scalariform
44	reticulate
45	marginal
46	not as above
<b>Parenchyma bands (features 42-46 concerned)</b>	
47	parenchyma bands absent (if absent, release features 48-54)
<b>Width (mm)</b>	
48	<=0.1
49	>0.1-0.2
50	>0.2
<b>Distance between the parenchyma bands (mm)</b>	
51	<=0.5
52	>0.5
<b>Width compared to fibre tissue</b>	
53	smaller than the fibre tissue bands
54	as wide as the fibre tissue bands or even wider

<b>Proportion of ground tissue fibres (%)</b>	
55	0-33 (=15-22 occurrences)
56	>33-66 (=8-14 occurrences)
57	>66-100 (=0-7 occurrences)
<b>Ray visibility</b>	
58	distinct to naked eye
59	indistinct to naked eye
<b>Ray - width compared to the vessels</b>	
60	<1/4 of vessel-size
61	1/4 to smaller than 1/2 of vessel-size
62	1/2 of vessel-size to smaller than the vessels
63	as large as the vessels or even larger
<b>Ray width (mm)</b>	
64	<=0.05
65	>0.05-0.1
66	>0.1
<b>Ray frequency</b>	
67	<=15
68	>15-30
69	>30-50
70	>50
<b>Ray height (mm)</b>	
71	<=0.2
72	>0.2-0.5
73	>0.5-1.0
74	>1.0
<b>Growth rings</b>	
75	boundaries indistinct or absent
76	boundaries distinct
<b>Storied structures</b>	
77	no storied structures
78	rays storied
79	axial parenchyma/fibres storied
<b>Density (g/cm<sup>3</sup>)</b>	
80	medium
81	high
<b>Heartwood colour</b>	
82	no difference between heart- and sapwood
83	heartwood darker than sapwood
84	basically brown or shades of brown
85	basically copper-coloured or shades of copper
86	basically red or shades of red
87	basically yellow or shades of yellow
88	basically white to grey
89	with streaks
90	none of the above
91	
<b>Lustre</b>	
92	dull
93	lustrous
<b>Odour</b>	
94	no distinct odour
95	distinct odour
<b>Additional features</b>	
<b>Canals</b>	
canals absent	
canals present	
<b>Included phloem</b>	
included phloem absent	
included phloem present	
<b>Oil or mucilage cells</b>	
oil or mucilage cells absent	
oil or mucilage cells present	
<b>Other features</b>	