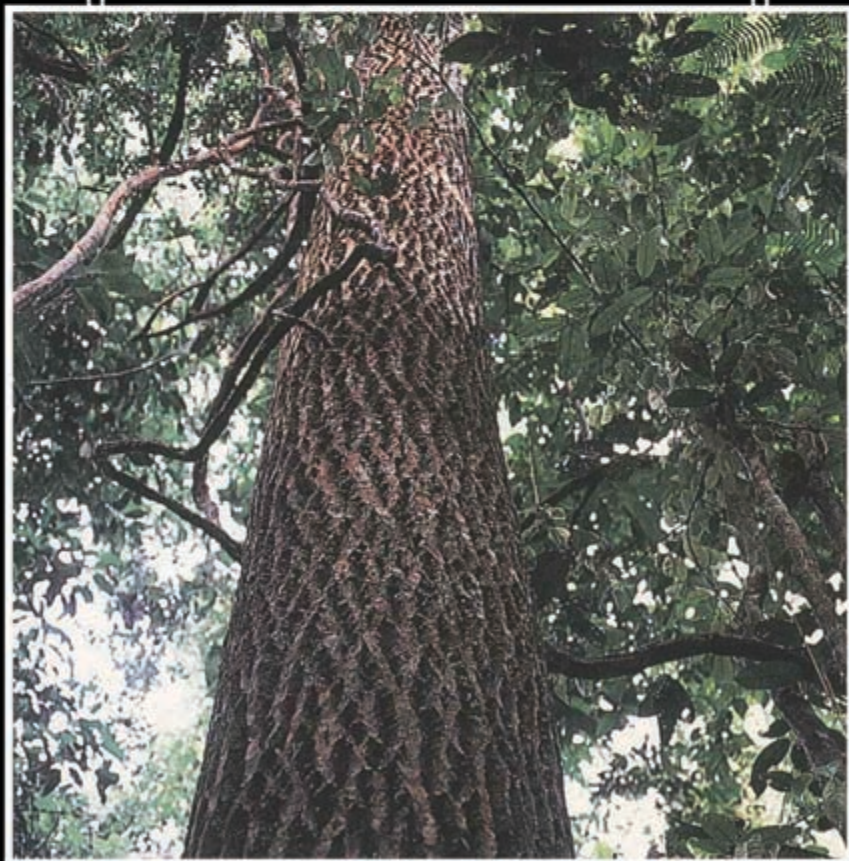


Major Timber Trees of Guyana A Field Guide

A.M. Polak
Illustrations by H.R. Rypkema



Tropenbos Series 2

Major timber trees of Guyana
A field guide

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A FIELD GUIDE

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The Tropenbos Foundation
Wageningen, The Netherlands
1992

TROPENBOS SERIES 1

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.



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FOREWORD

Whilst acknowledging the value of its forests in respect to their importance in the preservation of biodiversity and in reducing the effects of carbon dioxide emissions, Guyana also views its forests as being important for long term economic benefits and is committed to sustainable forest management.

The use of its natural forests for all their conservation and economic benefits is a challenge to Guyana. In this respect knowledge about trees, ability to recognise trees and the extension of this knowledge is of great importance. Guyana's total forest area is 16.5 million hectares of which 9.1 million hectares may be used for timber production. The present annual cut of approximately 240,000 m³ is dominated by only eight out of the more than one thousand tree species. Around 110 other species have been utilised on a spasmodic basis.

The Tropenbos-Guyana Programme which started in 1989 has concentrated on sustainable forest management with particular emphasis on the forest types in the Mabura Hill area. Tropenbos is an internationally respected tropical forest research organisation which carries out its research independently and objectively.

This is the third Tropenbos publication relating to Guyana. It will be an important reference for researchers and for timber users and will be an instrument in improving the use of Guyana's timbers. It is a valuable step along the path of optimising sustainable forest management.

D.A. Black
Commissioner of Forests
Guyana Forestry Commission
Georgetown, September 1992

1. INTRODUCTION

This field guide is the result of one of the research projects formulated in the Tropenbos-Guyana Programme, a multidisciplinary programme of cooperation between the Governments of Guyana and the Netherlands. It is part of a set of projects, designed to provide basic information on vegetations and soils. According to the aims of the Tropenbos-Guyana Programme, it is meant to contribute to forestry practices based on sustainable management systems. One of the aspects of sustainable management is to utilize a larger number of tree species than is currently exploited in forestry. Three more projects are focusing on the same set of species which are treated here. They concentrate on wood anatomy and timber characteristics, and are carried out by C.T.F.T./C.I.R.A.D.¹, E.T.H.², and U.S.F.P.L.³ in cooperation with several Guyanese institutions, e.g. G.N.R.A.⁴ and G.F.C.⁵

The field guide has been written for all persons working in and/or living from the forests of Guyana. This group comprises indigenous people, foresters, inventory crews, forestry and botany students, taxonomists, and ecologists. The guide aims at identification in the field of tree species that (may) play a role in forestry practices. The species were selected in several phases. A study of Fanshawe's classic work on the vegetation of Guyana (1952) resulted in the first rough selection. This selection was compared with lists of commercially logged species, which were provided by the Guyana Forestry Commission, Demerara Woods Ltd. (nowadays Demerara Timbers Ltd.), and members of the Forest Products Association, an organization of forest concessionaires in Guyana. The final selection was made after a period of preparatory fieldwork and discussions with persons in Guyana with much experience in the forestry sector. This field guide contains species that occur at least in the northern part of Guyana, where most forestry activities are carried out. This so-called 'forestry belt' covers the area between the coast and the line Barima-Kurupukari-Eight Mile Island (Courantyne River). Naturally, it does not include the densely populated coastal strip, which is ca. 25 km wide in the northwest and ca. 75 km in the east, nor the part covered by vegetations not exploited for timber extraction (e.g. Berbice savannas).

Although this book is primarily focusing on Guyana, many of the species can also be encountered in adjacent countries or even further away. In particular Venezuela, Surinam and French Guiana have many species in common with Guyana. Some of the species dealt with have a very wide range, such as *Hymenaea courbaril* (Locust), which is found all over Central and tropical South America and the Antilles.

For the identification of trees in the field the morphology of bark and slash is important. However, ecological aspects, such as vegetation type and soil type, can be important factors that have to be taken into account, too. A single leaf, flower, or fruit found among the litter on the forest floor can be an important clue toward locating a tree species which is being sought. Therefore, the entire spectrum of characters exhibited by a given species has to be studied carefully.

It is advisable to include a visit to a herbarium to gather more knowledge that will aid in

1 Centre Technique Forestier Tropicale ; Departement du Centre de Cooperation Internationale en Recherche Agronomique pour le Developpement , Nogent-sur-Marne, France

2 Eidgenossische Technische Hochschule. Zurich, Switzerland

3 United States Forest Products Laboratory, Madison, Wisconsin. U.S.A.

4 Guyana Natural Resources Agency, Georgetown. Guyana

5 Guyana Forestry Commission. Georgetown. Guyana

tree recognition. In the herbarium dried plant specimens are deposited in a logical order. A study of herbarium specimens of the species in which one is interested, assists in creating a picture of the species, thus facilitating the search in the field in a later stage. Guyana possesses two herbaria, one located at the Guyana Forestry Commission (the Jonah Boyan Herbarium), and the other at the University of Guyana (the Jenman Herbarium). Assistance from an experienced tree spotter is also a valuable support for those who want to become acquainted with the trees. Unfortunately, at present not very many truly experienced tree spotters are living in Guyana, and their number is even decreasing.

For optimal results when using this book, the reader is urged to study the chapter 'Explanatory notes' first, before taking it along in the field.

Specimens of the reference collections, which were made during the field work by the author, are deposited at the Jenman Herbarium (BRG) in Guyana and the Herbarium of Utrecht (U) in the Netherlands.

This book has been completed with the support of many persons of different institutions, both in Guyana and in the Netherlands. A summing-up of all people involved would yield a list too long to produce here, but I would like to thank some of them, and two persons in particular, for their indispensable contribution to my work. First of all my 'bush teacher' Sam Roberts, formerly working for the Guyana Forestry Commission and at present employed by Demerara Timbers Ltd., to whom I would like to dedicate this book. Mr. Roberts is one of Guyana's most outstanding tree spotters, who learned the 'tricks of the trade' from the famous Rufus Boyan. We have spent many hours of hard work in the forest together, during which he did not only point out all the differences between the various tree species (including many more than the ones treated in this book!), but also taught me general knowledge of the forest. Secondly, I would like to thank Hendrik Rypkema, who is working as a botanical artist at the Herbarium of Utrecht (Herbarium Division, Department of Botanical Ecology and Evolutionary Biology, University of Utrecht). He managed to transform herbarium specimens into the botanical drawings for this book.

I gratefully acknowledge the support of the Natuurwetenschappelijke Studiekring van Suriname en de Nederlandse Antillen to the publication of this book.

Furthermore, I wish to thank the coordinator for the Tropenbos-Guyana Programme, Ben ter Welle, and the programme team leader in Guyana, Hans ter Steege, as well as my three scientific coaches, Paul Maas, Ara Garts-van Rijn, and Marion Jansen-Jacobs (Herbarium of Utrecht) for their assistance in many aspects of the work. I am much indebted to Jan Lindeman (Herbarium of Utrecht) for the identification of most reference collections. My thanks also go to Claude Persaud, formerly working with the Forest Department, later Guyana Forestry Commission, for generously sharing his extensive knowledge of the forests of Guyana with me during the instructive talks we had. Those who provided logistic support during the field trips outside the Mabura Hill area, where most research of the Tropenbos Guyana Programme is carried out, also deserve a word of thanks: the authorities at Mabaruma and Port Kaituma (North-West district). J. & Z. Sawh Rice millers & Saw millers (Courantyne River), Willems Timber & Trading Company (Takutu River), and the staff of the Jenman Herbarium (field staff assistance in North-West district and Courantyne area). Highly appreciated logistic support was received from the Guyana Forestry Commission (forestry files, tree spotters, representatives at outposts) and from Demerara Timbers Ltd. (tree spotters, technical support). I wish to thank the curators of the following herbaria for providing herbarium material for this study: Field

Museum of Natural History at Chicago (F), Royal Botanic Gardens at Kew (K), New York Botanical Garden (NY), Forestry Herbarium Oxford (FHO), and Herbarium Division (formerly Institute of Systematic Botany) at Utrecht (U). Finally, I would like to thank Mr. D. Fouquet (C.T.F.T. Kourou, French Guiana) and Hendrik Rypkema (Herbarium of Utrecht), for providing the slides and photo negatives for the pictures in this guide of *Andira coriacea*, *Moronobea coccinea*, *Platonia insignis*, *Ocotea rubra*, and the bark of *Terminalia amazonia*, respectively.

A.M. Polak
Utrecht, September 1992.

2. EXPLANATORY NOTES

The identification keys

Several identification keys have been constructed for this field guide. There is one general synoptical key, based primarily on bark and slash characters. It is followed by three subkeys for the species with presence of, respectively, white, yellow, and red exudate in the slash. Furthermore, there is a key which is based primarily on characters of the leaves.

The descriptions

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

Synonyms

Only those synonyms are mentioned which can frequently be encountered in recent literature, and thereby could cause confusion in daily practice. A more complete synonymy is often found in the given literature reference .

For example, the correct scientific name of Greenheart presently is *Chlorocardium rodiei*. As this name was published only recently, the previously used name *Ocotea rodiei* is still much more frequently encountered in literature. In the case of *Eperua grandiflora* no synonyms have been given, although they do exist. The chance of encountering, e.g., the synonym *Parivoa grandiflora* is very small, as the species so named by Aublet in 1775 was already transferred to *Eperua* by Bentham in 1870.

Literature

The complete references for the citations which are given in the text can be found in the literature list. Whenever possible, references of recent date are included, published in a readily accessible source. In the literature mentioned usually references to other literature will be found, particularly publications containing identification keys for the species of a particular genus.

Vernacular names

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 in the top line of the page with the description of the pertaining species. Most vernacular names have been 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 the scientific names is often indispensable for access to botanical literature

The most commonly used vernacular names in Guyana come from the Arawak or Creole languages. The Creole name is usually clearly derived from English. In some cases the Creole name is a corruption of the Arawak name. For example, the names 'Silverballi' (from 'Shiruaballi') and 'Bulletwood' (from 'Balata') have nothing to do with silver or bullets, respectively.

The suffix '-balli' means '-like', so in principle every '-balli' is preceded by the name of a certain plant which shows similarity and often is related. For instance, 'Shiruaballi', used for species of *Ocotea*, *Liearia*, and *Aniba*, is derived from 'Shirua'. That name is used for *Nectandra* spp. and *Ocotea guianensis*. Likewise, 'Itikiboroballi', used for *Swartzia* spp., is derived from 'Itikiboro', which is the name for *Pterocarpus* spp. In these two examples there is an obvious relationship, but why, for example, *Voehysia* spp. are called 'Iteballi' is not quite clear, as 'Ite' is the name used for the palm *Mauritia flexuosa*. The link might be sought in the habitat, Ite swamp, which is shared between *Mauritia flexuosa* and one of the species of *Voehysia*, namely *V. schomburgkii*.

A second suffix which is encountered regularly in Arawak plant names is '-dan', which means 'tree'. An example from this book is 'Baradan' (*Deotea tomentella*), which means 'ocean tree', probably because of the use of this tree for building strong, large canoes.

In a glossary of Arawak names by Fanshawe (1949) the botanical equivalent of many Arawak plant names can be found (also of non-woody plants), as well as the translation of these Arawak names. The glossary also contains many animal names, which often form a part of plant names, as in 'Kamakuti' (*Bombax flaviflorum*), which means 'tapir foot' (kama = tapir, bush cow; kuti = foot), due to the resemblance of the digitate leaves of the tree with the foot print of a tapir.

In the Courantyne area sometimes names are being used which do not occur in Mennega et al. (1988). Some of these names come from Surinam names. An example of this is the name 'Cabbage', which is equivalent to the Surinam name 'Kabbes', used for species of several genera of Papilionaceae (*Andira*, *Diploptropis*, *Vatairea*).

The botanical description

In the botanical description information is given on the twig with leaves and flowers and/or fruits, the parts of the plant which can generally be found on herbarium sheets.

Field characteristics

The trunk diameters given in the descriptions are measured at breast height (the so-called diameter at breast height, 'dbh'), i.e. measured at 1.30 m above the soil. In the case of trees with buttresses reaching higher than 1.30 m, the diameter should be measured at 0.1 m above the highest buttress. The slash should preferably be made with a sharp and clean cutlass. When the exposed piece on the trunk measures ca. 15 x 15 cm, the different components are usually well visible. For trees with a thin bark (e.g. Inyak, *Antonia ovata*) a smaller piece will be sufficient, but for trees with a very thick bark (e.g. Suya, *Pouteria speciosa*) a larger piece may be necessary. As the bark and slash on a buttress are usually different from the bark and slash on the trunk itself, it is preferable not to make the slash in a buttress. In some descriptions question marks have been used to indicate that the information provided, found in the literature or on

herbarium labels, seems to be somewhat doubtful. No verification of that information could be made, however. An example for such a doubtful record, for which no evidence could be found, is the maximum diameter of 1.8 m of the trunk of Crabwood (*Carapa guianensis*), mentioned by Bascope (1958). Such thick trees have never been seen in Crabwood by the author, and it is more likely that this figure indicates the girth instead, which would mean a diameter of ca. 0.6 m. Only few species in the forests of Guyana can reach a trunk diameter exceeding 1.5 m.

Ecology and distribution

Some experience is needed to be able to identify the different forest types, but the ecological preference of trees often is a helpful element in their identification. The data on flowering and fruiting seasons are largely based on a compilation of data from the Guyana Forestry Commission by ter Steege and Persaud (1991), supplemented with personal observations and data from herbarium material. Dispersal data have mostly been taken from van Roosmalen's Fruits of the Guianan Flora (1985), which has also been a useful source of information for the identification of fruits found on the forest floor.

Notes

The information given under this heading comprises, among others, data on species which are closely related and/or look similar to the species dealt with. The related species are indicated in the list of treated species with a suffix a, b, etc. Furthermore, data on seedlings, if available, can be found in this paragraph.

Drawings

Most (parts of) drawings have originally been drawn on a 1:1 scale, in order to facilitate comparison between different species. Only where the size of the object was either too small (e.g. the flowers of Lauraceae) or too large (e.g. the habit of *Dimorphandra conjugata*), a different, more appropriate scale was chosen. For the printing, all drawings have been reduced to 60% of their original size. The drawings of the trunk bases usually represent the lower 2 m of the trunk, except for *Couratari guianensis* (6 m), and *Mora excelsa* and *M. gonggrijpii* (4 m).

Pictures of bark and slash

The plates can be found directly following the part with descriptions and drawings. For each species one picture of the bark and one of the slash is given. The sequence of the pictures conforms to the sequence of the descriptions, and the plate number is given in the description under the heading 'Field characteristics'.

Glossary

It has been attempted to limit the use of scientific terms in the descriptions. For those not familiar with the terms used, a glossary has been constructed where these terms are explained.

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 the reverse.

3. FOREST TYPES

Here, a limited survey is given of the forest types in Guyana. Only those which are of importance for this field guide are dealt with. More information, also on other forest types, can be found in Fanshawe (1952, 1954) and Davis & Richards (1933, 1934). These references form the basis for the information which is provided here. Furthermore the Guyana Forestry Commission has several reports of large inventories carried out in different areas in Guyana, in its office in Georgetown, Guyana.

The forest types treated in this chapter are: Wallaba forest, Mora forest, mixed forest (in particular Greenheart forest and Morabukea forest), seasonal forest, and marsh forest.

3.1 Wallaba forest

Wallaba forest occurs on the white sand penepains on more or less flat to slightly undulating terrain in the near interior and the sandstone areas of the Pakaraima plateau.

The canopy height lies at 20-27 m, with emergents to 33 m. The maximum trunk diameter is ca. 0.6-0.7 m. There are ca. 2150 stems/ha (> 4.5 m tall), with ca. 620 stems/ha > 0.1 m dbh. and ca. 1530 stems/ha < 0.1 m dbh.

The dominant canopy species are *Eperua falcata* (Soft wallaba), *Eperua grandiflora*, *Eperua jenmanii* (both Ituri wallaba), *Catostemma fragrans* (Sand baromalli), *Dicymbe altsonii* / *D. corymbosa* (Clump wallaba). Additional characteristic species are *Aniba hypoglauca* (Yellow silverballi), *Bombax flaviflorum* (Kamakuti), *Lecythis corrugata* (Wina), *Licania* spp., *Lueheopsis rugosa* (Koyechiballi), *Ormosia coutinhoi* (Korokororo, particularly on moister places), *Swartzia* spp. (e.g. *S. benthamiana*; Itikiboroballi), *Talisia squarrosa* (Moroballi). Buttressing is a rare feature, observed in e.g. *Talisia squarrosa*, but most trees are basally swollen. Stilt roots occur in *Tovomita* spp. (sometimes called Wild mangrove).

Species from the lower storey are *Matayba opaca* (Kulishiri) and *Tovomita* spp. (e.g. *T. cephalostigma*; Awasokule). The shrub and herb layers are sparsely represented. Lianas and epiphytes are scarce.

3.2 Mora forest

Mora forest occurs on alluvial silt, clay, or loam along rivers and on riverine flats, throughout the lowland region. The sites are inundated during the main rainy season (May-July).

The canopy height is 30-45 m. There is an abundant regeneration of Mora, creating dense sapling vegetations of 1.5-3 m tall. The following stem densities have been measured in the Moraballi Creek Reserve: 310 trees/ha > 0.1 m dbh, and 528 trees/ha < 0.1 m dbh (> 4.5 m tall).

The dominant species in canopy and lower storeys is *Mora excelsa* (Mora). Sub-dominant species in the canopy are *Aldina insignis* (Dakamaballi), *Apeiba petoumo*¹ (Duru), *Carapa guianensis*, *Carapa procera* (both: Crabwood), *Catostemma commune* (Common baromalli), *Clathrotropis brachypetala* (Aromata), *Couratari gloriosa* (Wadara),

¹ The name *Apeiba echinate*, a synonym of *Apeiba petoumo*, is perhaps better known.

Eperua falcata (Soft wallaba), *Eperua rubiginosa* (Watapa or Water wallaba), *Eschweilera decolorans* (Smooth-leaf kakaralli), *Eschweilera sagotiana* (Black kakaralli), *Lecythis zabucajo* (Monkey pot), *Macrolobium bifolium* (Sarebebe), *Pentaclethra macroloba* (Trysil), *Pterocarpus officinalis* (Swamp corkwood), *Symphonia globulifera* (Manni), *Tabebuia insignis* var. *monophylla* (White cedar), *Terminalia dichotoma* (Swamp fukadi), *Vatairea guianensis* (Arisauro), *Virola surinamensis* (Swamp dalli). Buttressing is a very prominent characteristic of the dominant species, *Mora excelsa* (Mora), and it is also found in *Couratari gloriosa* (Wadara), *Pterocarpus officinalis* (Swamp corkwood), and *Virola surinamensis* (Swamp dalli). Several palms can be found: *Astrocaryum* spp. (*A. vulgare*: Awara, *A. aculeatum*: Akuyuru), *Euterpe edulis* (Manicole).

Understorey species are: *Anaxagorea dolichocarpa* (Kurihikoyoko), *Duguetia pycnastera* (Yarriyarri), *Hevea pauciflora* (Hatti). The characteristic herb layer species are: *Cyclanthus bipartitus*, *Monotagma* spp. (e.g. *Monotagma spicatum* (Aumanabana)), *Dieffenbachia paludicola*, *Rapatea paludosa*, *Aciotis* spp. (e.g. *A. laxa*), *Pariana radiceflora*. Lianas are moderately abundant, epiphytes are abundant.

3.3 Mixed lowland forests

Mixed lowland forest is a term which covers quite a variety of forest types. Characteristic of mixed forest is the large number of species growing together at a particular locality, although usually there are a few species that form the major part of the canopy trees. The names of the different subtypes that exist within the group termed 'mixed forest', are derived from the names of these common tree species. Another characteristic of the mixed forest is the soil which is usually well drained, so that no stagnation of water occurs in the rainy season. The soil can be brown sand, laterite or loam. It is less poor in nutrients than the white sand, but this does not mean that these soils can be termed 'rich soils'.

The types of mixed forest dealt with here are Morabukea forest and Greenheart forest.

3.3.1 Morabukea forest

Usually Morabukea forest grows on laterite¹. Less frequently it is encountered on sandy loam or on brown sand. It occurs on undulating terrain with steep slopes in the near interior (> 50 km S of coast line), East of Cuyuni River.

The canopy height lies between 20-35 m. Measurements of density of plants have given the following results: 310 stems/ha of more than 0.1 m dbh, 640 stems/ha of less than 0.1 m dbh. (in both classes only trees > 4.5 m tall)

Mora gonggrijpii (Morabukea) is the dominant species in the canopy and lower storeys. It is well known for its prominent buttressing and its dominant role in the undergrowth with a dense vegetation of saplings of 1-2.5 m tall. Subdominant canopy species are *Alexa imperatricis* (Haariballi), *Catostemma commune* (Common baromalli), *Chamaecrista apoucouita* (Apokuita), *Chlorocardium rodiei* (Greenheart; formerly named *Ocotea rodiei*), *Clathrotropis brachypetala* and *C. macrocarpa* (both Aromata), *Eperua falcata* (Soft wallaba), *Eschweilera decolorans* (Smooth-leaf kakaralli), *Eschweilera sagotiana* and *E. subglandulosa* (both Black kakaralli), *Eschweilera wachenheimii* (Fine-leaf kakaralli), *Goupia glabra* (Kabukalli), *Jacaranda copaia* (Futui), *Lecythis*

¹ Although this term is not used much any more in scientific publications, most people will know what is meant by it. Therefore the perhaps more appropriate but less generally known term oxisol is not used.

confertiflora (Wirimiri), *Licania alba* (Kautaballi), *Licania laxiflora* (Kauta), *Moronobea coccinea* (Manniballi), *Pentaclethra macroloba* (Trysil), *Protium decandrum* (Kurokai), *Sterculia pruriens* (Smooth-leaf maho), *Sterculia rugosa* (Rough-leaf maho), *Swartzia jenmanii* (Parakusan), *Swartzia leiocalycina* (Wamara), *Vouacapoua macropetala* (Sarebebeballi).

Species growing in the lower storey are: *Clathrotropis paradoxa* (Iron Mary), *Exellodendron barbatum* (Burada), *Licania heteromorpha* var. *perplexans* (Kairiballi), *Mabea speciosa* (Swizzle-stick), *Pausandra martinii* (Masawi), *Quiina guianensis* and *Q. indigofera* (both Okokonshi).

As undergrowth species occur: *Cusparia fanshawei*, *Duguetia decurrens* (Yarriyarri), *Faramea* spp. (Koyarakushi), *Paypayrola longifolia* (Adebero), *Sandwithia guianensis* (Makang). In the herb layer quite some saprophytes can be found, e.g. *Gymnosiphon* spp. (e.g. *G. breviflorus*, *G. divaricatus*, *G. guianensis*), *Voyria* spp. (e.g. *V. corymbosa*) often in association with the tiny fern *Schizaea fluminensis*. Epiphytes are scarce in this relatively dark forest type.

3.3.2 Greenheart forest

Greenheart forest can be found on brown sand, as well as on laterite, often on slopes of ridges. It is known from the area east of Pomeroun River, north of the line Kartuni-Puruni-E.Kaburi-Kurduni Rivers.

Canopy height in this type of forest is 20-35 m. The density of trees > 0.1 m dbh is high: ca. 520 stems/ha. For trees < 0.1 m dbh the density is ca. 1235 stems/ha.

The canopy dominants in this forest next to *Chlorocardium rodiei* (Greenheart; formerly named *Ocotea rodiei*) are: *Eschweilera sagotiana* (Black kakaralli), *Licania alba* (Kautaballi), *Pentaclethra macroloba* (Trysil). Additionally occurring canopy species are: *Aspidosperma excelsum* (Yaruru), *Licania laxiflora* (Kauta), *Moronobea coccinea* (Manniballi), *Swartzia leiocalycina* (Wamara). Buttressing is scarce, although some species can have considerable buttresses, e.g. *Swartzia leiocalycina*.

In the lower canopy the following species dominate: *Licania heteromorpha* var. *perplexans* (Kairiballi), *Quiina guianensis*, and *Q. indigofera* (both Okokonshi).

The characteristic understorey species are: *Anaxagorea dolichocarpa* (Kurihikoyoko), *Duguetia neglecta* and *D. calycina* (Yarriyarri), *Sandwithia guianensis* (Makang), *Tabernaemontana undulata* (Pero-ishi-lokodo), but young canopy trees are usually far more abundant. The herb layer is well-developed: *Metaxya rostrata*, *Cyelodium meniscoides*, *Episcia densa*, *Psychotria variegata*, *Ischnosiphon* spp. (Mukru). Lianas are occasional, whereas epiphytes are frequent in this forest with a relatively open canopy.

3.4 Seasonal forest

Seasonal forest occurs on well-drained soils in areas where there is a marked seasonal distribution in the rainfall. During the dry season the amount of rainfall is less than the loss of water through evaporation and drainage. The only type of seasonal forest dealt with here is the evergreen seasonal forest.

The canopy is fairly open and the height lies at 20-40 m. The canopy trees often have relatively short trunks and large crowns. In experimental plots the following stem densities have been measured: 341-717 stems/ha > 0.1 m dbh, 2747 stems/ha < 0.1 m dbh.

Canopy dominants are *Aspidosperma excelsum* (Yaruru), *Goupia glabra* (Kabukalli), and *Swartzia leiocalycina* (Wamara). There are many more additional canopy species, which can still occur in quite high densities. Some of these species are: *Catostemma fragrans* (Sand baromalli), *Diploptropis purpurea* (Tatabu), *Emmotum fagifolium* (Manobodin), *Eperua falcata* (Soft wallaba), *Geissospermum sericeum* (Manyokinaballi), *Humiria balsamifera* (Tauroniro), *Hymenaea courbaril* (Locust), *Laetia procera* (Warakairo), *Licania densiflora* (Marishiballi), *Licania majuscula* (Kautaballi), *Licaria cannella* (Brown silverballi), *Loxopterygium sagotii* (Hububalli), *Ocotea canaliculata* (White silverballi), *Parinari campestris* (Burada), *Parinari excelsa* (Aiomoradan), *Quassia simarouba* (Simarupa), *Sacoglottis guianensis* (Sand dukuria), *Sclerolobium guianense* (Kaditiri), *Sterculia pruriens* (Smooth-leaf maho), *Terminalia amazonia* (Hill fukadi), *Vochysia surinamensis* (Iteballi).

In the understorey there are relatively few shrubs: *Pera schomburgkiana* (Hachiballi), *Rheedia benthamiana* (Asashi), *Rinorea endotricha* and *R. riana* (Mamusare). *Tabernaemontana undulata* (Pero-ishi-lokodo). Several palms can be quite frequent: *Attalea regia* (Kokorite), *Bactris humilis* (Yuruwe).

One of the remarkable species from the often well-represented herb layer is *Bromelia karatas* (Wild pine), with sword-shaped leaves with very spiny margins, which can form impenetrable thickets. Lianas are occasional to moderately abundant. Epiphytes are rare.

3.5 Marsh forest

Marsh forest occurs on pegasse or alluvial silt, and is inundated at least during the long rainy season, i.e. May-July. The stagnation of water is usually caused by a clay pan in the soil. Characteristic is the presence of palms, the abundance of which is determined by moisture conditions.

The forest is relatively low, with the canopy at 10-17 m and an emergent layer at 17-28 m. Density of trees in the higher diameter classes (> 0.3 m dbh) is usually low. Measurements have led to the following numbers: 697 trees/ha > 0.1 m dbh, and 1458 trees/ha < 0.1 m dbh.

In the canopy and the emergent layer the following species are well-represented: *Abarema jupunba* (Huruasa); *Catostemma commune* (Common baromalli), *Diospyros guianensis* (Barabara), *Iryanthera lancifolia* (Kirikaua), *Macrolobium bifolium* (Sarebebe), *Pradosia schomburgkiana* (Kakarua or Liquorice tree), *Pterocarpus officinalis* (Swamp corkwood), *Symphonia globulifera* (Manni), *Tabebuia insignis* var. *monophylla* (White cedar), *Tapirira guianensis* (Warimia), *Terminalia dichotoma* (Swamp fukadi), *Virola*

surinamensis (Swamp dalli), *Vitex compressa* (Hakiaballi). Furthermore the following palms are found among the canopy species: *Atlalea regia* (Kokorite), *Euterpe edulis* (Manicole), *Jessenia bataua* (Turu), *Manicaria saccifera* (Truli), and *Mauritia flexuosa* (Ite).

In the understorey several species of shrubs occur, in low numbers: *Miconia lateriflora* and *M. pubipetala* (Kunawaru), *Tococa aristata* (Huruereroko), *Marliera montana* (Kwako).

As the most common herb should be mentioned *Rapatea paludosa*, which can form quite a dense vegetation. There are few lianas, but epiphytes and hemiepiphytes are frequent. Particularly the hemiepiphytes are conspicuous, with the following common representatives: *Philodendron* spp., *Monstera* spp., and various species of *Cyclanthaceae*.

4. LIST OF TREATED SPECIES

The numbers given in this list correspond with the numbers used in the identification key on bark and slash characteristics and in the descriptive part. The suffices a, b, etc. are used to indicate species dealt with in lesser detail under the related species treated in full (bearing the same number).

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> (Bond) Splitg. ex Pulle	Papilionaceae	Koraro
4a	<i>Andira inermis</i> (Wright) Kunth	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
74a	<i>Buchenavia fanshawei</i> Exell & Maguire ¹	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 aftsonii</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

¹ Treated under *Terminalia dichotoma*

No	Species name	Family name	Vernacular name
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 waltaba
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
27	<i>Eschweilera decolorans</i> Sandw.	Lecythidaceae	Smooth-leaf kakaralli
27a	<i>Eschweilera coriacea</i> (A. DC.) Mart. ex O. Berg	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	Koraroballi
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> (Auble) D. Don	Bignoniaceae	Futui
37	<i>Laetia procera</i> (Poeppig) Eichler	Flacourtiaceae	Warakai(o)ro

38	<i>Lecythis confertiflora</i> (A.C. Smith) S. Mori	Lecythidaceae	Wirimiri
39	<i>Lecythis corrugata</i> Poiteau	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
	<i>Ocotea rodiei</i> ----> see <i>Chlorocardium rodiei</i>		
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
	<i>Pithecellobium jupunba</i> ----> see <i>Abarema jupunba</i>		
56	<i>Platonia insignis</i> Mart.	Guttiferae	Pakuri
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.	Caesalpinaceae	Kaditiri
66a	<i>Sclerolobium micropetalum</i> Ducke	Caesalpinaceae	Kaditiri
67	<i>Sterculia rugosa</i> (R. Br.) Kosterm.	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	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>Vouacapoua macropetala</i> Sandw.	Caesalpinaceae	Sarebebeballi

5. IDENTIFICATION KEY ON BARK AND SLASH CHARACTERS

5.1 Synoptical key

In this synoptical key the character states of bark and slash exhibited by the treated species are indicated. The numbers behind the character states are the numbers assigned to the 83 main species dealt with in this field guide. The list of numbers and corresponding names can be found directly after the identification keys. The same numbers are also used in the descriptive part of this field guide.

This key is primarily intended for the identification of mature trees, which have reached the canopy, and have a diameter of at least 0.25 m. In young trees the bark is usually somewhat thinner, and structures like buttresses and bark fissures are not yet present or only weakly developed.

In order to identify a particular tree, choose a character, select the character state, and note the series of numbers after this character state. Choose another character, select the character state, and cross out from the first series of numbers, all numbers that do not occur for this character state. In this way one will end up with one number, or only a few numbers. Starting with an uncommon character state (whenever possible) will speed up the identification process. Now one can check the description(s), pictures and drawings of the selected species, and see if the particular tree agrees well with this (or one of these) selected species. For example: a tree has large buttresses, and a deeply fissured, dark brown bark with an 8 mm thick dead bark and a 10 mm thick, red, living bark without exudate. Checking the numbers given in the synoptical key will show that only number 15 is present after each observed character state. This number corresponds with *Cedrela odorata* (Red cedar) in the species list. With the complete information given on this species (description, drawing, pictures), one will be able to check if this particular tree is indeed Red cedar. This last step in the identification process is important, as the key covers only 83 species. Although these species are common or even dominant, there are still many more species present in the forests of Guyana, and some may also get keyed out.

In the key some numbers are put in parentheses. This means that although the particular character state can sometimes be encountered in this species, it is not the most common character state.

Base of tree

- a. Straight: 7, 8, 13, 14, 20, (27), 28, 32, (35), 38, 39, 47, 53, 57, 59, 62, 67, 79.
- b. Swollen or with low root spurs (<0.4 m high in mature trees): 1, 3, 6, 7, 8, 9, 10, 11, 12, 16, 18, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 32, 35, 36, 37, 38, 39, 40, 41, 44, 47, 49, 53, 54, 56, 57, 58, 59, 62, 63, 64, 67, 70, 71, 72, 76, 77, 79, 81, 82.
- c. Buttressed: 1, 2, 5, 11, 12, 15, 16, 17, 18, 19, 21, 22, 24, (25), (26), 27, 28, 29, 30, 31, 32, 34, 40, 42, 43, 44, 45, 46, 48, 49, 50, 51, 52, 54, 55, 57, 58, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, (79), 80, 83.
- d. With very large buttresses (>2 m high in mature trees): 4, (12), 15, 17, 19, 22, (25), (28), 29, 30, (31), 33, (40), (42), 45, 46, (50), (54), 55, (60), 61, (66), 69, 74, (75), 76, (78), 80.
- e. Still rooted or with flying buttresses: (31), (50), 60, 70, 80.

Shape of bole

- a. With tendency to scalloped shape (i.e. clearly irregular in cross section): 17, (36), 40, (47), 58, 60, 61, 66, (67), 69, 71, (74), 83.
- b. Conspicuously cylindrical and straight: 7, 8, 13, 14, 32, 55.
- c. With bumpy surface: 16.

Bark surface colour

- a. Light brown: 1, 2, 3, 5, 7, 8, 10, 11, 16, 17-1, 18, 22, 29, 32, 36, 37, 38, 39, 40, 42, 47, 51, 52, 57, 59, 61, 62, 64, 65, (69), 70, 71, 72, 73, 74, 77, 81, 82.
- b. Dark brown: 1, 15, 19, 23,25, 26, 27, 28, 30, 42, (43), 44, 46, 48, 49, 55, 63, 70, 74, 79, 80.
- c. Grey to grey-brown: 1, 5, (7), 9, 11, 12, 13, 14, 15, 17¹, 19, 20, 23, 25, 27, 28, 29, 31, 32, 35, (36), 37, 38, 39, 40, 42, 43, 44, 45, 48, 50, 54, 56, 57, 59, 60, (63), 64, (66), 67, 70, 72, 73, 75, 76, 77, 79, 80, 81, 82.
- d. Yellow-brown: 7, 8, (17-1), 37, (53), (55), 70.
- e. Red-brown to orange-brown: 1, (9), (10), (11), (14), 15, 17², 19, 20, 23, 26, 27, 28, 30, 32, 34, 35, (38), 41, 44, 45, 46, 49, 53, 55, 58, 63, 66,72, 82, 83.

Bark surface structure

- a. Cracked: (8), 9, 11, 12, 17, 19, 20, 23, 25,27, 29, 31, 32, 35, 36, 38, 39,42, 43, 44, 47, (48), 49, 50, (56), 57, 58, 59, 63, 66, 70, 76, 77, 80, 81,82.
- b. Bark with fissures, forming a diamond-shaped pattern: 11, 15.
- c. Deeply fissured longitudinally: 11, 15, 30, 36, 40, 44, 45, 56, 62, 71, 72, 74, 75.
- d. Shallowly fissured longitudinally: 5, 6, 12, 17, 20, 21, 29, 35, 36, 39, (40), 42, (44), (56), 58, 62, 63, 70, 71, 72, 74, 75, 79, 81.
- e. With round lenticels: 1, 5, 7, 8, 9, 10, 12, 13, 14, 17, 19, 20, 23, 24, 25, 26, 27, 28, 29, 32, 34, 37, 38, 39, 40, 41, 42, 45, 46, 48, 50, 53, 54, 55, 57, 60, 64, 65, 67, 70, 71, 72, 73, 75, 76, 77, (82), 83.
- f. With linear lenticels: 1, 7, 8, 9, 13, 19, 20, 24, 25, 26, 28, 32, 34, 38, 41, 42, 48, 57, 60, 65, (83).
- g. With conspicuous vertical rows of lenticels: 13, 14, 37, 50, 64, 65, 67, 78.
- h. With scattered, large (ca. 5 mm in diam.) lenticels: 24, 42, 52, 67, 71.
- i. With densely arranged, small (ca. 0.5-2 mm in diam.) lenticels: 45, 46, 54, 55, 61, 69, 73.
- j. Scaly: 1, 9, 10, 17, 19, 20, 23, 24, 28, 31, 36, (39), 42, 44, 45, 46, 47, (48), 54, 55, 56, 58, 60, 62, (66), 72, 76, (77), (79), 83.
- k. Flaky: 1, 5, 12, 16, 17, 26, 27, 28, 29, 31, 35, 36, 42, 45, 46, 49, 54, (57), 69, 73, 74, 75, 76, 81, 82.
- l. With ridges that form a mussel shell pattern: (33), 34.
- m. Gritty (i.e. with densely arranged vertical and horizontal cracks): 7, 51.
- n. Pock-marked | dipped: 26,27,28,34, (42), 45,46,59.
- o. With horizontal rings: 13, 14, 25, 41, 59, (60), 65, 77, (79), (82).

1 Limonaballi, see description

2 Paripiballi, see description

Dead bark texture

- a. Hard: 9, 21, 32, 41, 51, 54, 55, 73, 79, 80, 82 .
- b. Soft: 8, 58 .

Dead bark thickness

- a. Thin (0.1-1 mm): 1, 7, 8, (9), 10, 12, 13, 14, 16, 19, 24, 25, 26, 27, (29), 34, (35), 37, 39, 41, (42), 45, 46, 48, 49, 50, 53, 54, 55, 57, 58, 60, (62), 63, 64, 65, 66, 67, (70), 73, (74), 75, 76, (77), 79, 80, 82, 83.
- b. Moderate (1.5-5 mm): 8, 9, 10, (11), (15), 17, 19, 20, 23, 24, (27), 28, 29, 30, 31, 32, 35, 36, 37, 38, 39, 42, 43, (44), 45, 46, 47, 53, 54, (56), 57, 58, 59, 62, 63, 66, 70, 71, 72, 73, 74, 77, 79, 81.
- c. Thick (5.5-10 mm): 5, (9), (10), 11, 15, 20, 36, (40), (42), 44, 47, 71, 53, (54) 56, (62), (77).
- d. Very thick (> 10 mm): 11, 40, 44, 56.

Living bark thickness

- a. Thin (< 5 mm): 1, 5, (7), 12, 16, 20, 25, 26, 28, 29, 30, 31, 34, 35, 36, 39, 40, 41, 45, 46, 48, 55, 57, 58, 60, 65, 66, 71, 73, 74, 75, 76, 77, 79, 81, 83.
- b. Moderate (5-10 mm): 5, 7, (8), 9, 11, 12, 15, 17, 19, (20), 23, 24, 27, (28), (29), (31), 34, (35), 36, 37, 38, (39), 41, (42), 43, 44, (45), 46, 48, 49, (50), 54, (55), 56, (57), (58), 62, 63, 64, 66, (67), (70), 71, 72, 73, (76), 77, 79, 80, 81, 82.
- c. Thick (> 10 mm): 8, 9, 10, 11, 13, 14, 15, 19, 23, 27, 32, 37, 38, 41, 42, 43, 44, 47, (49), 50, 54, 56, 59, 62, 67, 70, 72, (77), (79), 80.

Living bark structure

- a. Layered pattern: 4, (7), 9, 10, 11, 15, 22, (34), 35, 36, 39, 40, (43), 44, 56, 57, 61, 68, 71, 72, 74, 75, 79, 80, 81.
- b. With wedges of a different colour: 13, 14, 20.

Living bark colour

- a. Discolouring bluish green near sapwood: 21, 64, 65, 81.
- b. Mottled orange, white, and yellow: 7, 21, 37, 51, 52, 64, 65.
- c. Pink to reddish: 6, 9, (10), 11, 12, 13, 14, 15, 17, (19), 23, 24, 25, 26, (27), 28, 30, 31, 32, 34, 35, 39, 41, 43, 44, 45, 46, 49, (50), 53, 54, 55, 57, 58, 59, 60, 63, 67, 72, 73, 74, 76, 79, 80, 81, 82, 83.
- d. Yellow to orange: 1, 2, 3, 5, 7, 8, 9, 10, 11, 13, 14, 16, 17, 18, 19, 23, 25, 27, 29, 30, 34, 35, 36, 37, 38, 39, 40, 42, 48, 53, 57, 59, 61, 62, 63, 65, 66, 70, 71, 72, 73, 75, 77, 79, 80, 81, 82, 83.
- e. Light brown: 1, 7, 9, 10, 16, 20, 27, 28, 29, 40, 43, 45, 46, 47, 48, 50, 55, 56, 58, 62, 64, 65, 66, 70, 71, (74), 75, 81.
- f. Grey-brown: 5.
- g. Dark brown: 20, 32.

Living bark texture

- a. Hard: 7, 16, 32, 41, 54, 55, 73.
- b. Granular: 1,7, (25), 32, 36, 37, 41, 47, 49, 54, 59, 62, 67, 73, (79), 82, 83.
- c. With brittle fibres: 16, 29, 30, 31, 36, (41), 42, 58.
- d. Soft: 9, 10, 11, 12, 15, 27, 28, 39, 40, 43, 50, 59, 62, 70, 71, 74, 75, 76, 77, 80.

- e. Fibrous: 5, 9, 12, 15, 17, 19, 20, 23, (24), 26, 27, 28, 35, 38, 39, 40, 44, 45, 46, 48, 60, 63, 67, 71, 75, 80.

Slash scent

- a. Cucumber-like: 1, 3, 18, 51, 52.
- b. Linseed oil-like : 19, 26, 27, 28, 38, 39 .
- c. Ranalean-aromatic('Silverballi-like'): 5, 16, 42, 48, 49, 50.
- d. Incense-like aromatic: 60, 76, 77.
- e. Sweet: 6, 7, 20, 22, 36, (41), 43, (45), (57), 59, 62, 64, (67), 74, 80, 82, 83.
- f. Sour: 29.
- g. Tobacco-like: (40), 71 .
- h. Cedar-like: 15.
- i. Garlic-like: (15).
- j. Bitter: 62.

Exudate

- a. Red, clear: 22, 35, 61, 68, 69, 79, 80. [7: in branches only]
- b. Red-brown to orange-brown, clear: 12, 20, 34, 38.
- c. Yellow, milky: 47, 56, 70.
- d. Yellow, clear: 11 .
- e. (Creamy) white, milky : 8, 9, 10, 17, 43, 44, 53, 57, 58, 59.
- f. Brown, clear: 1, 12, 20, 23, 24, 25, 34, 45, 46, 48, 64, 66, 81, 82.
- g. Colourless, clear: 1, (16), 23, 24, 32, 34, 48,49, 55, 60, 65,67, 73, 76, 77, 81, 82.

Crown features

- a. Branches horizontal, ± in whorls: 35, 70, 79, 80.
- b. Leaves concentrated at twig ends: 11, 12, 13, 14, 36, 58, 59, 62, 74, 75, 82.
- c. Leaves distinctly in two rows¹: 37, 74, 75.

Presence observed in forest type

- a. Wallaba forest: 1, 5, 11, 14, (16), 20, 23, 24, 30, (36), 39, 42, 43, 44, (47), (48), 53, 56, 57²,62, 63, 64, (66) ,(70), 73, 74.
- b. Mora forest: 12, 13, 15, 16, 27, 28, 29, (31), 32, 45, 47, 50, 53, 54, 55, 58, 60, (64), 65, 67, 70, 72, 75, 80.
- c. Mixed forest: 5, 7, 8, 9, 10, 12, 13, 15, 16, 17, 19, 23, 25, 26, 27, 28, 29, 31, 32, 34, 36, 37, 38, 40, 41, 42, 43, 44, 46, 47, 48, 49, 50, (53), 55, 56, 57³, 58, 59, 60, 62, 63, (64), 65, 66, 67, 70, 72, 73, 74, 75, 76, 77, 79, (80), 81, 82, 83.
- d. Evergreen seasonal forest: 1, 14, 15, 23, 29, 30, (36), 40,43, 44, 53, 54, 55, 59, 62, 74, 77, 82.
- e. Marsh forest: 1, 9, 10, 11, 12, 19, 23, 30, 32, 35, 39, 40, 44, 45, (53), 54, 60, 70, 71, 72, 75, 80, 83 .

1 Take care not to confound pinnate leaves and twigs with 2 rows of simple leaves!

2 *Pouteria cuspidata* subsp. *dura*

3 *Pouteria cuspidata* subsp. *cuspidata*

5.2 Sub-key for trees with white exudate in the slash

- 1. a. Exudate very plentiful, covering slash in a few seconds; bark not layered2
- b. Exudate plentiful to very scanty, but not covering slash in a few seconds; bark layered in part of the species.....3

- 2. a. Living bark light brown to orange-brown.....
 10. *Bagassa guianensis* (Cow-wood)
- b. Living bark red-brown.....53. *Parahancornia fasciculata* (Dukali)

- 3. a. Exudate turning green-white after exposure, scanty; bark with a diamond-shaped pattern of ridges; living bark pink-brown to light brown.....
 43. *Loxopterygium sagotii* (Hububalli)
- b. Exudate remaining white after exposure, scanty to plentiful; bark with different structure; living bark light brown, pink-brown, red-brown or yellow-brown.....4

- 4. a. Bark with 1-3 cm deep fissures; dead bark and living bark layered; dead bark 5-50 mm thick; living bark pink-brown to red-brown, ca. 10 mm thick; exudate usually plentiful.....
 44. *Manilkara bidentata* (Bulletwood)
- b. Bark not fissured, or with fissures to 0.5 cm deep; dead bark and living bark not clearly layered; dead bark 1-3(-5) mm thick; living bark varying in colour, thickness varying between 3-50 mm; exudate scanty to plentiful.....5

- 5. a. Bark with horizontally oriented lenticels; living bark bright yellow, 25-30 mm thick.....8. *Aspidosperma vargasii* (Currywood)
- b. Bark without lenticels or with vertically oriented lenticels; living bark varying in colour, but not bright yellow, 3-10 mm or 25-50 mm thick6

- 6. a. Living bark 25-50 mm thick.....59. *Pouteria speciosa* (Suya)
- b. Living bark 3-10 mm thick.....7

- 7. a. Living bark red-brown.....57. *Pouteria cuspidata* (Kokoritiballi)
- b. Living bark yellow-brown.....8

- 8. a. Bark regularly fissured, red-brown to orange-brown; living bark with brittle fibres.....58. *Pouteria guianensis* (Asepoko)
- b. Bark irregularly fissured, yellow-brown to grey-brown (Limonaballi) or red-brown(Paripiballi).....
 17. *Chrysophyllum pomiferum* (Limonaballi/Paripiballi)

5.3 Sub-key for trees with yellow exudate in the slash

- 1. a. Tree with conspicuous stilt roots and/or flying buttresses, in swampy or marshy forest also with pneumatophores.....
 70. *Symphonia globulifera* (Manni)
- b. Tree without stilt roots, flying buttresses or pneumatophores2

2. a. Exudate clear, appearing in very small droplets, rather scanty; bark fissured in a diamond-shaped pattern; living bark pink.....11. *Calophyllum lucidum* (Kurahara)
- b. Exudate milky, plentiful; bark fissured, but diamond-shaped pattern lacking; living bark light brown to creamy brown.....3
3. a. Bark of mature trees cracked. Leaves¹ with secondary veins plane or slightly prominent above.....47. *Moronobea coccinea* (Manniballi)
- b. Bark of mature trees with 10-30 cm long, and 0.1-0.5(-1) cm deep fissures. Leaves with secondary veins strongly prominent above.....56. *Platonia insignis* (Pakuri)

5.4 Sub-key for trees with red exudate in the slash

1. a. Exudate plentiful, watery, rapidly covering living bark. Branches horizontally spreading, whorled. Tree of marsh forest or mixed forest2
- b. Exudate more scanty, thicker, appearing more slowly, often clearly showing a layered structure in the living bark. Branches not horizontally spreading and not whorled. Tree of mixed forest or Wallaba forest.....4
2. a. Dead bark soft, often with orange-brown patches. Tree of marshy forest.....35. *Iryanthera lancifolia* (Kirikaua)
- b. Dead bark hard, charcoal-like, often blackish tinged. Tree of marsh forest or mixed forest.....3
3. a. Tree of mixed forest. Base straight or with buttresses to 0.5 m high, rarely to 1 m high.....79. *Virola michelii* (Hill dalli)
- b. Tree of marsh forest. Base with heavy (flying) buttresses 1-2.5(-4.5) m high.....80. *Virola surinamensis* (Swamp dalli)
4. a. Dead bark hard. Living bark with red layers, and with blackish layers towards dead bark.....5
- b. Dead bark soft, Living bark with only red layers.....6
5. a. Tree from Wallaba forest on white sand. Base swollen. Bark rough. Living bark with clearly discernable black and red layers.....68. *Swartzia benthamiana* (Itikiboroballi)
- b. Tree from mixed forest on laterite or brown sand. Base with 0.5-3 m high buttresses. Bark smooth. Living bark with diffuse red-layer changing to black towards dead bark.....69. *Swartzia leiocalycina* (Wamara)
6. a. Trunk more or less round. Exudate scanty. Chips of slash vanilla-like scented, particularly after drying.....22. *Dipteryx odorata* (Tonka bean)
- b. Trunk angular to flanged. Exudate moderately scanty. Chips of slash more or less without scent or with scent of green beans.....61. *Pterocarpus rohrii* (Hill corkwood)

¹ The leaves of many species of Guttiferae have numerous pairs of parallel secondary veins close together. Therefore they can often easily be recognized in the litter.

6. IDENTIFICATION KEY ON VEGETATIVE CHARACTERS

Note: the term bark is used in this key to indicate the bark of the trunk, unless otherwise indicated.

1. a. Leaves in whorls of 3, or rarely 4.....82. *Vochysia surinamensis* (Iteballi)
- b. Leaves opposite (sometimes only partly so).....2
- c. Leaves alternate.....15
2. a. Leaves compound.....3
- b. Leaves simple.....6
3. a. Leaves bipinnate.....36. *Jacaranda copaia* (Futi)
- b. Leaves digitately compound.....4
4. a. Petiolules to 1 cm long.....81. *Vitex stahelii* (Hakiaballi)
- b. Petiolules 0.5-5 cm long, at least the middle one longer than 1 cm.....5
5. a. Blades (stiff) leathery, 15-27 x 7-11 cm; petiolules 2 mm in diam.; secondary veins sunken above, strongly prominent below, without domatia.....71. *Tabebuia insignis* var. *insignis* (White cedar)¹
- b. Blades papery, 5-18 x 3-7 cm; petiolules 1 mm in diam.; secondary veins slightly prominent on both sides, with domatia in the axils below.....72. *Tabebuia serratifolia* (Hakia)
6. a. Twigs and leaves without exudate.....7
- b. Twigs and leaves with exudate.....10
7. a. Only part of the leaves opposite, most leaves alternate.....42. *Licaria cannella* (Brown silverballi)
- b. All leaves opposite.....8
8. a. Petiole 3-10 cm long; blade 15-27 x 7-11 cm.....71. *Tabebuia insignis* var. *monophylla* (White cedar)²
- b. Petiole to 1.2 cm long; blades smaller.....9
9. a. Secondary veins 3-4 pairs; opposite petiole bases nearly connate, leaving a rim on the twigs after the leaves fall off. Twigs without conspicuous terminal bud.....6. *Antonia ovata* (Inyak)
- b. Secondary veins 10-15 pairs; petioles not leaving a rim on twigs after leaves fall off. Twigs with conspicuous, 0.5-1 cm long, terminal bud.....16. *Chlorocardium rodiei* (Greenheart)
10. a. Twigs and leaves with white exudate. Venation palmate or pinnate with 10-12 pairs of secondary veins.....11
- b. Twigs and leaves with yellow exudate. Venation pinnate, with at least 35 pairs of secondary veins.....12
11. a. Venation palmate.....10. *Bagassa guianensis* (Cow-wood)
- b. Venation pinnate.....53. *Parahancornia fasciculata* (Dukali)

¹ In Mennega et al. (1988) the vernacular name White cedar is used only for var. *monophylla*; see note 3 of botanical description of *Tabebuia insignis*.

² Although this variety actually has 1-foliate instead of simple leaves, for convenience it has been placed in the key as if it has simple leaves.

12. a. Exudate clear, scanty. Secondary veins running up to the leaf margin.
.....11. *Calophyllum lucidum* (Kurahara)
- b. Exudate milky, copious. Secondary veins running to a marginal vein at ca.
1 mm from the margin.....13
13. a. Secondary veins 35-50 pairs, with thinner ones in between. Tree with stilt
roots and/or flying buttresses, occurring mainly in swamp and marsh
forest.....70. *Symphonia globulifera* (Manni)
- b. Secondary veins more than 50 pairs. Tree without stilt roots and/or flying
buttresses, occurring mainly in mixed forest.....14
14. a. Petiole 0.5-1 cm long; leaves 2-4 cm wide, secondary veins plane or
slightly prominent below.....47. *Moronobea coccinea* (Manniballi)
- b. Petiole 1-2 cm long; leaves 3.5-8 cm wide; secondary veins strongly
prominent above.....56. *Platonia insignis* (Pakuri)
15. a. Leaves compound.....16
- b. Leaves simple.....50
16. a. Leaves palmate¹.....17
- b. Leaves bipinnate.....18
- c. Leaves pinnate (including 2-foliolate).....19
17. a. Apex of leaflets obtuse to acute, with obtuse to rounded tip.....
.....64. *Schefflera decaphylla* (Blunt-leaf karohoro)
- b. Apex of leaflets acuminate, with acute tip.....
.....65. *Schefflera morototoni* (Pointed-leaf karohoro)
18. a. Leaflets obliquely ovate or rhombic, 2-5 x 1-3 cm; rachis with a gland
between each pair of pinnae and each pair of petiolules.....
.....1. *Abarema jupunba* (Huruasa)
- b. Leaflets obovate, 5-12(-25) x 3-7(-15) cm; rachis without glands.....
.....20. *Dimorphandra conjugata* (Dakama)
19. a. Leaves with 2 leaflets².....20
- b. Leaves with more than 2 leaflets (usually more than 4).....22
20. a. Leaflets straight, not glandular-punctate; leaves without stipules, with a
rudimentary rachis as a free tip between the bases of the petiolules
.....73. *Talisia squarrosa* (Moroballi)
- b. Leaflets falcate, glandular-punctate; leaves with stipules, at least when
young, without rudimentary rachis.....21
21. a. Petiolules twisted; leaflets with strongly inequilateral base, i.e. with the two
halves of a blade inserted at different levels at the petiole; stipules
1.5-3 cm long.....32. *Hymenaea courbaril* (Locust)
- b. Petiolules not twisted; leaflets with equilateral base; stipules ca. 0.5 cm
long.....55. *Peltogyne venosa* (Purpleheart)

1 In the Common baromalli (*Catostemma commune*) the leaves are palmate in young trees which grow in the understorey. However, trees which have reached the canopy always have simple leaves

2 In Morabukea (*Mora gonggripii*) sometimes some leaves have 2 leaflets, but most leaves have 4 leaflets.

22. a. Leaflets alternate.....23
 b. Leaflets opposite.....29
23. a. Rachis prolonged beyond the terminal leaflet, flattened and slightly winged22. *Dipteryx odorata* (Tonka bean)
 b. Rachis not prolonged beyond the terminal leaflet, round, or if flattened not winged.....24
24. a. Twigs and slash with red exudate.....61. *Pterocarpus rohrii* (Hill corkwood)
 b. Twigs and slash without red exudate.....25
25. a. Leaflets blackish-punctate below.....2. *Acosmium praeclarum* (Blackheart)
 b. Leaflets not blackish-punctate below.....26
26. a. Leaflets discolorous, lower side duller and paler than upper side; tertiary veins inconspicuous.....27
 b. Leaflets with lower side and upper side more or less of the same colour; tertiary veins reticulate or inconspicuous.....28
27. a. Leaflets glabrous; base often asymmetrical; petiole without a basal pulvinus. Tree of seasonal, mixed, and Wallaba forest.....62. *Quassia simarouba* (Simarupa)
 b. Leaflets densely covered with appressed hairs below; base symmetrical; petiole with a round pulvinus at the base. Tree of swamp, marsh, and Mora forest.....78. *Vatairea guianensis* (Arisauro)
28. a. Leaflets 12-24 cm long; tertiary veins reticulate on both sides. Slash with a strong cucumber-like scent, not discolouring bluish near sapwood.....3. *Alexa imperatricis* (Haiariballi)
 b. Leaflets 6-12(-14) cm long; tertiary veins inconspicuous. Slash with a weak cucumber-like scent, discolouring bluish near sapwood after exposure.....21. *Diploptropis purpurea* (Tatabu)
29. a. Leaves paripinnate.....30
 b. Leaves imparipinnate.....38
30. a. Rachis with a disc-shaped gland between each pair of leaflets.....34. *Inga alba* (Maporokon)
 b. Rachis without glands between leaflet pairs.....31
31. a. Stipules finely divided, lateral.....66. *Sclerolobium guianense* (Kaditiri)
 b. Stipules absent, or undivided if present.....32
32. a. Petiole without a round pulvinus at base; petiolules without pulvinulus.....33
 b. Petiole with a round pulvinus at base; petiolules with pulvinulus.....34
33. a. Leaflets (10-)18-40(-50) x (4-)6-14(-18) cm, nearly symmetrical; secondary veins (6-) 12-16 (-20) pairs. Bark usually smooth, lenticellate; dead bark 0.5 mm thick, grey-brown, not layered.....12. *Carapa guianensis* (Crabwood)
 b. Leaflets 5-14 x 3-6 cm, often falcate; secondary veins 7-12 pairs. Bark deeply fissured, not lenticellate; dead bark 5-10 mm thick, dark brown, layered.....15. *Cedrela odorata* (Red cedar)

- 34. a. Margin of leaflets strongly recurved, particularly in lower half.....24. *Eperua grandiflora* (Ituri wallaba)
- b. Margin of leaflets plane or only slightly recurved.....35
- 35. a. Leaflets falcate, with pellucid dots; stipules united into a to 0.5 cm long, intrapetiolar structure.....23. *Eperua falcata* (Soft wallaba)
- b. Leaflets symmetrical, without pellucid dots; stipules lateral or absent.....36
- 36. a. Leaflets 4, rarely 2.....46. *Mora gonggrijpii* (Morabukeya)
- b. Leaflets 6 or 8, rarely 4.....37
- 37. a. Leaflets with marginal vein near or in leaf margin; leaves often with 1.5-3 cm long stipules. Tree during large part of the year with 50-250 cm long, pendent inflorescences (flowers pink-purple) or infructescences¹.....25. *Eperua rubiginosa* (Watapa)
- b. Leaflets without marginal vein; stipules minute. Inflorescences 10-20 cm long, erect, with white flowers, inconspicuous from below the tree.....45. *Mora excelsa* (Mora)
- 38. a. Twigs with red or white exudate.....39
- b. Twigs without coloured exudate.....41
- 39. a. Twigs with white exudate.....43. *Loxopterygium sagotii* (Hububalli)
- b. Twigs with red exudate.....40
- 40. a. Leaflets sparsely, minutely hairy and glaucous below.....68. *Swartzia benthamiana* (Itikiboroballi)
- b. Leaflets densely brown-puberulous and not glaucous below.....69. *Swartzia leiocalycina* (Wamara)
- 41. a. Petiole with a round pulvinus at the base. Bark often with cucumber-like scent.....42
- b. Petiole without a round pulvinus at the base, flat above. Bark often with resinous-aromatic scent.....47
- 42. a. Leaflets densely covered with short, appressed, brown hairs below, obscuring the secondary veins; leaves usually with more than 11 leaflets.....33. *Hymenolobium flavum* (Koraroballi)
- b. Leaflets not densely hairy below (at least not when mature); leaves with at most 11 leaflets.....43
- 43. a. Leaf rachis with transverse ridges between the leaflets; petiole base with glands above. Slash sweet-scented.....83. *Vouacapoua macropetala* (Sarebebeballi)
- b. Leaf rachis without transverse ridges; petiole base without glands. Slash scented cucumber-like.....44
- 44. a. Petiolules 0.3-0,5 cm long.....45
- b. Petiolules at least 0.7 mm long.....46

1 Soft wallaba (*Eperua falcata*) also has long, pendent inflorescences; see key entry 35a.

45. a. Leaflets with 6-10 pairs of secondary veins, puberulous below; leaves (when not too old) with a pair of small stipellae at base of each pair of leaflets.....4. *Andira surinamensis* (Koraro)
 b. Leaflets with (8-) 10-17 pairs of secondary veins, sparsely covered with appressed hairs along veins below; leaves without stipellae.....51. *Ormosia coccinea* (Barakaro)
46. a. Leaflets elliptic to ovate, shiny below. Slash with weak to moderate cucumber-like scent. Tree of Wallaba forest and marsh forest on white sand.....52. *Ormosia coutinhoi* (Korokororo)
 b. Leaflets obovate to narrowly obovate, glaucous and dull below. Slash with very strong cucumber-like scent. Tree of mixed forest on laterite.....18. *Clathrotropis macrocarpa* (Aromata)
47. a. Leaves with 3-5(-7) leaflets.....48
 b. Leaves with 5-15 leaflets.....49
48. a. Petiolules swollen at both ends, 0.5-1.5(-2) cm long; leaflets 8.5-15(-19) cm long; leaf rachis keeled above.....60. *Protium decandrum* (Kurokai)
 b. Petiolules not swollen at ends, 0.2-0.7 cm long; leaflets 3-6.5(-9) cm long; leaf rachis flat above.....9. *Astronium ulei* (Bauwaua)
49. a. Leaflets with acute base; petiolules 0.5-0.7 cm long.....76. *Tetragastris altissima* (Haiawaballi)
 b. Leaflets with more or less heart-shaped base; petiolules 0.5-1.5 cm long.....77. *Trattinickia rhoifolia* (Ulu)
50. a. Leaves and twigs with red or white exudate.....51
 b. Leaves and twigs without exudate.....60
51. a. Leaves and twigs with white exudate. Leaves often clustered at twig ends.....52
 b. Leaves and twigs with red exudate. Leaves often in 2 rows, not clustered at twig ends.....57
52. a. Secondary veins plane or only slightly prominent below, inconspicuous53
 b. Secondary veins clearly prominent below.....54
53. a. Petiole 1.5-4.5 cm long; leaves clustered at twig ends; primary vein sunken above. Bark conspicuously fissured..... 44. *Manilkara bidentata* (Bulletwood)
 b. Petiole 0.4-2 cm long; leaves spaced; primary vein slightly prominent above, Bark not fissured, sometimes cracked.....57. *Pouteria cuspidata* (Kokoritiballi)
54. a. Tertiary veins plane and very inconspicuous below. Living bark bright yellow.....8. *Aspidosperma Vargasii* (Currywood)
 b. Tertiary veins slightly prominent and well-visible below. Living bark not yellow.....55
55. a. Secondary veins 7-10 pairs; blade usually obovate, sometimes elliptic, usually less than 10 cm long, at most 14 cm long¹; petiole 0.3-0.7 cm

1 Probably only on twigs of relatively small trees, which have not reached the canopy yet.

- long.....17. *Chrysophyllum pomiferum* (Limonaballi / Paripiballi)
- b. Secondary veins more than 10 pairs; blade usually narrowly obovate or narrowly oblong-elliptic, usually more than 10 cm long, and at least 8 cm long; petiole often more than 1 cm long.....56
56. a. Petiole 1.5-5 cm long; leaf apex shortly acuminate to rounded. Bark red-brown; living bark 2-3 mm thick.....58. *Pouteria guianensis* (Asepoko)
- b. Petiole 0.5-1.5 cm long; leaf apex obtuse. Bark light brown to grey-brown; living bark 25-50 mm thick.....59. *Pouteria speciosa* (Suya)
57. a. Blades and petioles glabrous; leaves spirally arranged along twigs. Red exudate only in twigs, not from living bark.....7. *Aspidosperma cruentum* (Shibadan)
- b. Young blades and petioles with stellate or forked hairs; leaves in 2 rows along twigs. Red exudate both from twigs and living bark.....58
58. a. Hairs on young blades and petioles forked. Tree of swamp and marsh forest; mature tree without flying buttresses.....35. *Iryanthera lancifolia* (Kirikaua)
- b. Hairs on young blades and petioles stellate. Tree of mixed forest, or of swamp forest and then mature tree with (flying) buttresses.....59
59. a. Leaves with dull grey, minute stellate hair (<0.1 mm in diam.); base usually acute or gradually narrowed; margins not parallel. Tree of mixed forest; base straight or with 0.25-0.5(-1)m high buttresses.....79. *Virola michelii* (Hill dalli)
- b. Leaves with yellow-brown, larger stellate hairs (0.1-0.3 mm in diam.); base rounded to almost cordate, sometimes acute; margins usually parallel. Tree of swamp and marsh forest, with 1-2.5(-4) m high (flying) buttresses.....80. *Virola surinamensis* (Swamp dalli)
60. a. Stipules leaf-like, 0.5-1.8 cm long; leaves densely covered with grey, stellate scales on both sides ; petiole (2-)-4-7(-9) cm long.....31. *Hyeronima alchorneoides* (Suradan)
- b. Stipules of different shape and size, or lacking; leaves without scales.....62
61. a. Leaves with pellucid lines and dots, glabrous, with asymmetrical base, arranged in 2 rows. Bark with conspicuous vertical rows of lenticels.....37. *Laetia procera* (Warakairo)
- b. Leaves without pellucid lines and dots.....61
62. a. Leaves with 2-3 pairs of long-arcuate secondary veins; stipules linear, to 1 cm long; leaves in 2 rows along the twigs.....29. *Goupia glabra* (Kabukalli)
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¹ These two species are difficult to separate by the leaves only. However, the difference in their ecological preferences usually prevents problems in the identification. The presence of fruit makes identification much easier, as the fruits of Wirimiri are smooth, whereas the fruits of Wina bear horizontally oriented ridges (see drawings opposite the species descriptions).

7. DESCRIPTIVE PART

For the 83 main species a full description is provided here. The chapter ‘ Explanatory notes’ contains information on the subjects treated under the different headings of each description. The species are arranged in the same way as in the list of treated species: alphabetically by their scientific name.

Synonym: *Pithecellobium jupunba* (Willd.) Urban

Literature: Kleinhoonte, A. 1940.

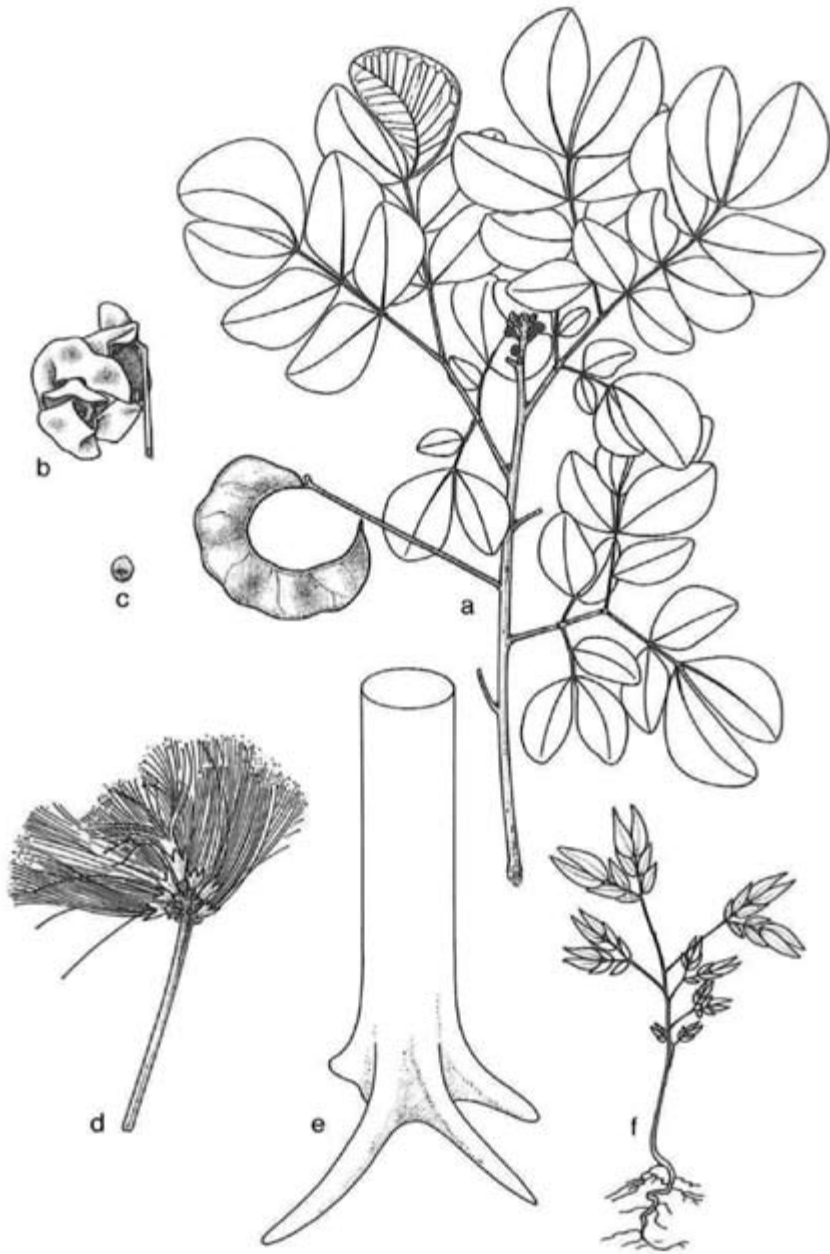
Vernacular names: Huruasa (Ar), Klaipio (C), Kwatapuna(M), Kwatpain (W), Örkürong(Ak), Soapwood (Cr).

Botanical description: Twigs angular, rather densely covered with erect and appressed hairs when young. Leaves alternate, bipinnate, with 2-4(-6) pairs of (2-) 8-16-foliolate pinnae, to 15 cm long; stipules not observed; petiole 1.5-3.5 cm long; rachis 2-12 cm long, yokes with glands ca. 1 mm in diam.; secondary rachis 0.5-6 cm long, with similar glands; petiolules ca. 1 mm long; leaflets opposite; blades more or less leathery, obliquely ovate or rhomboid, 2-5 x 1-3 cm, glabrous above, rather densely covered with short white appressed hairs below, margin slightly recurved, apex obtuse, base obtuse to acute; primary vein slightly raised above, prominent below; secondary veins 7-10 pairs, weakly prominent on both sides. Inflorescence a terminal (or axillary) pedunculate cluster of heads, covered with rusty-brown hairs; peduncle of heads (4 -)5-8 cm long; pedicels 0.4-1.2 mm long. Flowers sparsely covered with rusty hairs; calyx cup-shaped, 2 mm long; corolla (green-)white, 4-6 mm long; stamens well over 10, exerted, to 20 mm long. Fruit a more or less woody pod, green to dark brown, curved and twisted, flat, 10 x 0.8-1.6 cm, swollen over the seeds, inner side brick-red, ventral margin somewhat thickened; seeds 8-10(-12), white with blue-green spot, 7 x 5 x 4 mm.

Field characteristics: Tree(6-)20-30(-40) m tall; trunk (0.1-)0.35-0.85(-1.2) m in diam. Base swollen or with low buttresses, sometimes with surface roots to 1.5 m long. Buttresses 0.3-0.4 x 0.2-0.3(-0.4) x 0.2-0.25 m. Bark very variable in colour, green-brown to grey-brown, or light orange brown, or red brown, or dark brown, smooth, lenticellate, in older trees scaly to flaky. Lenticels more or less round to linear, 1-3 x 1-10 mm, orangish, horizontally oriented when linear, most conspicuous on young bark. Scales more or less round, 5-10 cm in diam. Flakes irregular, to 40 x 10 x 0.3 cm, more or less vertically arranged. Dead bark 0.5 mm thick, light brown. Living bark 3-4 mm thick, creamy orange to yellow-brown to light brown, usually with green layer just below dead bark, often with a ca. 1 mm thick red layer just below green layer (or below dead bark if green layer is lacking), brittle, scented cucumber-like; exudate colourless or light brown, clear, very sticky, slow, forming a shiny film. Sapwood light brown; heartwood darker pink-brown. Crown large, spreading, rounded, branches ascending and spreading. Plate 1.

Ecology and distribution: Occasional to frequent in (often secondary) seasonal forest and marsh forest. Occasional in Wallaba forest. Preferring sandy soils. Widely distributed. Semi-deciduous; flowering and fruiting throughout the year. Pollination by hummingbirds (Snow and Snow, 1972). Seed dispersal by e.g. spider monkeys.

Notes: (1) The presence of Huruasa is often indicated by the twisted fruits with red inner side and the rhombic leaflets with glaucous lower side in the litter; (2) Seedlings with bipinnate leaves already in an early stage. Rachis glandular in mature leaves. Leaflets more slender than mature leaves; (3) An infusion of scraped roots or bark is used as shampoo (Soapwood!).



Abarema jupunba

a. habit (x 0.6); b. dehiscent fruit (x 0.6); c. seed (x 0.6); d. inflorescence (x 1.2); e. trunk base; f. seedling (x 0.2).

2. *Acosmium praeclarum* (Sandw.) Yakovlev

Blackheart

Synonym: *Sweetia praeclara* Sandw.

Literature: Sandwith, N.Y. 1947; Yakovlev, G.P. 1969.

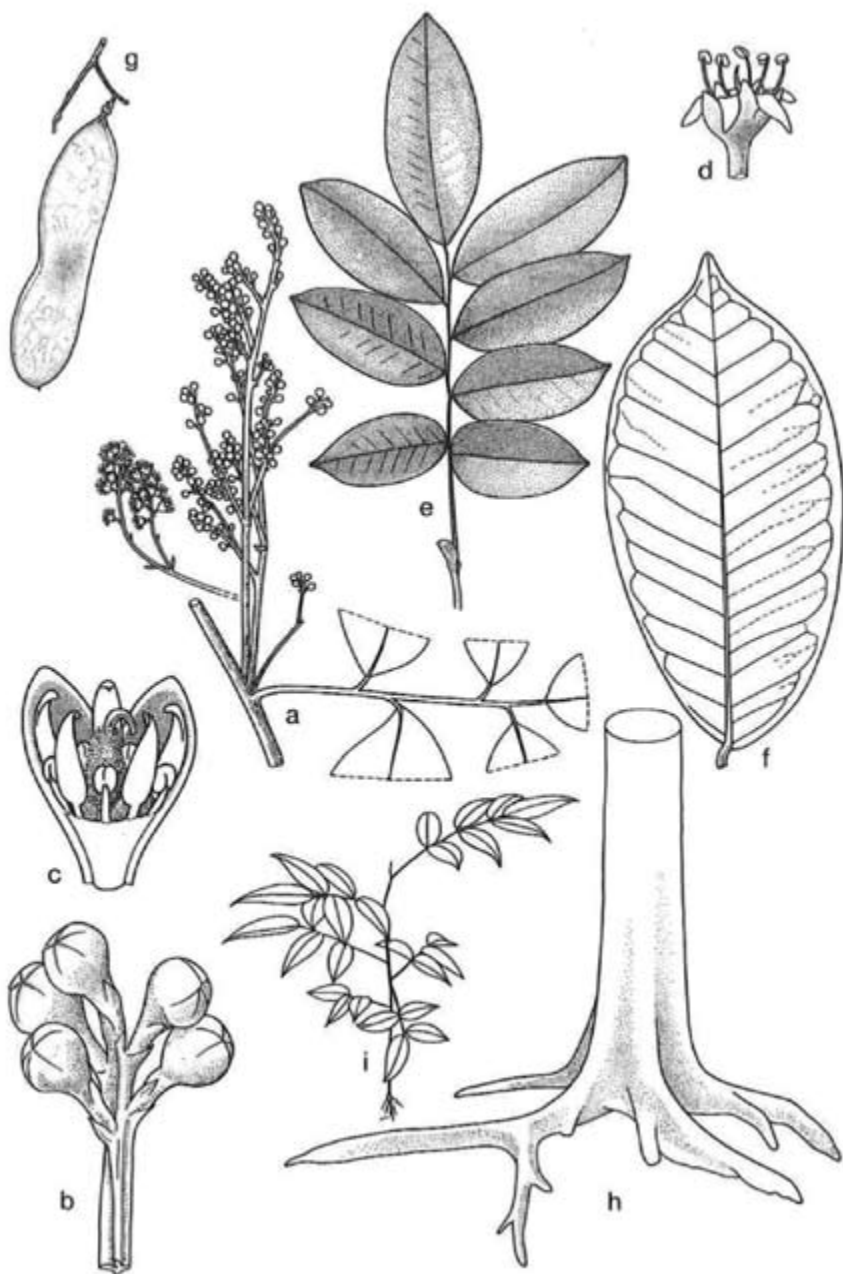
Vernacular name: Blackheart (Cr).

Botanical description: Twigs black-brown, sparsely covered with white appressed hairs when young. Leaves alternate, imparipinnate, 3-7-foliolate; stipules leathery, ovate to elliptic, ca. 0.5 cm long, caducous; petiole 2-3.5 cm long, basally swollen; rachis 4-7.5 cm long; petiolules 0.2-0.5 cm long, transversely wrinkled; leaflets opposite or alternate; blades leathery, elliptic-oblong, 5.5-9.5(-13) x 2.5-5 cm, subglabrous, blackish-punctate below, margin slightly revolute, apex acuminate with obtuse tip, base acute to rounded; primary vein sunken above, prominent below; secondary veins 7-10 pairs, prominent above, slightly prominent below; tertiary veins well visible and slightly prominent above. Inflorescence an axillary or terminal panicle, to 10 x 7 cm, covered with short brown hairs; pedicels 1-2 mm long. Calyx creamy green, cup-shaped, 2-3.5 mm long, lobes ca. 1 mm long, persistent; petals 5, white, ca. 4 mm long, clawed; stamens 5. Fruit a hard-papery to soft-leathery pod, green-brown, shiny, narrowly ellipsoid-oblongish, 5-8.5 x 1.52 x 0.3 cm, apiculate, glabrous, flattened, prominently reticulately veined, indehiscent; seeds 1-3, brown, elongate-oblong, 0.6-1 x 0.2-0.5 x 0.3 cm.

Field characteristics: Tree 25-35 m tall; trunk 0.25-0.45 m in diam. Base buttressed. Buttresses 0.4-1.5 x 0.3-1.5 x 0.1 m, often branched near ends. Bark light brown to creamy brown, lenticellate. Lenticels round to elongate, 2-20 x 2-3 mm, horizontally oriented. Dead bark 1-1.5 mm thick, grey-brown. Living bark ca. 5 mm thick, yellow-brown, rapidly darkening to grey-brown at exposure, with 0.5 mm thick green layer under the dead bark, and with 0.5 mm orange layer under this green layer, slash scented cucumber-like or bean-like. Sapwood yellow-white to light brown; heartwood dark brown. Crown obtriangular, flattened, moderately dense, branching erect. Plate 2.

Ecology and distribution: Occasional to common in Wallaba forest, Mora forest, Marsh forest and mixed forest (e.g. Greenheart forest), on sand or loam. Occurring in central and north-central Guyana; only known from Guyana. Evergreen; flowering recorded from March to August (not in June); fruiting from September to November. The fruits wind-dispersed.

Notes: (1) Seedlings 3-foliolate, two first leaves opposite, later leaves alternate. Petiole and rachis very narrowly winged. Leaflets alternate or opposite, elliptic, punctate below. Stipules often conspicuous in saplings, more than in mature leaves; (2) Information on *Acosmium praeclarum* is scarce. Much more is known about *Acosmium nitens*, Kamarakata(Ar), which occurs in Guyana, in all surrounding countries and in Colombia; (3) Imirimiaballi (*Chamaecrista adianrifolia* var. *pteridophylla*) is sometimes also called Blackheart. It has 40-70-foliolate leaves, 1-2 cm long leaflets, yellow flowers, woody, dehiscent pods, and a light brown living bark with black fibres .



Acosmium praeclarum

a. inflorescence (x 0.6); b. flower buds (x 5); c. immature flower, with part of the calyx removed (x 12); d. mature flower (x 3); e. leaf (x 0.25); f. leaflet (x 0.6); g. fruit(x 0.6); h. trunk base; i. seedling (x 0.1) .

Literature: Amshoff, G.J.H. 1939.

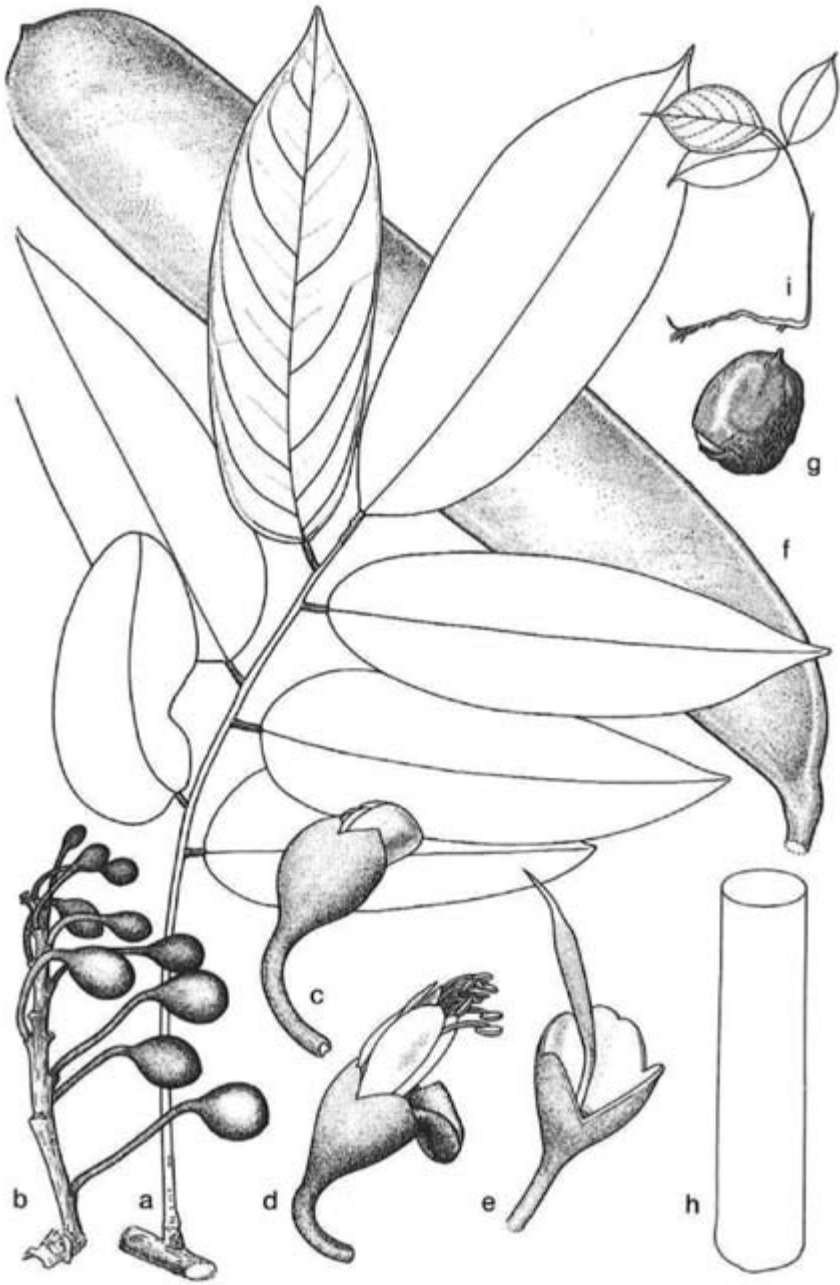
Vernacular names: Crook (Cr), Haiariballi (Ar), Kapai (Ak). Koatoi (Ak).

Botanical description: Twigs minutely puberulous when young. Leaves alternate, imparipinnate, 7-9-foliolate; stipules not observed; petiole 7-15 cm long, more or less round; rachis 10-30 cm long; petiolules 1-1.5 cm long, round, transversely wrinkled; leaflets alternate; blades leathery, narrowly oblong-elliptic. 12-24 x 5-11 cm, glabrous, margin plane, apex shortly acuminate to acute, base obtuse; primary vein slightly prominent to plane above, prominent below; secondary veins 6-10 pairs, plane to slightly prominent above and below; tertiary veins distinctly reticulate on both sides. Inflorescence a raceme, terminal or axillary or on leafless older branches, 10-25 cm long, branches deep red. rather densely to sparsely covered with small, brown, appressed hairs; pedicels 40-70 mm long. Flowers stout, producing nectar; calyx cup-shaped, dark red, leathery, 15-30 mm long, dark brown-velutinous, with 3 narrow lobes above and 2 somewhat wider lobes below, persistent; petals 5, somewhat leathery, 35-50 mm long, 4 petals orange, ca. 5 mm wide, connivent, upper one dark red, ca. 15 mm wide, recurved; stamens 10, orange, basally red. Fruit a woody pod, dark brown, elongate, falcate, 30-40(-50) x 5 cm, brownish velutinous, flattened, longitudinally dehiscent, valves with spongy, white inner layer, stipe 3-4 cm long; seeds 8-10, black, broadly ellipsoid, flattened, to 2.5 x 2 x 0.5 cm.

Field characteristics: Tree (15-)30-40 m tall; trunk 0.3-0.6(-0.9) m in diam. Base somewhat swollen. Bole cylindrical, somewhat tapering. Bark light brown, lenticellate, lenticels round to elongate, 2-5 x 2-3 mm, white, sometimes in short vertical or horizontal rows. Dead bark 0.1-0.5 mm thick, grey-brown. Living bark 2-3 mm thick, greenish just below outer bark, orange-brown, mottled with yellow, with a darker layer next to dead bark and a yellow layer next to sapwood, with strong cucumber-like (haiari-like) scent; exudate colourless, clear, scanty. Sapwood whitish to light brown; heartwood dark (red-)brown. Plate 2.

Ecology and distribution: Locally dominant in mixed forest on light coloured sands and loamy soils in N.W.-district, upper Mazaruni area and Pakaraima Mts. Flowering nearly throughout the year; fruiting mainly in April and May. Fruiting only every 3-4 years, but then usually producing a very heavy crop (Fanshawe, 1954).

Notes: (1) *Alexa leiopetala* (Haiariballi) occurs in central Guyana. Leaflets with fine, grey-brown hairs below, and flowers somewhat smaller; (2) Haiariballi is named after the Haiari vine (*Lonchocarpus* spp., Papilionaceae; fish poison), because the scent of the slash is similar, although in Haiari it is stronger; (3) *Ormosia coutinhoi* (see p.142) is another Papilionaceae tree called Crook. Bark and slash are rather similar, but lenticels more scattered and slash scent weaker. Crown more dense. Leaflets opposite; (4) Seedling growth abundant in fruiting years (Fanshawe, 1954). Two first leaves opposite, later leaves alternate. Leaflets 3, apex acuminate; (5) The red, tough, free-exposed flowers, are probably pollinated by hummingbirds, but no actual observations have been made; (5) Ramirez made a revision of the Venezuelan species of *Alexa* (including *A. imperatricis*) for a thesis (not seen), published by the Central University of Venezuela (Caracas).



Alexa imperatricis

a. leaf (x 0.3); b. inflorescence with flower buds (x 0.6); c. immature flower (x 0.6); d. mature flower (x 0.6); e. flower, with petals and stamens removed (x 0.6); f. fruit (x 0.6); g. seed (x 0.6); h. trunk base; i. seedling (x 0.1).

Literature: Amshoff, G.J.H. 1939.

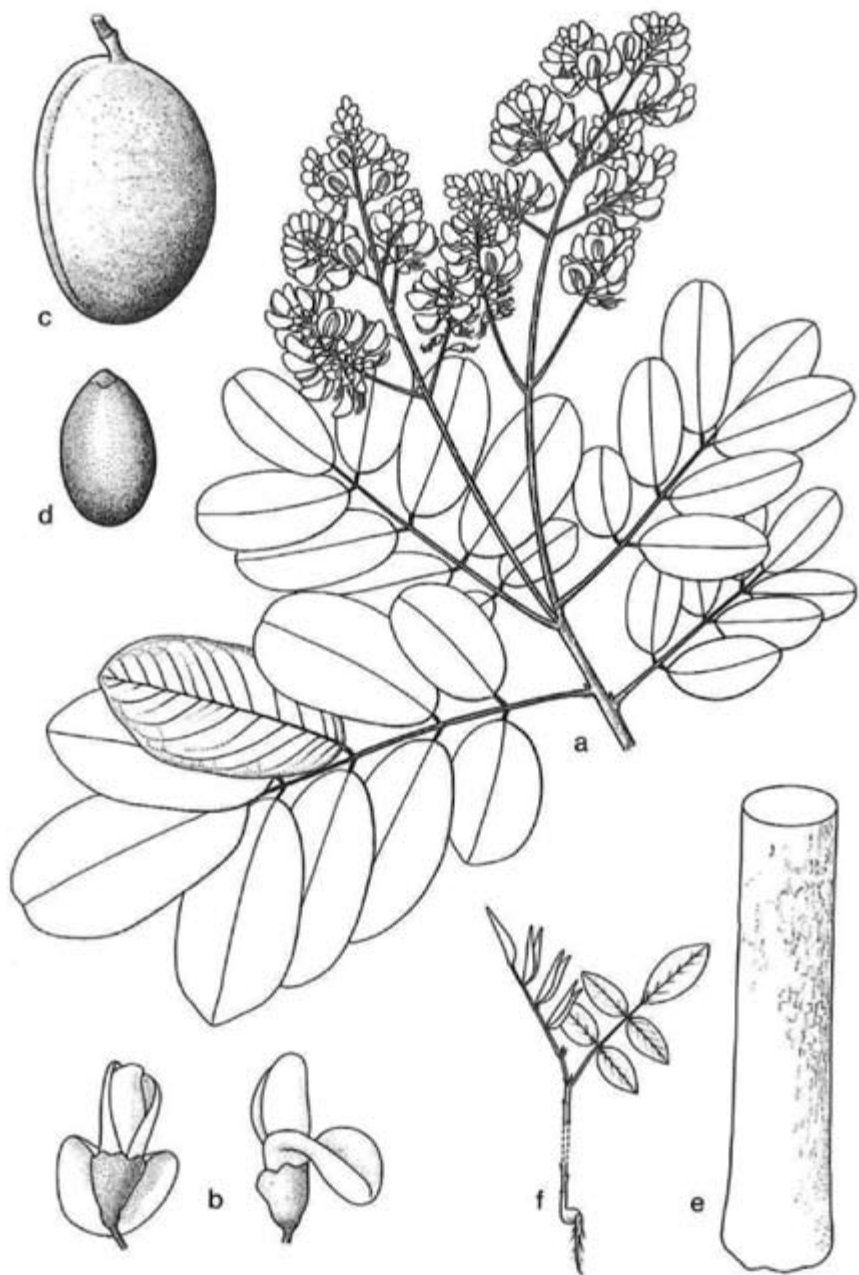
Vernacular names: Bat seed (Cr). Koraro (Ar). Maats (W).

Botanical description: Twigs round, brownish puberulous when very young. Leaves alternate, imparipinnate, (7-)9-11-foliolate; stipules linear, 0.3 cm long, caducous; petiole 3.5-6 cm long, round, grooved above, basally swollen; rachis 4.5-9 cm long; petiolules 0.3-0.4 cm long; leaflets opposite; blades leathery, oblong to ovate-oblong, 5-14 X 3-6.5 cm, glabrous above, puberulous below, margin slightly recurved, apex obtuse to emarginate, base rounded; primary vein sunken above, prominent below; secondary veins 6-10 pairs, sunken above, prominent below. Inflorescence a (sub)terminal, lax (sometimes dense), many-flowered panicle, 20-30 cm long, tomentose; peduncle 6-7 cm long; pedicels 2-3 mm long. Calyx dark purple to almost black, bell-shaped, 5-6 mm long, very shortly 5-toothed, tomentose; petals 5, light purple, ca. 15 mm long, clawed, standard with a large, white, central patch at the base; stamens 10. Fruit a drupe-like pod, green, ovoid to globose, to 3.5-6 x 2.5-3 x 2.5-3 cm, glabrous, outer layer fleshy, inner layer woody, indehiscent, stipe to 0.5 cm long; seeds 1-2(-3), very hard, light brown with paler specks, ovoid, 2-3.5 x 1.5-2.5 cm.

Field characteristics: Tree 20-35 m tall ; trunk 0.5-0.7(-1) m in diam. Base often with adventitious roots. Bark grey, or dark brown with grey patches, or red-brown, lenticellate, cracked, scaly to flaky on older trees. Lenticels inconspicuous. Cracks vertical. Dead bark 0.5-1 mm thick, grey -brown. Living bark 6-8 mm thick, salmon pink to orange-brown, yellow near sapwood, darkening at exposure, layered, scented haiari-like (=cucumber-like). Sapwood yellow-white to yellow-brown; heartwood pink-brown to fed-brown, with lighter streaks. Crown flat to rounded, with erect branching. Plate 3(*Andira cotiacea*).

Ecology and distribution: Occasional in forests along rivers in north-central and northeastern Guyana and the Rupununi district. Flowering mainly from March to June; fruiting from January to March. Dispersal of the seeds takes place by scatter-hoarding rodents and possibly bats: they drop the seeds after the fruit wall has been eaten.

Notes:(1) Seedlings with scattered scales on stem. First leaves 1-3-foliolate, later leaves 5-7-foliolate. The stipules and stipellae are linear; (2) *Andira inermis* (Koraro) has glabrous leaflets, and somewhat smaller flowers and fruits.



Andira surinamensis

a. habit (x 0.5); b. flower, ventral view (l) and side view (r) (x 1.5); c. fruit (x 0.6); d. seed (x 0.6); e. trunk base; f. seedling (x 0.3).

5. *Aniba hypoglauca* Sandw.

Yellow silverballi

Synonym: *Aniba ovalifolia* Kosterm., non Mez

Literature: Kubitzki, K. and Renner, S. 1982.

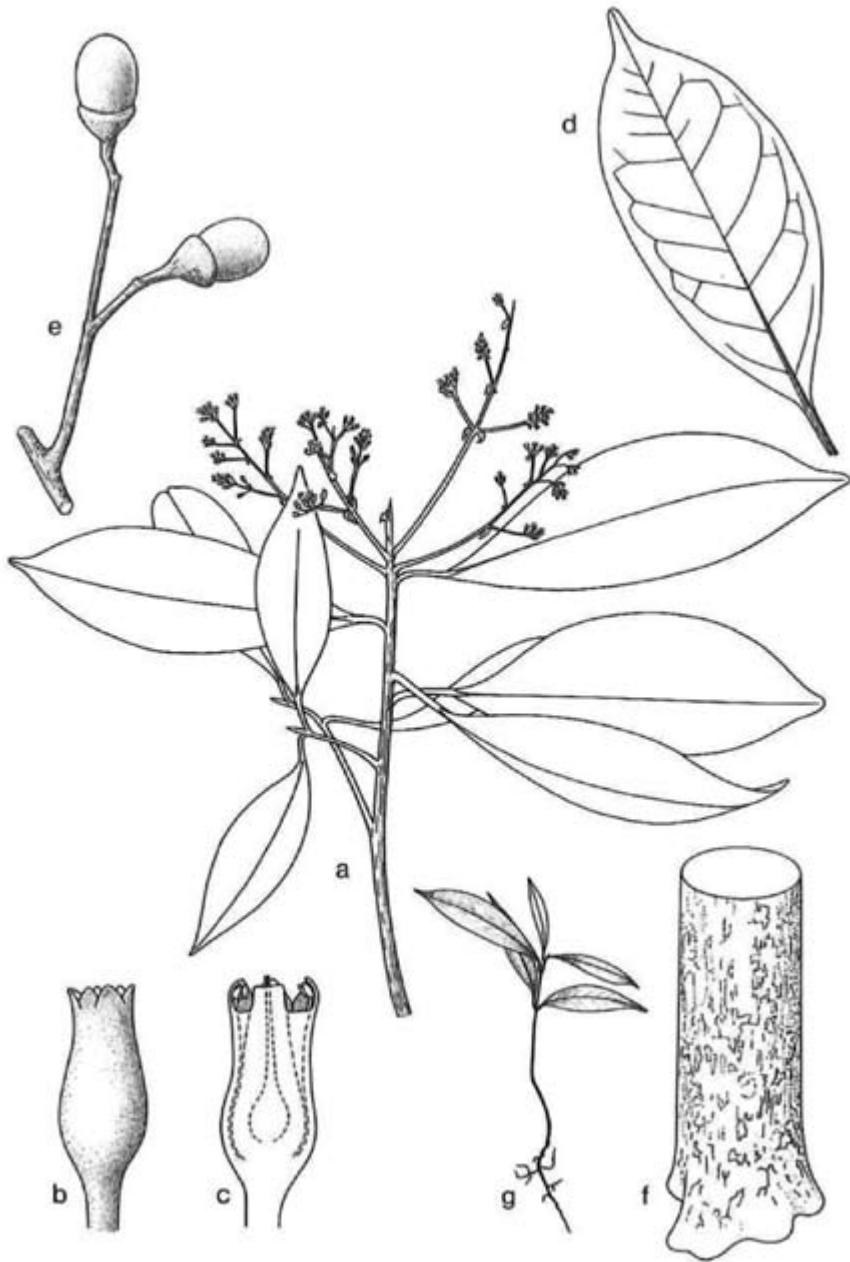
Vernacular names: Kawioi (Ak), Kurero silverballi (Cr), Yellow silverballi (Cr).

Botanical description: Twigs more or less angular, densely covered with brown to white appressed and erect hairs when young. Leaves alternate; petiole 1.5-2 cm long, grooved above; blades leathery, ovate to elliptic. 4-14 x 2-8 cm, glabrous above, sparsely covered with small, appressed hairs and glaucous below, margin flat, apex acuminate, base acute to obtuse; veins yellow-green above; primary vein prominent on both sides; secondary veins 6-12 pairs, plane to slightly prominent on both sides. Inflorescence a subterminal, pyramidal, many-flowered panicle to 10 cm long, branches densely covered with yellow-brown hairs; peduncle 2-3 cm long; pedicels 1.5-5 mm long. Flowers yellow-brown, 2.5-3 x 1.3-1.5 mm; floral tube pronounced, ellipsoid, tepals 6, erect, ca. 0.7 mm long; stamens in 4 rows. ca. 0.7 mm long. Fruit a berry, ellipsoid, 2.2-2.3 x 1.5-1.7 cm, glabrous, with a cup-like structure at the base; cupule half-round, 0.6-1 cm high, 0.5-1 .5 cm in diam., warty; seed 1. ellipsoid .

Field characteristics: Tree 20-30 m tall; trunk 0.4-0.75 m in diam. Base buttressed. Buttresses 0.4-1 x 0.2-0.4 x 0.1-0.3 m. Bark light brown or grey-brown, lenticellate, fissured, often scaly to flaky. Lenticels round, 1-2 mm in diam., irregularly scattered. Fissures vertical, to 40 x 0.5 x 0.5 cm. Flakes more or less rectangular, to 15 x 3 x 1 cm. Dead bark ca. 10 mm thick, brown, tinged somewhat pinkish. Living bark ca. 5 mm thick, grey-brown, with orange fibres, innermost part orange-brown, fibrous, with a strong aromatic scent. Sapwood light yellow-brown, shiny when slashed; heartwood dark(yellow-)brown. Crown oval or rounded, small, branches erect to spreading. Plate 3.

Ecology and distribution: In Wallaba forest and in mixed forest on white or light brown sand. Occurring in the near interior. Evergreen; flowering mainly from May to August; fruiting data too scarce for pattern indication. The berries are probably dispersed by birds.

Note: (1) Seedlings usually present under or near the parent tree. Easily recognized by glaucous lower side of young leaves and strong synthetic-aromatic scent of crushed leaves. Secondary veins clearly sunken above and prominent below, making the blade almost bullate.



Aniba hypoglauca

a. habit (x 0.6); b. flower (x 6); c. flower, longitudinal section (x 6); d. leaf (x 0.6);
 e. infructescence (x 0.6); f. trunk base; g. seedling (x 0.15).

Literature: Raalte. M.H. van 1937.

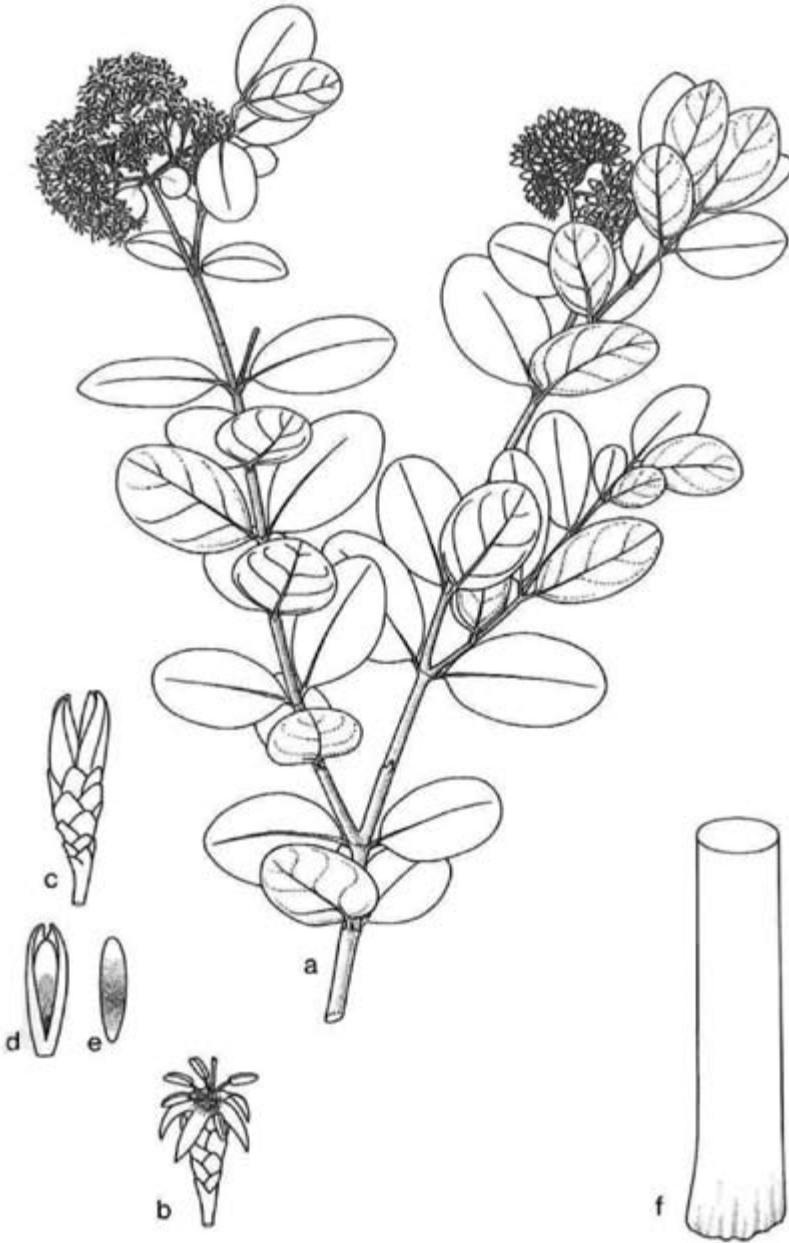
Vernacular names: Inyak (W). Tamanokware(C).

Botanical description: Twigs white-lenticellate, round, glabrous. Leaves opposite; petiole 0.5-1 cm long, grooved above, bases of opposite petioles almost united; blades leathery, broadly elliptic-oblong, 3-11 x 3-7 cm, glabrous above, sometimes slightly hairy below, margin often revolute, apex obtuse to acute, base rounded to gradually narrowed; primary vein prominent near base and sunken near apex above, prominent below; secondary veins 3-4 pairs, sunken above, prominent below. Inflorescence consisting of ca. 3 terminal corymbs, 2-2.5 x 3.5-5.5 cm; peduncle 1-5 cm long; pedicels 1-2 mm long. Flowers scented, enveloped by many, persistent bracts; sepals 5, 2-3 mm long, margins ciliate; corolla white-yellow, 5-8 mm long, tube cylindrical, 2-3 mm long, lobes 5, linear, 3-5 mm long, hairy inside; stamens 5, exserted. Fruit a capsule, dark brown, oblong-ellipsoid, 0.7-0.9 x 0.3 cm, glabrous, dehiscent with 2 valves, valves splitting at top when fruit is ripe; seeds 2(-4), dark brown, 7-8 x 1.5 mm, with a membranous wing at base and top.

Field characteristics: Tree 20-25 m tall; trunk 0.30-0.45 m in diam. Base swollen or with root spurs. Root spurs 0.4-0.7 x 0.02-0.1 x 0.05-0.1 m. Bark light grey brown, cracked. Cracks vertical, 1-5 x 0.1-0.3 x 0.1-0.2 cm, 0.1-0.3 cm apart. Dead bark 1-2 mm thick, grey-brown. Living bark remarkably thin, 1-2 mm thick, red-brown with pink to light brown streaks, with pleasant sweet scent. Sapwood and heartwood light brown, not clearly differentiated. Plate 4.

Ecology and distribution: 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. Flowering mainly from September to October; fruiting data scarce. The small, winged seeds are dispersed by wind.

Note:(1) The pulped leaves are used as a fish poison (note on label of collection A.C. Smith 2196).



Antonia ovala

a. habit (x 0.6); b. flower (x 3); c. fruit (x 3); d. fruit valve with seed (x 3); e. seed (x 3); f. trunk base .

Literature: Allorge, L. and Poupat, C. 1991 ; Woodson, R. E. 1951.

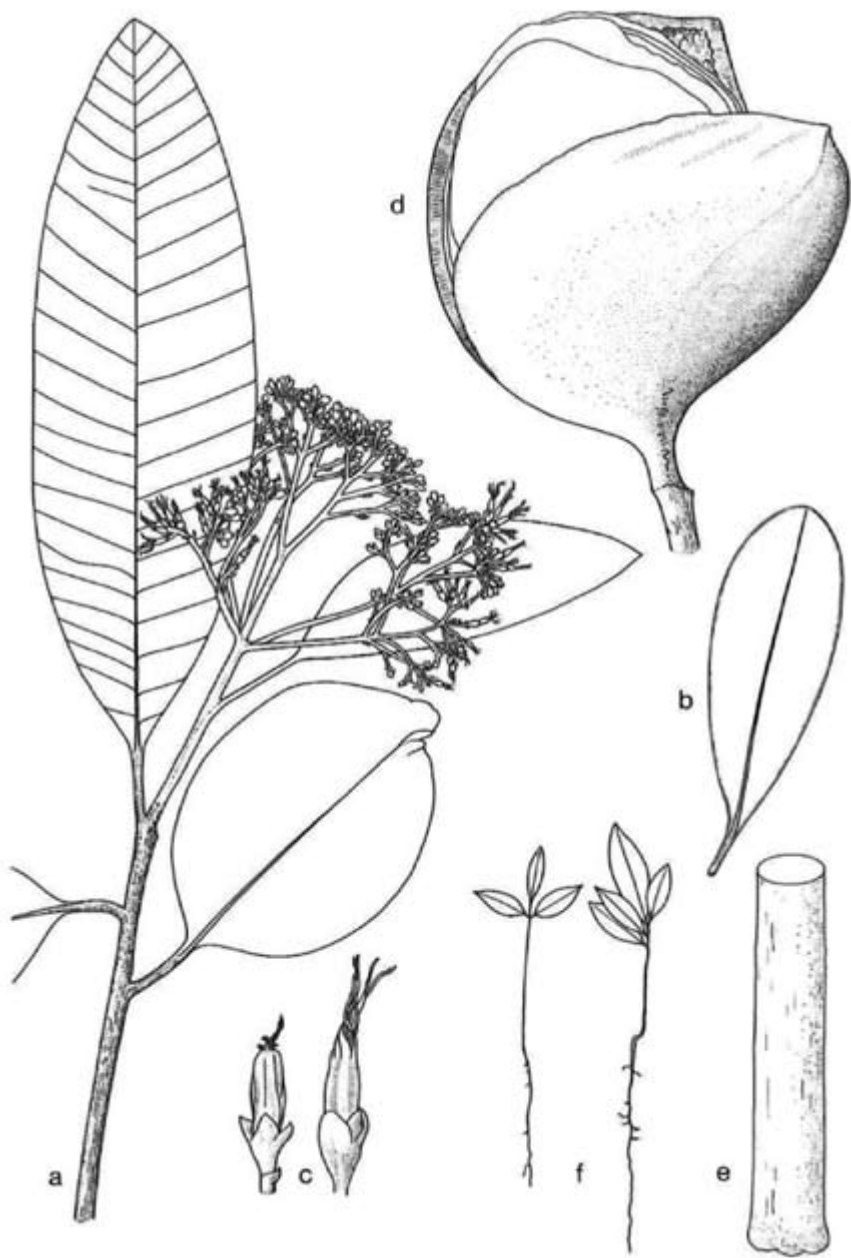
Vernacular name: Shibadan (Ar) .

Botanical description: Twigs densely and greyish papillate, with abundant, reddish, watery exudate. Leaves alternate; petioles 1.5-3 cm long, with double groove above; blades more or less papery, elliptic to obovate to narrowly so, (7.5-)14-23.5 x(2.5-)4-7.5 cm, glabrous and shiny above, rather densely greyish papillate below, margin weakly revolute, apex acute (to obtuse), apiculate, base acute; primary vein prominent on both sides, grooved above in lower half; secondary veins 20-25 pairs, sunken above, prominent below, running straight to margin, at a 70-75° angle from primary vein, often with smaller, irregular veins in between. Inflorescence a terminal panicle, branches densely grey-brown papillate, 5-10 cm long; peduncle 2-9 cm long; pedicels ca. 1 mm long. Flowers at end of panicle branches; calyx brown-puberulous, 2-4 mm long, lobes ca. 1 mm long; corolla yellowish white, 4.56 mm long, lobes twisted, 1.5-2 mm long; stamens 5. Fruit a woody follicle, mericarp(s) 1(-2), brown, broadly elliptic to broadly obovate, 8-15 x 6-11 x 3-4 cm. apiculate, puberulous, with numerous longitudinal ribs, median rib a little more prominent, base tapering over 1-3 cm; seeds numerous, papery, light brown, circular, 50-70 mm in diam., wing 15-20 mm wide.

Field characteristics: Tree 30-35 m tall; trunk 0.45-0.60 m in diam. Base straight or somewhat swollen. Bole remarkably cylindrical. Bark creamy brown to dark yellow-brown, sometimes pale brown-grey, rough, lenticellate. Lenticels coarse, round to elongate, 3-20 x 3-7 mm, arranged horizontally and, to a lesser degree, vertically, sometimes connected and forming short rows. Dead bark ca. 1 mm thick, dark orange-brown. Living bark (3-)5-10 mm thick, creamish to pale yellow, mottled orange and dark yellow, with light brown layer next to sapwood, getting a pinkish tinge after ca. 1/2 hour, appearing slightly layered, hard, brittle, sweetscented. Sapwood light brown; heartwood dark brown. Crown rounded, moderately dense, branches erect to spreading. Plate 4.

Ecology and distribution: An occasional to common species in mixed forest on brown sand in north-central and northeastern Guyana and the Kanuku Mts. The seeds are wind-dispersed.

Notes: (1) The slash of most species of *Aspidosperma* with a cylindrical trunk (e.g. *A. album*) is similar to the slash of *A. cruentum*. See *A. vargesii* for a different, less common type of slash in *Aspidosperma*. Part of the species, e.g. *A. excelsum*, has a deeply fluted trunk. These species, called Yaruru in Arawak language, produce white latex from the slash; (2) Seedlings have heartshaped, somewhat fleshy cotyledons. The plants have white latex in all parts. The two first leaves are opposite, later leaves are alternate; (3) *Aspidosperma album* (Shibadan) occurs mainly in Wallaba forest. It has leaves which are light green above and light grey-green below; (4) The red, watery exudate in the twigs and the alternate leaves are unusual for Apocynaceae, as most species of this family possess white latex and opposite leaves (e.g. *Parahancornia fasciculata*) .



Aspidosperma Cruentum

a. habit (x 0.6); b. leaf (x 0.6); c. flowers, old (l) and young (r) (x 3); d. dehisced fruit with seeds (x 0.6); e. trunk base; f. seedlings, young (left, *Aspidosperma* sp.) and somewhat older (right, *A. cruentum*) (x 0.15).

8. *Aspidosperma vargasii* A. DC.

Currywood

Literature: Allorge, L. and Poupat, C. 1991; Woodson, R.E. 1951.

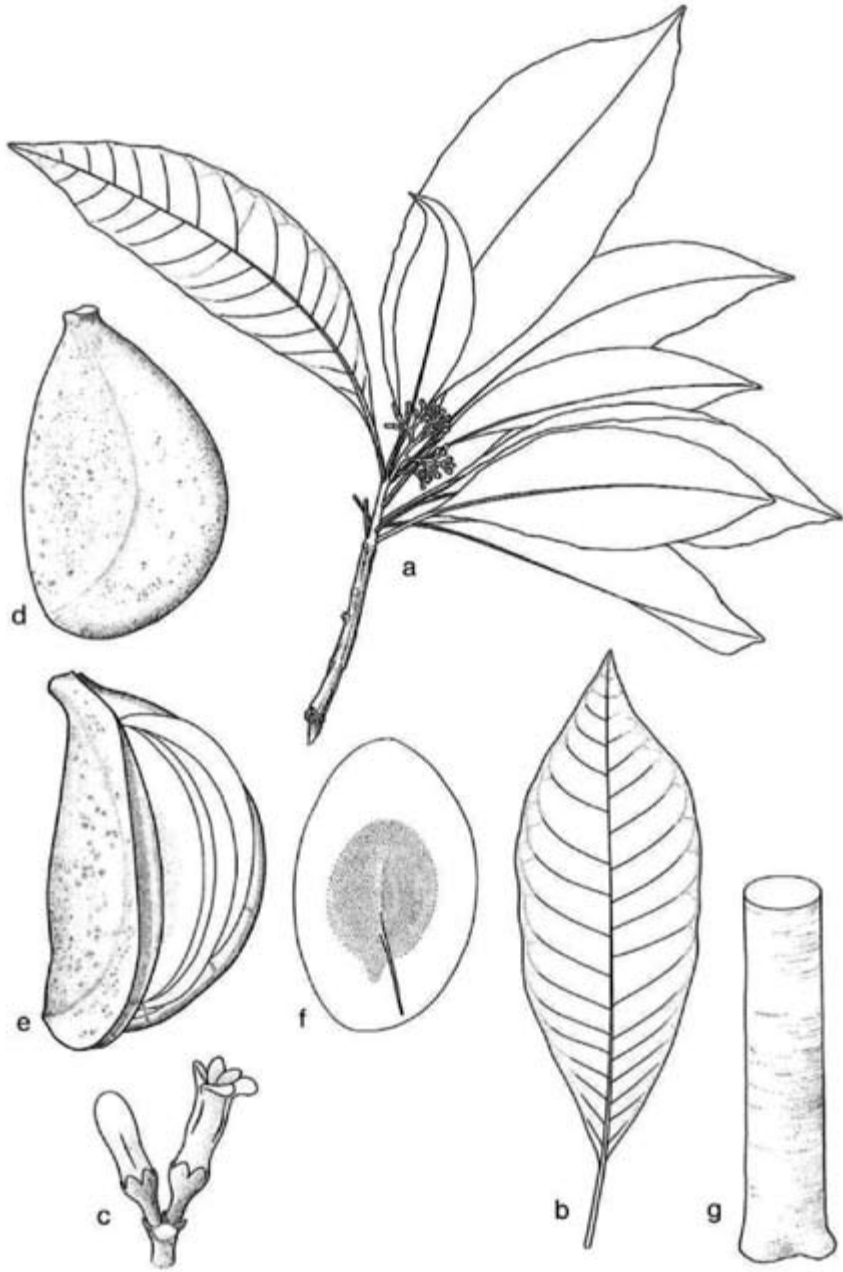
Vernacular names: Shibadan (Ar), Currywood (Cr).

Botanical description: Twigs slender, covered with brownish appressed hairs, soon becoming glabrous. Leaves alternate; petiole 1-2 cm long; blades papery, elliptic to obovate, 5-15 x 3-7 cm, glabrous to sparsely covered with tiny appressed hairs along veins above and below, margin slightly undulate, apex shortly acuminate to acute, base gradually narrowed 10 acute; primary vein plane with grooved central zone above, prominent below; secondary veins 13-15 pairs, plane above, slightly prominent below. Inflorescences subterminal, clustered, densely-flowered cymes, 2-5 cm long; branches densely covered with brownish appressed hairs; peduncle 1-2 cm long; pedicels 1-2 mm long. Flowers fragrant; calyx cup-shaped, 2-3 mm long, puberulous, lobes ca. 1 mm long; corolla white, trumpet-shaped, 5-6 mm long, puberulous, lobes 1.5-2 mm long; stamens 5. Fruit a woody follicle, mericarps 1-2, pear-shaped, 4-10 x 2.5-4 x 1 cm, verrucose, with an obvious midrib on both sides; seeds ca. 10, ovate, 40 x 25 mm, winged.

Field characteristics: Tree (10-)20-35 m tall; trunk 0.5-0.7 m in diam. Base straight, or sometimes somewhat swollen. Bole remarkably cylindrical. Bark light brown to yellow-brown, lenticellate, cracked. Lenticels round to elongate, 3-5 x 2-3 mm, often connected in horizontal rows. Cracks vertical, only on parts of the trunk, 5-30 x 0.5-2 cm. Dead bark 0.5-2 mm thick, red-brown. Living bark 10-30 mm thick, yellow, with darker yellow-brown fibres near dead bark, soft, with spicy and somewhat mango-like scent. Exudate (creamy) white, scanty. Sapwood light yellow-brown; heartwood yellow, bitter tasting. Plate 5.

Ecology and distribution: A species of mixed forest on brown sand. Occurring in north-central Guyana and the Kanuku Mts. The seeds are dispersed by wind.

Note:(1) It is not known if any other species of *Aspidosperma* of the Shibadan type has a similar, conspicuous, yellow slash. Most species have a slash. Similar to *A. cruentum*. Possibly *A. ulei* also has a yellow slash (C.A. Persaud. pers. comm.).



Aspidosperma vargasii

a. habit (x 0.6); b. leaf (x 0.6); c. flower bud and flower (x 3); d. fruit (x 0.6); e. dehiscent fruit (x 0.6); f. seed (x 0.6); g. trunk base.

Literature: Barkley, F.A. 1968.

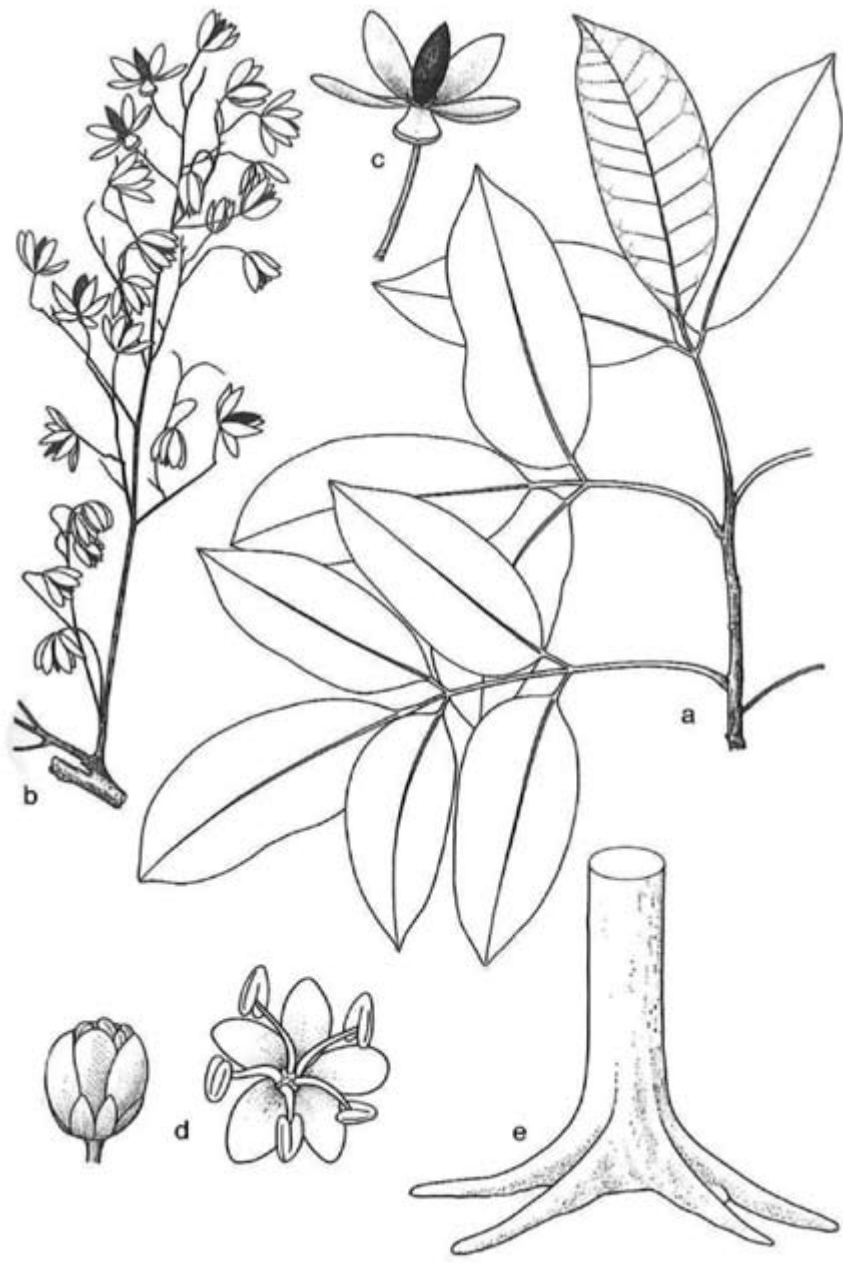
Vernacular names: Bastard purpleheart (Cr), Bauwana (W), Bauwaua (M).

Botanical description: Twigs grey or purplish, glabrous. Leaves alternate, imparipinnate, 3-5-(7)-foliolate; petiole 2.5-4-(6.5) cm long, flat above; rachis 2-3.5 cm long, flat above; petiolules 0.2-0.7 cm long, to 1 cm long in terminal leaflet, flat above; leaflets opposite; blades thin-leathery, ovate, very slightly oblique, 3-6.5-(9) x 2-4-(6.5) cm, glabrous, shiny above, dull below, margin slightly recurved, apex shortly acuminate, apiculate, base acute to obtuse and frequently unequal; primary vein prominent on both sides; secondary veins 9-11 pairs, sunken above, slightly prominent below. Inflorescence a terminal, or rarely axillary panicle, (6-)20-30 cm long, branched from the base, branches glabrous; pedicels slender, 2-3 mm long, 15-20 mm long in fruit. Plants dioecious; flowers unisexual; sepals 5, 0.5-1.5 mm long, enlarging to 12-14 mm in fruit; petals 5, pale green, 2-3.5 mm long (male) or 1.5-2 mm long (female), persistent in fruit. Fruit a drupe, brown, oblongish to cylindrical, 1-1.2 x 0.3-0.4 cm, glabrous, apiculate, with thin, resinous pulp; seed 1, fusiform.

Field characteristics: Tree (5-)15-40 m tall; trunk (0.3-)0.45-0.6 m in diam. Base swollen or buttressed. Buttresses 0.4-0.7 x 1-1.5 x 0.1-0.15 m, concave. Basal part of bole somewhat flanged, because of prolongation of buttresses. Bark dark grey-brown to grey, more reddish on buttresses, lenticellate, cracked, flaky on and near buttresses. Lenticels round to linear, 1-10 x 1-2 mm, red-brown when young, in irregular vertical rows. Cracks vertical, 1-15 x 0.1-0.3 cm. Flakes vertical, 3-10 x 1.5-5 x 0.2-0.3 cm. Dead bark 1 mm thick, dark brown. Living bark 5-10 mm thick, light salmon, creamy brown, or pale brown, with 1 mm thick, whitish layer next to sapwood; exudate light brown, clear, oily, somewhat sticky, slow, appearing in drops, but finally flowing over entire surface. Sapwood light brown; heartwood dark red-brown. Crown flat to rounded, light, with erect to spreading branches. Plate 5.

Ecology and distribution: A deciduous tree of mixed forest on brown sand, in eastern Guyana and the Rupununi district. Flowering when leafless; no clear flowering or fruiting pattern can be indicated, because of the scarcity of data. The fruits are dispersed by wind (Mattick, 1934) and birds (van Roosmalen, 1985).

Note: (1) There might be a second species of *Astronium* occurring in Guyana: *Astronium lecointei*. This species is known from coastal Venezuela and Surinam, as well as from the lower Amazon in Brazil. It has leaves with 7-11 leaflets.



Astronium ulei

a. habit, sterile (x 0.6); b. infructescence(x 0.6); c. fruit (x 1.8); d. male flower, side view (l) and top view (r) (x 6); e. trunk base .

Synonym: *Bagassa tiliifolia* (Hamilton) Benoist

Literature: Berg, C.C. 1992.

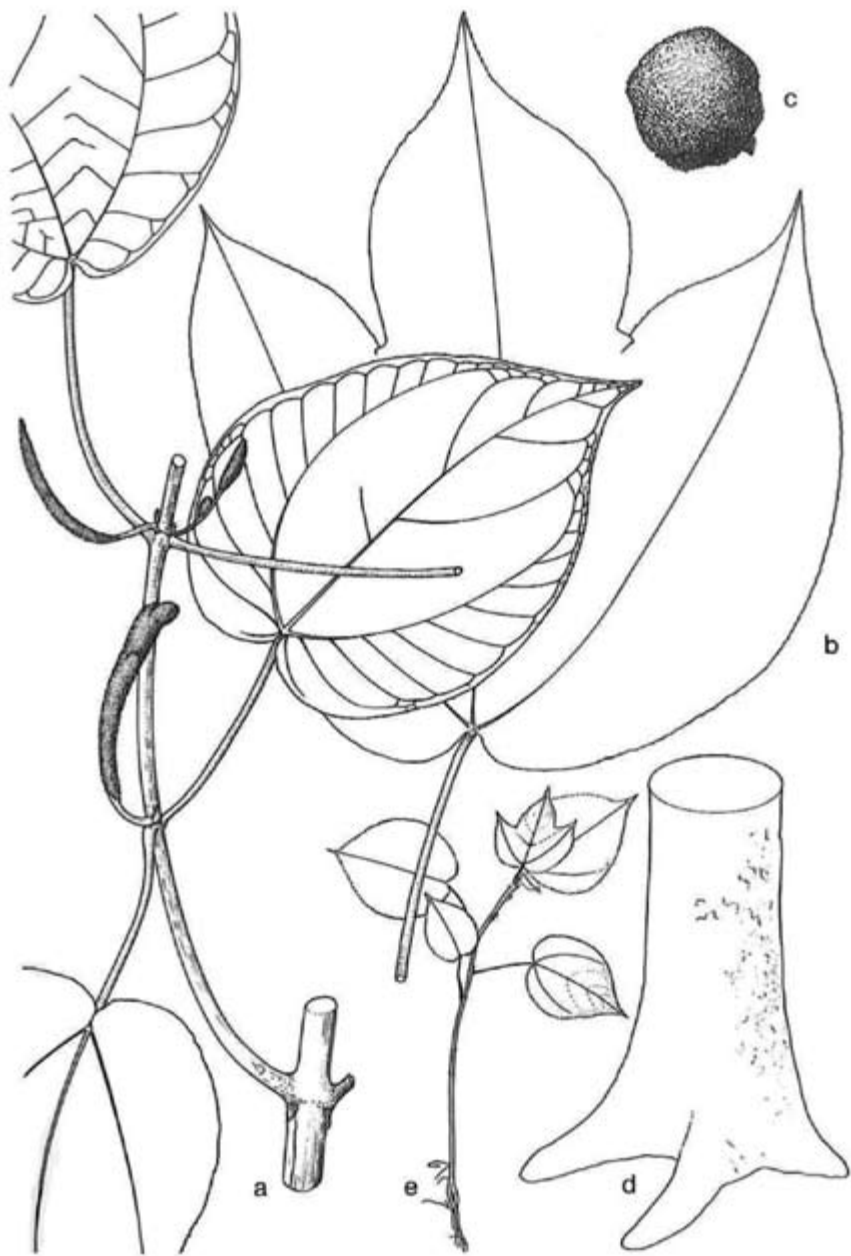
Vernacular names: Cow-wood (Cr), Katowar (W), Tuwne (M), Yawahudan (Ar).

Botanical description: Twigs minutely puberulous, rough when young. Leaves opposite; stipules (5-) 10-15 mm long, puberulous; petiole 3-10(-14) cm long; blades papery to leathery, entire to 3-lobed or 3-parted, circular, deltoid-ovate to elliptic, 6-30 x 4-23 cm, glabrous above, except for main veins, densely brownish puberulous below, margin entire, crenate, or serrate, apex acuminate to acute, base emarginate to cordate; venation palmate, primary veins 3, plane above, prominent below; secondary veins plane above, strongly prominent below. Tree with either male or female inflorescences. Inflorescences axillary, paired or solitary. Male inflorescence spicate, 4-10 x 0.3-0.5 cm; peduncle 1-1.5 cm long; tepals 1 mm long; female inflorescence capitate, 1-1.5 cm in diam.; peduncle ca. 1.5 cm long; tepals (in fruit) to 10 mm long. Infructescence green turning yellow, more or less globose, 2.5-6 cm in diam., velutinous, juicy, tasting (sour-) sweet, with a plum scent. Fruit 0.5 cm long, outer layer fleshy, inner layer hard; seeds ca. 3.5 mm long.

Field characteristics: Tree 20-35(-45) m tall; trunk 0.4-0.55(-0.95) m in diam. Base with root spurs. Root spurs relatively thick, 0.2-0.3 x 0.2-0.5 x 0.15-0.25 m. Bark light grey-brown, tinged orangish in some parts, lenticellate, cracked, scaly. Lenticels round, 2-4 mm in diam., more or less in vertical rows. Cracks vertical, to 20 x 2 cm, best visible higher on bole. Scales irregular, to 5 x 2 x 0.2 cm, dry papery. Dead bark 1-5 (-10) mm thick, yellow-brown. Living bark 15-25 mm thick, light brown to orange-brown to pale pink, layered, soft, fibrous, with ill-defined scent; exudate white to creamy white, very sticky, oozing over entire slash surface within seconds, very copious, reported to be drinkable. Sapwood light yellowwhite; heartwood golden-yellow, turning orange-brown after exposure to air. Crown umbrella-shaped, large, rather light, branching erect, leaves concentrated at twig ends. Plate 6.

Ecology and distribution: Occasional in mixed forest on brown sand and in marsh forest. In northwestern, central, and southeastern Guyana, the Rupununi district, and the Kanuku Mts. Semi-deciduous; flowering mainly from July to September; fruiting mainly from February to June. Seeds dispersed by a variety of animals: spider, howler, and tamarin monkeys, powis, deer, agoutis, acouchis and turtles .

Notes: (1) Seedling leaves heart-shaped, margin conspicuously serrate, apex acuminate. Early leaves alternate and unlobed, later leaves opposite and 3-lobed; (2) The copious amount of rapidly appearing, white latex makes it relatively easy to recognize Cow-wood. Dukali (*Parahancornia fasciculata*) is the only other species in this field guide producing equal amounts of latex. It differs from Cow-wood by the red-brown living bark; (3) The opposite leaves of *Bagassa guianensis* are an unusual character in Moraceae, the family to which it belongs. Moraceae usually have alternate leaves.



Bagassa guianensis

a. habit, with male inflorescences (x 0.6); b. leaf, lobed type (x 0.6); c. infructescence (x 0.6); d. trunk base; e. seedling (x 0.15).

11. *Calophyllum lucidum* Benth.

Kurahara

Literature: Bentham. G. 1843.

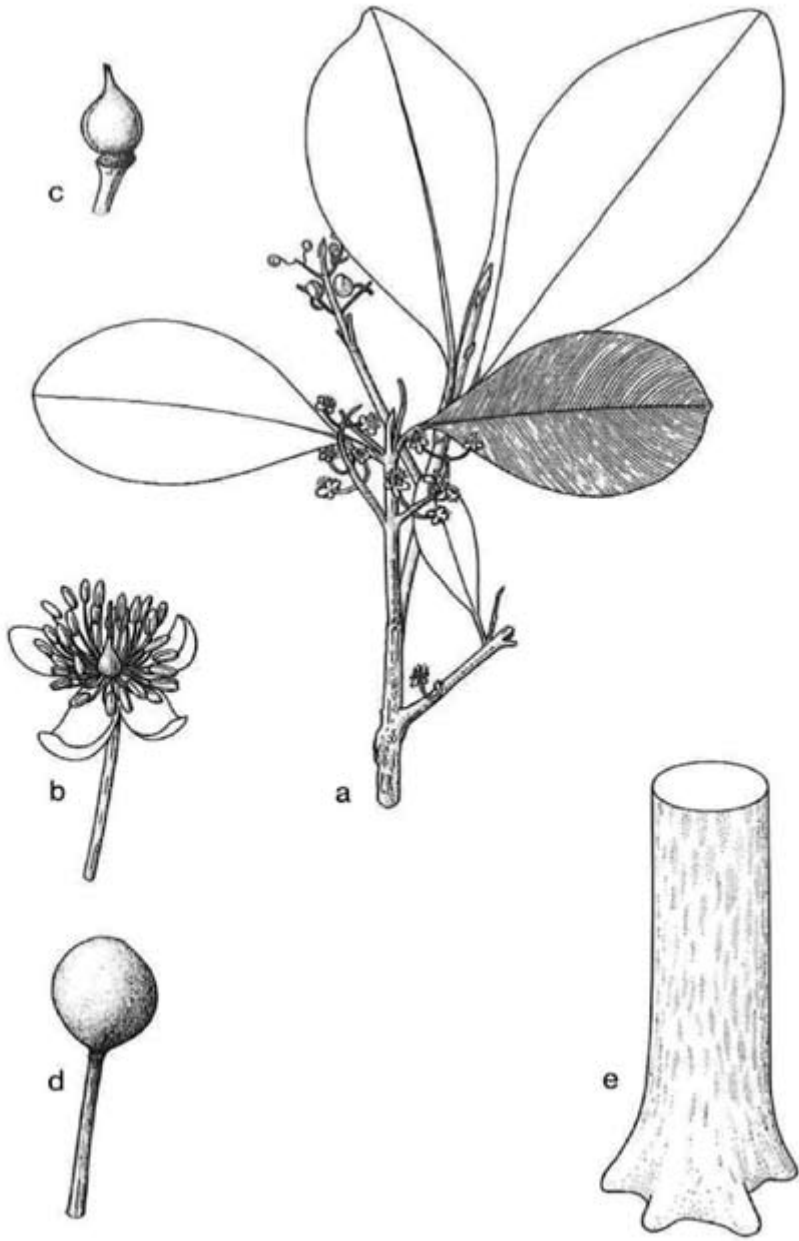
Vernacular names: Kopö (Ak), Kurahara (Ar), Marawaro (Ak), Serena (M). Watschir (W).

Botanical description: Twigs minutely puberulous when young. Leaves opposite; petiole 1.5-2.5 cm long; blades stiff-leathery, elliptic to obovate. 8-14 x 5-8.5 cm, glabrous, shiny above, margin thickened, flat to slightly recurved, apex obtuse to slightly emarginate, base acute; primary vein basally sunken above, apically plane to slightly prominent, prominent below; secondary veins in 50-75 pairs, parallel, close together, slightly prominent above, plane to slightly prominent below. Inflorescence an axillary 5-9-flowered raceme, 6-8 cm long; peduncle 0.5-2.5 cm long; pedicels 5-15 mm long, to 20 mm in fruit. Flowers slightly scented; sepals 2, broadly ovate, 4-6 mm long; petals 4, ovate to obovate, 6-12 mm long, white; stamens ca. 40, orange. Fruit subglobose, with sharply pointed tip, 1.5-3 cm in diam., glabrous; seed 1, more or less round, embedded in pulp.

Field characteristics: Tree (10-) 20-35 (-45) m tall; trunk 0.25-0.8(-1.87) m in diam. Base somewhat swollen to buttressed. Buttresses to 0.6 x 0.6 x 0.3 m. Bark pale brown to grey-brown, sometimes dark orange-brown, cracked to fissured. Cracks/fissures vertical, forming a diamond-shaped pattern. 5-40 x 0.5-3(-5) x 0.5-3 cm. Dead bark 5-30 mm thick, layered, dark (red-)brown, often with several 1 mm thick light brown layers. Living bark 5-20(-30) mm thick, pink to light orange-brown, with red layers, soft, very fibrous; exudate yellow, transparent, gummy, very sticky, appearing in small droplets, particularly near sapwood. Sapwood light brown; heartwood dark-brown. Crown rounded, moderately dense. branches erect. Plate 6.

Ecology and distribution: Occasional in swamp forest and Wallaba forest in the near interior, southeastern Guyana and the Kanuku Mts. Evergreen; flowering from July to November; fruiting data too limited for pattern indication.

Note: (1) For this species very little literature is available. The only two sources that could be found, were the original description written in Latin in 1843, and an unpublished manuscript received from Mr. C.A. Persaud from Guyana. More information is available for *C. brasiliense* Camb., which might be the same species as *C. lucidum* Benth. In that case, *Calophyllum brasiliense* Camb. will be the correct name, and *Calophyllum lucidum* Benth. will become a synonym. However, this matter cannot be decided upon until after revision of the genus.



Calophyllum lucidum

a. habit (x 0.6); b. flower (x 5); c. immature fruit (x0.6); d. mature fruit (x 0.6); e. trunk base.

12. *Carapa guianensis* Aublet

Crabwood

Literature: Pennington, T.O. 1981.

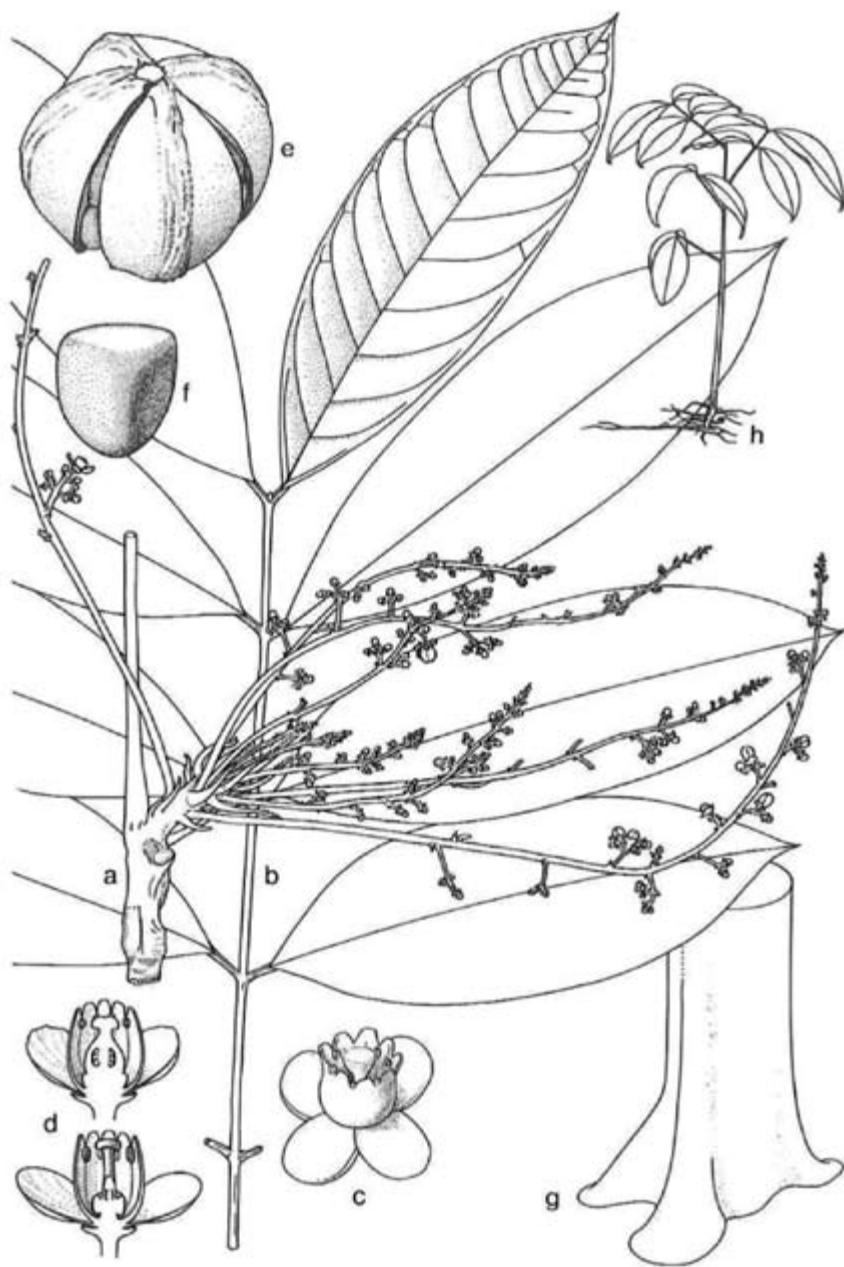
Vernacular names: Crabwood (Cr), Karaba (Ar, P, Ak), Karapai (Ak). Karapa-yek (Ak).

Botanical description: Twigs thick, rufous-brown, lenticellate. Leaves alternate, paripinnate, (6-) 8-16(-20)-foliolate, clustered at end of branchlets; petiole (8-)12-20 cm long; rachis up to 70 cm long, lenticellate; petiolules 0.4-1.5 cm long, swollen; leaflets opposite; blades leathery, narrowly elliptic(-ovate), (10-)18-40(-50) x (4-)6-14(-18) cm, glabrous, shiny above, margin flat, apex acute or acuminate, rarely obtuse, provided with a gland, base somewhat oblique, acute to rounded; primary vein plane above, prominent below; secondary veins (6-)12-16(-20) pairs, slightly prominent on both sides. Inflorescences axillary or terminal, clustered spike-like panicle, (20-)35-60(-80) cm long; peduncle 1-10 cm long. Flowers (sub)sessile, clustered at end of inflorescence branches, waxy, sweet- or musky-scented, functionally unisexual; calyx 4-lobed almost to the base, lobes 1.5-2 mm long, margins ciliate, inner 2 lobes larger than the 2 outer ones; petals 4, rarely 5, free, (creamy) white, often tinged pinkish outside, 4.5-6 mm long; staminal tube 3.5-5 mm long, anthers 8. Fruit a woody capsule, dark brown, globose to broadly ovoid, somewhat 4-angled, 5-10(-15) x 6-8(-10) cm, glabrous, valves with a prominent, warty, longitudinal, median ridge; seeds 1-2(-3) per valve, dull (orange-)brown, pyramidal, 4-5 cm in diam., with 2 or 3 flattened sides and one rounded side (opposite hilum).

Field characteristics: Tree 25-35(-55) m tall; trunk 0.45-0.95(-1.87) m in diam. Base swollen or buttressed. Buttresses 0.5-1(-2) x 1-2 m. Bark smooth, grey-brown to light grey, sometimes reddish, lenticellate, fissured or cracked, flaky on older trees. Lenticels round, 2-3 mm in diam., of ten several connected. Cracks vertical, to 50 x 0.2-0.3 cm. Flakes square to rectangular, to 40 x 5 cm. Dead bark 0.5 mm thick, grey-brown. Living bark 4-8 mm thick, (brown-)pink to red, with lighter streaks, sometimes with white inner border, soft, fibrous, bitter tasting; exudate pale brown to orange-brown, gummy, scanty. Sapwood pink-brown; heartwood light to dark brown. Crown large, very dense, branches erect or spreading. Plate 7.

Ecology and distribution: Abundant in Mora forest. Frequent to locally common in marsh forest and riverine forest. Widely distributed in the near interior, scattered to occasional elsewhere. Semi-deciduous; flowering mainly from November to February; fruiting mainly from April to July. Seed-dispersal probably by scatterhoarding rodents, monkeys and water. Predation of seeds and seedlings by scatterhoarding rodents and deer.

Notes: (1) Taproot of seedlings up to 45 cm long, with numerous side roots just below the seed. Stem fleshy, reddish. First leaves simple, later ones 2-4-foliolate. Leaflets ovate, bronze-pink below; (2) *Carapa procera* (Crabwood) has pedicellate, 5-merous flowers and usually oblong leaflets with rounded or apiculate tip; (3) Crab wood seeds yield the highly estimated crabwood oil, used locally as insect repellent and for lamps, soap and candle -making. Scrapings from the inner bark are applied on sores. Tea prepared from the bark is used to treat diarrhoea; (4) Crabwood yields three types of timber: a) Red or Hill Crabwood. b) White or Swamp Crabwood, c) Black Crabwood (Fanshawe, 1947).



Carapa guianensis

a. inflorescence (x 0.6); b. leaf (x 0.6); c. flower (x 3); d. longitudinal section of female flower (top) and of male flower (bottom) (x 3); e. fruit (x 0.6); f. seed (x 0.6); g. trunk base; h. seedling (x 0.1).

Literature: Steyermark. J.A. 1987.

Vernacular names: Baramanni (Cr). Baromalli (Ar). Common baromalli (Cr), Katama (Ak). Paku (An), Simana (Ak). Swamp baromalli (Cr).

Botanical description: Twigs stout, with prominent leaf scars below the leaves, glabrous. Leaves alternate, clustered at end of branchlets; stipules narrowly triangular, 0.3-0.4 cm long, caducous; petiole 1-9 cm long, thickened at both ends; blades stiff papery or somewhat leathery, elliptic to obovate, 4-19 x 2-9 cm. glabrous, apex rounded to emarginate, apiculate, base acute, rarely obtuse; primary vein prominent on both sides; secondary veins 8-12 pairs, sunken to slightly prominent above, slightly prominent below; tertiary veins irregularly reticulate below. Inflorescence an axillary cluster; pedicels 5-20(-30) mm long, densely covered with stellate hairs. Flowers sweet-scented; calyx tubular, ca. 10 mm long, lobes 5, 7 mm long; petals 5, white. ca. 10 mm long; stamens 40-50, ca. 10 mm long. Fruit a woody capsule, orange-brown to rusty-brown, oblong-ellipsoid, (5-)7-10 x 3-5 cm, sweet-scented when cut, very densely velvety, with 3 or 4 longitudinal ribs; seed 1, bright (red-)orange, 50-80 x 20-30 mm, smooth, seed wall fleshy, edible.

Field characteristics: Tree 30-45(-50) m tall; trunk 0.45-0.7(-1.5) m in diam. Base remarkably straight. Trunk remarkably cylindrical. Bark grey-brown, smooth, often ringed, lenticellate. Rings horizontal, prominent. Lenticels round to elongate, 1-2 x 3-5 mm, often red -brown, in vertical rows which are 5-15 mm apart. Dead bark ca. 0.5 mm thick, dark brown. Living bark 30-50 mm thick, pink-brown to orangebrown, striped vertically, darkening after exposure; stripes white, pale yellow or pink brown, 2-3 mm wide; pinkish part horizontally barred. Sapwood and heartwood light brown. Crown rounded, small, sometimes flattened, branches erect. Plate 7.

Ecology and distribution: Frequent to abundant in mixed forest and Mora forest. Occurs principally in the Essequibo and Cuyuni River basins. A semi-deciduous species; flowering mainly from February to May; fruiting mainly from October to May. The seeds with a brightly coloured wall are probably partially animal dispersed.

Notes: (1) Bark is often used for covering walls (and floors) of huts in bush settlements. It is released from the trunk by making a longitudinal cut in the bark and beating the bark surface with the back of an axe head. After the entire surface has been treated, the bark can be taken off and used: (2) Seedlings usually abundant near parent trees. Leaves, palmate, clustered at the top. Leaflets (2-)3-5, 10-30 cm long, with 1-2 cm long drip lip with an excurrent primary vein. Most seedlings have the top grazed off by deer and other mammals, but they seem to have a strong resprouting capacity.



Catostemma commune

a. habit (x 0.6); b. leaf (x 0.6); c. fruit (x 0.6); d. seed (x 0.6); e. trunk base; f. seedling, with side view and top view (x 0.05).

14. *Catostemma fragrans* Benth.

Sand baromalli

Literature: Steyermark, J.A. 1987.

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

Botanical description: Twigs densely covered with stellate hairs. Leaves alternate, clustered at end of branchlets, caducous before flowering; stipules not observed; petiole 0.5-5 cm long; blades more or less leathery, elliptic to obovate, 7-23 x 3-8 cm, glabrous above, sometimes covered with stellate hairs below, apex rounded to emarginate, sometimes long-acuminate, base obtuse to acute; primary vein sunken above, but central zone distinctly prominent, prominent below; secondary veins 8-12 pairs, sunken above, prominent below; tertiary veins conspicuous and prominent below, more or less parallel. Inflorescence an axillary cluster; pedicels 15-40 mm long, densely covered with stellate hairs. Flowers sweet-scented; calyx tubular, ca. 15 mm long, lobes 5, ca. 10 mm long; petals white, ca. 15 x 5 mm; stamens 35-40, 7-8 mm long. Fruit a woody capsule, dull orange to rusty-brown, oblong-ellipsoid, 4-10 x 1.5-5.5 cm, densely velvety, with numerous longitudinal ribs; seed 1, orange, (20-)50-70 x (10-)25-30 mm, smooth, seed wall fleshy, edible.

Field characteristics: Tree 15-30(-35) m tall; trunk 0.25-0.5(-1) m in diam. Base remarkably straight. Trunk remarkably cylindrical. Bark grey(-brown), tinged reddish, smooth, often ringed, lenticellate. Rings horizontal, prominent. Lenticels round, 2-3 mm in diam., scored in vertical rows and often hardly individually discernible. Dead bark 0.5 mm thick, dark brown. Living bark 15-20 mm thick, (orange-)pink to orange-brown, sometimes tinged greenish just below dead bark, striped vertically, darkening after exposure; stripes whitish, 2-5 mm wide, pinkish part horizontally barred. Sapwood and heartwood light brown. Crown rounded, small, branches erect. Plate 8.

Ecology and distribution: Occasional to frequent in Wallaba forest on white sand and in evergreen seasonal forest. Widely distributed. Semi-deciduous; flowering and fruiting nearly all year round. The seeds are dispersed by animals, e.g. by howler monkeys.

Notes: (1) Seedlings usually present below parent tree. Leaves simple, concentrated at top of plant. Blades ca. 10-40 cm long, with 1-5 cm long drip tip; (2) Bark and slash of *Catostemma fragrans* look very similar to those of *Catostemma commune*. On mature trees the bark of *Catostemma fragrans* is less thick than in *Catostemma commune*. The striking difference between the seedlings of the two species can be helpful in the identification. Furthermore the leaves from the litter, which are relatively easy to learn to recognize, can be studied for identification as there is a useful difference in the tertiary veins of the two species. The species hardly ever occur together in the same stand because of different ecological preferences; (3) *Catostemma altsonii* (Baromalli) also occurs in Wallaba forest and is endemic to central Guyana (Mazaruni R., Bartica-Potaro road area). Leaves 8-30 x 3-11.5 cm, margin usually revolute. Flowers large: pedicels 40-100 mm long; calyx lobes 10 mm long; petals 17-23 x 7-8 mm.



Catostemma fragrans

a. habit (x 0.6); b. flower (x 1.8); c. flower, longitudinal section (x 1.8); d. fruit (x 0.6); e. seed (x 0.6); f. trunk base; g. seedling (x 0.2).

15. *Cedrela odorata* L.

Red cedar

Literature: Pennington, T.D. 1981.

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

Botanical description: Twigs round, lenticellate, glabrous. Leaves alternate, paripinnate, (10-)12-18-foliolate; petiole, rachis, and petiolules puberulous when young; petiole 2.5-7.5 cm long, round; rachis 18-38 cm long, grooved above; petiolules to 2 cm long; leaflets more or less opposite; blades papery or thin-leathery, (narrowly) ovate, often falcate, 5-14 x 3-6 cm, glabrous, margin flat, apex slightly acuminate, with obtuse tip, base rounded; primary vein plane above, slightly prominent below; secondary veins 7-12 pairs, loop-forming, with some smaller ones in between, prominent above, moderately prominent below; tertiary venation dense. Inflorescence a terminal, pendulous panicle, 10-40 cm long, puberulous; peduncle 0.5-8 cm long; pedicels 1-2 mm long. Flowers functionally unisexual; calyx cup-shaped, ca. 3 mm long, with 5 short teeth; petals 5, pale green or white, 8-9 mm long, connate, lobes 0.5-1 mm long, yellowish puberulous outside; stamens 5, basally connate. Fruit a woody capsule, at first green, finally brown-black with light brown spots, ellipsoid to broadly so, 3-5 x 2-4 cm, glabrous, dehiscent with 5 valves, central column with 5 broad wings; seeds numerous, papery, light brown, narrowly obovate, 2-3 cm long (including wing).

Field characteristics: Tree 30-40(-45) m tall; trunk 0.5-1.0(-1.8) m in diam. Base buttressed. Buttresses 1.5-2.5(-3) x 1-2 x 0.2-0.3 m, fairly straight, branched near ends. Bark dark (grey-)brown to red-brown, longitudinally fissured or ribbed in a diamond-shaped pattern. Fissures 10-60 x 2-4 x 1-2 cm, 5-8 cm apart. Dead bark 5-10 mm thick, (dark) brown, layered, with some lighter brown layers. Living bark ca. 10 mm thick, pink to dark red, layered, soft, fibrous, with typical cedar-like scent and taste, sometimes with offensive garlic scent. Sapwood light brown; heartwood darker brown. Crown flat or rounded, light, branches erect to spreading. Plate 8.

Ecology and distribution: Rare to occasional in Mora forest, seasonal forest and in mixed forest on poorly drained soils. Occurring throughout the country. Semideciduous; flowering from August to November; fruiting from January to March. The seeds of Red Cedar are dispersed by wind.

Note:(1) Seedlings with short taproot. Cotyledons opposite, ovate. ca. 3 x 1.5 cm, apex and base rounded. Two first leaves opposite, trifoliolate leaflets subsessile; blades of lateral leaflets narrowly elliptic, ca. 2 x 0.5 cm; blade at middle leaflet rhombic, ca. 3 x 1 cm.



Cedrela odorata

a. habit (x 0.6); b. flower (x 2.7); c. flower, longitudinal section (x 2.7); d. dehiscent fruit (x 0.6); e. seed (x 0.6); f. trunk base; g. seedling (x 0.6).

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

Greenheart

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

Literature: Rohwer J.G. et al. 1991; Steege, H. ter 1990.

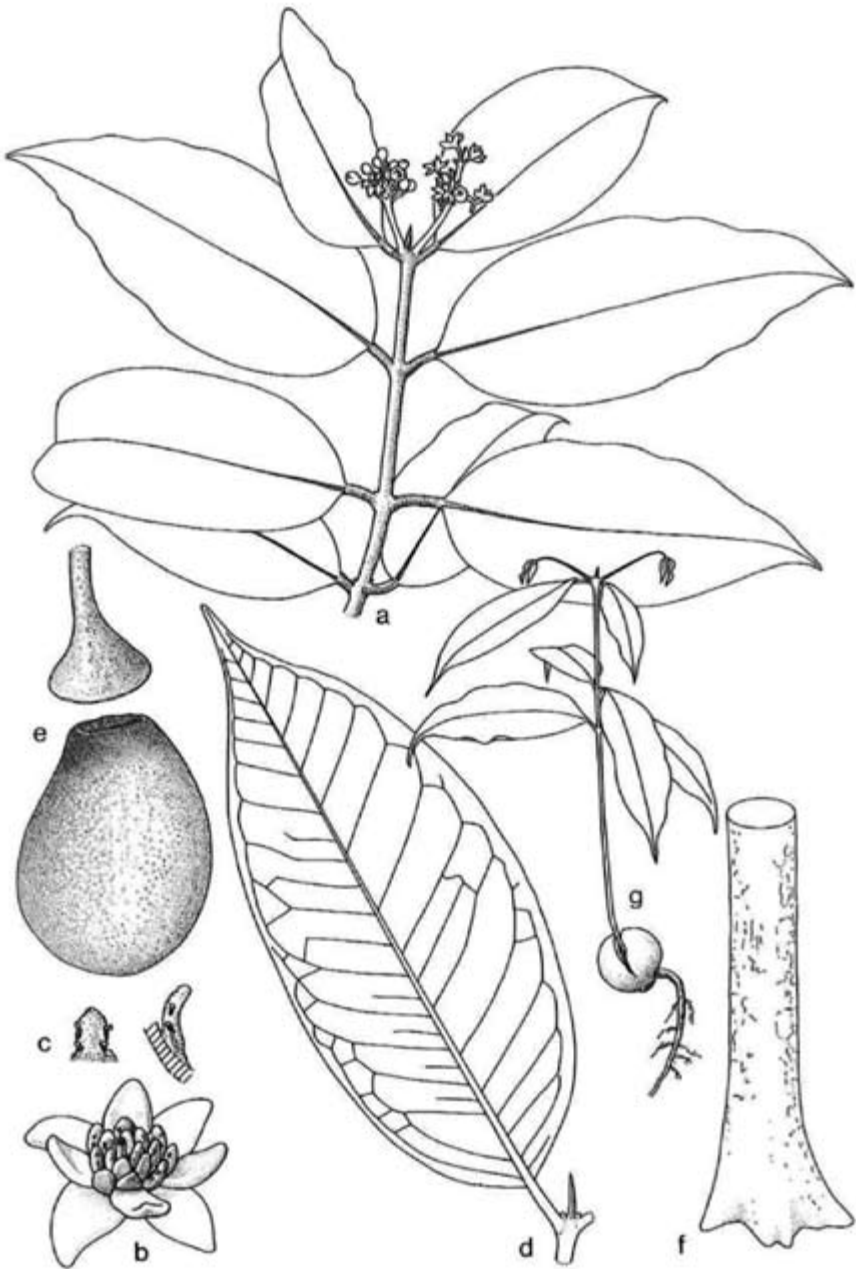
Vernacular names: Bibiro / Biburu (Ar), Cogwood (Cr), Greenheart (Cr), Kut (Ak), Rora(-yek) (AK), Sipiri (An), Sipu (C).

Botanical description: Twigs angular, densely white-puberulous when young, with a very typical, 0.5-1 cm long apical bud. Leaves opposite; petiole 0.8-1.2 cm long; blades stiff-leathery, elliptic to oblong-elliptic, 10-15(-20) x 4-7 cm, glabrous above, very sparsely covered with small, appressed hairs below, shiny above, somewhat glaucous green below, margin undulate, apex acuminate, base gradually narrowed to acute or obtuse; primary vein slightly prominent above, strongly prominent below; secondary veins 10-15 pairs, plane above, slightly prominent below. Inflorescence an axillary panicle to 5 cm long, densely brownish to whitish-puberulous; peduncle ca. 1 cm long; pedicels 3-5 mm long. Flowers 5-10 mm in diam., creamy-white, jasmine-scented; tepals 8 (rarely 4), basally connate, lobes thick, spreading, 4 mm long; stamens in 3-5 whorls of 4 stamens each, all fertile. Fruit a berry, pale (grey-)brown with white specks, broadly oblong-ellipsoid to globose, slightly laterally compressed, up to 7 x 5 x 4 cm, glabrous, with a cup-like structure at base; cupule brown, shallow, with entire margin, 1 cm high, 1.5-2 cm in diam., wall woody, 1-2 mm thick, brittle; seed 1, fleshy, to 6.5 x 4.5 cm.

Field characteristics: Tree 20-45(-53) m tall; trunk 0.35-0.6 (-1) m in diam. Trunk sometimes with bumpy surface (so-called 'bull's forehead'). Base swollen or buttressed. Buttresses 0.5-1.8 x 0.5 x 0.1 m. Bark light brown to creamy-brown, flaky. Flakes vertically oriented, irregular, 5-40 x 3-20 x 0.1-0.2 cm. Dead bark 0.5-1 mm thick, light brown. Living bark 3-5 mm thick, orange-brown to yellow-brown to creamy-brown, sometimes with a white inner border, hard, brittle, with very bitter taste, sometimes with very scanty, clear exudate. Sapwood yellowbrown; heartwood dark brown. Crown conical or oval, small, dense, rarely with irregular openings, branches erect to spreading. Plate 9.

Ecology and distribution: Reef forming and dominant in Greenheart forest on light sandy-loam soils. Occasional to frequent in other types of mixed forest, occasional in Mora forest, rare in Wallaba forest. Often growing mixed with *Morabukea (Mora gonggriipii)*, but apparently growing in separate patches. Widely distributed, but rare in N.W.-district. Flowering mainly from March to June; fruiting mainly from March to May. Mast fruiting every 12-15 years. The seeds are hardly dispersed and germinate under or near the parent tree, after 4-6 months. The cotyledons still remain present for about 1 year.

Notes:(1) Seedlings with opposite branches and with typical bud as in mature trees; (2) Stands of Greenheart show an unusual low percentage at trees in the middle -size classes (10-30 cm dbh), a phenomenon discussed by ter Steege (1990); (3) Greenheart trees contain bitter alkaloids, which may prove to be effective in preventing and/or treating malaria; (4) Greenheart occurs nearly exclusively in Guyana. It also occurs in western Surinam and Venezuela, but only in low densities



Chlorocardium rodiei

a. habit (x 0.45); b. flower (x3); c. stamen, ventral view (l) and side view (r) (x 6); d. leaf (x 0.6); e. fruit with cupule (x 0.6); f. trunk base; g. seedling (x 0.2).

17. *Chrysophyllum pomiferum* (Eyma) Penn. Limonaballi / Paripiballi

Synonym: *Achrouteria pomifera* Eyma

Literature: Pennington, T.O. 1990.

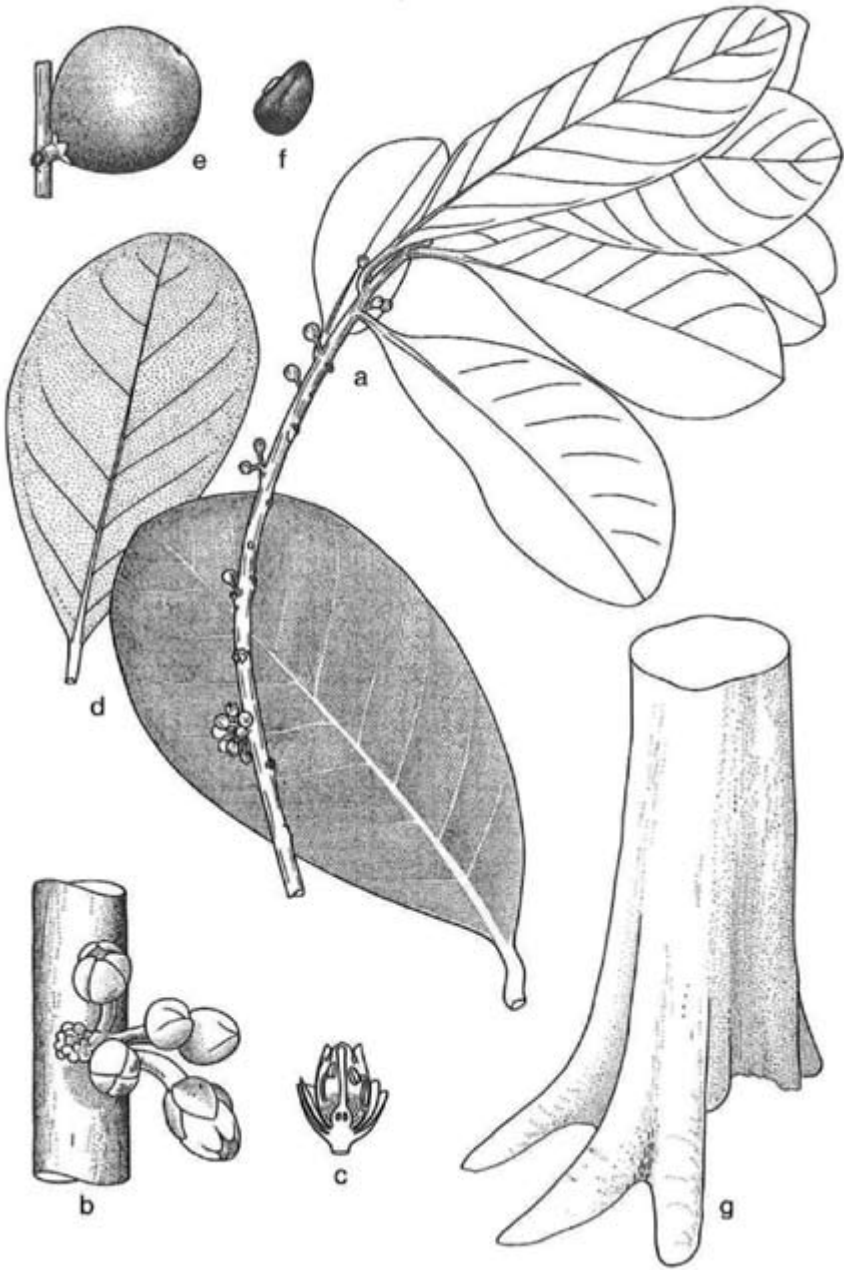
Vernacular names: Aknon (Ak), Kwikpa (Ak), Limonaballi (Ar), Paripiballi (Ar).

Botanical description: Twigs grey, sparsely covered with rusty-brown hairs when young. Leaves alternate; petiole 0.3-0.7 cm long; blades papery to leathery, obovate, angular-obovate, sometimes elliptic, 4.5-14 x 2.5-6 cm, glabrous, margin recurved, apex obtuse to emarginate, base gradually narrowed; primary vein slightly prominent, plane or slightly sunken above, prominent below; secondary veins 7-10 pairs, slightly prominent to sunken above, prominent below. Inflorescences fasciculate, axillary and on older part of branches, 3-10-flowered; pedicels 1-2.5 mm long. Flowers unisexual, plants dioecious; sepals green, 5, broadly ovate, 2.5-3 mm long, persistent; corolla green-white, tubular, 3-4 mm long, 5-lobed, lobes ca. 1 mm long; stamens 5, inserted in lower half of corolla tube. Fruit a berry, yellow, globose, 2-4 cm in diam., glabrous, often with paler, lenticellate patch at the top, pulp fleshy, sweet, edible; seeds ca. 20, 1.3-1.5 cm long, shiny.

Field characteristics: Tree 30-40 m tall; trunk 0.6-0.9 m in diam. Base buttressed or somewhat flanged. Buttresses 1.5-3(-4) x 0.4-2 x 0.1-0.2 m. Bark grey to light grey-brown, yellow-brown, or red-brown, lenticellate, cracked to fissured, scaly to flaky. Lenticels round, 1-3 mm in diam., scattered, sometimes in vertical rows. Cracks vertical, 1-20 x 0.1-0.4 cm. Scales / flakes vertical, rectangular or somewhat irregular, 2-20(-100) x 0.5-4(-30) x 0.1-0.5 cm. Dead bark 3-5 mm thick, dark (orange-)brown, soft. Living bark 5-10 mm thick, yellow-brown or pink-brown, with red-brown layer next to dead bark, darkening after exposure, with short, soft fibres; exudate white, somewhat sticky, scanty. Sapwood light brown; heartwood dark brown. Crown oval or rounded, small, with erect branches. Plate 9.

Ecology and distribution: Occasional to locally frequent in Morabukea and Greenheart forest, often on laterite. Found in the near interior and Pakaraima Mts. Evergreen; flowering mainly in September and October; fruiting mainly from February to June. The fruits are eaten by spider and howler monkeys, who swallow the seeds and the pulp and later defecate the seeds.

Note:(1) forest workers distinguish two different trees in *Chrysophyllum pomiferum*: Limonaballi (with yellow-brown bark) and Paripiballi (with red-brown bark).



Chrysophyllum pomiferum

a. habit (x 0.6); b. inflorescence (x 3.5); c. flower, longitudinal section (x3.5); d. leaf, lower side (top) and upper side (bottom) (x 0.6); e. fruit (x 0.6); f. seed (x 0.6); g. trunk base.

Literature: Lewis, G.P. and Owen, P.E. 1989.

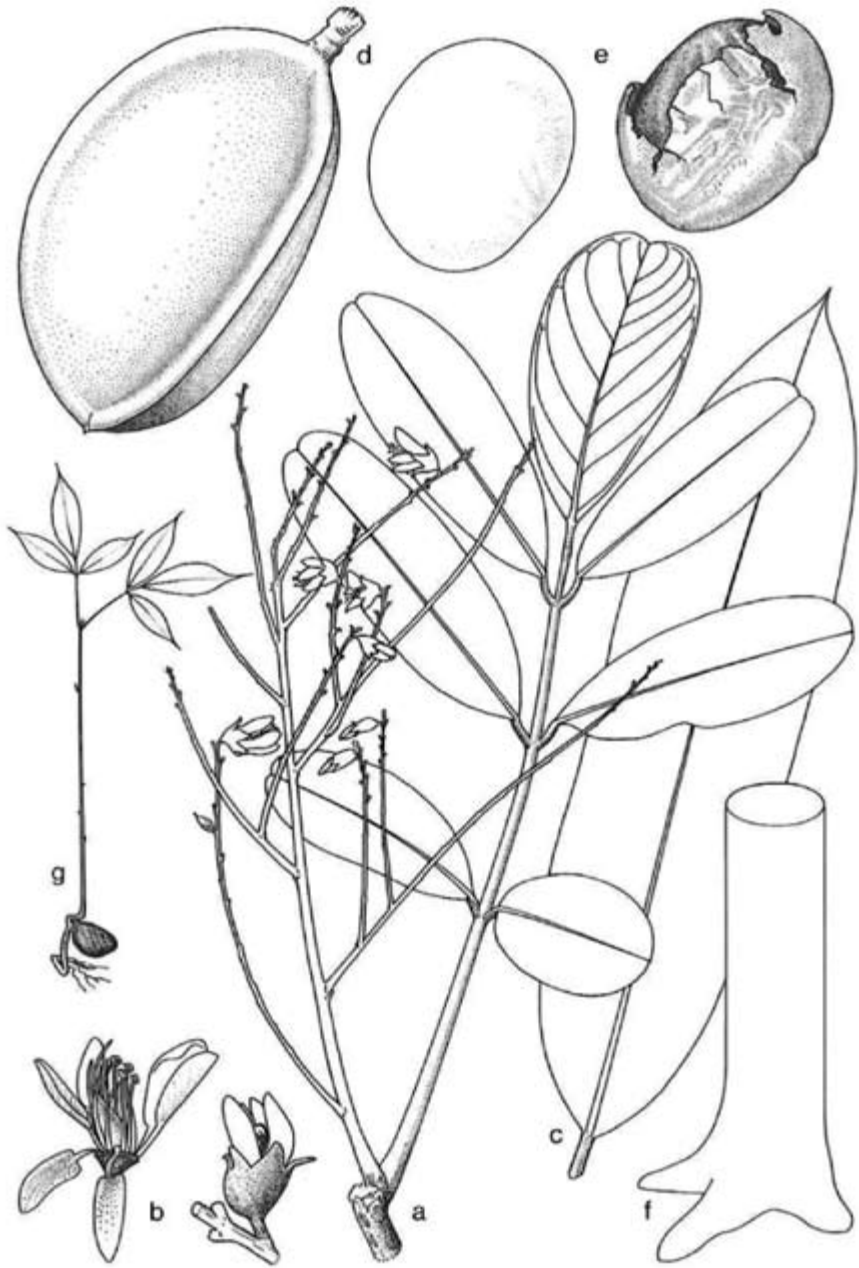
Vernacular names: Aromata (Ar), Kauwi (Ak). Koreko (C), Mutuwali (Ak).

Botanical description: Twigs lenticellate, ochraceous-velutinous when young. Leaves alternate, imparipinnate, 5-7-foliolate; stipules spatulate, ca. 2 mm long, caducous; petiole 6-12 cm long, round, basally swollen; rachis 3-8(-10) cm long; petiolules 0.7-1.1 cm long; leaflets opposite; blades more or less leathery, obovate to narrowly obovate, 9-25 x 5-12 cm, glabrous above, slightly covered with rusty hairs below, shiny above, glaucous green below, margin thickened, slightly recurved, apex rounded to obtuse, rarely acuminate or emarginate, base acute to obtuse; primary vein slightly prominent above, strongly prominent below; secondary veins 8-11 pairs, slightly sunken above, more or less prominent below. Inflorescence a terminal or axillary, showy panicle, 23-33 cm long, brown-velutinous; peduncle 1-2 cm long; pedicels 3-4 mm long. Calyx bell-shaped, 8-10 mm long, brown-velutinous; petals pink-purple, firm, clawed, 12-15 mm long; stamens 10, nearly free, 5 long and 5 somewhat shorter. Fruit a woody pod, ellipsoid, 12-21 x 5-8 x 3-4.5 cm, densely golden-yellow to rusty-brown velutinous, flattened, smooth, margins thickened (particularly the upper one), longitudinally dehiscent, stipe 0.2-0.3 x 0.5 cm; seeds 1-2, broadly ellipsoid to kidney-shaped, 6-7 x 5-6 cm, light green, covered by shiny brown testa, flattened, fleshy.

Field characteristics: Tree 20-30 m tall; trunk 0.25-0.5(-0.6) m in diam. Base swollen to buttressed. Buttresses 0.4-2 x 0.1-0.5 x 0.3-0.4 m, slightly branched near base. Bark creamy brown to grey-brown, smooth to rough, sometimes with rough transverse bands, lenticellate, cracked to fissured, sometimes scaly. Lenticels ca. 1 mm in diam., often in patches. Rough bands 10-25 cm wide, 3-5 cm high, conspicuous. Cracks vertical, (2-)5-15 x 0.1-0.3 cm. Dead bark 1-3 mm thick, light brown, with thin orange-red layer on transition to living bark. Living bark 5-10 mm thick, orange-brown with white streaks, with white layer next to sapwood, with strong, haiari-like (= cucumber-like) scent. Sapwood yellow, streaked with orange-brown; heartwood dark (red-)brown. Crown flat to rounded, dense, branches erect. Plate 10.

Ecology and distribution: Locally frequent in mixed forest, on laterite, in the further near interior and Rupununi district. Flowering recorded in October and November; fruiting recorded in March and October. Flowers of *Clathrotropis brachypetala* are pollinated by hummingbirds (Snow and Snow, 1972).

Notes:(1) Seedling stem blackish, with appressed yellow hairs and scattered scales. Leaves 3-5-foliolate, yellow-brown velutinous when very young; leaflets with long-acuminate apex; (2) The slash scent can cause serious headaches when inhaled too much; (3) *C. brachypetala* (Aromata) is more frequently found in the Northern part of the near interior. Leaflets glabrous and green below, apex acuminate, base rounded. Fruits glabrous, black-brown, with slightly thickened margins; (4) An infusion of the bark is used to cleanse sores and to treat insect, scorpion, and snake bites. A decoction of the bark is used in a bath to get rid of lice, flees, and ticks.



Clathrotropis macrocarpa

a. habit (x 2.7); b. complete flower (r), and flower with part of the calyx removed (i) (x 0.8); c. leaflet (x 2.7); d. fruit (x 0.6); e. seed, fresh (l) and dried (r) (x 0.6); f. trunk base; g. seedling (x 0.1).

Synonym: *Couratari pulchra* Sandw.

Literature: Mori, S.A. and Prance, G.T. 1992.

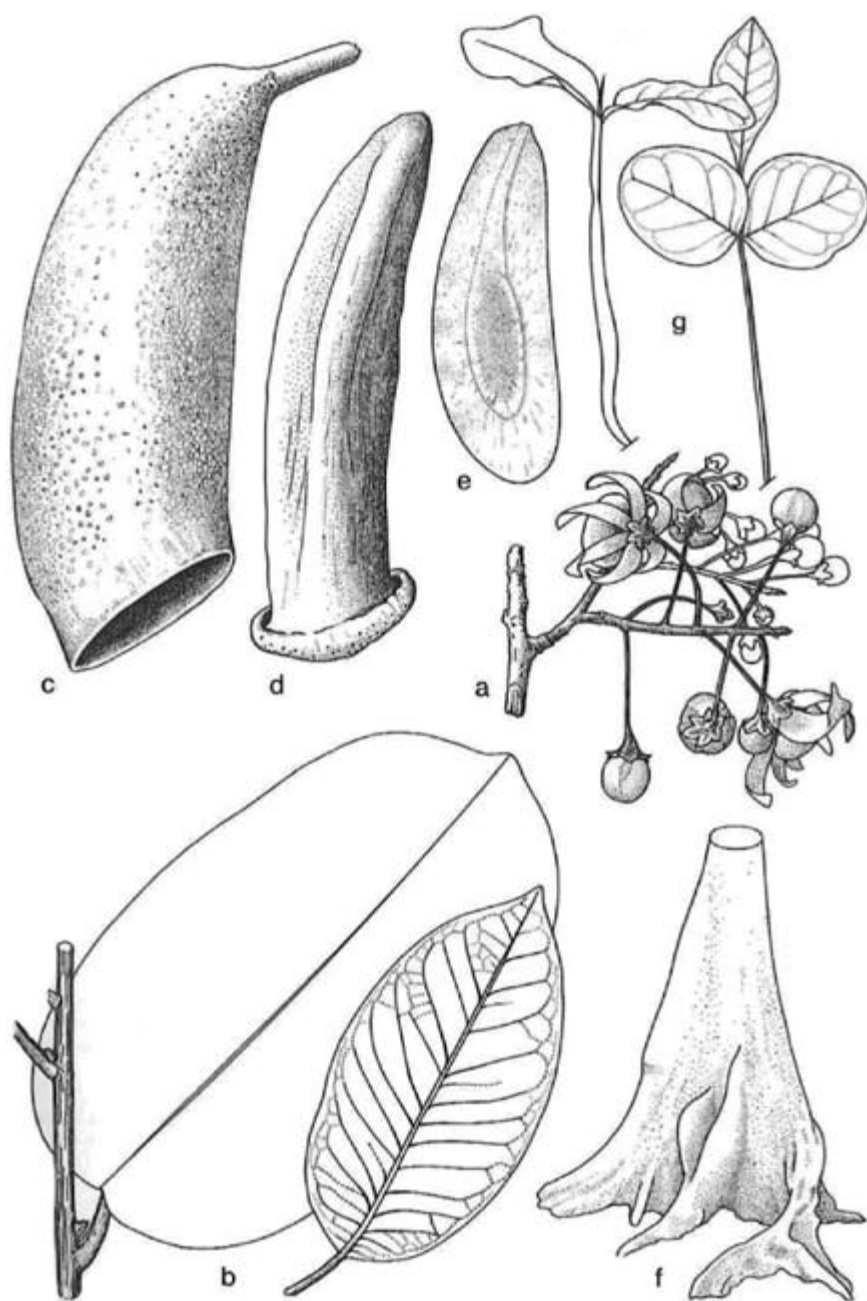
Vernacular names: Fine-leaf wadara (Cr.), Inmariye (M), Irimiyar (W), Marimari (Wr), Urimari (C), Wadara (Ar), Waranaka (Ak).

Botanical description: Twigs striate, lenticellate, sparsely brown-puberulous when young. Leaves alternate; petiole 1.3-2.5 cm long, stout, (slightly) grooved above; blades leathery, oblong-elliptic to oblong-obovate, 8-20 x 4-10 cm, glabrous above, densely covered with stellate hairs on primary vein and lower side of leaf, shiny above, margin recurved, apex rounded, emarginate to bluntly acuminate, base acute, rounded to obtuse; primary vein plane or sunken above, prominent below; secondary veins 15-22 pairs, plane to slightly sunken above, strongly prominent below. Inflorescence a terminal or axillary (panicle of) raceme(s), ca. 25 cm long, rarely to 40 cm long, brown-puberulous; peduncle 7-10 cm long; pedicels 10-22 mm long. Flowers zygomorphic; calyx lobes 6, 3-4 mm long, persistent; petals 6, bright purple, 20-30 mm long; staminal hood with a double coil; staminal ring with 15-25 stamens; ovary 3-locular. Fruit a woody pyxidium, red-brown or brown-black, cup-shaped, cylindrical to somewhat triangular in cross-section, 12-17 x 6 cm, glabrous, white-lenticellate, lid with 10-15 cm long column, calyx remnants inserted ca. 1.5 cm from the top of the cup; seeds numerous, papery, (light) brown, oblong-elliptic, 6.5 x 2.5 cm (wing included), wing surrounding seed.

Field characteristics: Tree 25-50 m tall; trunk (0.25-)0.4-0.8 m in diam. Base buttressed. Buttresses 1.5-4(-8) x 0.5-2 x 0.05-0.15 m, steep, with smaller secondary buttresses, Bark dark brown to grey-brown to red-brown, the latter particularly at young exposed patches, smooth, lenticellate, cracked, scaly. Lenticels round to elongate, 1-3 x 1-1.5 mm, light brown, in vertical rows or scattered. Cracks vertical, 1-10 x 0.1-0.2 cm, fine. Scales rectangular or irregular, 1-5 x 1-2 x 0.1 cm, somewhat papery. Dead bark 1-2 mm thick, dark-brown, with light brown layer on inner side. Living bark 5-15 mm thick, yellow-white, often with pinkish tinge, very fibrous, with scent of linseed oil. Sapwood light brown; heartwood creamy-brown, tinged pink (or sometimes tinged yellow). Crown round, dense, lower branches spreading, higher branches erect. Plate 10.

Ecology and distribution: Occasional in seasonal and mixed forest, sometimes in marsh forest often as emergents. Widely distributed. Deciduous; flowering when leafless, mainly from July to September; fruiting mainly in March and April and from October to December. The seeds are wind-dispersed.

Notes:(1) Seedlings with short taproot. Stem conspicuously flattened in the part under the green cotyledons; (2) Fruits persistent on the tree after seed-dispersal; (3) *Couratari gloriosa* (Wadara) is a species of riverine and swamp forest, with lower and broader buttresses. Its leaves are larger (14-27 x 7.5-16 cm), have a less dense hair cover, and the secondary and tertiary veins are more impressed above. *Couratari multiflora* (Smooth-leaf wadara) has smaller leaves (4.5-10.5 x 2-5 cm) which are glabrous or only sparsely puberulous below, and have a more acute apex.



Couratari guianensis

a. inflorescence (x 0.6); b. leaves (x 0.6); c. fruit, without lid (x 0.6); d. fruit lid (x 0.6); e. seed (x 0.6); f. trunk base; g. seedlings (x 0.6).

Literature: Silva, M.F. da 1986.

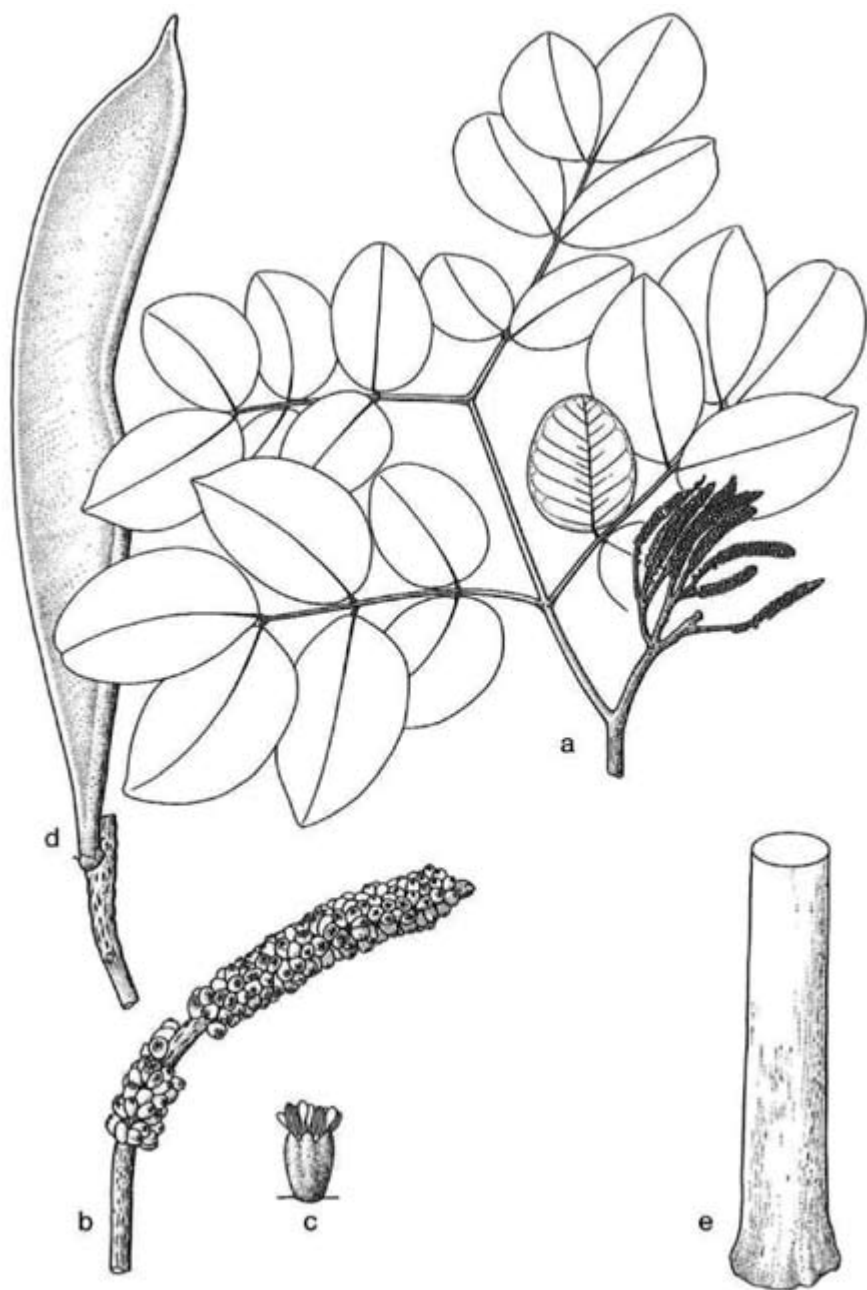
Vernacular names: Akayoran (C), Dakama (Ar).

Botanical description: Twigs round, covered with rusty stellate hairs when young. Leaves alternate, bipinnate, with 1-2(-3) pairs of (2-)4-6-foliolate pinnae, to 25 cm long; petiole 2-10 cm long; stipules not observed; primary rachis 15-25 cm long; secondary rachis 6-20 cm long; petiolules 0.5-0.7(-0.9) cm long; leaflets opposite; blades leathery, obovate, 5-12(-25) x 3-7(-15) cm, glabrous above, sparsely covered with tiny stellate hairs below, shiny above, dull yellow-green below, margin revolute, apex obtuse to rounded, base gradually narrowed; primary vein plane above, prominent below; secondary veins 8-9 pairs, plane to slightly prominent above, strongly prominent below. Inflorescence a terminal dense corymb of panicles, composed of pedunculate, 5-8 cm long spikes, densely covered with rusty stellate hairs; peduncle of panicles 3-6 cm long. Flowers sessile, white to creamy white; calyx tubular, 3-4(-5) mm long, lobes 1 mm long; petals 5, 3-4 mm long, hidden in the calyx, densely covered with long, appressed hairs; stamens 10, 5 of which sterile, white, exserted. Fruit a woody pod, dark brown, erect, narrowly elliptic to linear, somewhat falcate, (12-)18-20 x 2-3(-4) x 0.3-0.5 cm, covered with rusty stellate hairs when young, margins thickened, stipe 1-2 cm long; seeds broadly ovate, flat, to 1 x 1.2 cm.

Field characteristics: Tree 8-25 m tall; trunk (0.2-)0.35-0.5 m in diam. Base with thick root spurs or buttresses. Buttresses 0.5-0.9 x 0.2-0.3 x 0.1 m. Bark dark grey to red-brown to orange-brown, often covered with light green lichens, lenticellate, cracked, scaly, Lenticels round to elongate, 2-10 x 2-3 mm, more or less vertically oriented. Cracks vertical, 1-15 x 0.1-0.3 cm. Scales vertically oriented, more or less rectangular, 2-10 x 0.5-2(-3) cm. Dead bark 3-10 mm thick, dark brown, with lighter patches, inconspicuously layered, hard. Living bark 4-5 mm thick, dark brown to light brown, with 1 mm thick light brown layer adjacent to dead bark, tough, sweet-scented; exudate dark (red-)brown, clear, somewhat sticky, moderate to scanty. Sapwood pink-brown; heartwood brick-red or orange-brown. Crown broad, flattened. Plate 11.

Ecology and distribution: In Wallaba forest on white sand. Occurring in north-central and central Guyana and Rupununi district. Also occurring as a dominant shrub in (secondary) scrub forest, known as Dakama scrub. Dakama is fire-resistant and therefore abundant in secondary forest in burnt areas. Flowering mainly from May to July; fruiting mainly from September to November.

Notes:(1) A decoction of the bark is used for asthma, and as a disinfectant of sores and wounds; (2) A second, less common species of *Dimorphandra* occurring as a large tree in Guyana. Is *D. polyandra* (synonym: *D. hohenkerkii*) which is called Huruhurudan in Arawak. Leaflets 15-30 per pinna, 2-5 x 1-2.5 cm. Flowers red.



Dimorphandra conjugata

a. habit (x 0.15); b. branch of inflorescence (x 1); c. flower (x 2.5); d. fruit (x 0.6); e. trunk base

Literature: Amshoff, G.J.H. 1939.

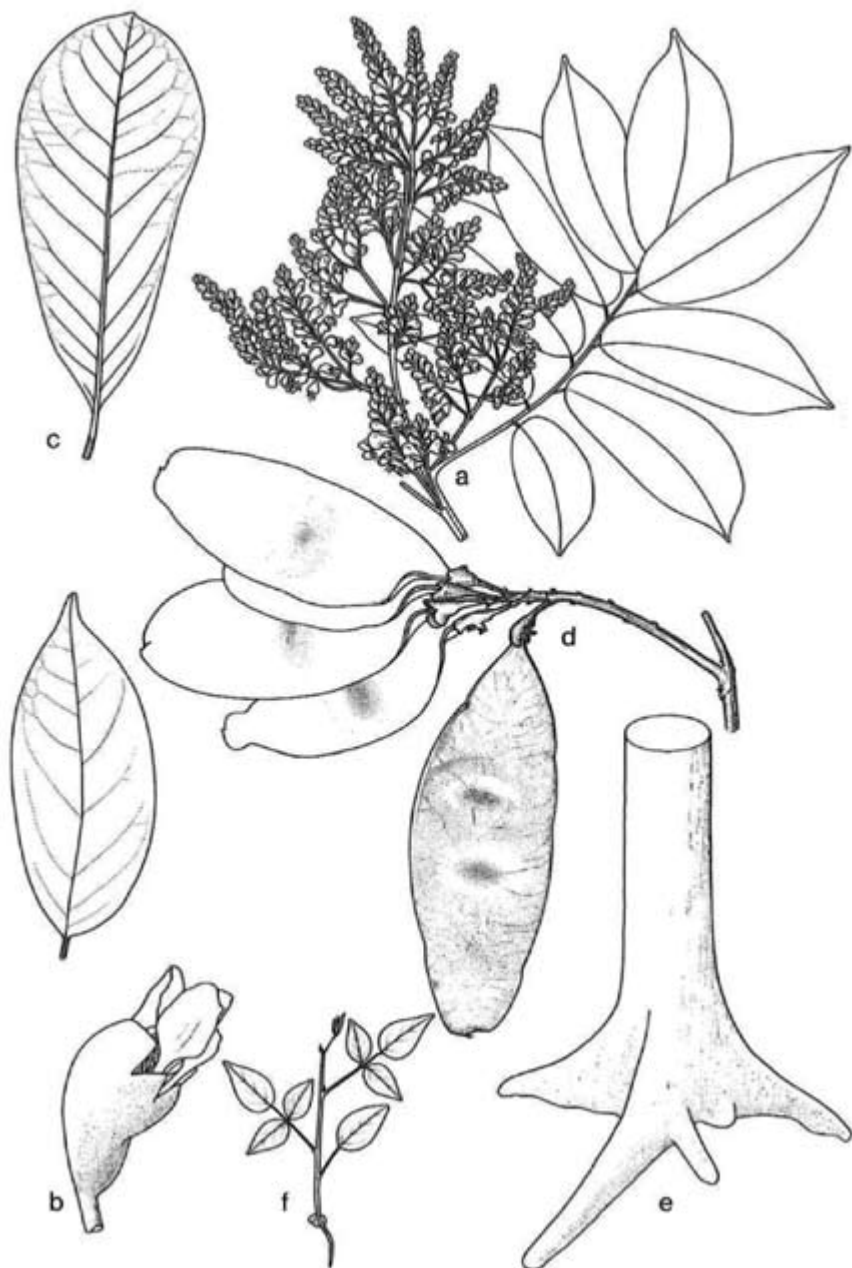
Vernacular names: Konatopo (C), Ogoru (Ak), Olgoi (Ak), Tatabu (Ar).

Botanical description: Twigs round, lenticellate, puberulous when very young. Leaves alternate, imparipinnate, 5-9(-15)-foliolate; stipules absent; petiole 2.5-4(-6) cm long, round; rachis 15-30 cm long, grooved above; petiolules 0.4-0.6 cm long, deeply grooved above; leaflets alternate; blades leathery, ovate, 6-12 (-14) x 3-6 (-7) cm, glabrous, margin flat to slightly recurved, apex acuminate, obtuse, or emarginate, base obliquely rounded; primary vein plane or sunken above, prominent below; secondary veins 6-8 pairs, weakly prominent on both sides. Inflorescence a terminal panicle, 10-30 cm long, densely brownish puberulous. Flowers fragrant. Calyx bell-shaped, curved, purplish, leathery, 6-7 mm long, persistent; petals 5, pink, 8-11 mm long; stamens 10, unequal. Fruit a membranous pod, light green to straw-coloured, narrowly oblong-ellipsoid, 10-18 x 2.5-4.5 x 0.05 cm, glabrous, reticulately veined, dorsal ridge slightly winged, indehiscent; seeds 1(-2), narrowly ellipsoid-oblong, flat, 2-3 x 0.5-0.7 x 0.2 cm.

Field characteristics: Tree (20-)35-40 m tall; trunk 0.25-0.6(-1)m. in diam. Base with root spurs. Root spurs 0.2-0.4 x 0.15-0.3 x 0.15 m, concave or straight. Bark creamy brown or grey-brown, sometimes ringed, lenticellate, cracked, somewhat flaky. Rings few, 5-10 mm wide, running all around the bole. Lenticels elongate, 5-30 x 2-5 mm, horizontal. Cracks vertical, 1-10 x 0.1-0.2(-0.5) cm, 0.2-0.5 cm apart, fine. Dead bark 1-3 mm thick, grey-brown. living bark 6-10 mm thick, mottled creamy brown, yellow-brown and orange, hard, granular, often becoming greenish near sapwood after exposure, weakly cucumber-scented; exudate colourless, but rapidly turning green and finally dark brown to blackish, scanty. Sapwood light brown to greyish yellow-brown; heartwood brown to dark brown. Crown rounded, moderately dense, branches erect. Plate 11.

Ecology and distribution: Occasional in mixed forest and seasonal forest on brown sand in the near interior and Rupununi district. Also in bush islands in the savanna. Semi-deciduous; flowering mainly from January to March; fruiting mainly from April to May. The fruits are dispersed by wind.

Note:(1) Seedlings with a short taproot. First leaf simple, later leaves 3-foliate, with a short rachis. Leaflets nearly sessile, terminal leaflet somewhat larger than lateral ones.



Diplotropis purpurea

a. habit (x 0.5); b. flower (x 3); c. leaflets (x 0.6); d. infructescence (x 0.6); e. trunk base; f. seedling (x 0.3).

Literature: Amshoff, G.J.H. 1939.

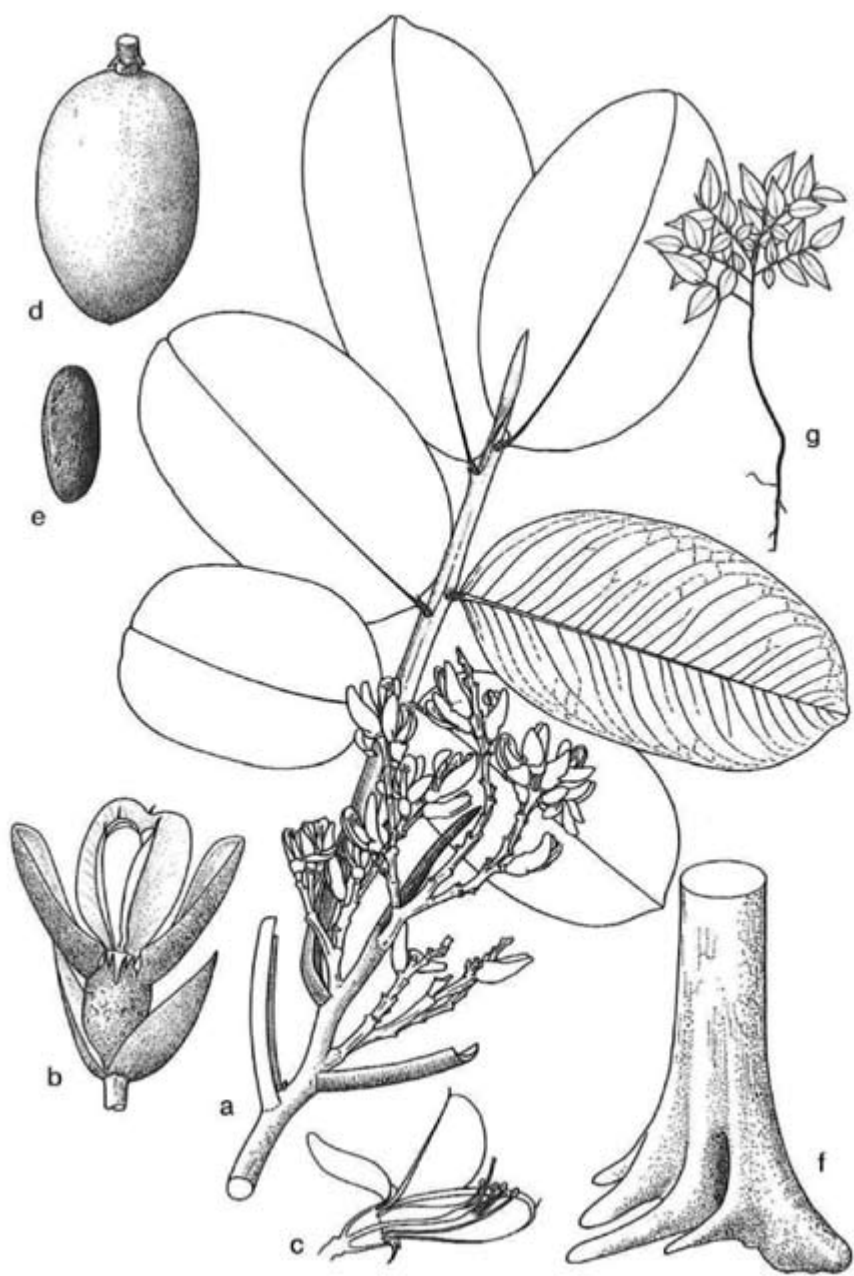
Vernacular names: Aipo (Ak), Krapabosi (C), Kumaru (Ar), Tonka bean (Cr).

Botanical description: Twigs round, yellow-brown puberulous when young, like the petiole. Leaves alternate, imparipinnate, 4-7-foliolate: stipules not observed; petiole (1.5-)5-10 cm long, narrowly winged; rachis 7-9 cm long, flattened above, often narrowly winged, continuing beyond the leaflets for 0.5-3(-5) cm; petiolules (0.1-)0.3-0.5 cm long, grooved above; leaflets nearly opposite or alternate; blades (thick) leathery, asymmetrical, oblong-elliptic, 8-18(-25) x 4-7.5 cm, glabrous, shiny above, margin flat, apex obtuse to acuminate, base asymmetrical, rounded to obtuse; primary vein eccentric, with 2 groovelets alongside, sunken above, prominent below; secondary veins 10-16 pairs, prominent on both sides. Inflorescence a terminal panicle, 10-20 cm long, branches densely brownish puberulous. Flowers sweet-scented; calyx belt-shaped, tube ca. 4 mm long, 2 upper lobes ca. 10 mm long, 3 lower lobes ca. 2 mm long; petals 5, (except for standard) pink to purplish, standard white, ca. 12 mm long, with a filiform apex; stamens 10. Fruit a drupe-like pod, dark green, ovoid-oblong, 5-8 x 3-4 x 2.5 cm, glabrous, outer layer fleshy and fibrous, inner layer woody, indehiscent, stipe to 0.7 cm long; seed 1, to 3 x 1 x 1 cm, containing a fragrant oil.

Field characteristics: Tree 25-35(-48) m tall; trunk 0.3-0.75(-2.5) m in diam. Base with thick, broad root spurs or buttresses. Buttresses 1.5-2.5 x 0.6-1.2(-5) x 0.2-0.4 m, often branched near ends. Bark creamy brown, grey or sometimes dark brown, cracked, smooth or flaky on older trees, sometimes with yellow flake scars. Cracks vertical, irregular, 2-30 x 0.1-0.5 cm. Flakes to 20 x 20 cm. Dead bark 0.13 mm thick, light brown. Living bark 8-10 mm thick, creamy brown with orange-brown to red streaks, layered, with 0.1 mm thick green layer just below dead bark, sweet-scented (like vanilla); exudate red, clear, somewhat watery, in moderate quantity. Sapwood light brown-yellow to light orange-brown; heartwood dark brown, sometimes lighter. Crown large, rounded to flattened, dense, branches erect to spreading. Plate 12.

Ecology and distribution: Occasional in mixed and seasonal forest on brown sand. Widely distributed in the near interior. Semi-deciduous; flowering mainly in June and July and in November; fruiting mainly from January to March. The seeds are dispersed by scatter-hoarding rodents and bats, who eat the fruit wall, after which the seed is dropped.

Notes:(1) Seedlings are easily recognized, by the same winged, prolonged rachis as in mature leaves, although the tip is only 1-1.5 cm long. Stem light brown. Leaflets (nearly) sessile; (2) The fruits are used because of the fragrant oil in the seed.



Dipteryx odorata

a. habit (x 0.6); b. flower (x 3); c. flower, longitudinal section (x 3); d. fruit (x 0.6); e. seed (x 0.6); f. trunk base; g. seedling (x 0.1).

Literature: Cowan, R.S. and Lindeman, J.C. 1989; Steege, H. ter 1990.

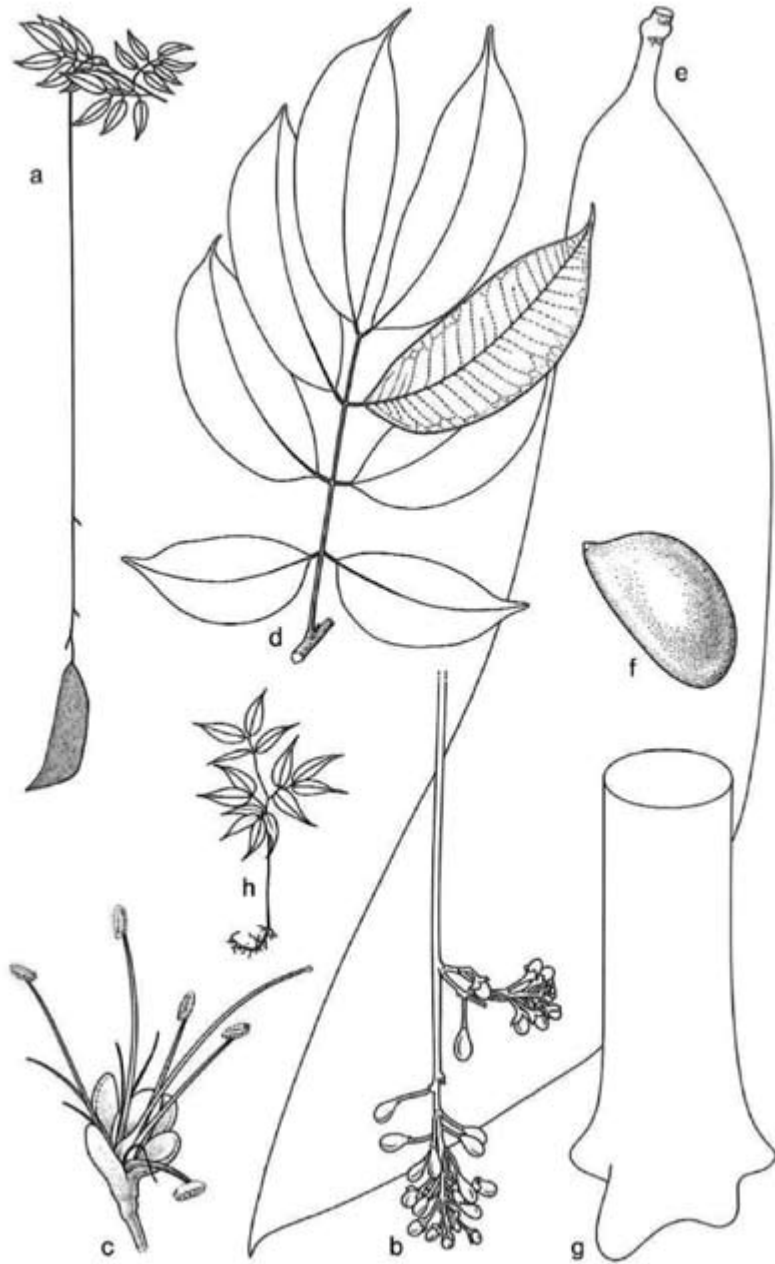
Vernacular names: Parewe (C), Soft wallaba (Cr), White wallaba (Cr), Wopa (A).

Botanical description: Twigs puberulous when young. Leaves alternate, paripinnate, 6-8-foliolate; stipules triangular, to 0.5 cm long, united in the leaf axil, caducous; petiole 3-5.5 cm long; rachis 4.5-7.5 cm long; petiolules 0.3-0.6 cm; leaflets opposite; blades papery to thin-leathery, falcate-elliptic, 9-14(-18) x 3-8 cm, glabrous, with pellucid dots, margin plane, apex acuminate, usually apiculate, base obtuse to rounded; primary vein plane or sunken above, prominent below; secondary veins 20-25 pairs, weakly prominent on both sides. Inflorescence a pendent, terminal panicle or raceme, 100-200 cm long, branches 3-5 cm long, almost glabrous, but minutely puberulous in flowering part; pedicels 9-18 mm long. Flowers held horizontally; receptacle 4-5 mm long; sepals 4, elliptic to ovate-oblong, 16-20 x 6-14 mm; petal 1, pink to scarlet, oblate-flabelliform, 13-18 mm long; stamens 10, 9 of which united basally and 1 free, 20-45 mm long, 4 or 5 of the united stamens sterile. Fruit a woody pod, red to brown-red, falcate, narrowly oblong-ellipsoid, flat, 20-36 x 6-9.5 x 0.5 cm, velutinous when young, often without developed seeds, stipe ca. 2 cm long; seeds 2-5, red -brown, 2-5 x 2-3 cm.

Field characteristics: Tree (8-)-15-30(-40) m tall; trunk 0.2-0.8 m in diam. Base straight or with few root spurs. Root spurs 0.15-0.4 x 0.2-0.4 m. Bark brown-grey to red-brown, usually rough, lenticellate, cracked, scaly at the base of older trees. Lenticels round, 2-3 mm in diam., inconspicuous. Cracks vertical, 2-20 x 0.1-0.3 cm, 0.2-0.5 cm apart. Dead bark 1-3 mm thick, grey to black-brown. Living bark 5-12 mm thick, red-brown towards dead bark, pink-brown to orange-brown towards sapwood, fibrous, tough. Exudate colourless or brown, clear, very sticky, appearing slowly from inner part of living bark and from sapwood. Sapwood creamy white to light yellow-brown; heartwood red-brown, Crown small, obtriangular or rounded, branches erect to spreading. Plate 12.

Ecology and distribution: In Wallaba forest on white sand, often as a dominant tree with *E. grandiflora*, in marsh and seasonal forest and sometimes in mixed forest. For more information on the ecology see ter Steege (1990). Widely distributed, particularly common on the white sand penepains in central Guyana. Evergreen; flowering and fruiting all year round, but with a peak in flowering from September to November and in fruiting from February to May. The flowers are pollinated by bats (Brazil), *Glossophaga soricina* and *Anoura geoffroyi* (Carvalho, 1961). The seeds are dispersed mechanically by explosive dehiscence of the fruit on the tree. Distances of 10-30 m can be reached. The seeds are predated upon by mammals (rats, acushi, agouti, labba, deer, peccary).

Notes:(1) Seedling leaves similar to mature leaves, but 2-4-foliolate. Leaflets thinner, apex long-acuminate, with ca. 2 cm long tip; (2) The wood of *Eperua falcata* and other *Eperua* species is much used in Guyana, mainly for electricity poles, fence posts, and for roofing shingles. See also ter Steege (1990); (3) A species often mistaken for a 'true' Wallaba (*Eperua* spp.), is *Dicymbe altsonii*, the Clump wallaba. It can be frequent to dominant in forest on white to light brown sand. As indicated by the vernacular name, it often has sprouts at the base of the trunk, which can survive when the 'parent tree' dies. It can be distinguished by the presence of red-brown bark layers in the sapwood, of which the most superficial one is usually visible when making a slash in the trunk.



Eperua falcata

a. habit (x 0.05); b. inflorescence, terminal part (x 0.6); c. flower (x 0.6); d. leaf (x 0.35); e. fruit (x 0.6); f. seed (x 0.6); g. trunk; h. seedling (x 0.1)

24. *Eperua grandiflora* (Aublet) Benth.

Ituri wallaba

Literature: Cowan, R.S. and Lindeman, J.C. 1989.

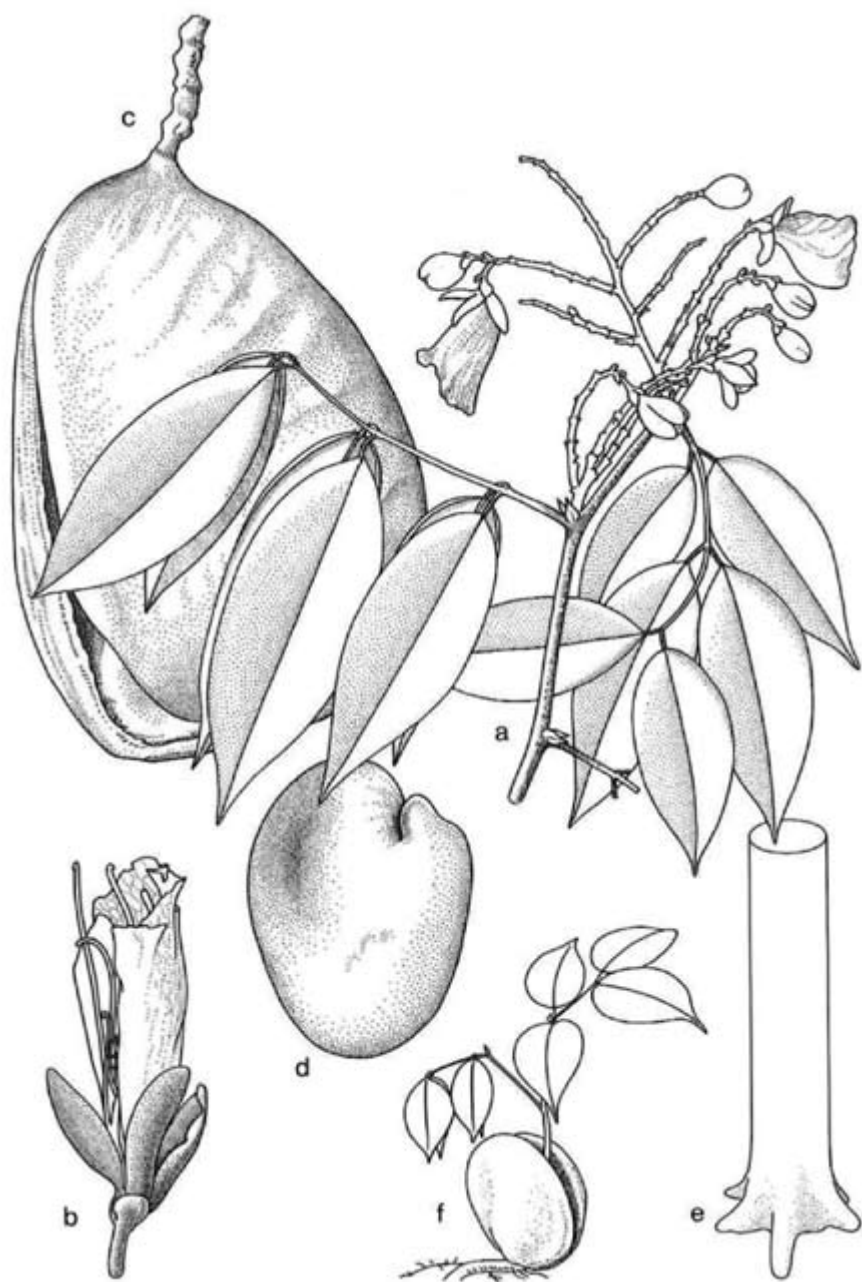
Vernacular names: Ituri wallaba (Cr), Yoboko (Ar).

Botanical description: Twigs glabrous. Leaves alternate, paripinnate, (4-)6-8 (-10)-foliolate; stipules unequally ovate to elliptic, 0.4-1.2 cm long, caducous; petiole 1-3 cm long; rachis 4.5-14 cm long; petiolules 0.4-0.6(-0.8) cm long; leaflets opposite; blades stiff-leathery, elliptic to ovate, (6-)7-11.5(-15.5) x 2-5(-7.5) cm, subglabrous, with pellucid dots, margin strongly recurved, apex acute to long-acuminate, base obtuse to acute; primary vein weakly prominent above (basally), prominent below; secondary veins 10-20 pairs, more or less plane on both sides; tertiary veins distinctly reticulate at both sides. Inflorescence an erect axillary panicle or raceme, 3-10 cm long, branches puberulous; pedicels ca. 5 mm long. Receptacle cup-shaped, 1-1.5 mm long; sepals 4, strongly imbricate in bud, 10-12 mm long, dorsal one somewhat larger than the others; petal 1, pink to purple, very broadly to depressed ovate, 25-35 x 25-45 mm, margin crenulate; stamens 10, 20-35 mm long, usually 9 connate to a tube and 1 free. Fruit a woody pod, dark brown, rounded, ca. quadrangular, or oblong, flattened, 10-13 x 7-9 cm, glabrous, reticulately veined, (explosively) dehiscent, stipe ca. 1 cm long; seeds 12, ovoid to reniform, flat, 5-7 x 4-5 cm.

Field characteristics: Tree (8-)15-30 m tall; trunk (0.2-)0.4-0.6(-0.8) m in diam. Base swollen to buttressed. Buttresses 0.3-1 x 0.4-0.85 x 0.05-0.15 m, concave. Bark grey-brown (to blackish), smooth, becoming rough with age, lenticellate, sometimes scaly at the base of older trees. Lenticels round (to elongate), 2-6 mm in diam., if elongate up to 10-30 mm long, numerous, usually horizontally arranged. Dead bark 1-2 mm thick, light brown. Living bark 7-8 mm thick, pink-brown to redbrown, red-purple on older trees, often with fine whitish streaks, somewhat fibrous; exudate colourless or brownish, clear, from living bark and sapwood, resinous, very sticky, appearing very slowly. Sapwood (very) light brown; heartwood red-brown to dark brown. Crown oval, moderately dense, branches erect. Plate 13.

Ecology and distribution: Gregarious in white sand areas, co-dominant in Wallaba forest together with Soft wallaba (*Eperua falcata*) and together forming up to 70% of the canopy trees (Richards, 1952). Most common and dominating over Soft wallaba in eastern and central Guyana; more rare and dominated by Soft wallaba in the N.W.-district. Flowering all year round, with a peak from September to -December; fruiting mainly from January to April.

Notes:(1) Seedling leaves like mature leaves. Leaflets usually only 4-6, with a flat margin; (2) *Eperua jenmanii* (Ituri wallaba) has a red-brown bark, with more lenticels, arranged in horizontal rows. Leaflets with a flat margin. Petal 5-10 cm long. For *Eperua schomburgkiana*: see note (2) of *Eperua rubiginosa*; (3) Of the 2 existing subspecies only subsp. *guyanensis* occurs in Guyana. whereas subsp.*grandiflora* has a more easterly distribution.



Eperua grandiflora

a. habit (x 0.6); b. flower (x 1.3); c. fruit (x 0.6); d. seed (x 0.6); e. trunk base; f. seedling (x 0.25).

Literature: Cowan, R.S. and Lindeman. J.C. 1989.

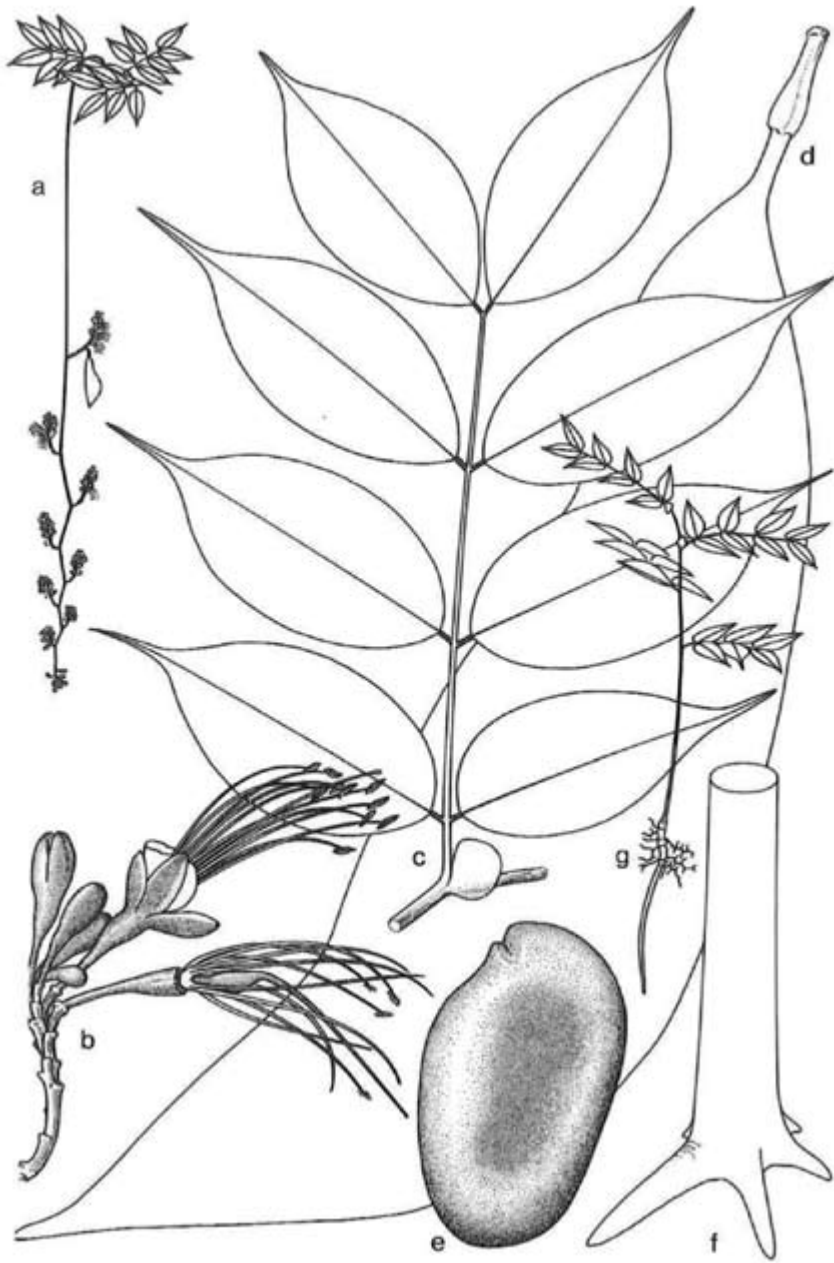
Vernacular names: Watafa (Ar), Watapa (Ar), Water wallaba (Cr).

Botanical description: Twigs glabrous. Leaves alternate, paripinnate, 6-8-foliolate; stipules triangular to ovate-triangular, 1.5-3 cm long caducous; petiole 0.8-2.5 cm long; rachis 5.5-12.5 cm long; petiolules 0.4-0.7 cm long; leaflets opposite; blades leathery, elliptic to ovate, 6.5-18 x 4.5-8 cm, glabrous, margin plane to slightly recurved, apex acute to long-acuminate, apiculate, base obtuse to rounded; primary vein sunken above, prominent below; secondary veins 15-20 pairs, very inconspicuous on both sides. Inflorescence a terminal pendent panicle or raceme, 50-250 cm long, branches 4-8 cm long, covered with rusty hairs; pedicels 20-30 mm long. Receptacle 3.5-5 mm long; sepals 4, elliptic to ovate-oblong, 13-30 mm long, 2 outer ones largest; petal 1, dark pink to purple-red, broadly oblate to flabelliform, 10-35 x 20-50 mm; stamens 9 or 10, all united basally, most or all fertile, 35-70 mm long. Fruit a woody pod, brown, falcate, narrowly oblong-elliptic, flat, 20-50 x 6-12 cm, rusty-brown velutinous, stipe 1.5-2.5 cm long; seeds 2-5, elliptic, 4-8 x 2.5-4 cm.

Field characteristics: Tree (5-)15-30 m tall; trunk (0.1-)0.3-0.9 m in diam. Base with root spurs or sometimes buttressed. Buttresses 1.5-2.5 m high. Bark dark brown to brown-grey, lenticellate, cracked. Lenticels round to linear, 2-5 x 2-3 mm, numerous, obscured by cracks. Cracks vertical, to ca. 10 cm long, fine. Dead bark 1 mm thick, dark orange-brown. Living bark 2-4 mm thick, red-brown to light orange-brown, streaked white towards sapwood, somewhat granular towards dead bark; exudate yellow-brown, clear, also from sapwood, very sticky, scanty. Sapwood light brown; heartwood dark (red-)brown. Crown moderately dense, branches erect to spreading. Plate 13.

Ecology and distribution: Dominant to frequent in mixed forest along rivers and creeks on white sand. Occurring in central Guyana. Flowering and fruiting data for Guyana are scarce; flowering has been observed in September, November and December, fruiting in November and January. Seed dispersal as in *Eperua falcata*.

Notes:(1) Seedlings usually abundant in forest where Watapa occurs. Easily recognized by the large, lateral stipules at the leaf base, similar to mature leaves; (2) The name Water wallaba is also used for 2 other riverine Caesalpniaceae, *Eperua schomburgkiana* (also called huri wallaba) and *Macrolobium bifolium*. The former has 10-12-foliolate leaves, and a 6-15 cm long inflorescence with flowers with a white petal. The latter has 2-foliolate leaves with more or less falcate leaflets.



Eperua rubiginosa

a. habit (x 0.05); b. branch of inflorescence (x 0.6); c. leaf (x 0.6); d. fruit (x 0.6); e. seed (x 0.6); f. trunk base; g. seedling(x 0.1).

Literature: Mori, S.A. and Prance, G.T. 1992.

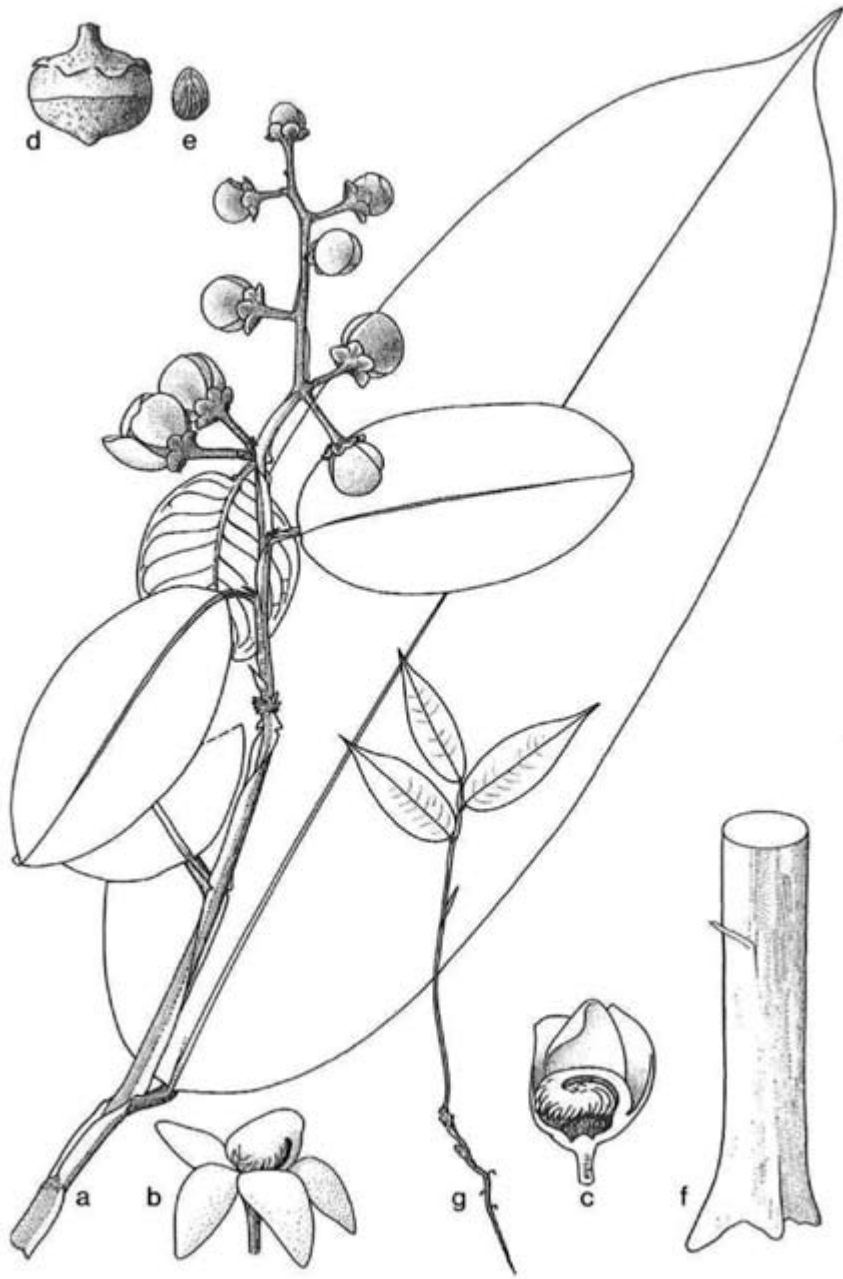
Vernacular names: Guava-skin (kakaralli) (Cr), Kakaralli (Ar), Okoromai (Ak), Tekröma (Ak).

Botanical description: Twigs narrowly winged, wings 1-1.5 mm wide, glabrous. Leaves alternate; petiole 0.5-1.2 cm long, flat above; blades papery, elliptic-oblong to narrowly ovate, 8-27 x 5-10 cm, glabrous, margin entire to crenulate, apex acuminate, base obtuse to rounded; primary vein prominent on both sides; secondary veins 9-17 pairs, sunken to prominent above, prominent below; tertiary veins distinctly reticulate below. Inflorescence a terminal or axillary raceme, 10-30 cm long, branches somewhat zigzagged; pedicels 3-20 mm long. Flowers zygomorphic, 40-50 mm in diam.; calyx lobes 6, 4-6 mm long, persistent; petals 6, white to pale yellow, sometimes reddish tinged outside, 20-25 mm long; staminal hood with double coil, yellow-orange; staminal ring with ca. 250-300 stamens, stamens to 2.5 mm long; ovary 2-locular. Fruit a woody pyxidium, widely obconical, 2-3 x 3-5 cm, glabrous, calyx remnants inserted below the middle of the cup; seeds 2, ca. 1.5 x 1 cm, aril lateral.

Field characteristics: Tree 20-30 m tall; trunk 0.2-0.4 m in diam. Base somewhat swollen, rarely buttressed. Buttresses to 0.5 x 0.5 x 0.1 m. Bark smooth, dippled, red-brown when young turning black-brown with age, lenticellate, flaky. Lenticels round, 0.5-2 mm in diam., or elongate, 1-2 x 2-5 mm, in irregular, more or less vertical rows or in patches. Dead bark thin, 0.1 mm thick, dark brown. Living bark 2-3 mm thick, pink to red-pink (to red-brown), often with a 0.5 mm thick green layer just below dead bark, very fibrous, with scent of linseed oil. Sapwood light brown; heartwood dark brown. Crown small, rounded. Plate 14.

Ecology and distribution: In mixed forest, particularly Morabukea forest, on brown sand, or less frequently on laterite. Occurring mainly in the further near interior. Flowering and fruiting mainly in November.

Notes:(1) Seedling leaves similar to mature leaves. Stem winged, thickened at the base on transition to the taproot; (2) *Eschweilera alata* is the only species of *Eschweilera* with winged twigs; (3) Lecythidaceae, here represented by several species of *Couratari*, *Eschweilera*, and *Lecythis*, all have a fibrous living bark, which can be pulled down in strips. The living bark often has a scent like linseed oil ('paint-like'). Most species of *Eschweilera* have a relatively smooth bark, which is spotted in different tinges due to the scaling off of the dead bark. In *Lecythis* the bark is usually vertically cracked to fissured in an obvious way.



Eschweilera alata

a. habit (x 0.6); b. flower (x 0.6); c. flower, longitudinal section (x 0.6); d. fruit (x 0.6); e. seed (x 0.6); f. trunk base; g. seedling (x 0.25).

Literature: Mori, S.A. and Prance, G.T. 1992.

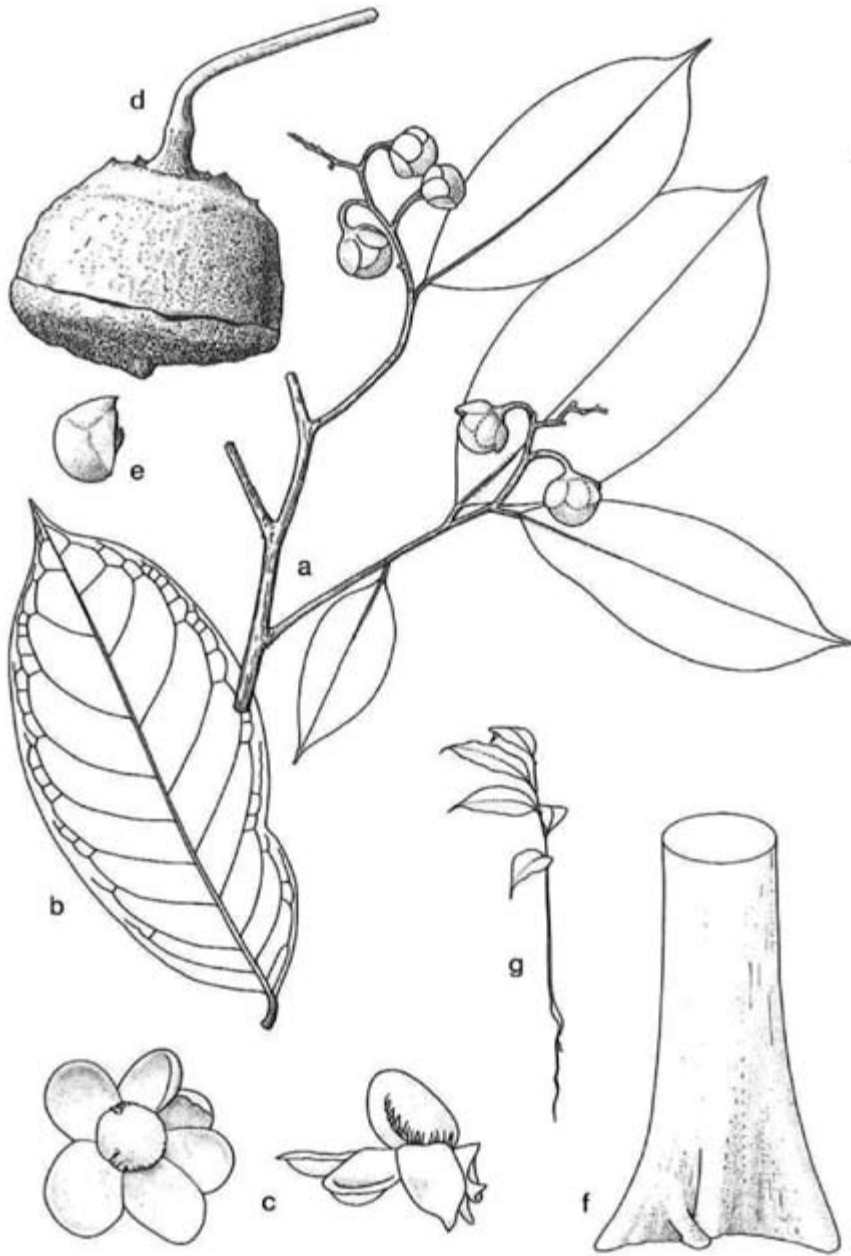
Vernacular names: Akurima (Ak), Kwateri (C), Kwatru (M), Smooth-leaf kakaralli (Cr).

Botanical description: Twigs glabrous. Leaves alternate; petiole 0.6-1.2 cm long, grooved above to flat; blades papery to thin-leathery, elliptic, 8.5-23 x 3.5-8.5 cm, glabrous, punctate below, margin entire to crenulate, apex acuminate, base obtuse to rounded, rarely acute; primary vein prominent on both sides; secondary veins 9-14 pairs, prominent on both sides; tertiary veins distinctly reticulate. Inflorescence a terminal, or sometimes axillary, rarely branched raceme, 3-9 cm long; rachis glabrous, zigzagged; pedicels 1.5-13 mm long. Flowers zygomorphic, (30-)50-70(-80) mm in diam.; calyx lobes 6.5-13 mm long, erect, persistent; petals 6, (15-)26-35 mm long, white to light yellow, turning blue-green when bruised; staminal hood with a double coil, dark yellow; staminal ring with ca. 180 stamens, stamens 1.5-2.5 mm long; ovary 3-5-locular. Fruit a woody pyxidium, green or dull brown, turning bluish when bruised, depressed-globose, 4-5.5(-6) x (5-)7-8 cm, glabrous, rough, lid convex, calyx remnants near base of fruit; seeds 2-6, subglobose, ca. 2 cm in diam., shiny, obscurely ribbed, aril lateral.

Field characteristics: Tree 20-35 m tall; trunk 0.25-0.6 m in diam. Base variable in shape, straight, swollen, or buttressed. Buttresses 0.4-0.6 x 0.05-0.2 x 0.05-0.1 m. Bark (dark) brown to grey-brown to red-brown, lenticellate, smooth, diphloic, in older trees cracked and flaky. Lenticels round, 1-2(-3) mm in diam., usually in vertical rows. Cracks vertical, 1-5(-8) x 0.1-0.2 cm, inconspicuous. Flakes vertically oriented, irregular or rectangular, 1-4 x 0.5-2(-3) cm, 0.5-1.5 mm thick, leaving depressions in the bark. Dead bark 0.25-1 mm thick, black-brown. Living bark 5-15 mm thick, yellow to white-yellow to light brown, sometimes tinged pink-brown, soft, very fibrous, with scent of linseed oil. Sapwood light brown, darker towards heartwood; heartwood dark brown. Crown oval, dense, branches spreading. Plate 14.

Ecology and distribution: Occasional to common in mixed forest and Mora forest West of Demerara River and in the Kanuku Mts. Evergreen; flowering mainly from September to November with a smaller peak in April and May; fruiting mainly in February and March. Pollination of the flowers takes place by bees (e.g. *Xylocopa americana* and *Eulaema meriana*). Research on this species has been carried out in French Guiana (Mori et.al., 1987)

Notes:(1) Seedlings: see *E. sagoriana*; (2) *E. decolorans* is the only species of *Eschweilera* in Guyana which has flowers and fruits that turn bluish when bruised; (3) Several other *Eschweilera* species occurring as large forest trees in Guyana bear the name Smooth-leaf kakaralli or a similar name. They are less common and less dominant in the vegetation. Identification by the leaves is difficult, but *E. coriacea* (Smooth-leaf kakaralli) has less conspicuous tertiary veins than *E. decolorans*, *E. parviflora* (Fine smooth-leaf kakaralli) has leaves which are often red-punctate below, and *E. wachenheimii* (Fine-leaf kakaralli) may be recognized by its conspicuous, long-acuminate leaf apex.



Eschweilera decolorans

a. habit (x 0.6); b. leaf (x 0.6); c. flower, top view (l) and side view (r) (x 0.6); d. fruit (x 0.6); e. seed (x 0.6); f. trunk base; g. seedling (x 0.1).

Literature: Mori, S.A. and Prance. G.T. 1992.

Vernacular names: (Common) black kakaralli (Cr). Kwateri (C). Kwatru (M). Poko (Ak). Prukoi (P). Tamad (W).

Botanical description: Twigs glabrous. Leaves alternate; petiole 0.8-1.5 cm long, flat above; blades lea thery, elliptic, 10.5-22 x 4-10 cm, glabrous, margin entire, apex acuminate to acute, base obtuse; primary vein slightly prominent above, prominent below; secondary veins 10-15 pairs, prominent to plane above, prominent below; tertiary veins distinctly reticulate below. Inflorescence a terminal or axillary panicle of racemes, 10-20 cm long, branches glabrous to puberulous; pedicels 5-12 mm long. Flowers zygomorphic, 25 mm in diam.; calyx lobes 6, 3.5-4.5 mm long, spreading to erect, persistent; petals 6, white, 12-15 mm long; staminal hood with double coil, light yellow, with a marginal groove on anterior, exterior surface; staminal ring with 115-130 stamens, stamens ca. 1.5 mm long; ovary 2-locular. Fruit a woody pyxidium, cup-shaped, 2-3 x 4.5-5 cm, glabrous, calyx remnants inserted near the top of the cup; seeds 1-2(-3), 1.6-2 x 1.3-1.5 cm, aril lateral.

Field characteristics: Tree 15-30(-40) m tall; trunk (0.15-)0.3-0.6 m in diam. Base straight or buttressed. Buttresses (0.25-)0.5-1(-2) x 0.1-0.4 x 0.2-0.3 m. Bark grey, dark-brown, or red-brown, somewhat shiny when young, smooth or dipped, lenticellate, scaly to flaky. Lenticels round to elongate, 1-5 x 1-2 mm, in vertical rows, often more or less connected. Scales and flakes usually more or less vertically oriented, irregular, 1-20(-40) x 1-8 x 0.2-0.3 cm. Dead bark 1-3 mm thick, dark brown, sometimes with light brown layer at inside. Living bark 3-5 mm thick, light brown or pink brown, soft, very fibrous, tough, with scent of linseed oil. Sapwood light yellow-brown; heartwood light pink-brown to dark brown. Crown oval, dense, branches erect to spreading. Plate 15.

Ecology and distribution: Gregarious in mixed forest, particularly on laterite, and Mora forest. Widely distributed. *Eschweilera sagotiana* is one of the characteristic species of the mixed rainforest in Guyana. Evergreen; flowering mainly from October to December, with a smaller peak in April and May; fruiting mainly in February and March, with a smaller peak from June to September.

Notes:(1) Difficult to distinguish from *Eschweilera decolorans* (Smooth-leaf kakaralli) on characters of bark and slash. Usually in Black kakaralli the slash is darker yellow. Furthermore Black kakaralli seems to have a stronger preference for laterite, whereas Smooth- leaf kakaralli is more often encountered on brown sand; (2) Seedlings with a laproot, which is thickened on transition to the stem. Leaf apex long-acuminate, with 1-1.5 cm long tip; secondary veins are very prominent below. In *E. decolorans* these are only slightly prominent below. Furthermore the seedlings are more coarse than those of *E. decolorans* (3) *E. subglandulosa* (Black kakaralli) has leaves which are more shiny and smooth above. Furthermore the calyx remnants are inserted ca. halfway the fruit cup. *E. pedicellata* (Kakaralli) has leaves with less conspicuous tertiary veins. Its flowers are purple.



Eschweilera sagotiana

a. habit (x 0.6); b. leaf (x 0.6); c. flower (x 0.6); d. fruits (x 0.6); e. seed (x 0.6); f. trunk base; g. seedling (x 0.1).

Literature: Lindeman, J.C. and Mennega, A.M.W. 1963.

Vernacular names: Goupi (Cr), Kabiuk (Ak), Kabukalli (Ar), Kupiye (C), Stinkwood (Cr), Waramai (Ak).

Botanical description: Twigs smooth, glabrous, somewhat angular. Leaves alternate, in 2 rows; stipules linear, to 1 cm long, caducous; petiole 0.5-1 cm long, grooved above; blades papery to thin-leathery, elliptic to (narrowly) ovate, oblique, 5-12 x 2-5 cm, glabrous and shiny above, sparsely covered with appressed hairs along veins below, shiny above, margin crenulate, apex (long-)acuminate, base oblique, rounded to acute; primary vein slightly prominent above, prominent below; secondary veins 2-3 pairs, long-arcuate, plane to slightly prominent above, prominent below; tertiary veins more or less parallel, closely spaced, clearly visible. Inflorescence an axillary umbel; peduncle 0.5-1.5(-2) cm long; pedicels 8-15 mm long. Flowers 3-10(-15) together, 5-10 mm in diam.; calyx minute; petals yellowwhite, base red, 5, linear, to 8 mm long, apex folded inward in bud; stamens 5. Fruit a berry, at first green, turning yellow to red, finally black, globose, 0.1-0.4(-0.7) cm in diam., glabrous; seeds 2-5, yellow-brown, 1.5 x 1 mm.

Field characteristics: Tree 20-35(-40) m tall; trunk 0.2-0.9 m in diam. Base swollen to buttressed. Buttresses 1.5-3(-4) x 1-2 x 0.15-0.25 m, straight. Bark light grey-brown to creamy brown, often with pink patches on young trees, lenticellate, cracked, flaky on older trees. Lenticels round, 1-3 mm in diam., irregularly scattered, quite inconspicuous. Cracks 0.5-15 x 0.1-0.5 cm, rather irregular. Flakes vertically oriented, 1-20 x 0.5-7 x 0.1-0.5 cm, irregular. Dead bark (1-)-3-5 mm thick, grey, tinged reddish, brittle. Living bark 2-5(-10) mm thick, creamy brown to orange-brown, with darker spots, slowly to rapidly darkening after exposure to air, with many orange-brown, brittle fibres, inner 1 mm yellow-white, scent unpleasant, somewhat sour. Sapwood light brown to yellow-brown to pinkish, often streaked with red; heartwood dark red to dull red-brown, sometimes with darker rings. Crown oval, broad, open, branching erect; branchlets deciduous. accumulating under the tree. Plate 15.

Ecology and distribution: Dominant in seasonal forest in eastern Guyana. Frequent to occasional in mixed forest on sandy soil. Occasional in Mora forest. Widely distributed. Can form dense stands in secondary vegetations (e.g. along roads) as young trees. Semi-deciduous; flowering mainly from September to November; fruiting mainly from November to February. The seeds are dispersed by animals, particularly birds, who swallow the fruits and defecate the seeds.

Notes:(1) Seedlings often abundant on open spaces, even in areas where there are no mature trees nearby. They initially measure only a few centimetres high, with patent hairs on all parts. The young trees bear numerous, drooping, unbranched, densely arranged branches; (2) The leaves dry blackbrown after falling from the tree; (3) Sometimes *Goupia glabra* is placed in a separate family, Goupiaceae.



Goupia glabra

a. habit (x 0.6); b. complete flower (l), and flower with 2 petals removed (r) (x 5); c. complete fruit, and fruit in cross-section (x 5); d. trunk base; e. seedling (x 0.1).

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

Tauroniro

Synonym: *Humiria floribunda* Mart.

Literature: Cuatrecasas. J. 1961.

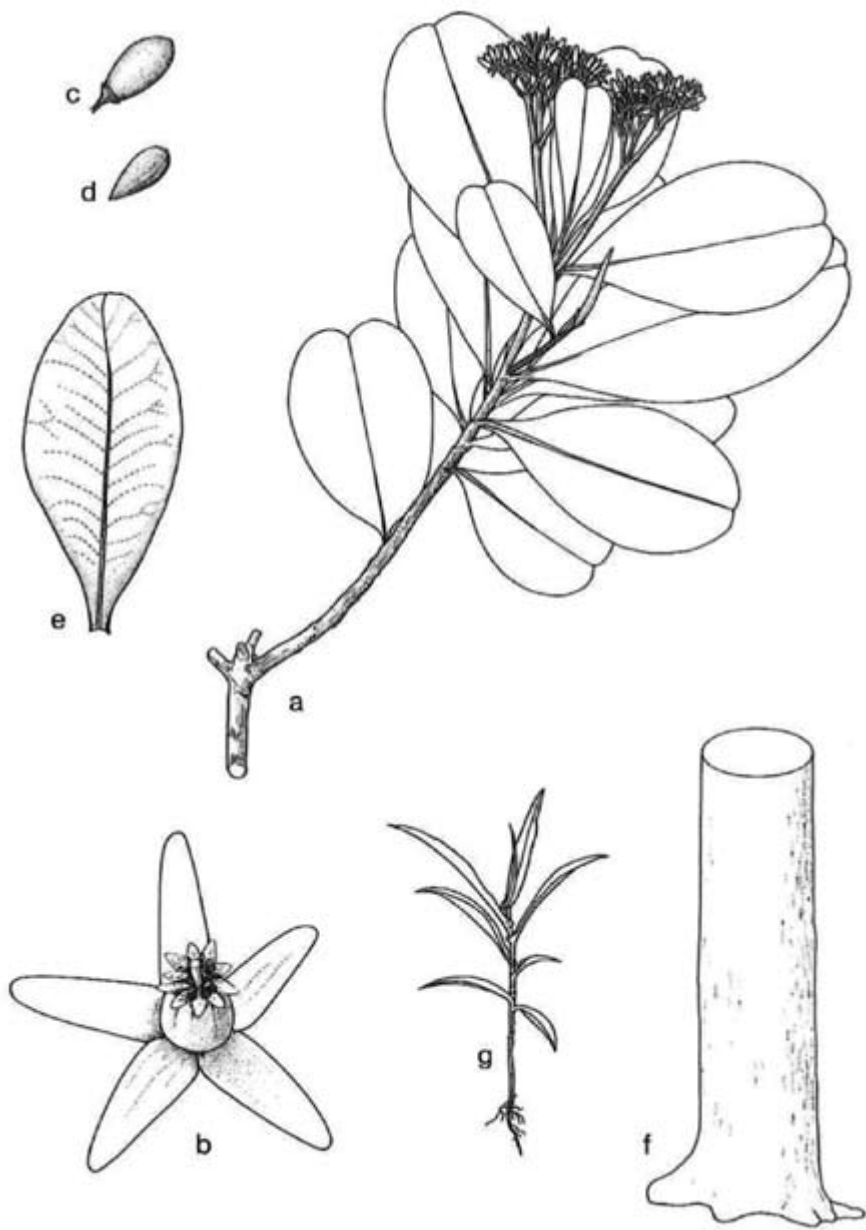
Vernacular names: Bastard bulletwood (Cr), Meri (Cr), Tauaranru (Ar), Tauroniro (Cr).

Botanical description: Twigs flattened and winged by decurrence of the leaf base when young, glabrous. Leaves alternate, sessile, stem-clasping; stipules minute, caducous; blades leathery, usually stiff, obovate or obovate-elliptic. 3-14 x 2-8 cm, glabrous, margin flat, apex rounded to obtuse to emarginate, base acute; primary vein slightly prominent above, prominent below; secondary veins 10-20 pairs, thin, slightly prominent above and below. Inflorescence a many-flowered panicle, 2.5-7 cm long, in upper leaf-axils; peduncle 1.5-6 cm long, winged; pedicels 0.5-2(-3) mm long. Flowers sweet-scented; calyx cup-shaped, 1-2 mm long; petals white to green-white, 4.5-7 mm long; stamens 20. Fruit a fleshy drupe, glossy, black, oblong-ellipsoid, 1-1.4 x 0.5-0.8 cm, glabrous, pulp sweet, edible; pyrene 1, with 10, thin furrows, endocarp bony; seeds (4-)5.

Field characteristics: Tree 20-40 m tall; trunk 0.3-0.9(-1.2) m in diam. Base swollen. Bark very dark brown to dark red-brown, fissured. Fissures 10-20(-30) x 0.2-0.5(-1) cm. Dead bark 2-5 mm thick, grey-brown, layered. Living bark 2-3 mm thick, orange-brown, with coarse, splintery fibres, clearly different from the dark red lobes between the fissures, which have a ca. 1 mm thick, dark brown layer on transition to the dead bark. Sapwood grey-brown; heartwood red-brown. Crown large, rounded or flat-rounded, consisting of many small subcrowns, branching erect to spreading. Plate 16.

Ecology and distribution: Occasional to frequent in Wallaba forest or marsh forest on (white) sand. Occasional in seasonal forest on brown sand. Also as a small tree or shrub on savanna (var. *guyanensis*: Muri). General in near interior and Rupununi district. Semi-deciduous; flowering mainly in May and June; fruiting mainly in September and October.

Notes:(1) *Humiria balsamifera* is an extremely variable species, of which numerous varieties and forms have been described. The varieties and forms differ mainly in shape and size of the leaves and the indument. The large trees in the forest belong to var. *balsamifera*; (2) Seedlings with zig-zagged stem. Leaves narrowly elliptic, base stem-clasping, margin glandular-serrate. Three wings run down from the leaf base. Leaves in bud rolled inward and resting on primary vein of previous leaf. Leaf apex often remaining pinkish longer than rest of blade. Young trees can be abundant in secondary (roadside) vegetation. They have densely arranged, horizontal branches. Stem-clasping leaves borne more or less erect at twig ends, young ones with pink-green apical part.



Humiria balsamifera var. *balsamifera*

a. habit (x 0.6); b. flower (x 4); c. fruit (x 0.6); d. pyrene (x 0,6); e. leaf (x 0.6); f. trunk base;
g. seedling (x 0.2).

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

Literature: Franco, R.P. 1990.

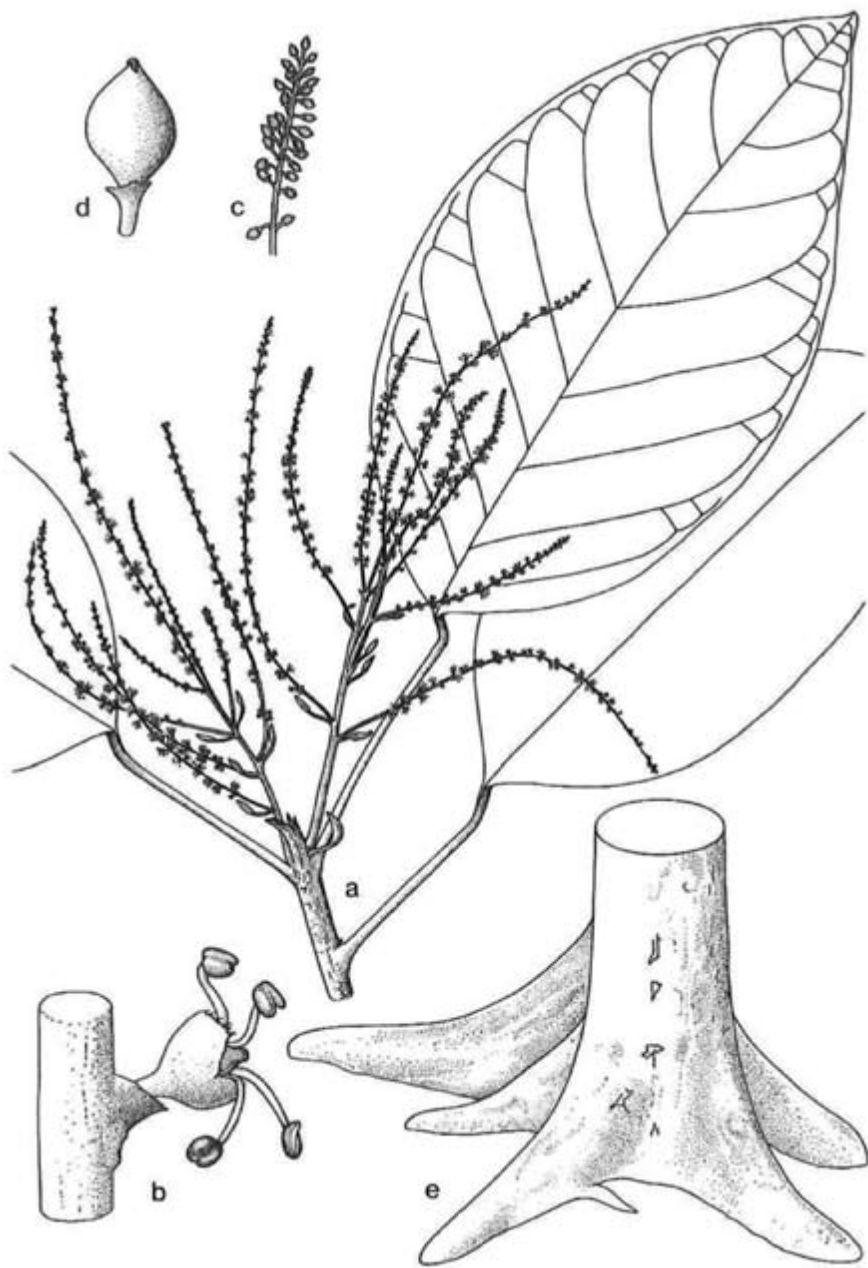
Vernacular names: Napo (Ak), Suradan (Ar).

Botanical description: Twigs round, densely covered with greyish, stellate scales when young. Leaves alternate; stipules leaf-shaped and distinctly petiolate, 0.5-1.8 cm long; petiole (2-)4-7(-9) cm long, grooved above; blades papery, broadly elliptic, rarely ovate, 8-18 x 5.5-13 cm, densely covered with greyish scales on both sides, margin plane, apex obtuse, rounded, or acuminate, base obtuse to acute; primary vein slightly prominent above, prominent below; secondary veins (6-)7-10(-11) pairs, slightly prominent above, prominent below. Trees with either male (m) or female (f) inflorescences. Inflorescence a panicle composed of racemes of fascicles, 11-20 cm (m) resp. (4-)6-10 cm (f) long, densely brownish stellate haired; peduncle 2-3 cm (m) resp. 0.7-2 cm (f) long; pedicels 0.6-0.9 mm (m) resp. 0.7-1 (-2) mm (f) long. Calyx cup-shaped, 0.7-0.8 mm (f) resp. 0.9-1 mm (m) long, persistent; petals absent; stamens 3-6. Fruit a fleshy drupe, red-black to black, globose, 0.25-0.4 x 0.3-0.5 cm, sparsely covered with stellate scales, edible; pyrene 1, hard; seed 1.

Field characteristics: Tree (5-)15-35 m tall; trunk 0.3-0.7(-0.9) m in diam. Base buttressed, sometimes with stilt roots if growing in flooded forest. Buttresses 0.4-0.8(-2.5) x 0.4-0.9(-2.5) x 0.1-0.2 m. Bark light grey-brown, soft, cracked, scaly to flaky. Cracks irregular, mainly vertical, 1-15 x 0.1-0.3 cm. Scales / flakes 1-15 x 1-3 x 0.2-0.3 cm, papery. Dead bark 2-3 mm thick, dark brown with white spots, brittle. Living bark 4-5 mm thick, dark red near dead bark, more red-pink towards sapwood, with orange-brown fibres, which are best visible near sapwood. Sapwood light brown, more orange-brown towards heartwood; heartwood dark red to red-brown. Plate 16.

Ecology and distribution: 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 in the near interior and the Rupununi district. Flowering mainly from June to December (except for September); fruiting mainly from November to March. The fruits are eaten by birds and spider monkeys.

Note:(1) Suradan sometimes looks like Kabukalli (*Goupia glabra*) from the outside. But even although the living bark of Kabukalli also has conspicuous orange-brown fibres, the creamy brown to orange-brown colour is very different from the red to red-pink colour of the living bark of Suradan.



Hyeronima alchorneoides

a. habit (x 0.6); b. male flower (x 12); c. infructescence (x 0.6); d. fruit (x 3.5); e. trunk base.

Literature: Lee, V.T. and Langenheim, J.H. 1975.

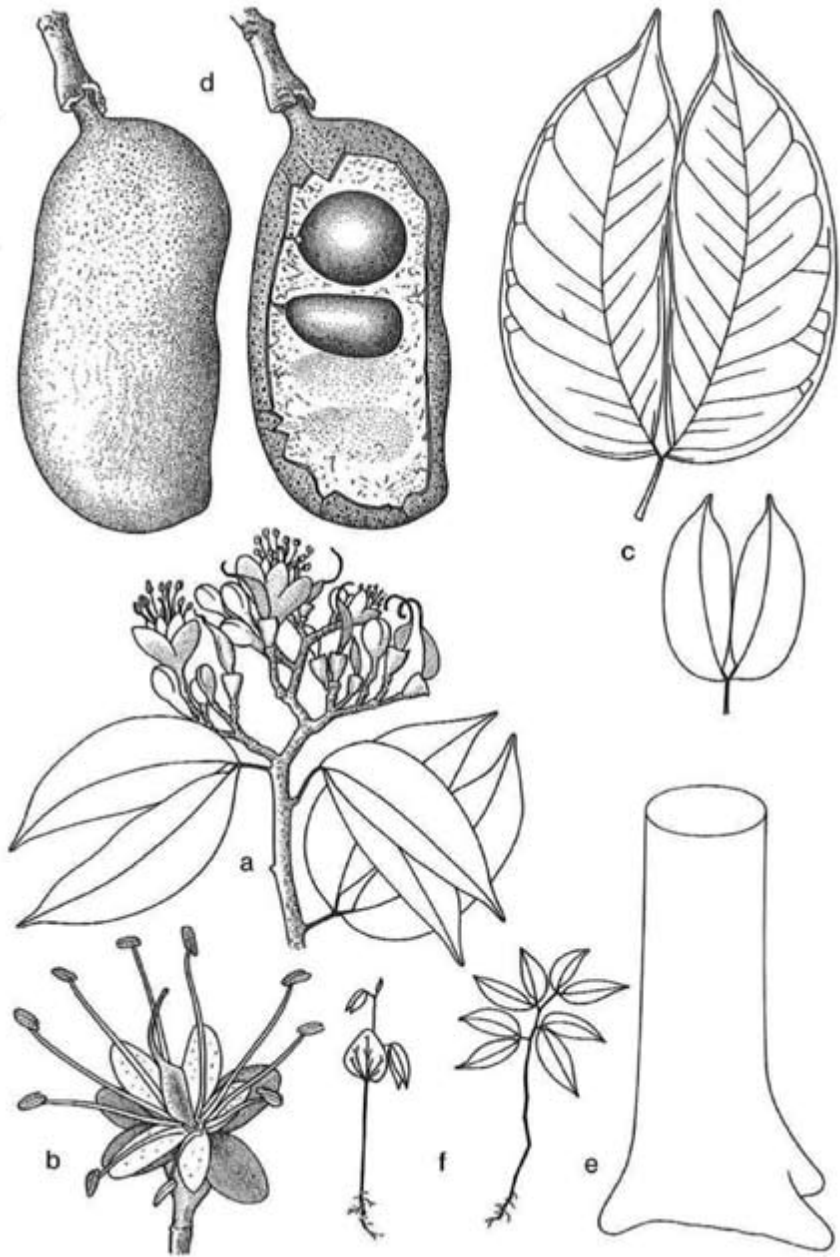
Vernacular names: Kawanari (Ar), Locust (Cr), Moire (M), Not (W), Stinking toe (Cr).

Botanical description: Twigs thin, round, glabrous. Leaves alternate, 2-foliolate; stipules linear, 1.5-3 cm long, enclosing the leaf bud, caducous; petiole 1-2 cm long, round; petiolules 0.2-0.4 cm long, twisted; blades leathery, obovate to elliptic, falcate, 4-10(-11) x 2-5 cm, glabrous, glandular-punctate, shiny above, margin flat, apex shortly acuminate, base oblique, broadly rounded outside and acute to slightly rounded inside; primary vein slightly prominent above, moderately to strongly prominent below; secondary veins 8-10 pairs, loop-forming, slightly prominent above, more prominent below. Inflorescence a terminal panicle, 5-15 cm long. Flowers 25-30(-40) mm long (stamens included); receptacle cup-shaped, 10 mm long; calyx 4-lobed, leathery, ca. 10-20 mm long; petals 5, whitish, (ob)ovate, 15-20 mm long; stamens 10, free, 25-30(-40) mm long, exserted. Fruit a woody pod, dark to light (red-)brown, oblong-ellipsoid, (80-)90-140(-200) x 40-60(-80) x 15-25(-35) mm, glabrous, shiny, dotted with numerous resinous pockets, somewhat constricted between the seeds, wall 0.5 cm thick, indehiscent, stipe to 7 mm long, obliquely anached; seeds (1-)2-4(-8), broadly obovoid to broadly ellipsoid, flattened, red-brown, ca. 20 x 15 mm, embedded in pulp; pulp light green to yellow, mealy, unpleasantly scented, sweet tasting, edible.

Field characteristics: Tree 30-45(-50) m tall; bole (0.3-)0.5-1(-27) m in diam., conspicuously cylindrical. Base more or less straight, or buttressed and with 4-5 m long, superficial roots. Buttresses 0.5-1.5 x 0.3-0.5 x 0.3-0.4 m, concave. Bark (light) brown to red-brown or grey, often with light horizontal bands, smooth, or rough with many warty lenticels, cracked. Lenticels round to elongate, 25-20 x 2-3 mm, horizontally and vertically oriented, often scored in rows of up to 15 cm long, rows 0.3-0.5 cm apart. Cracks vertical, 1-3 x 0.1-0.2 cm, 0.2-0.5 cm apart. Dead bark 3-4 mm thick, dark brown, with a 2 mm thick white zone bordered by thin black lines on transition to living bark. Living bark ca. 30 mm thick, red-brown to purple-brown to dark brown, somewhat lighter towards sapwood, often with fine grey fibres, hard, granular; exudate colourless, clear, resinous, (very) scanty. Sapwood light brown to yellow-brown; heartwood dark orange-brown to red-brown. Crown (moderately) dense, branches thick, spreading. Plate 17.

Ecology and distribution: Occasional along rivers in mixed and Mora forest, also in marsh forest. Occurs both on sand and on clay. Widely distributed, particularly common in eastern Guyana. Flowering mainly in May and June; fruiting almost throughout the year. The flowers are pollinated by bats. The seeds are dispersed by saki and capuchin monkeys and scatter-hoarding rodents, who eat the fruit pulp.

Notes: (1) Seedlings with short taproot. Cotyledons lifted by the stem. First leaves are opposite, broadly ovate, ca. 8 x 6 cm. Later leaves alternate, similar to mature leaves, but with ca. 1 cm long drip lip; (2) *H. oblongifolia* (Locust / Simiri) has 15-35 cm long inflorescences with more slender branches, and 1-2(-3)-seeded fruits which are only 4-5.5 cm long; (3) See *Peltogyne venosa* for differences in leaves; (4) The gum of the trunk is used for curing wounds and against diarrhoea, and as incense. The fruits are sold on the market



Hymenaea courbaril

a. habit (x 0.6); b. flower (x 0.6); c. leaves (x 0.6); d. complete fruit (l), and fruit with part of the wall and pulp removed (r) (x 0.6); e. trunk base; f. seedling, young (l) and older (r) (x 0.1).

Literature: Amshoff, G.J.H. 1939.

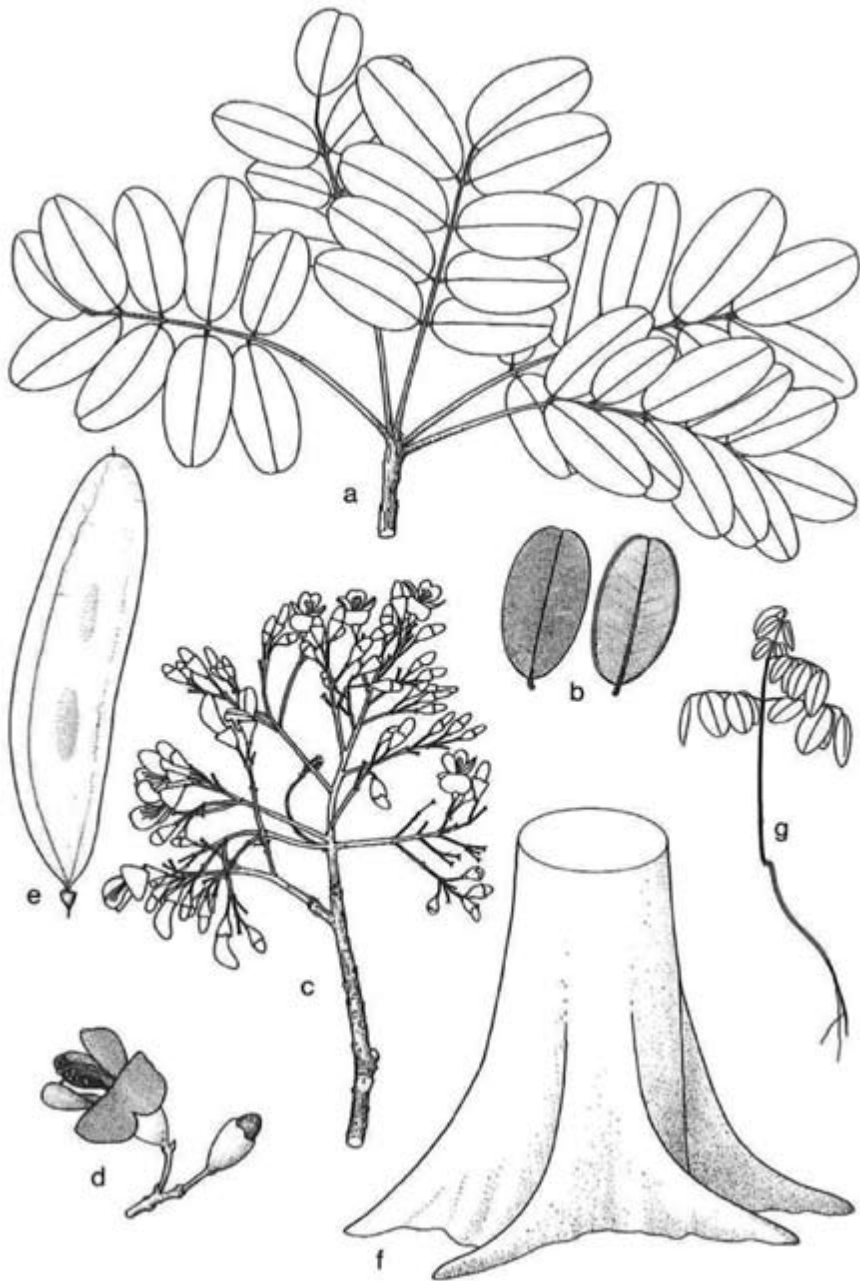
Vernacular names: Atoritan (W), Darina (Ar), Kaserena (M), Kororoballi (Ar), Kotik (Ak), Mabinanero (Ak).

Botanical description: Twigs densely covered with short, brownish, appressed hairs when young; stipules not observed. Leaves alternate, imparipinnate, (11-)15-17-foliolate; petiole 1.5-3 cm long; rachis 5-7 cm long, grooved above; petiolules 0.1-0.2 cm long; leaflets opposite; blades leathery, oblong-elliptic, 3-5(-7) x 1.5-2(-3) cm, glabrous above, densely covered with short, appressed brownish hairs below, margin recurved, apex obtuse, slightly emarginate, base obtuse; primary vein sunken above, slightly prominent below; secondary veins 9-12 pairs, plane or sunken above, slightly prominent below. Inflorescence a terminal panicle, 7-20 cm long, densely covered with brownish appressed hairs; peduncle to 2 cm long; pedicels 2-6 mm long. Flowers scented; calyx bell-shaped, 5-9 mm long, persistent, obscurely 5-dentate; petals 5, pink, standard ca. 15 mm long, reflexed; stamens 10, all connate over most of their length. Fruit a membranous pod, red or brown, indehiscent, to 15 x 3 x 0.05 cm, glabrous, reticulately veined, with strongly prominent longitudinal vein above and below the middle, stipe to 0.7 cm long; seeds 1-2, oblong-elliptic, ca. 2.5 x 1 cm.

Field characteristics: Tree 20-35(-50) m tall; trunk 0.3-0.65(-1) m in diam. Base buttressed. Buttresses 1.5-3(-4) x 1.5-2.5 x 0.1-0.2 m, usually branched, concave. Bark red-brown to dark grey-brown, roughly lenticellate, cracked, scaly to flaky. Lenticels round to elongate, 3-10 x 3-20 mm, up to 5 mm thick, most prominently present on young parts of the bark and on buttresses. Cracks vertical and horizontal, 2-15 x 1 mm, 2-5 mm resp. 5-10 mm apart. Scales / flakes irregular, usually more or less vertically oriented, 3-50 x 1-15 x 0.5-1.5 cm. Dead bark 1-3 mm thick, (grey-)brown. Living bark ca. 10 mm thick, pink-orange to orange-brown, with 2-3 red layers near sapwood, brittle; exudate colourless, sticky. Sapwood light brown; heartwood (dark) yellow-brown. Crown broad, flattened, with few, thick branches. Plate 17.

Ecology and distribution: Occasional in mixed and seasonal forest in near interior and Kanuku Mts. Deciduous; leafless when flowering and fruiting. The fruits are dispersed by the wind.

Notes: (1) Two first seedling leaves opposite and 5-7-foliolate, later leaves alternate. Leaves with small, linear stipules and stipels. Leaflets lack appressed brown pubescence on the lower side; (2) All vernacular names apply to *Hymenolobium* sp., either *H. flavum* or *H. petraeum*, as the identity of the species was not yet known to Fanshawe when he published his Checklist of the indigenous woody plants of British Guiana (1949).



Hymenolobium flavum

a. habit (x 0.6); b. leaflet upper side (l) and lower side (r) (x 0.6); c. inflorescence (x 0.6); d. flower (x 1.1); e. fruit (x 0.6); f. trunk base; g. seedling (*Hymenolobium* sp.) (x 0.3).

Literature: Kleinhoonte, A. 1940.

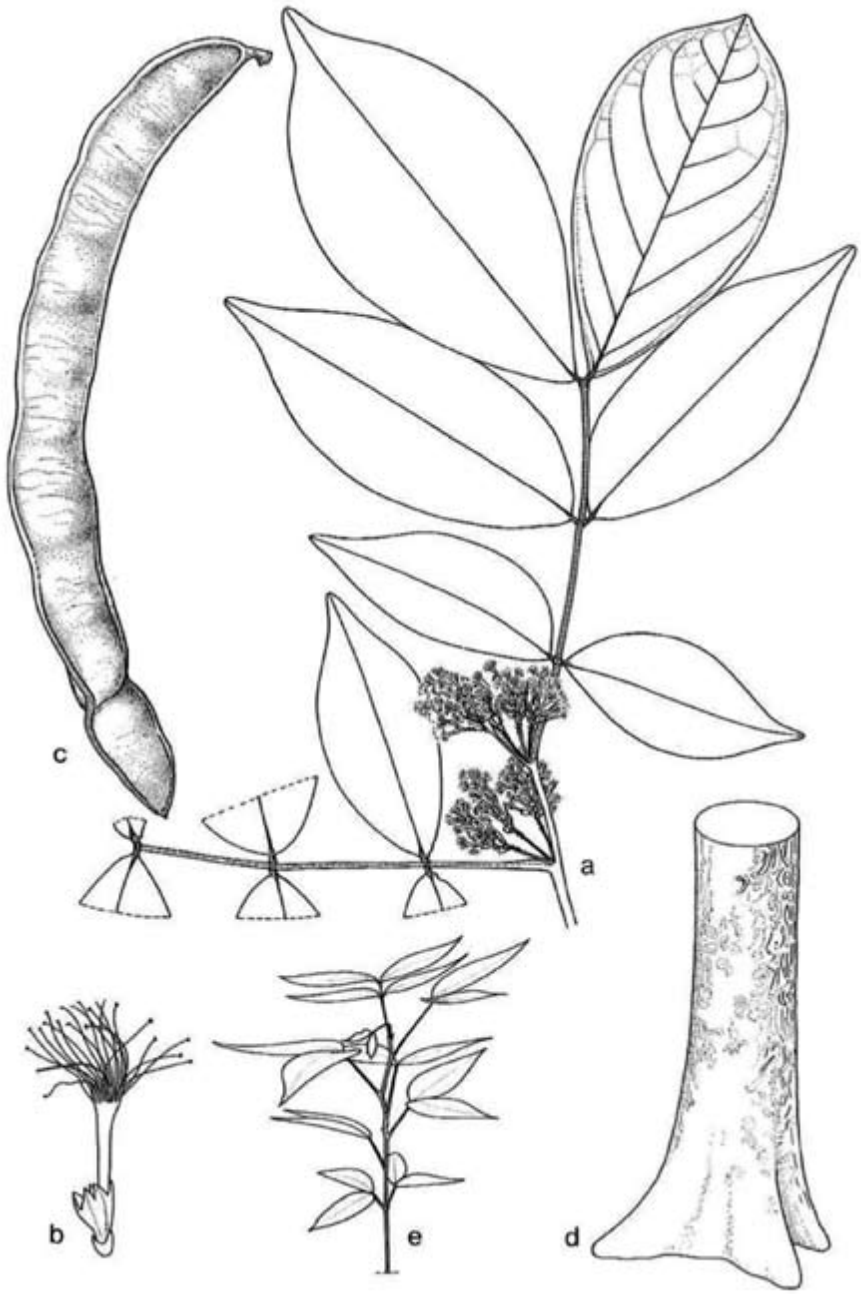
Vernacular names: Kurang (Ak), Kwari (Ak), Kwariye (M), Maporokon (Ar), Yokar (W).

Botanical description: Twigs angular, slender, white-lenticellate, puberulous when young. Leaves alternate, paripinnate, 14-16(-10)-foliolate; stipules triangular, ca. 2 mm long, caducous; petiole 2-4 cm long, slightly grooved above; rachis round, or winged in the upper part, above flat to slightly grooved, with flat interpetiolar glands, 1-2 mm in diam.; petiolules 0.1-0.2 cm long; leaflets opposite; blades papery, 6-13 x 3-7 cm, glabrous, margin plane, apex acute to acuminate, base acute to obtuse; primary vein prominent on both sides; secondary veins 5-9 pairs, weakly prominent above, slightly prominent below. Inflorescence an axillary panicle of spikes, ca. 5 cm long, covered with brown hairs; peduncles of spikes 0.5-1 cm long. Flowers white, sessile; calyx bell-shaped, 1-1.5 mm long, puberulous; corolla tubular, 3-4 mm long; stamens numerous, 15 mm long, united at base. Fruit a pod, green-brown, narrowly oblong-ellipsoid, flat, 0-20 x 1.5-2 x 0.8 cm, glabrous, swollen over seeds, constricted at irregular intervals, margin thickened, wall transversely veined, irregularly dehiscent; seeds 5-10, oblong-ellipsoid, 10-15 mm in diam.; aril loose, fleshy, sweet, edible.

Field characteristics: Tree 20-35 m tall; trunk (0.2-)0.35-0.75 m in diam. Base buttressed. Buttresses 1-1.5 x 0.4-0.7 x 0.1-0.2 m, straight, often branched near ends. Bark light red-brown to orange-brown, lenticellate, with mosaic pattern from fallen scales. Lenticels round to elongate. 1-3 x 1-2 mm, best visible on older bark. Pattern consisting of more or less concentric ridges, often irregularly deviating from strict circular pattern, similar to oyster shell. Dead bark 1 mm thick, orange-brown. Living bark 4-5 mm thick, pink-red to dark red-brown, with few thin, darker red layers; exudate colourless to red-brown, clear, sticky, scanty, sharp and bitter tasting. Sapwood light brown near living bark, more reddish towards centre; heartwood dark red-brown. Crown dense to open, branching erect to spreading. Plate 18.

Ecology and distribution: Frequent in mixed forest on brown sand, both in primary and secondary forest. Widely distributed. Flowering mainly from May to September; fruiting mainly from October to March.

Note: (1) Seedlings of Maporokon grow fast. When the seeds germinate, the cotyledons remain on the soil. First 2 leaves opposite, later leaves alternate. First 2-10 leaves 2-foliolate, with slightly winged petiole. Rachis with a red gland between the leaflets, which is wider than the rachis itself.



Inga alba

a. habit (x 0.6); b. flower (x 3); c. fruit (x 0.6); d. trunk base; e. seedling (x 0.3).

Literature: Smith, A.C. and Wodehouse, R.P. 1937.

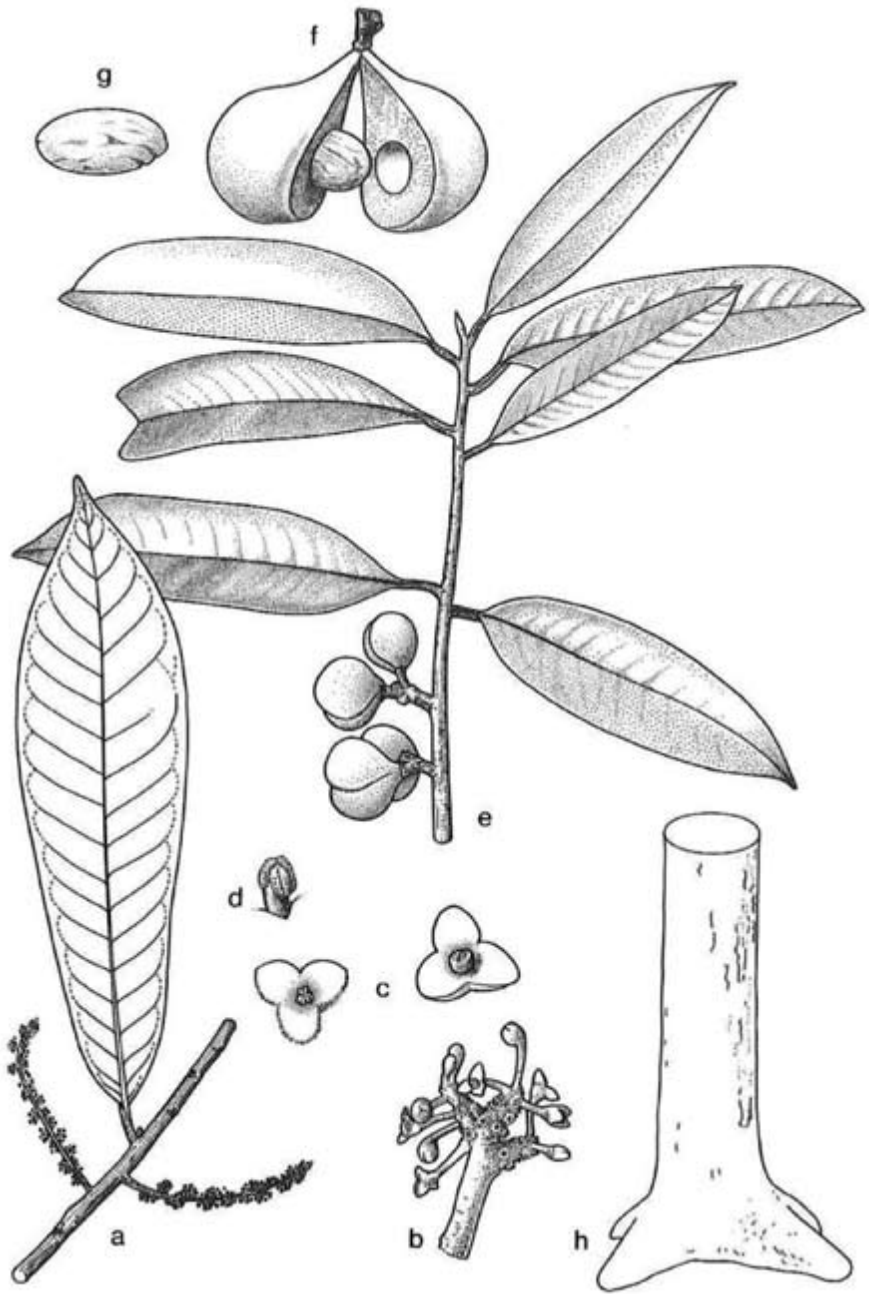
Vernacular names: Kirikaua (Ar), Marbuk (Ak), Swamp kirikaua (Cr), Weputana(C).

Botanical description: Twigs often stout, covered with rusty-brown hairs when young, striate. Leaves alternate, in 2 rows along the branches; petiole 1-2.3 cm long, black-brown, rugose, grooved above; blades (more or less) leathery, narrowly elliptic-oblong, 13-28(-32) x 3-9.5 cm, more or less glabrous on both sides, in bud densely covered with rusty brown, simple and forked hairs, shiny above, finely papillose on both sides, margin plane or slightly recurved, apex (long-)acuminate, base obtuse or sometimes acute; primary vein prominent on both sides; secondary veins 12-18 pairs, sunken or sometimes slightly prominent above, (slightly) prominent below. Trees with male (m) and female (f) inflorescences. Inflorescence an axillary raceme of fascicles, 1-3 together, branches covered with rusty brown hairs; peduncle often angular; pedicels 3-6 mm long; male inflorescence 3-20 cm long, fascicles 5-12-flowered, drooping or sometimes erect; peduncle 0.5-3.5 cm long; female inflorescence 1-3.5 cm long, 3-6-flowered, erect; peduncle 0.5-2 cm long. Flowers unisexual; perianth white (m) or pale green (f) inside, thin-fleshy, cupshaped, 1.5-1.8 mm (m) or 1.5-2.5 mm (f) long, to 3.5 mm long in young fruit, 3-lobed nearly to the base, lobes spreading at maturity; stamens 3, ca. 0.5 mm long, connate to a central column. Fruit a woody capsule, shiny green, transversely ellipsoid or more or less globose, 2.5-3.5(-5) x 2.7-4(-5) cm, glabrous, rugose, with sticky and staining sap, wall ca. 0.5 cm thick, dehiscent with 2 valves; seed 1, dark brown, transversely ellipsoid, 1.5(-2.5) x 2.5(-3) cm, irregularly grooved, with apical pit, aril pink to red, fleshy, with slits (best visible near ends of seed).

Field characteristics: Tree (10-)20-27 m tall; trunk (0.2-)0.35-0.6 m in diam. Base often swollen, in young trees often stilt-rooted. Bark red-brown to dark orange-brown or grey-brown with orange patches, lenticellate, smooth, or cracked to fissured and flaky on older trees. Lenticels round. 3-5 mm in diam., scattered. Cracks / fissures vertical, 1-20 x 0.1-0.5 x 0.1-0.5 cm. Flakes vertical, 2-15 x 1-5 cm. Dead bark 1-4 mm thick, dark brown to orange-brown, sometimes outer 1 mm grey. Living bark 1-5 mm thick, pink to red-brown to orange-brown, fibrous; exudate red, somewhat cloudy, watery, somewhat sticky, usually rapidly flowing in large quantity over entire surface. Sapwood light brown, with small droplets of red exudate; heartwood orange-brown to dark brown. Crown small, rounded, moderately dense; branches horizontal, whorled. Plate 18.

Ecology and distribution: Abundant in palm marsh forest, occasional to frequent in other types of marsh and swamp forest. Widely distributed. Evergreen; flowering mainly from August to November; fruiting mainly from March to May. The seeds are dispersed by monkeys and large birds (e.g. toucans), who digest the fleshy aril and either regurgitate or defecate the seed.

Note: (1) Although it is mentioned in Mennega et al. (1968), *Iryanthera macrophylla* is occurring abundantly in Guyana in the N.W.-district, it seems doubtful if this species occurs in Guyana at all (W.A.Rodrigues, pers. comm.). Its flowers have short lobes, ca. 1/3 of the perianth length, and its hulls are smaller, ca. 1-2.5 cm in diam.



Iryanthera lancifolia

a. habit, with male inflorescences (x 0.3); b. female inflorescences (x 1.1); c. male flower (l) and female flower (r) (x 3); d. staminal column (x 15); e. habit, fruiting (x 0.3); f. dehiscent fruit (x 0.6); g. seed, with aril (x 0.6); h. trunk base.

Literature: Gentry, A.H. 1992; Morawetz, W. 1982.

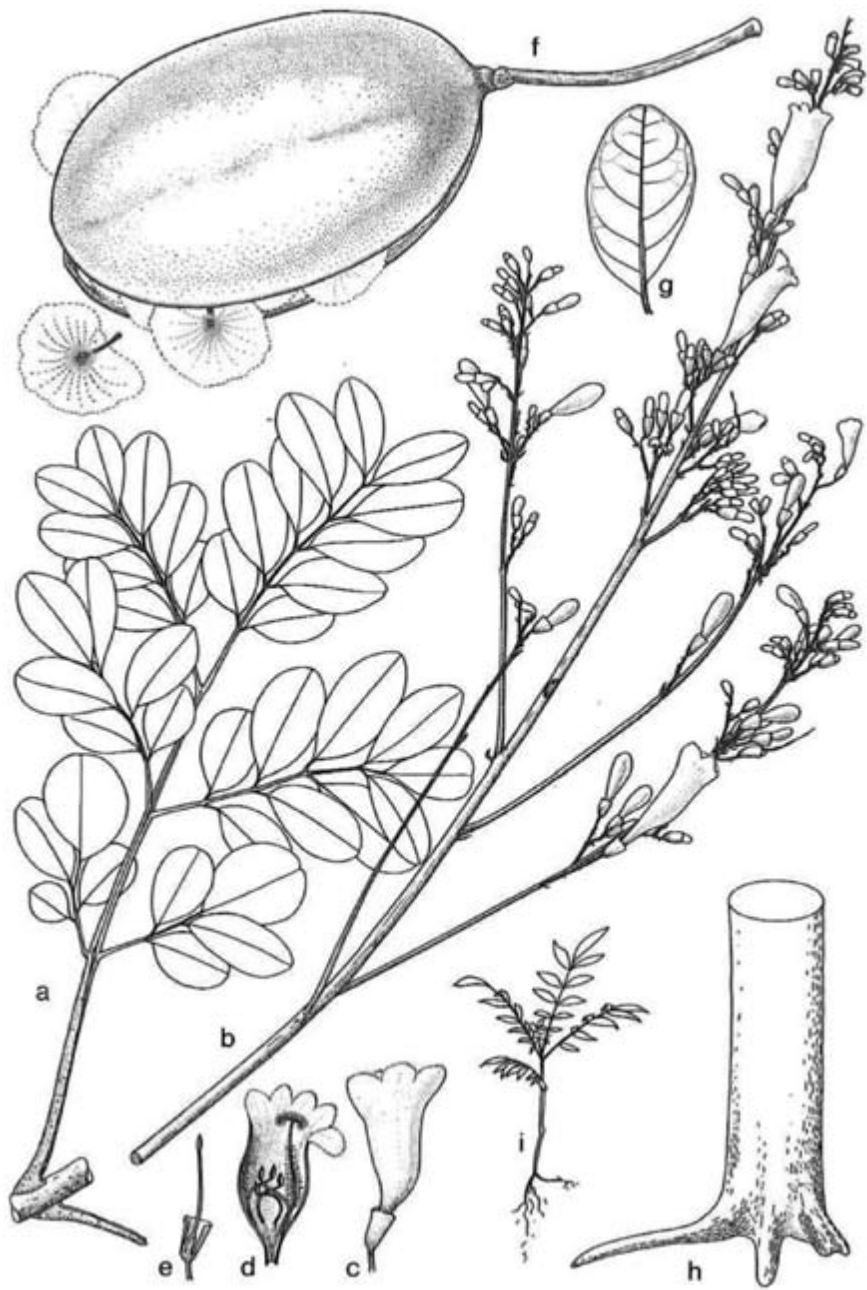
Vernacular names: Aku (Ak), Futui (Ar), Kopaia (C), Pasa (Ak), Phootee (Cr).

Botanical description: Twigs sparsely minutely puberulous when young. Leaves opposite, bipinnate, with 3-5 pairs of (3-)4-24-foliolate pinnae, to 50 cm long; petiole 9-11 cm long, angular, swollen at base; rachis with 2 narrow wings on upper side; petiolules 0.3-0.5 cm long; leaflets opposite; blades papery to leathery, elliptic to obovate, 2-7(-10) x 1.5-3.5 cm, almost glabrous, shiny above, margin flat, apex obtuse, acute, acuminate or slightly emarginate, base unequal, acute; primary vein sunken above, prominent below; secondary veins 5-7 pairs, sunken above, prominent below. Inflorescence a terminal panicle, densely to sparsely covered with scurfy hairs, 30-40 cm long; pedicels 2-3 mm long. Calyx dark purple, cup-shaped, 5-6 mm long; corolla blue-purple, inside white, tubular, 25-45 mm long, densely covered with branched hairs outside; stamens 4, staminode 1, 2-4 cm long, with long glandular hairs, apically bifurcate. Fruit a woody capsule, dark brown, elliptic, 13-17 x 8-10 x 1-3 cm, glabrous, smooth, splitting into 2 valves at maturity, slipe 5 mm long; seeds numerous, brown, papery, 2.5-3 x 4-4.5 cm, winged, wing hyaline, forming major part of seed.

Field characteristics: Tree 20-30(-43) m tall; trunk 0.3-0.8(-1) m in diam., sometimes angular. Base swollen, sometimes with root spurs. Root spurs 0.15-0.7 x 0.15-0.7 x 0.05-0.2 m, continuing in superficial roots. Bark light (grey-)brown, soft, cracked to fissured, becoming scaly to flaky with age. Cracks / fissures vertical, 1-10 x 0.1-1 x 0.1-0.5 cm, more coarse (to 40 x 1.5 cm) on root spurs. Scales / flakes 1-50 x 0.5-3 x 0.1-0.2 cm. Dead bark (1-)3-10 mm thick, outer 2 mm grey-brown, inner part light brown to brown. Living bark 3-10 mm thick, brown to orange-brown, darkening after exposure, layered, with darker brown, brittle fibres, which make a cracking sound when slashed, granular, sweet-scented. Sapwood and heartwood light (yellow-)brown. Crown rounded, flat-topped, light, with many small sub-crowns; branches erect, regularly forked. Plate 19.

Ecology and distribution: Occurring in primary and secondary mixed forest, sometimes in seasonal forest, on brown sand and on laterite. Sometimes in (secondary) Wallaba forest. Frequent and widely distributed. Flowering mainly from August to December, with a minor peak from March to May; fruiting mainly from March to May. The seeds are dispersed by Wind.

Note: (1) Seedlings have opposite, imparipinnate leaves with a narrowly winged rachis, leaflets are opposite, sessile, and are larger towards the leaf apex. The blade margin often bears several teeth at the adaxial side. Young treelets of \pm 3-7 m high can often be seen in secondary vegetation along forest roads. They can easily be recognized by their opposite, large, bipinnate leaves. Usually they are unbranched and the leaves are clustered in the upper part of the plant.



Jacaranda copaia

a. leaf (x 0.35); b. inflorescence (x 0.6); c. flower (x 0.7); d. corolla, opened to show stamens and staminode (x 0.7); e. calyx, opened to show pistil (x 0.7); f. dehiscent fruit (x 0.6); g. leaflet (x 0.6); h. trunk base; i. seedling (x 0.3).

Literature: Sleumer, H.O. 1980.

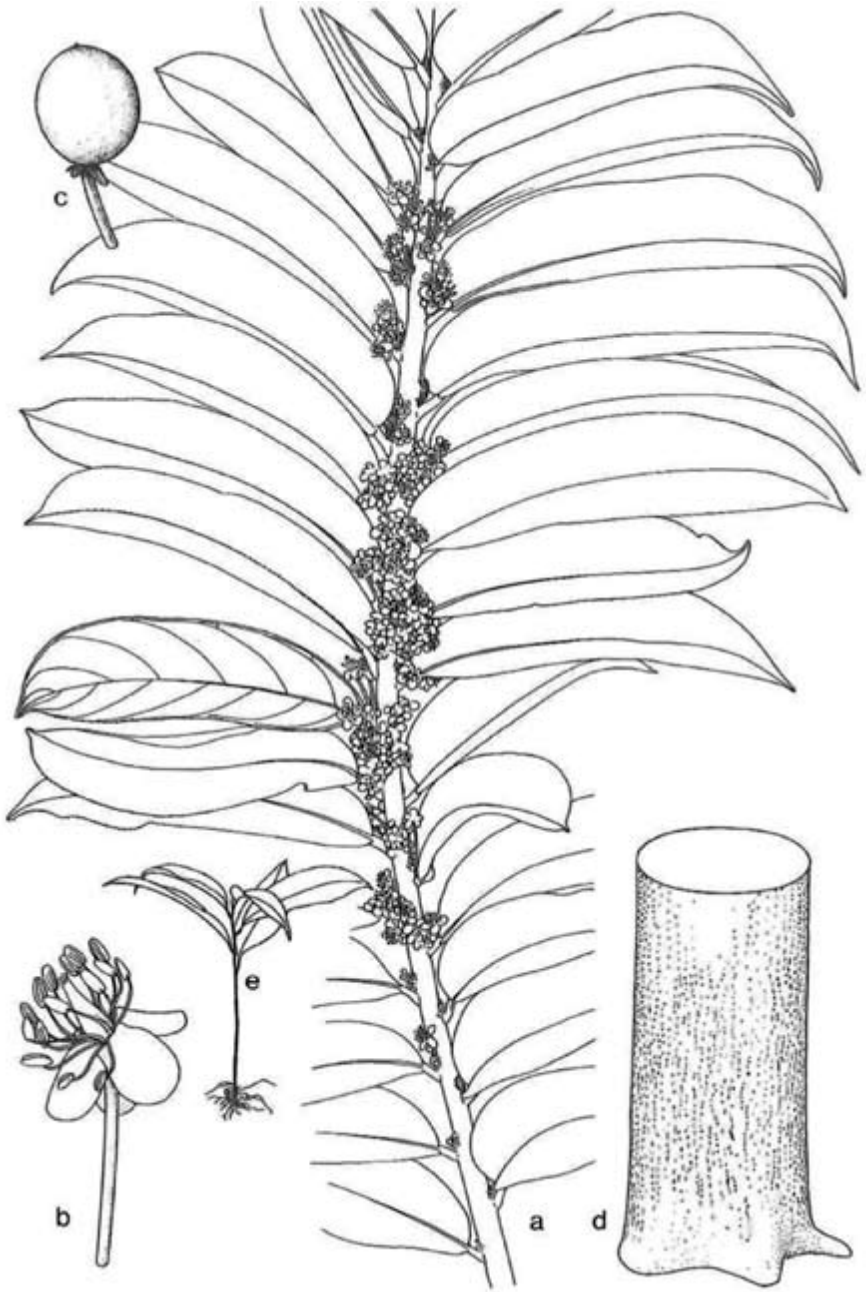
Vernacular names: Bastard kabukalli (Cr), Murewa (C), Warakai(o)ro (Ar), Watuwai (Ak).

Botanical description: Twigs round or somewhat angular, glabrous, lenticellate, in younger parts with decurrent ribs from petiole base. Leaves alternate, in 2 rows; stipules triangular, less than 0.5 cm long, caducous; petiole 0.5-1(-1.5) cm long, more or less grooved above; blades stiff-panery to somewhat leathery, elliptic-oblong to narrowly so, (8-)10-21 x 3-6 cm, glabrous, with pellucid dots and lines, margin serrulate or subcrenulate, glandular, apex acuminate, base unequal, rounded to nearly heart-shaped; primary vein with 2 grooflets alongside above, prominent below; secondary veins 9-10(-14) pairs, plane to slightly prominent above, prominent below; tertiary veins prominent on both sides. Inflorescence a sessile, 15-30-flowered fascicle, originating just above the leafaxils; pedicels 6-12(-15) mm long, slender. Flowers green, white to pink, fragrant; sepals 5, (5-)6-7 mm long, reflexed, often persistent in young fruit; petals lacking; stamens (12-)15-20. Fruit a leathery capsule, green-yellow turning maroon, globose-ellipsoid, (1-)1.5-2.5 x 1-2 cm, glabrous, dehiscent into 3 valves; seeds (3-)20(-60), brown-black, broadly obovoid, 2.5-4 x 2-2.5 mm, pitted, aril fleshy, milky, white, forming a sweet-tasting pulp around the seeds.

Field characteristics: Tree 20-30(-40) m tall; trunk 0.25-0.8 m in diam. Base swollen or with root spurs, to ca. 0.4 x 0.4 m. Bark dark grey to yellow-brown, lenticellate. Lenticels round, 3-5 mm in diam., often black-brown, scored in vertical rows which are 1-3 cm apart. Dead bark 1-2.5 mm thick, light brown, papery. Living bark 5-30 mm thick, yellow to orange-brown, mottled with light brown, turning darker on exposure, with white layer next to sapwood, granular. Sapwood and heartwood yellow-white, turning light brown. Crown pyramidal, branches spreading, leaves conspicuously arranged in 2 rows. Plate 19.

Ecology and distribution: Occasional to locally frequent in primary and secondary mixed forest, on sandy soil. Widely distributed. Evergreen; flowering mainly in June and from September to November; fruiting mainly from October to March. The fruits are eaten by many tree-inhabiting animals, e.g. spider monkeys and birds. During a study in French Guiana, 21 species of birds were observed eating from the fruits of *Laetia procera* (Sabatier. 1983). Warakairo needs light for early development, but can survive in mature forest, like for example Kabukalli (*Goupia glabra*) and Tauroniro (*Humiria balsamifera* var. *balsamifera*), species with which it is often found in secondary forest along roads and in forest gaps.

Notes: (1). Seedlings and young treelets with somewhat fleshy leaves, with many pellucid lines and dots. Margin more conspicuously serrate than in mature leaves; (2) Bafadan (*Ocotea tomentella*) has similar rows of coarse lenticels. It differs by the unmottled slash and the characteristic, aromatic Lauraceae scent of the slash. Furthermore, the leaves of the 2 species are easy to recognize in the litter and very different. Warakairo leaves have pellucid lines and a more or less plane, serrate to subcrenulate margin, whereas Baradan leaves lack pellucid lines and have an entire margin which is revolute at the base.



Laetia procera

a. habit (x 0.6); b. flower (x 3.5); c. fruit (x 0.6); d. trunk base; e. seedling (x 0.2)

Synonym: *Eschweilera confertiflora* A.C. Smith

Literature: Mori, S.A. and Prance, G.T. 1992.

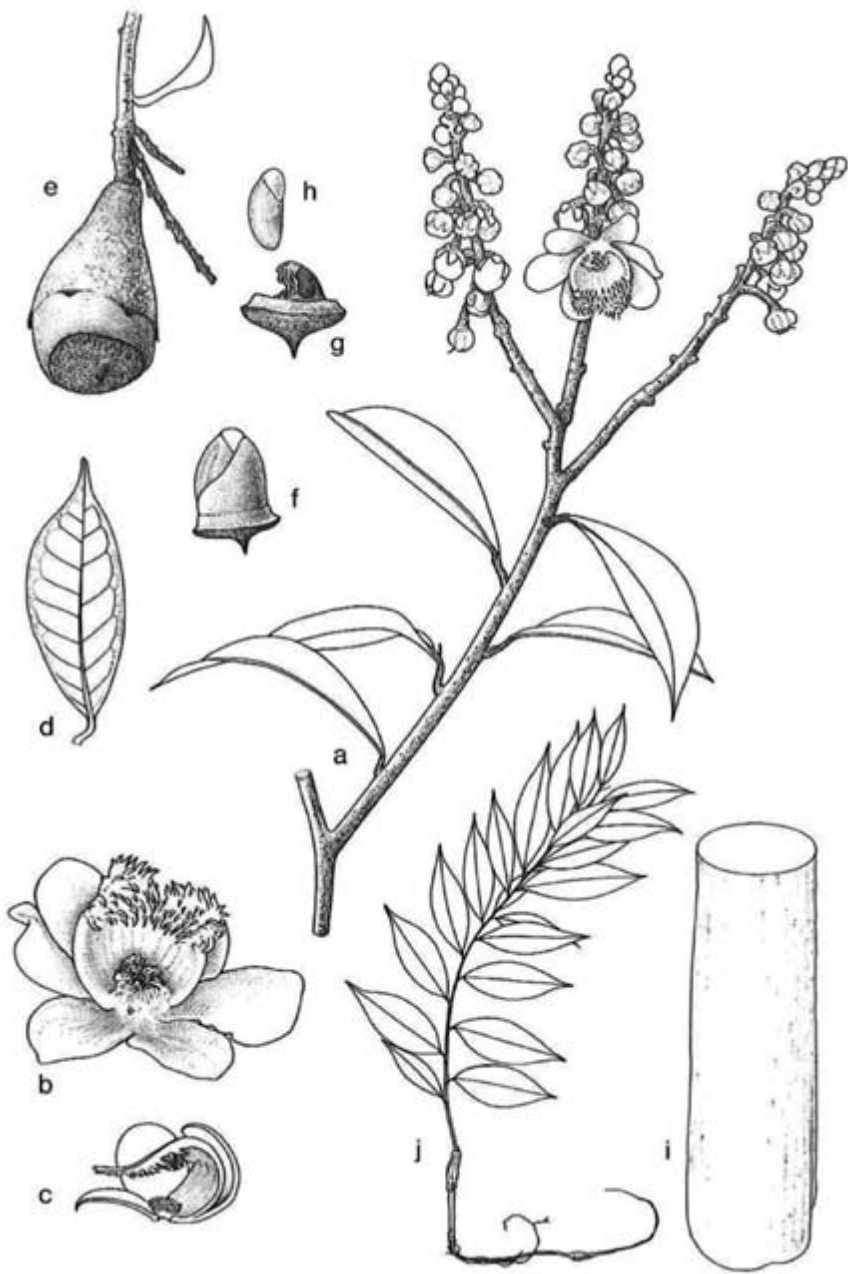
Vernacular name: Wirimiri (Ar).

Botanical description: Twigs, densely brownish puberulous when young. Leaves alternate; petiole 0.6-1.2 cm long, grooved above; blades papery, elliptic, 6-10(-13.5) x 2.5-6 cm, glabrous, margin slightly recurved, apex acuminate, base acute; primary vein prominent on both sides; secondary veins 8-14 pairs, prominent on both sides; tertiary veins distinctly reticulate, particularly well-visible at the lower side. Inflorescence a terminal or axillary (panicle of) racemes, rachis densely brownish puberulous, primary rachis 3-17 cm long; pedicels 5-15 mm long, with a joint at 1-5 mm from the base. Flowers zygomorphic, 20-25 mm in diam., sweet-scented; calyx lobes 6, 4-8 mm long, persistent; petals 6, pink to dark purple, rarely white, 14-19 mm long; staminal hood with single coil; stamens of staminal ring 110-175, 4.5-5.5 mm long, somewhat smaller in centre, question markshaped; ovary 4-locular. Fruit a woody pyxidium, narrowly conical, 4-5 x 2.5-3.5 cm, glabrous, smooth; seeds 20-25 x 10 mm, aril basal, fleshy, white, ca. 10 mm long.

Field characteristics: Tree (15-)20-35 m tall; trunk 0.4-0.7 m in diam. Base straight or swollen. Bark grey-brown to light brown, sometimes with a reddish tinge, lenticellate, cracked. Lenticels inconspicuous, round to elongate, 1-5 x 1-2 mm, horizontally oriented. Cracks vertical, 2-40 x 0.1-0.5 x 0.1-0.3 cm. Dead bark 2-3 mm thick, grey-brown. Living bark 5-20 mm thick, orange-brown, faintly streaked vertically with light brown, fibrous, with scent of linseed oil; exudate red-brown, clear, very scanty. Sapwood light brown to yellow-brown, sometimes with few black streaks; heartwood dark red-brown. Crown moderately dense, branching erect. Plate 20.

Ecology and distribution: Occasional to frequent in mixed forest on brown sand and on laterite. Mostly in further interior. Flowering mainly in October and November; fruiting data too scarce for pattern indication. The pollination of the flowers takes place by *Euglossa* bees (Mori et al., 1987). The seeds are probably animal-dispersed (see *L. corrugata*).

Note: (1) Seedlings with coarse taproot, with thickening on transition to stem (seed scar). Usually with some scale-like leaves between normal leaves, particularly in upper part at the stem. Stem often bent over to one side. The arrangement of the leaves along the stem in *L. confertiflora*, as well as in *L. corrugata* and *L. zabucajo*, is more dense than in the seedlings of *Eschweilera decolorans* and *E. sagoliana*. Furthermore the *Lecythis* seedlings have very narrow wings running down from the petiole bases, which are not present in *Eschweilera decolorans* and *E. sagoliana*.



Lecythis confertiflora

a. habit (x 0.6); b. flower, with lifted staminal hood (x 1.2); c. corolla and stamens, longitudinal section (x 1.2); d. leaf (x 0.6); e. fruit (x 0.6); f. fruit lid, with column enclosing seed (x 0.6); g. fruit lid (x 0.6); h. seed, with aril (x 0.6); i. trunk base; j. seedling (x 0.2).

Synonym: *Eschweilera corrugata* (Poit.) Miers

Literature: Mori, S.A. and Prance, G.T. 1992.

Vernacular name: Wina (Ar.)

Botanical description: Twigs minutely white-puberulous when young. Leaves alternate; petiole 1-2.5 cm long, grooved above; blades papery to leathery, elliptic, sometimes obovate, 8-25 x 4-10 cm, glabrous, except for scattered hairs on primary vein below, margin slightly revolute, apex acute to obtuse, base acute to obtuse; primary vein slightly prominent to almost plane in lower half above, strongly prominent below; secondary veins 10-23 pairs, slightly prominent to plane above, slightly prominent below; tertiary veins distinctly reticulate on both sides. Inflorescence a terminal or axillary raceme or panicle of racemes, ca. 10 cm long, branches densely pale brownish-puberulous; pedicels 2-8(-10) mm long, rugose, with a joint at about the middle. Flowers zygomorphic. 25-30 mm in diam., somewhat sweet-scented; calyx lobes 6, 2-6 mm long, persistent; petals 6, pink to purple, broadly ovate, 10-19 mm long; staminal hood with simple coil; stamens of staminal ring 150-190, 1.5-2.5 mm long. Fruit a woody pyxidium, green, sometimes tinged reddish, (broadly) conical, to globose, (2.5-3.5-5(-7) x 2.5-4.5(-6) cm, with horizontally oriented ridges, lid with a 1-3 mm long, dull spine; seeds 1-3, dark brown, shiny, 20-32 x 15-18 mm, glabrous, longitudinally ribbed, aril basal, fleshy, white, ca. 10 mm long.

Field characteristics: Tree (15-)20-35 m tall; trunk (0.15-)0.25-0.9 m in diam. Base fairly straight or swollen. Bark light brown to grey-brown, lenticellate, cracked to fissured, sometimes scaly on older trees. Lenticels round, 2-5 mm in diam., in vertical lines. Cracks vertical, 5-20 x 0.1-0.5 cm, 1-3 cm apart. Dead bark 0.5-2 mm thick, dark brown. Living bark 3-5 mm thick, pink-brown to orange-brown, layered, soft, fibrous, with scent of linseed oil. Sapwood light brown, sometimes with black layers; heartwood dark brown. Crown oval or rounded, dense, branching spreading. Plate 20.

Ecology and distribution: Found in Wallaba forest, sometimes in marsh forest. Frequent to occasional in near interior, southeastern Guyana, and Rupununi district. Flowering mainly from November to February, with a smaller peak from May to July; fruiting mainly from February to May, with a smaller peak in August and September. The seeds are dispersed by scatter-hoarding rodents and monkeys, who eat the aril of the seed. No data on pollination are available, but it is to be expected that the same group of *Euglossine* bees as in *L. confertiflora* is involved.

Note: (1) Seedlings are similar to those of *L. confertiflora*. The taproot may reach a length of up to 1.25 m.



Lecythis corrugata

a. habit (x 0.6); b. flower, top view (x 0.6); c. corolla and stamens, longitudinal section (x 0.6); d. fruit (x 0.6); e. seed, with aril (x 0.6); f. trunk base; g. seedling (x 0.4).

Synonym: *Lecythis davisii* Sandw.

Literature: Mori, S.A. and Prance, G.T. 1992.

Vernacular names: Kume (Ak), Monkey pot (Cr), Wadaduri (Ar).

Botanical description: Twigs markedly lenticellate, puberulous when young, strongly branched. Leaves alternate; petiole 0.3-1 cm long, grooved above; blades papery, narrowly elliptic to elliptic, (5-)6-11.5 x 2.5-5 cm, glabrous, margin crenate, apex shortly acuminate, base obtuse; primary vein prominent on both sides; secondary veins 10-16 pairs, slightly prominent on both sides; tertiary veins distinctly reticulate on both sides. Inflorescence an axillary 5-30-flowered raceme, sometimes several together, rachis 4-10.5 cm long; pedicels 3-5(-8) mm long. Flowers zygomorphic, 40-50 mm in diam.; calyx lobes 6, 5-10 mm long, persistent; petals 6, yellow, sometimes white, often with purple margin, 15-25 mm long; staminal hood flat; stamens of staminal ring 370-510, 1.5-2 mm long; ovary 4-locular. Fruit a woody pyxidium, globose to turbinate, 6-16.5 x 7.5-17.5(-20) cm, glabrous, calyx remnants at ca. 1/3 from the top; seeds few, fusiform, trigonous. 2-4 x 1-1.5 mm, grooved, aril basally attached, sweet-tasting, edible.

Field characteristics: Tree 35-55 m tall; trunk 0.7-0.9(1.5) m in diam., tapering, scalloped in lower part. Base buttressed or swollen. Buttresses stout, 2 x 1.2 x 0.4-0.6 m. straight with concave base. Bark (light) brown to grey-brown, lenticellate, fissured. Lenticels coarse. Fissures vertical, (5-)10-40 x 0.5-2 x 0.5-1.5 cm, more shallow higher on bole. Dead bark 10-15 mm thick, dark (orange-)brown, layered, with fine, black lines. Living bark 2-4 mm thick, cream to yellow, outer border with fine, dark-brown lines, soft, fibrous, with sweetish, somewhat tobacco-like scent. Sapwood cream to yellow-white; heartwood red-brown. Crown flat to rounded, moderately dense, branches erect to spreading. Plate 21.

Ecology and distribution: Occasional to frequent in mixed, seasonal, and Mora forest. Occurring in near interior, Pakaraima Mts., and southeastern Guyana. Deciduous, producing flowers and new leaves at the same time; flowering mainly from August to November; fruiting mainly in March and April. The seeds are probably dispersed by bats, who eat the aril of the seeds. The seeds are eaten by monkeys, e.g. spider monkeys, who contribute little to the dispersal of the seeds because of their destructive consumption (Mori et al., 1987).

Note: (1) Seedlings with a taproot, which is thickened on transition to the stem (seed scar), leaves arranged in 2 rows, (relatively) much more narrow than mature leaves, petioles only ca. 0.1 cm long. Leaf margin more clearly serrate than in mature leaves.



Lecythis zabucajo

a. habit (x 0.6); b. flower (x 0.6); c. fruit (x 2.5); d. lid (x 2.5); e. seed, with aril (x 2.5); f. trunk base; g. seedling (x 0.2); h. seedling leaf (x 0.6).

Synonym: *Licania venosa* Rusby

Literature: Prance, G.T. 1986.

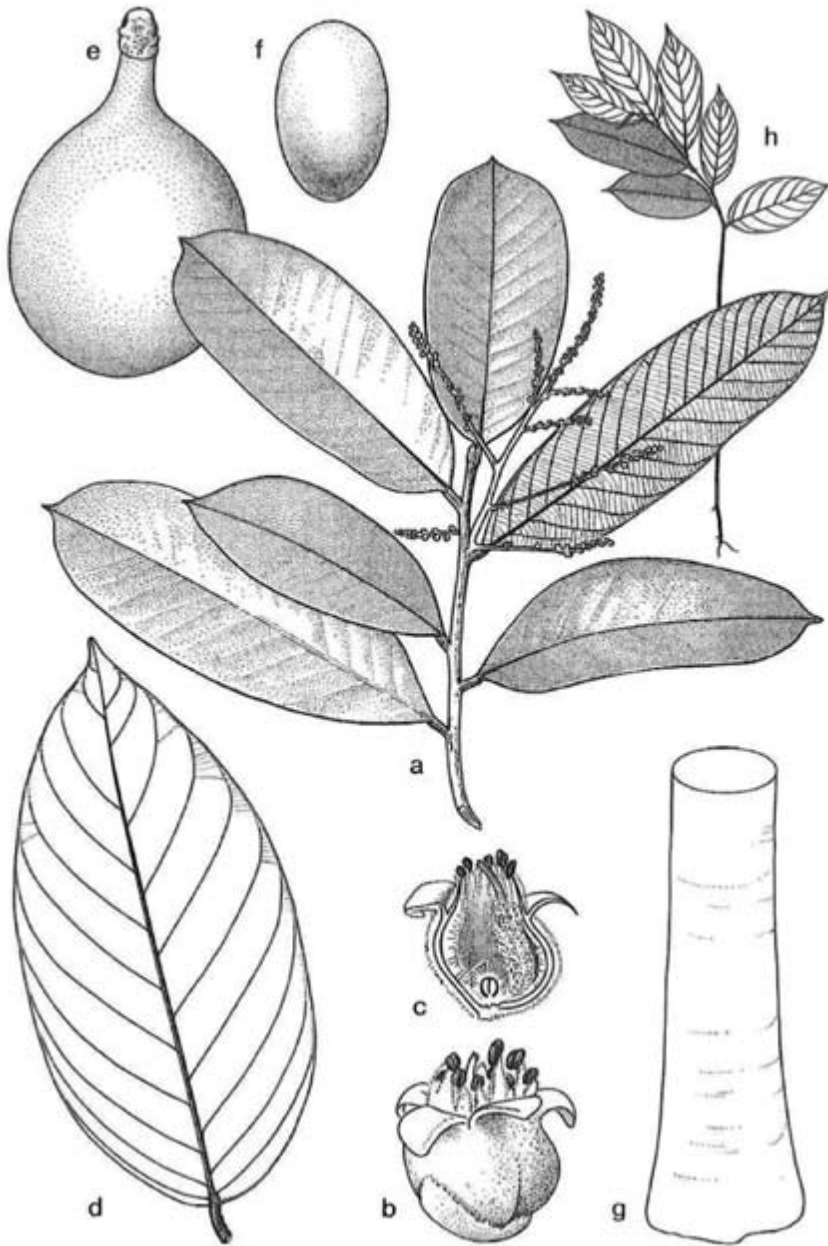
Vernacular names: Countaballi (Cr), Counter (Cr), Kauada (M), Kaudanaro (Ar), Kautaballi (Ar), Maiuarai (Ak), Toker (W).

Botanical description: Twigs greyish brown-puberulous when young. Leaves alternate; stipules axillary, elliptic to (narrowly) triangular, 0.5-1 cm long, often with some teeth near base, caducous; petiole 0.9-1.7 cm long, grooved above, near the middle lateral, with round glands of 0.5-1 mm in diam.; blades leathery, elliptic to narrowly so, 9-27 x 4-10 cm, glabrous and dull above, densely covered with greyish white woolly hairs below, margin plane, apex acuminate, base obtuse; primary vein sunken above, prominent below; secondary veins 8-12 pairs, sunken above, prominent below; tertiary veins parallel. Inflorescence a terminal or axillary panicle, 13-20 x 5-10 cm, brown-puberulous; peduncle 0.5-1.5 cm long. Flowers sessile; hypanthium 2-3 mm long; sepals triangular, 1-1.5 mm long; petals lacking; stamens 6-8. Fruit a woody drupe, pear-shaped, 4-9 x 2-5 cm, densely rusty-brown puberulous to velutinous, inner layer of wall very hard, stipe 8-15 mm long; seed 1, to 70 x 40 mm.

Field characteristics: Tree (10-)15-35 m tall; trunk 0.2-0.45 m in diam. Base somewhat swollen. Bark red-brown, sometimes with horizontal rings, lenticellate. Lenticels round to linear, 2-5 x 2-3 mm, horizontally or vertically oriented, sometimes several scored in a row. Dead bark 0.5-1 mm thick, red-brown, hard. Living bark 3-15 mm thick, (dark) red-brown, hard, granular, somewhat brittle-fibrous, slightly sweet-scented. Sapwood light brown to yellow-brown; heartwood red-brown. Crown small, rounded, dense. Plate 21.

Ecology and distribution: Common to frequent in mixed forest, on brown sand, loam and laterite. Widely distributed, and regarded as one of the characteristic species of the mixed forest type. Flowering and fruiting all year round, with a peak in flowering from September to November, and in fruiting from March to May. The seeds are dispersed by scatter-hoarding rodents.

Notes: (1) Seedling leaves similar to mature leaves, usually with a long-acuminate tip (to 2 cm long); (2) A decoction of the inner bark is used for treating bites of the Morabana snake. The powdered outer bark is used to treat ulcers and sores; (3) In *L. laxiflora* (Kauta) the petiole is 0.2-0.7 cm long (vs. 0.9-1.7 cm). *L. majuscula* (Kautaballi) is more difficult to distinguish from *L. alba* by the leaves. The lower side of its leaves is more brown-woolly (vs. white-woolly). With fruits the two species are more easily separated, as the slipe of the fruit of *L. majuscula* is to 5 mm long (vs. 8-1.5mm long in *L. alba*); (6) There are many species of *Licania* (and other Chrysabalanaceae) occurring in Guyana. From the genus *Licania* 43 species have been collected in Guyana, 15 of which are known from the Mabura Hill area, the research site of the Tropenbos programme. In general they possess a hard, granular or short-fibrous living bark, sometimes with scanty, red exudate. The living bark can vary in colour from light orange-brown to dark purple-brown, and is usually sweet-scented, although in some species it has a pungent, fish-like scent. The leaves are often grey-brown below, which is often already visible when looking at the leaves in the canopy. The fruits are often found in the litter on the soil. They are usually round of pear-shaped, brown hairy, and 1-seeded.



Licania alba

a. habit (x 0.35); b. flower (x 8.5) ; c. flower, longitudinal section (x 8.5); d. leaf, lower side (x 0.3); e. fruit (x 0.6); f. seed (x 0.6); g. trunk base; h. seedling (x 0.1).

42. *Licaria cannella* (Meisner) Kosterm.

Brown silverballi

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

Literature: Kostermans, A.J .G.H. 1936; Kurz. H. 1982.

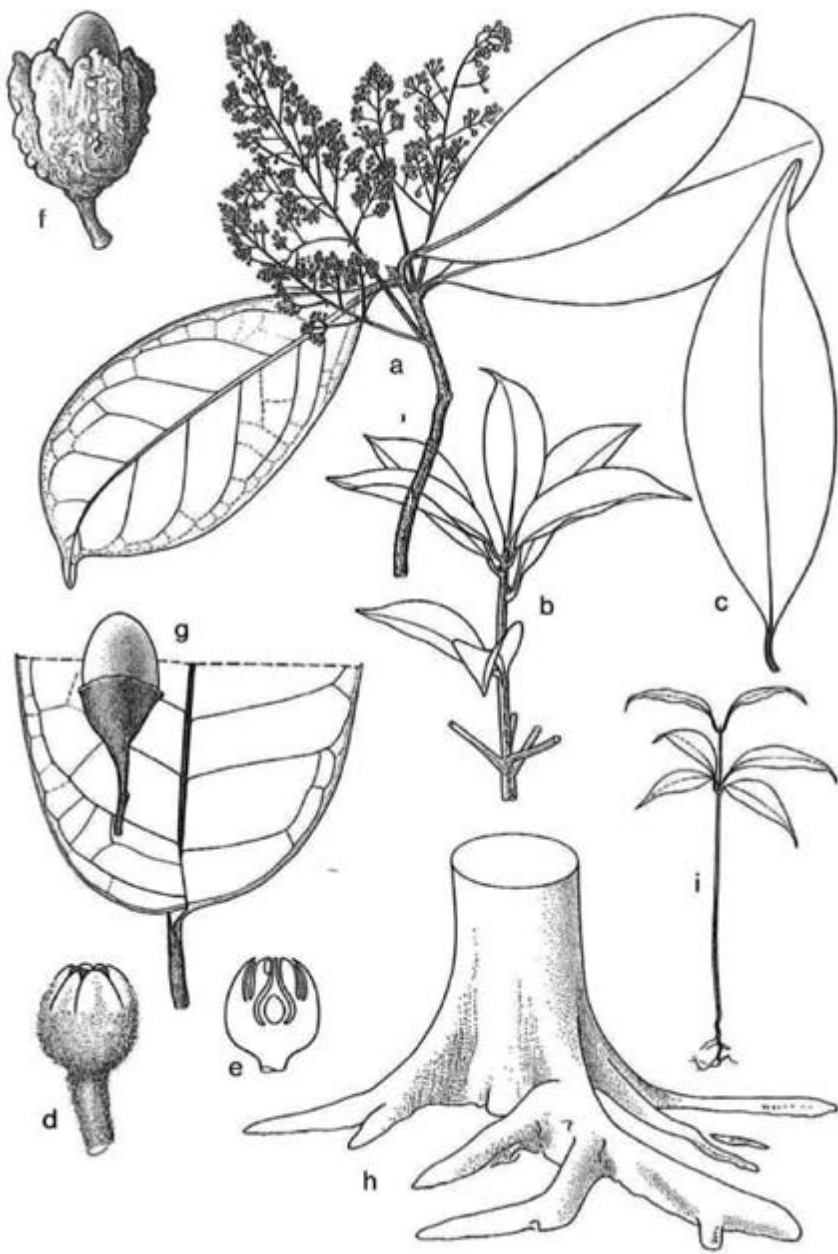
Vernacular names: Brown silverballi (Cr), Itik (Ak), Kamarai (Ak), Kharemero shiruaballi (Ar), Tiniari (C), Wabaima (Ar).

Botanical description: Twigs round, glabrous. Leaves alternate or sometimes (nearly) opposite, clustered at twig ends; petiole 0.5-3.5 cm long, flattened above; blades leathery, elliptic to narrowly oblong-elliptic, (5-)8-12(-28) x (2-)3-5(-9) cm, glabrous and shiny on both sides, brown-green below, margin thickened, apex acuminate or rounded, base acute to obtuse; primary vein slightly prominent above, prominent below; secondary veins 6-12 pairs, slightly prominent above, prominent below. Inflorescence in the axils of the upper leaves, to 11 cm long, densely covered with rusty hairs when young; peduncle 0.1-5 cm long, pedicels 0.5-3 mm long. Flowers greenish, creamy-white to yellow-white, 1-3 mm long, covered with rusty hairs; floral tube cup-shaped, 1.5 mm long; tepals 6, fleshy, curved inwards, 1mm long; stamens 9, ca. 1 mm long, in 3 rows, the 2 outer rows sterile and tepal-like. Fruit a berry, green to yellow, maturing purple, ellipsoid, 2-5(-7) x 1-3(-4) cm, glabrous, with cup-like structure at the base; cupule 1.5-4 cm high, 1.5-5 cm in diam., thickened, nearly smooth or densely warty, with a double margin, lobes of the outer margin 0.5-1 cm long; seed 1, shiny, dark brown.

Field characteristics: Tree (15-)20-35 m tall; trunk (0.2-)0.35-0.75 m in diam. Base buttressed. Buttresses (0.35-)0.6-2(-3) x 0.3-1.5(-2) x 0.1-0.3 m, sometimes running over soil for 2-4 m, concave, often with secondary branches. Bark light brown to grey-brown to dark brown, sometimes ringed, sometimes pock-marked, lenticellate, cracked to fissured, sometimes scaly to flaky. Lenticels round to elongated, 2-30 x 2-7 mm, scattered or in irregular vertical rows. Cracks horizontal and vertical, 0.5-5 x 0.1-0.3 cm. Scales / flakes 1-30 x 1-8 x 0.2-0.5 cm. Dead bark 1-3(-10) mm thick, creamy brown to grey-brown to black-brown. Living bark 10-30 mm thick, light orange-brown, with orange to rusty-brown fibres, but very rapidly turning darker at exposure, with strong aromatic scent reminding of spices and dried fish. Sapwood light brown to yellow-brown, turning darker at exposure; heartwood yellow-brown to dark brown. Plate 22.

Ecology and distribution: Occasional in mixed forest on brown sand or laterite and in Wallaba forest on white sand. Occurring in the near interior and the Rupununi district. Flowering data too scarce for pattern indication; fruiting mainly from November to February.

Notes: (1) In Mennega et al. (1988) the vernacular name Wabaima is used for *Licaria cayennensis* (Meisner) Kosterm. Kurz (1982), however, considered that species to be a synonym of *L. cannella*. As can be judged from the different vernacular names, Brown silverballi and Wabaima, the tree spotters distinguish two different types of trees in *L. cannella*. Brown silverballi is said to have a lighter bark with smaller lenticels and a more yellowish slash than Wabaima; (2) Seedlings with sweet-spicy aromatic bark. First 3-5 leaves clustered at stem apex, later leaves more spaced. Leaves similar to mature leaves, but always with an acuminate apex with a ca. 2 cm long tip; (3) The rare subsp. *tenuicarpa* occurs only on white sand. Twigs stout; leaf base obtuse; fruit thinwalled, with fine warts, margins equally high.



Licaria cannella

a. habit (x 0.6); b. habit, sterile (x 0.3); c. leaf (x 0.6); d. flower (x 9); e. flower, longitudinal section (x 9); f. fruit (x 0.6); g. fruit and leaf base of subsp. *tenuicarpa* (x 0.6); h. trunk base; i. seedling (x 0.15).

Literature: Barkley, F.A. 1962.

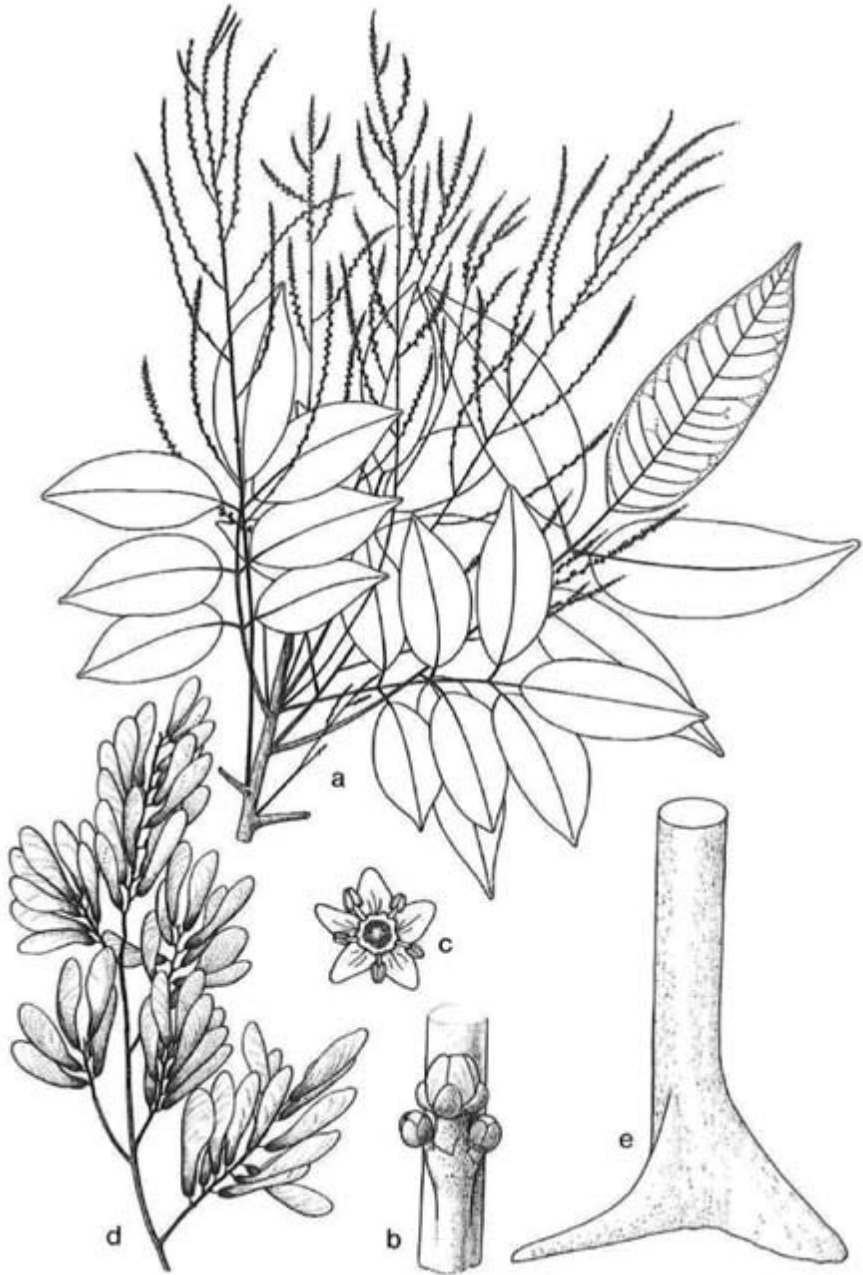
Vernacular names: Aupar (W), Hububalli (Ar), Kwipari (C), Kwipariye (M).

Botanical description: Twigs finely lenticellate, densely covered with minute, brownish appressed hairs when young. Leaves alternate, imparipinnate, (3-)5-13-foliolate, clustered at twig ends; petiole 5-10 cm long; rachis 3-15 cm long; petiolules 0.2-1 cm long, grooved above; leaflets opposite; blades thin-leathery, oblong-ovate, rarely narrowly ovate, 7-15 x 3-5 cm, glabrous above, sparsely covered with minute appressed hairs when young below, margin plane to slightly recurved, apex acute to acuminate, base truncate to rounded, oblique; primary vein slightly prominent above, prominent below; secondary veins 8-10 pairs, plane or weakly prominent above, prominent below. Inflorescence an axillary panicle, near end of twig, lax, to 50 cm long; branches densely covered with minute, brownish, appressed hairs; peduncle 2-8 cm long; pedicels 2-4 mm long. Flowers yellowgreen, clustered at branch ends, functionally unisexual; calyx 5-lobed, persistent, lobes 0.3 mm long, yellow-brown puberulous; petals 5, 0.8 mm long, persistent; stamens 5. Fruit winged, 3 x 0.9 x 0.05 cm, glabrous, wing membranous, with dichotomous venation, indehiscent; seed 1, 12 x 3 x 0.6 mm.

Field characteristics: Tree (15-)25-35(-40) m tall; trunk 0.25-0.75 m in diam. Base buttressed. Buttresses (0.3-)0.4-1.2 x (0.3-)0.6-1.2 x 0.1-0.15 m, straight to concave. Bark grey to grey-brown, sometimes dark brown, cracked to ridged. Cracks irregular, more or less vertical, 1-10 x 0.1-0.3 cm. Ridges irregular, 1-10 x 0.2-0.4 cm, 1-3 cm apart, formed by curling up of outer part of bark, creating a characteristic diamond-shaped pattern (but see note 1). Dead bark 2-4 mm thick, grey-brown to dark brown. Living bark 5-15 mm thick, light brown to pink-brown, with a red layer on transition to dead bark, with faint orange-brown layers, soft, somewhat sweet-scented; exudate creamy white, turning darker and somewhat greenish on exposure to air, thick, sticky, appearing in droplets. Sapwood light yellow-brown to grey-brown, tinged pinkish; heartwood (dark) brown to pale red-brown, streaked with dark brown. Crown oval to rounded, light, branches erect to spreading. Plate 22.

Ecology and distribution: Evergreen tree, frequent to common in seasonal forest, occasional in secondary mixed forest and Wallaba forest (particularly in the Pomeroun-Supenaam-area), preferring sandy soils. Occurring in the near interior, Kanuku Mts., and Rupununi district. Flowering and fruiting occur nearly throughout the year. The fruits are wind-dispersed.

Notes: (1) The diamond-shaped pattern of ridges is sometimes not so well-developed, particularly in young trees; (2) The exudate is poisonous and can cause blisters on the skin.



Loxopterygium sagotii

a. habit (x 0.35); b. part of inflorescence (x 9); c. flower, top view (x 9); d. infructescence (x 0.6); e. trunk base.

Literature: Pennington, T.D. 1990.

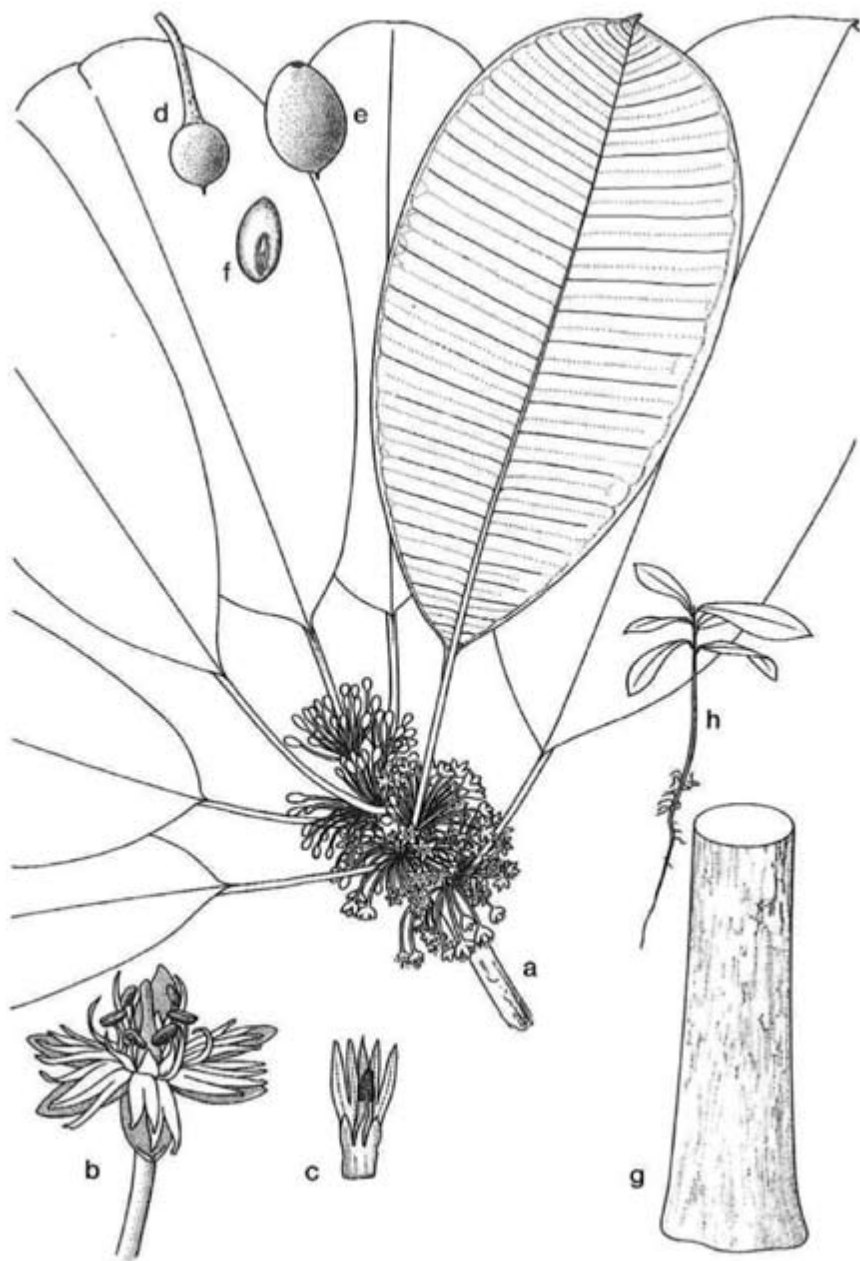
Vernacular names: Balata (P), Balata burue (Ar), Beefwood (Cr), Bulletwood (Cr), Bully tree (Cr), Iriar (W), Kobero (Wr), Purue (M).

Botanical description: Twigs thick, glabrous, rough. Leaves alternate, clustered at branch ends; stipules absent, rarely present and then less than 1 mm long; petiole 1.5-4.5 cm long, angular, flattened above; blades stiff-leathery, obovate, sometimes elliptic, 6-30 x 3-12 cm, glabrous above, below with a greyish to (rusty) brown wax layer, scaling off later, margin often recurved, apex obtuse to acuminate, curved downwards, base rounded to gradually narrowed; primary vein sunken above, prominent below; secondary veins 15-25 pairs, slightly sunken or plane on both sides, straight, under a right angle to the primary vein, with numerous thinner veinlets in between. Inflorescence an axillary 3-20-flowered cluster, in upper leaf axils; pedicels (15-)20-30 mm long, in fruit up to 50 mm long and apically thickened. Flowers bisexual, pendent, with appendages inside the corolla: sepals 6, free, in 2 rows, 5-6 mm long, outer ones glabrous, inner ones puberulous, persistent in fruit; corolla white, 5-7 mm long, glabrous, lobes 6, 4-6 mm long, each lobe divided to the base into 3 segments; stamens 6, opposite the petals, staminodes 6, entire, 2-lobed, or lacinate. Fruit a berry, yellow-orange to purple-black, broadly ellipsoid (to globose), 2.5-3.5 x 1.8-2.5 cm, shortly apiculate to rounded, glabrous, smooth or somewhat rough, wall firm, flesh pulpy, edible, sweet-tasting; seeds 1(-2), dark brown, with a light brown patch, depressed ellipsoid, 20-22 x 10-13 x 10-11 mm, scar 0.5-1.2 cm long, ventral, dull.

Field characteristics: Tree (12-)30-40(-50) m tall; trunk (0.25-)0.5-0.9(-1.5) m in diam. Base swollen to buttressed. Buttresses 0.4-1.5 x 0.3-1 x 0.15-0.4 m. Bark (grey-)brown to dark brown to red-brown, fissured, often transversely cracked, scaly. Fissures vertical, 5-50 x 0.5-3 x 1-3 cm, 1-5 cm apart. Scales 3-10 x 2-3 cm. Dead bark 5-50 mm thick, brown, layered, sometimes with thin grey layers. Living bark ca. 10 mm thick, pink to flesh-coloured, fibrous; exudate white, milky (balata), sticky, copious. Sapwood light brown; heartwood dark red-brown. Crown broad, rounded, umbrella-shaped, dense. Plate 23.

Ecology and distribution: Dominant in seasonal forest in eastern districts, often with *Wamara* (*Swartzia leiocalycina*). Occasional to locally common in Wallaba, mixed (e.g. Morabukea forest) and marsh forest. Occurs on sand or clay soil. Widely distributed. Semi-deciduous or evergreen; flowering mainly from May to August; fruiting mainly from February to April. According to forestry files good fruiting years occur every 3-4 years. The fruits of Bulletwood are eaten by monkeys and large fruit-eating birds, who digest the pulp and defecate the seed.

Notes: (1) Bulletwood is the source of balata-gum and therefore, protected to a certain degree by law, although balata bleeding is hardly practised any more nowadays in the forestry belt of Guyana; (2) Seedlings can grow under shady conditions. White, sticky latex present in all parts. Leaves like mature leaves, but base more acute, apex more acuminate and secondary veins inconspicuous; (3) Bark and latex are used in a decoction with bark of Locust (*Hymenaea* spp.) and Tauroniro (*Humiria balsamifera*) as a treatment for dysentery.



Manilkara bidentata

a. habit (x 0.6); b. flower (x 3); c. petal, with staminoide and stamen (x 3); d. young fruit (x 0.6); e. fruit (x 0.6); f. seed (x 0.6); g. trunk base; h. seedling (x 0.1).

Literature: Amshoff, G.J .H. 1939; Steege, H. ter 1990.

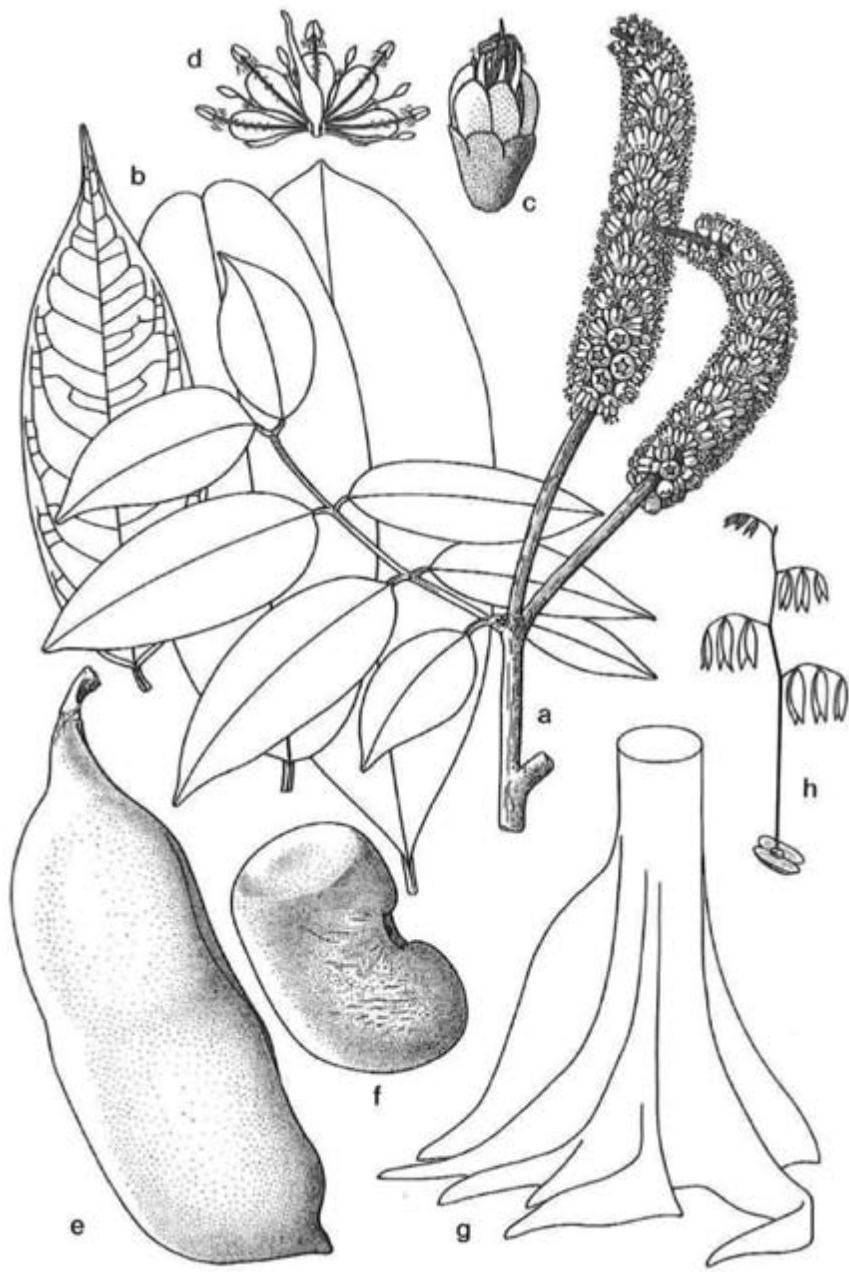
Vernacular names: Mora (Ak, Ar), Mora-yek (Ak), Parakaua (C).

Botanical description: Twigs glabrous. Leaves alternate, paripinnate, (4-)6-8-foliolate; stipules minute, caducous; petiole 0.5-7.5 cm long, flat above; rachis 7-10 cm long; leaflets opposite; petiolules 0.4-0.6 cm long, grooved above; blades leathery, oblong-elliptic, sometimes narrowly ovate, 8-20 x 3-9 cm, glabrous, apex acute, obtuse to emarginate, on sterile branches often acuminate, base rounded (to acute); primary vein prominent on both sides; secondary veins 15-20 pairs, weakly prominent on both sides. Inflorescence a terminal panicle of few, dense spikes; spikes 10-20 x 1-2 cm. Flowers white, sessile; calyx cup-shaped, 4 mm long, margins ciliate; petals 5, 6 mm long, margins ciliate; stamens 10, 5 of which sterile, exserted, covered with white, woolly hairs. Fruit a brown, woody pod, 12-20(-25) x 5-7(-8) x 4-5.5 cm, glabrous, flattened, longitudinally dehiscent; seeds 1-2(-3), ellipsoid to more or less kidney -shaped, 7-12 x 4-7 x 3-4 cm, seed wall thin and fragile.

Field characteristics: Tree 20-40(-50) m tall; trunk 0.6-0.9(-1.2) m in diam., in old trees often hollow. Base buttressed. Buttresses 2-5 x 1-4 x 0.1-0.25 m, concave, spreading, often with smaller secondary branches. Bark grey-brown to red-brown, hard, (rather) smooth or pockmarked, lenticellate, scaly to flaky. Lenticels round, 1-2 mm in diam., very densely arranged, scattered or in irregular vertical rows. Scales irregular to round, 1-3(-10) x 1-5 cm, 0.1-0.4 cm thick, leaving pockmarks. Flakes to 35 x 10 cm. Dead bark 1-1.5 mm thick, light brown. Living bark 3-5 mm thick, pink to light brown, darkening after exposure, somewhat fibrous, slightly sweet-scented; exudate brown-yellow, clear, somewhat sticky, slow. Sapwood light brown; heartwood (dark) red-brown. Crown oval to rounded, broad, dense, branches erect to spreading. Plate 23.

Ecology and distribution: Growing on moist to wet places. Locally abundant to dominant (Mora forest) along rivers and creeks. Occasional in marsh and swamp forest. On clay soils. General in the near interior. Semi-deciduous or evergreen, often with conspicuous leaf-flush. Flowering mainly from January to May, sometimes in July and August; fruiting mainly in June and July, sometimes in October and November (see ter Steege, 1990). Seeds of Mora have a small air pocket between the cotyledons, which allows them to float and therefore they can be dispersed by water. The seeds, however, often germinate under the tree without being dispersed.

Notes: (1) Mora is well-known for its abundant germination under fruiting trees, creating a dense 'seedling bank', even under dense shade. The seeds germinate within 2 weeks after dropping,. Whereby the 2 cotyledons are spread out flat on the soil. Seedling leaves are more slender than mature ones and have 6 leaflets with a long-acuminate apex; (2) An infusion of the bark is used to treat dysentery. The bark is also used as a fish poison; (3) The vernacular name Parakaua (and Parakwai: *M. goggrijpii*) might be equivalent to Parakwa (*Dinizia excelsa*, Mimosaceae). That tree grows like Mora to very large sizes (trunk diameter to 2. m). It has a red-brown, flaky bark. Leaves bipinnate, with alternate pinnae and small leaflets (ca. 2. x 1 cm). Pods indehiscent, flat 30-35 x 5-6.5 cm and with numerous, transversely oriented, ca. 1 cm long seeds.



Mora excelsa

a. habit (x 0.6); b. leaflets (x 0.6); c. flower (x 3); d. dissected flower (x 3); e. fruit (x 0.6); f. seed (x 0.6); g. trunk base; h. seedling (x 0.1).

Literature: Amshoff, G.J .H. 1939; Steege, H. ter 1990.

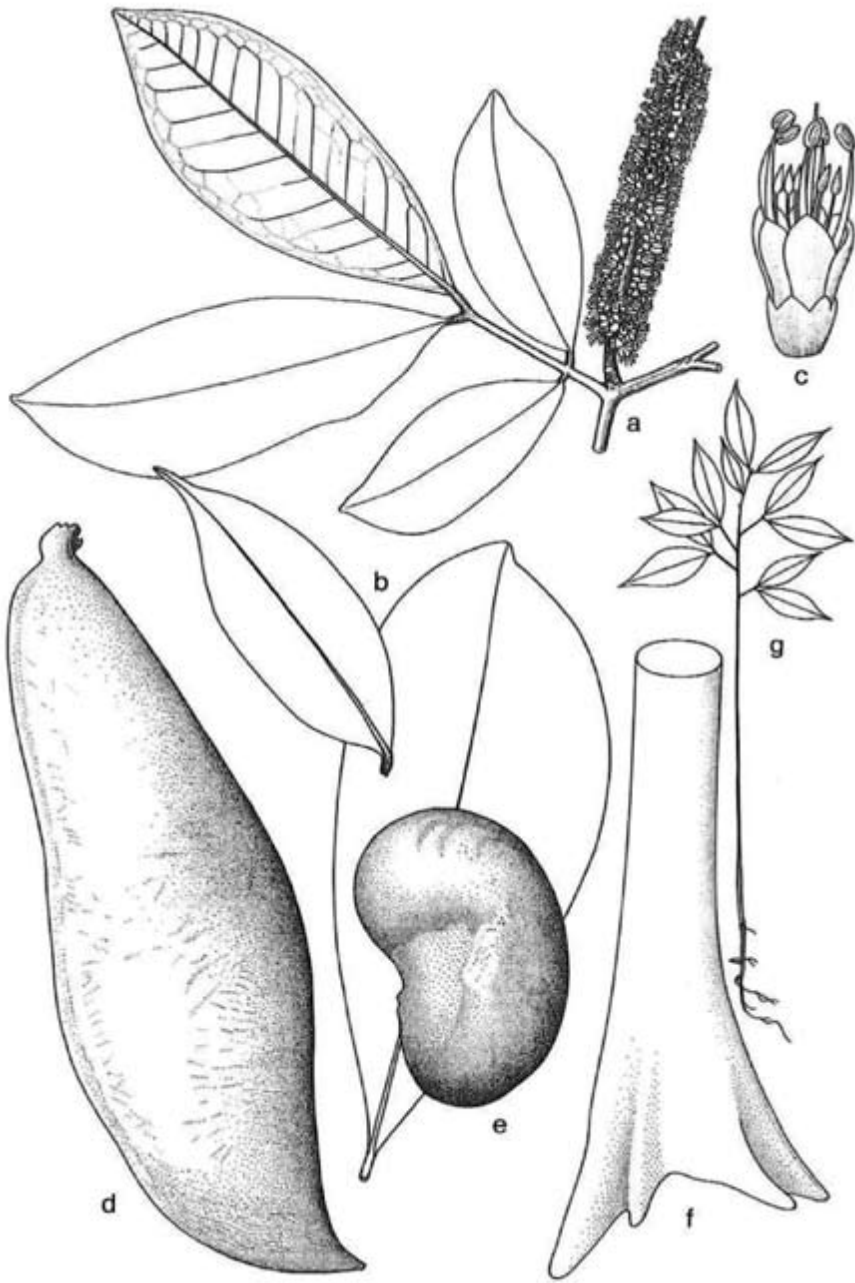
Vernacular names: Morabukea (Ar), Parakwai (Ak).

Botanical description: Twigs glabrous, leaves alternate, paripinnate, (2-)4-foliolate; stipules caducous, not observed; petiole 1-4 cm long, flat above; rachis 3-4 cm long, flat above; leaflets opposite; petiolules 0.2-0.5 cm long, grooved above; blades leathery, elliptic to obovate, 7-16 x 3-7 cm, glabrous, dark green, apex rounded, acute on sterile branches of young trees, base rounded to acute; primary vein prominent on both sides; secondary veins 10-15 pairs, weakly prominent on both sides. Inflorescence a terminal panicle of dense spikes, spikes 8-13 x 2-2.5 cm. Flowers creamy-white, sessile, sweet scented; calyx cup-shaped, ca. 3 mm long, margins ciliate; petals 5, 5-6 mm long, more or less erect, margins ciliate; stamens 10, 5 of which sterile, exerted, covered with white, woolly hairs. Fruit a brown, woody pod, 10-25 x 5-9 x 4 cm, glabrous, flattened, longitudinally dehiscent; seeds 1-3, ellipsoid to more or less kidney-shaped, 6-12 x 4-8 x 2 cm, seed wall thin, fragile.

Field characteristics: Tree 20-45(-50) m tall; trunk 0.4-0.8(-1.5) m in diam. Base usually buttressed. Buttresses 1.5-4 x 0.7-3 x 0.1-0.2 m, steep, straight to concave. Bark dark brown to red-brown, spotted red or orange-brown from scaling bark, rough, lenticellate, scaly and flaky. Lenticels (more or less) round, 1-2 mm in diam., densely arranged. Scales round to irregular, ca. 2-3 cm in diam., leaving shallow depressions. Flakes vertically oriented, irregular, 10-25 (-50) x 2-5 cm. Dead bark 0.5-2 mm thick, light brown. Living bark 3-5(-10) mm thick, pink to light brown, sometimes with some darker bands, somewhat fibrous, weakly aromatic; exudate brown-yellow to orange-brown, clear thin, sticky, slow or rapid. Sapwood light brown; heartwood dark red-brown. Crown rounded, dense, branches erect to somewhat spreading. Plate 24.

Ecology and distribution: Locally abundant, forming almost pure stands (Morabukea forest) or in mixed forest with e.g. Greenheart and Black kakaralli. On laterite soil or loam, particularly on slopes. General in the near interior, but rare in the N.W. district and Courantyne River area. Evergreen; flowering mainly from January to March, sometimes in July and August; fruiting in June and July, or in October and November (see ter Steege, 1990).

Notes: (1) Morabukea looks very much like *Mora* (*Mora excelsa*). Usually the ecological circumstances are a good identification character. Furthermore the bark of Morabukea is somewhat darker and more orange-tinged than in *Mora*. The leaves of seedlings and saplings, which usually grow under the tree, are 4-foliolate in Morabukea. vs. 6-foliolate in *Mora*; (2) Morabukea is well-known for its abundant regeneration, resulting in dense stands of 1-3 m high saplings. The density may be as high as 11,700 saplings per ha! The dense undergrowth of Morabukea forest is a favourite place for animals, such as small rodents (e.g. agouti), the morabana (very poisonous snake, *Lachesis* sp.) and the notorious maiobulis (small ticks); (3) See note (2) of *Mora excelsa*.



Mora gonggrijpii

a. habit (x 0.45); b. leaflets (x 0.45); c. flower (x 3); d. fruit (x 0.8); e. seed (x 0.6); f. trunk base; g. seedling (x 0.1).

Literature: Eyma, P.J. 1934.

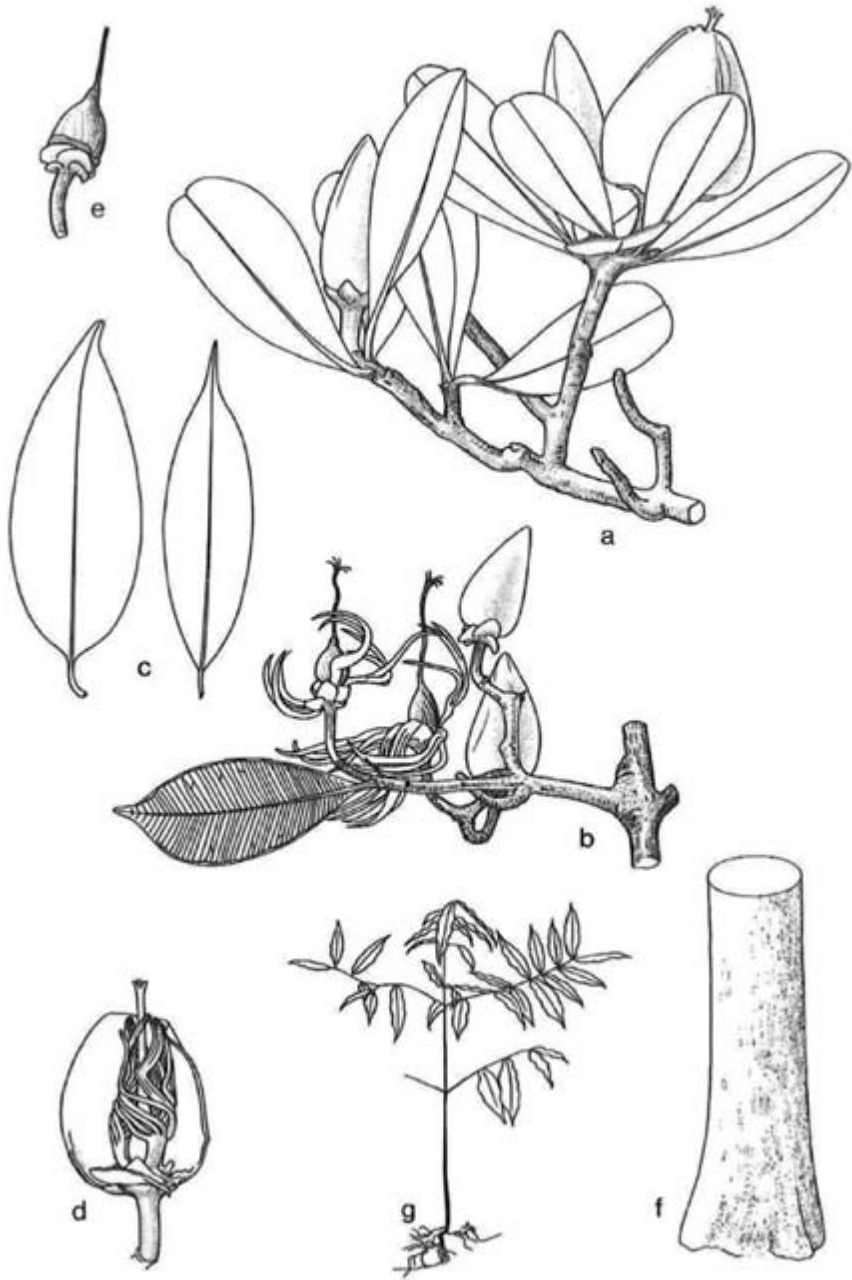
Vernacular names: Manniballi (Ar), Morombo-rai (Akl).

Botanical description: Twigs sparsely black-puberulous. Leaves opposite, concentrated at branch ends; petiole 0.5-1 cm long, grooved above; blades more or less leathery, narrowly ovate-oblong to obovate-oblong, 5-11 x 2-4 cm, glabrous, margin slightly recurved, apex acuminate to rounded, sometimes emarginate, base acute to obtuse; primary vein somewhat sunken above, strongly prominent below; secondary veins 50-60 pairs, straight, parallel, close together, plane or slightly prominent above, slightly prominent below. Flowers terminal, solitary; pedicels 10-20 mm long; sepals 5, 6-7 mm long, persistent in fruit; petals 5, pink, twisted, ca. 25 mm long; stamens in 5 bundles of 3-6, connate at the base, free part of the filaments twisted around the ovary; style slender, apically 5-fid, persistent. Fruit a berry, greenish to bluish yellow, ellipsoid to globose, 4-5 cm in diam., with white waxy layer; seeds few.

Field characteristics: Tree 30-40 m tall ; trunk 0.5-0.8 m in diam., sometimes faintly scalloped. Base straight, or swollen in older trees. Bark (light) brown, smooth, cracked, thin-scaly on older trees. Dead bark 2-12 mm thick, red-brown. Living bark 12-15 mm thick, creamy brown, with paler streaks, rather hard, granular; exudate yellow-orange latex, turning red-orange after exposure, sticky, copious. Sapwood yellow with light brown spots; heartwood yellow-brown, tinged pinkish. Crown conical, rounded or flattened, branching more or less horizontal. Plate 24.

Ecology and distribution: Locally frequent in mixed forest, occasional in Mora forest, rare in Wallaba forest. Occurring in north-central and central Guyana, and in Pakaraima Mts. Semi-deciduous; flowering and fruiting observations too scarce for indicating a pattern.

Notes: (1) Seedlings look like those of *Symphonia globulifera*. They have more slender, red-brown branches, and thinner leaves with an undulate margin; (2) Manniballi can be confused with Pakuri (*Platonia insignis*). The coarser leaves of Pakuri are more clustered at the twig ends, and have a more obtuse apex and more prominent secondary veins; (3) The latex of Manniballi is used medicinally as a substitute for copaiba balsam (exudate of *Copaifera pubiflora*, Caesalpiniaceae). It can also be made into a pitch similar to Karaman (see *Symphonia globulifera*). The pitch is used for torches and for pitching of boats.



Moronobeia coccinea

a, b. habit (x 0.6); c. leaves (x 0.6); d. flower, with part of the petals removed (x 0.6); e. young fruit (x 0.6); r, trunk base; g. seedling (x 0.15).

Literature: Kostermans, A.J.G.H. 1936.

Vernacular names: Hariraro shiruaballi (Ar), Heburu (W), Ileng (Ak), Sawariskin silverballi (Cr), White silverballi (Cr).

Botanical description: Twigs round, rather densely covered with appressed hairs when young. Leaves alternate; petiole to 1.5 cm long; blades leathery, narrowly elliptic to elliptic-ovate, (5-)9-11(-14) x (2-)3-4(-5) cm, sparsely covered with some appressed hairs at base above, densely so below when young, often glabrous below, margin slightly recurved, apex acute to shortly acuminate, base cuneate; primary vein sunken above, strongly prominent below; secondary veins 7-10 pairs, slightly prominent above, prominent below; tertiary veins reticulate on both sides. Inflorescences panicles, in the axils of the upper leaves, 7.5-9 cm long; branches covered with grey or rusty hairs; peduncle 3 cm long, flattened, pink; pedicels 0.51 mm long, to 6 mm long in fruit. Flowers yellow, turning pink, unisexual, covered with yellow hairs; tepals 6, basally connate, lobes 1-1.5 mm long, spreading; fertile stamens 9, arranged in 3 rows, 1-1.5 mm long. Fruit a berry, green, ellipsoid, 1-1.6 x 0.8-0.9 cm, glabrous, with cup-like structure at the base; cupule red, 1-1.2 cm high, 0.8-1 cm in diam., surface fairly rough; seed 1.

Field characteristics: Tree (15-)20-35 m tall; trunk 0.2-0.5(-1.2) m in diam. Base usually buttressed. Buttresses 0.4-1.5(-3) x 0.2-1 x 0.15-0.2 m. Bark dark brown to grey-brown, smooth, lenticellate, sometimes cracked, sometimes scaly in older trees. Lenticels round to elongate, 1-10 x 1.5-3 mm, in vertical or horizontal rows or scattered irregularly. Cracks vertical, fine, 0.5-3 x 0.1-0.2 cm. Dead bark ca. 1 mm thick, black-brown. Living bark 3-15 mm thick, light brown to light orange-brown to pink, rapidly turning darker at exposure, faintly vertically streaked with orange lines, fibrous, aromatically scented; exudate colourless, clear, turning very dark brown after exposure, very scanty, somewhat sticky, from inner part of living bark. Sapwood light yellow-brown; heartwood somewhat darker, more grey-brown. Crown rounded, rather open, branching erect. Plate 25.

Ecology and distribution: Rare to locally frequent, usually in mixed forest on brown sand, rarely in Wallaba forest on white sand. Occurring in near interior, Rupununi district, southeastern Guyana, and Pakaraima Mts. Evergreen; flowering mainly in May and June; fruiting data too scarce for pattern indication.

Notes: (1) Seedlings with an aromatic bark. First 3-5 leaves clustered near stem apex, later leaves more spaced. Leaves glaucous below, with an acuminate apex with a 1-2 cm long lip. The tertiary veins form a well-visible reticulate pattern below; (2) Other large-sized species of *Ocotea* which are relatively common in Guyana are *O. glomerata* (Kurahara silverballi), *O. oblonga* (Salt kereti) and *O. wechenheimii* (Hard kereti). However, still many more other species of Lauraceae occur in Guyana. Identification at the species, both in the field and in the herbarium, is often difficult, although some species, such as Greenheart (*Chlorocardium rodiei*), are unmistakable. Many species have a relatively smooth bark, with scattered, more or less round lenticels, and an aromatic slash which turns darker after exposure. General vernacular names used for Lauraceae are: Shirua, Silverballi (Creole for the Arawak name Shiruaballi), Kereti, and Gale (usually with prefix, e.g. Almond gale for *Aniha citrifolia*).



Ocotea canaliculata

a. habit, flowering (x 0.6); b. flower (x 6); c. habit, fruiting (x 0.6); d. fruit (x 0.6); e. trunk base; f. seedlings (x 0.2).

Synonym: *Nectandra rubra* (Mez) Alien

Literature: C.T.F.T. 1989; Kostermans, A.J.G.H. 1936.

Vernacular names: Determa (Cr), Teteruma (Ar), Wanu (C),

Botanical description: Twigs stout, with large petiole scars, glabrous. Leaves alternate, tufted at twig ends; petiole 1-3 cm long, flattened above, basally thickened; blades leathery, narrowly obovate-triangular, 7-15(-23) x 2.5-5(-8) cm, more or less glabrous, margin flat, apex obtuse, mostly slightly emarginate, base gradually narrowed; primary vein plane above, prominent below; secondary veins 10-12 pairs, plane to slightly sunken above, plane below. Inflorescence a panicle, several together in upper leaf axils, narrowly pyramidal, to 8 cm long, with opposite, grey-puberulous branches; peduncle to 4.5 cm long, thick, flattened, shiny; pedicels 5-8 mm long, up to 25 mm long and thickening in fruit, glabrous. Flowers greenish to white, sweet-scented; tepals 6, basally connate, lobes 1-1.5 mm long; fertile stamens 9, arranged in 3 rows, 1.5-2 mm long. Fruit a berry, depressed globose, 1-1.7 x 1-2.1 cm, glabrous, with cup-like structure at the base; cupule fleshy, thickened, 1-1.5 cm high, 1-1.5 cm in diam. gradually narrowing into pedicel; seed 1.

Field characteristics: Tree (10-)25-40(-50) m tall ; trunk (0.25-)0.5-1(-1.5) m in diam., tapering. Base swollen or with low, spreading buttresses. Bark red-brown (to grey-brown), roughly lenticellate, often cracked and flaky on older trees. Lenticels round, 2-4 mm in diam., densely arranged, in vertical rows or in irregular pattern. Flakes 10-40 x 5-20 cm, to 1 cm thick. Dead bark 1 mm thick, brown. Living bark 8-10(-25) mm thick, (dark) pink with white or dark pink streaks or speckled orange, red and brown, granular, aromatic; exudate colourless, turning darker after exposure, sticky, scanty. Sapwood yellow-brown, pink-brown, or pinkish grey-brown; heartwood light brown-red, turning red-brown. Crown dense, branches erect. Plate 25.

Ecology and distribution: Locally frequent in mixed forest (e.g. Greenheart forest) on laterite. Found chiefly east of the Essequibo R. Evergreen; flowering and fruiting data too scarce for pattern indication, according to files of the Guyana Forestry Commission flowering occurs every 2-3 years.

Notes: (1) Seedling leaves are quite different from mature leaves: they have a long-acuminate apex and appressed hairs below on the veins; (2) *Ocotea rubra* does not fit well in the genus *Ocotea* (Rohwer et al., 1991), because of an unusual combination of characters. It is easy to identify in the field, unlike most other species of *Ocotea*. Future research will have to show if it has to be transferred to another or even a new genus.



Ocotea rubra

a. habit (x 0.6); b. flower, top view (top) and side view (bottom) (x 5); c. stamen (x 5); d. inflorescence (x 0.6); e. trunk; f. seedlings, young (r) and somewhat older (l) (x 0.1).

Literature: Sandwith, N.Y. 1935.

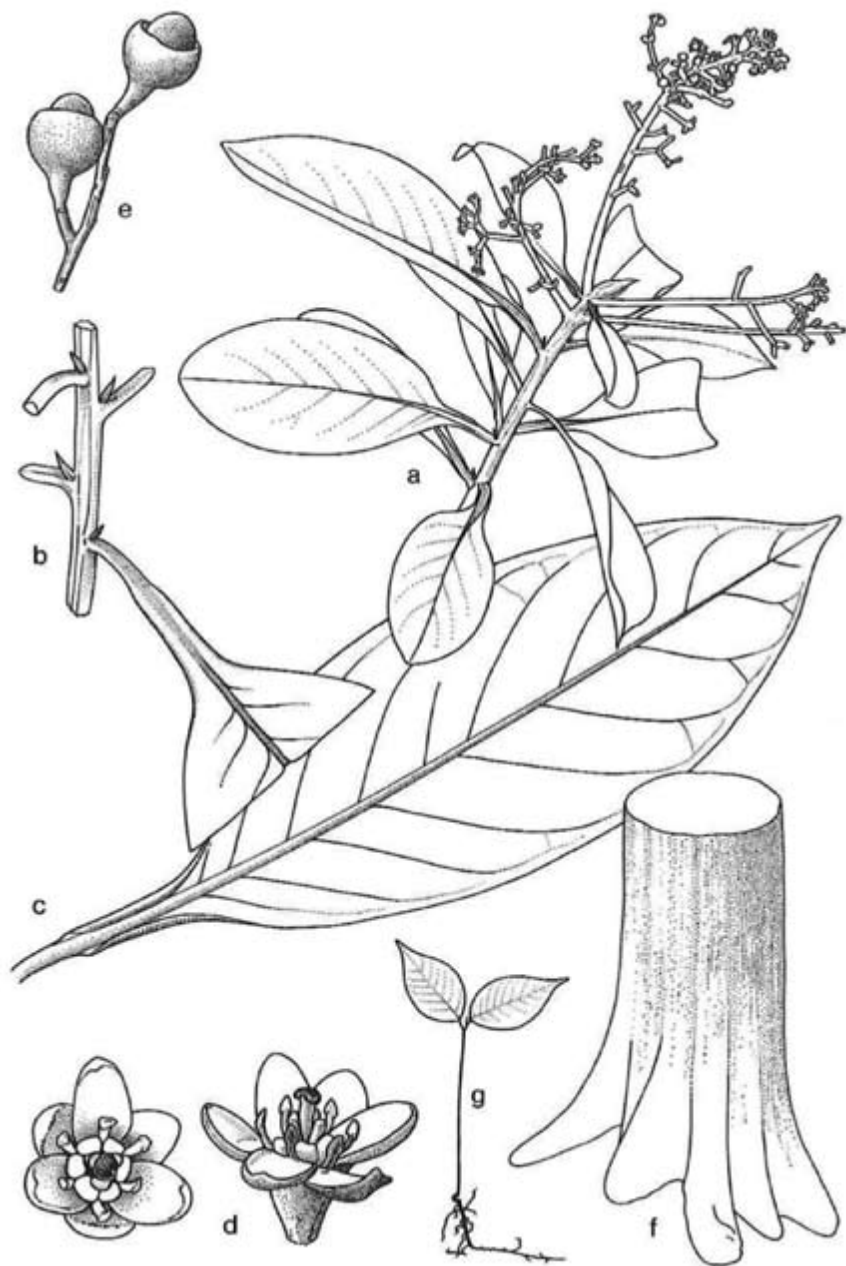
Vernacular names: Baradan (Ar), Yanéau (Ak).

Botanical description: Twigs stout, brownish, angular, grooved, densely covered with tiny appressed and erect hairs when young. Leaves alternate, clustered at twig ends; petiole 1.5-1.8(-2.5) cm long, grooved above, winged towards blade; blades leathery, elliptic to elliptic-oblong, (6-)11-26 x (4-)5-10.5 cm, glabrous and shiny above, densely puberulous below, margin strongly recurved towards base, apex acuminate, base acute; primary vein plane to sunken above, prominent below; secondary veins 8-14 pairs, plane to sunken above, prominent below. Inflorescences axillary panicles, 14-25 cm long, branches covered with grey hairs, angular; peduncle 2-5.5 cm long, angular; pedicels 1-3 mm long to 5 mm in fruit. Flowers creamy white to yellowish white, functionally unisexual, bell-shaped; tepals 6, basally connate, lobes 2-3 mm long; fertile stamens 9, in 3 rows, ca. 2 mm long, inner row appressed to pistil. Fruit a berry, ellipsoid, 1.5-2 x 1-1.3 cm, glabrous, with cup-like structure at the base; cupule 1.5-2 cm high, 1.2-2 cm in diam.; seed 1.

Field characteristics: Tree 20-40(-45) m tall; trunk 0.5-0.8(-1.2) m in diam. Base buttressed. Buttresses 1-2(-5?) x 0.6-1 x 0.2-0.35 m. Bark grey or grey-brown, lenticellate, cracked, lenticels round, 3-7 mm in diam., dark brown, in vertical rows, sometimes connected in to 10 cm long lines. Cracks vertical, 1-15 x 0.10.3(-0.8) cm. Dead bark 0.5 mm thick, light brown. Living bark 10-20 mm thick, light brown, tinged pink, turning darker on exposure to air, soft. with aromatic scent. Sapwood white, somewhat lustrous when slashed; heartwood darker greybrown. Crown conical, branches erect to spreading. Plate 26.

Ecology and distribution: Occasional to locally frequent in mixed forest on brown sand, occasional in Mora forest. Occurring in the Lower Cuyuni River basin, N.W. district and Rupununi district. Evergreen; flowering mainly from January to March; fruiting from December to June.

Notes: (1) Seedlings do not have the typical leaf base of mature trees (acute with strongly recurved margin), but instead a more or less rounded base; (2) For differences with the similar Warakairo (*Laeria procera*). see page 112.



Ocotea tomentella

a. habit (x 0.3); b. leaf base (x 0.6); c. leaf, lower side (x 0.6); d. flower, top view (l) and side view (r) (x 5); e. fruits (x 0.6); f. trunk base; g. seedling (x 0.3).

Literature: Rudd, V.E. 1965.

Vernacular names: Barakaro (Ar), Epik rik (Ak), Jumbi bead tree (Cr), Lucky seed (Cr).

Botanical description: Twigs round, densely yellow-to rusty-puberulous-velutinous when young. Leaves alternate, imparipinnate, 7-11-foliolate; stipules triangular, 0.1-0.2 cm long; petiole 3-5 cm long; rachis 8-30 cm long; petiolules 0.3-0.5 cm long; leaflets opposite; blades leathery, ovate to obovate, 3-22 x 2-11 cm, glabrous above, sparsely covered with appressed hairs along veins below, margin plane, sometimes recurved, apex acute, shortly acuminate to obtuse, base obtuse; primary vein sunken above, prominent below; secondary veins (8-)10-17 pairs, sunken above, strongly prominent below. Inflorescence a terminal raceme, yellow to rusty-tomentose; peduncle ca. 5 cm long; pedicels 2-4 mm long. Calyx cupshaped, 6-9 mm long, teeth 3-5 mm long; petals 5, 8-10 mm long, dark purple. Fruit a woody pod, black, brown to red-brown, shiny, obliquely depressed-globose, 2.5-6 x 2-3 x 1-3 cm, glabrous, smooth, slightly constricted between the seeds if more-seeded, dehiscent; seeds 1(-4), red with black spot, depressed-globose, 10-15 x 9-12 x 7-10 mm, hard, hilum elliptic, 2 x 1 mm.

Field characteristics: Tree (8-)20-35 m tall; trunk (0.2-)0.4-0.9 m in diam. Base straight or swollen. Bark grey to brown, lenticellate. Lenticels ca. linear, to 5 x 3 mm, horizontally and vertically oriented, densely arranged. Dead bark 1-2 mm thick, dark brown. Living bark 2-3 mm thick, yellow-brown, particularly in outer part mottled cream and orange, with an orange layer near dead bark, hard, granular, with cucumber scent. Sapwood creamish; heartwood dark brown. Crown rounded and somewhat spreading, moderately dense, branches erect to spreading. Plate 26 (*Ormosia paraensis*).

Ecology and distribution: Locally dominant in evergreen seasonal forest, rare to occasional in mixed forest. Occurring in near interior and Pakaraima Mts. Evergreen; flowering mainly in October and November; fruiting mainly from March to June.

Notes:(1) The seeds are dispersed by birds, who are misled by the red-black seeds which imitate red-arillate black seeds; (2) *O. coarctata*, *O. paraensis* and *O. stipularis* (all called Barakaro) also occur as large trees. They are hard to distinguish from *O. coccinea* by bark and slash. If leaves are available, identification is possible. *O. coarctata* and *O. stipularis* have brown-velvety fruits.



Ormosia coccinea

a. habit (x 0.6); b. flower (x 1.8); c. dehiscent, 1-seeded fruit (x 0.6); d. 2-seeded fruit (x 0.6); e. seed (x 0.6).

Literature: Rudd, V.E. 1965.

Vernacular names: Crook (Cr), Horse-eye (Cr), Korokororo (Ar), Korongpinbiu (Ak), Wanaka (M).

Botanical description: Twigs round, rusty-puberulous when young. Leaves alternate, imparipinnate, 3-11-foliolate; stipules not observed; petiole 3-5 cm long; rachis 8-50 cm long; petiolules 0.8-2 cm long; leaflets opposite; blades thick-leathery, ovate to elliptic, 6-27 x 3-16 cm, glabrous and shiny above, glabrous below, margin flat to slightly recurved, apex obtuse, rounded or short-acuminate with obtuse tip, base rounded to more or less heart-shaped; primary vein plane, central zone slightly prominent above, prominent below; secondary veins 6-9 pairs, plane above, weakly prominent below. Inflorescence a terminal, many-flowered panicle, ca. 30 cm long, covered with appressed silvery hairs; peduncle 5-10 cm long; pedicels 3-5 mm long. Calyx cup-shaped, 12-15 mm long, teeth 4-5 mm long; petals 5, pink to dark purple, 20-25 mm long. Fruit a woody pod, yellow-brown, depressed-globose, 5-7 x (3.5-)5-7 x 1.5-5 cm, glabrous, indehiscent; if 2-seeded elongate, to 13 cm long, and slightly constricted between the seeds; seeds 1(-2), red, drying red-brown, discoid or lenticular, 25-40 x 10-20(-30) x 15-20 mm, hard, hilum linear, 30-45 1-3 mm.

Field characteristics: Tree 20-35(-60?) m tall; trunk 0.4-0.75 m in diam. Base swollen or buttressed. Buttresses to 1 x 1 x 0.3 m, stout, rounded, concave. Bark light brown to grey-brown, lenticellate. Lenticels numerous, round to elongate, 2-10 x 2-3 mm, horizontally oriented. Dead bark ca. 0.5 mm thick, grey-brown. Living bark 4-6 mm thick, mottled orange-brown and light brown, hard, granular, with (weak) cucumber scent. Sapwood light brown; heartwood dark brown. Crown rounded, dense, branching erect. Plate 27.

Ecology and distribution: Occasional to frequent in Wallaba forest and in marsh forest on white sand in central Guyana. In Wallaba forest often near creeks. Flowering mainly in February and March and from July to September; fruiting mainly from January to June. According to data from the Guyana Forestry Commission flowering occurs every 3-4 years.

Notes: (1) The seeds can often be found under or near the parent tree. Apparently they often fall from the tree in the indehiscent pod. It takes 1-2(-4) months before they have germinated. Seedling stem smooth green. Leaves simple, blade somewhat fleshy, heart-shaped, shiny on both sides; (2) The seeds are used as beads. The name *Ormosia* is derived from the Greek word 'hormos' = necklace, referring to this use. They are also used to treat toothache. The inner bark is used on joints to ease rheumatic pains; (3) The name 'Horse-eye' is also used for the vine *Mucuna urens*.



Ormosia coutinhoi

a. habit (x 0.4); b. fruit (x 0.6); c. seed, side view (top) and ventral view (bottom) (x 0.6); d. trunk base; e. seedling (x 0.1).

Synonyms: *Parahancornia amapa* (Huber) Ducke; *Parahancornia fasciculata* (Poir.) Benoist.

Literature: Markgraf, F. 1932 Zarucchi, J.L. 1991.

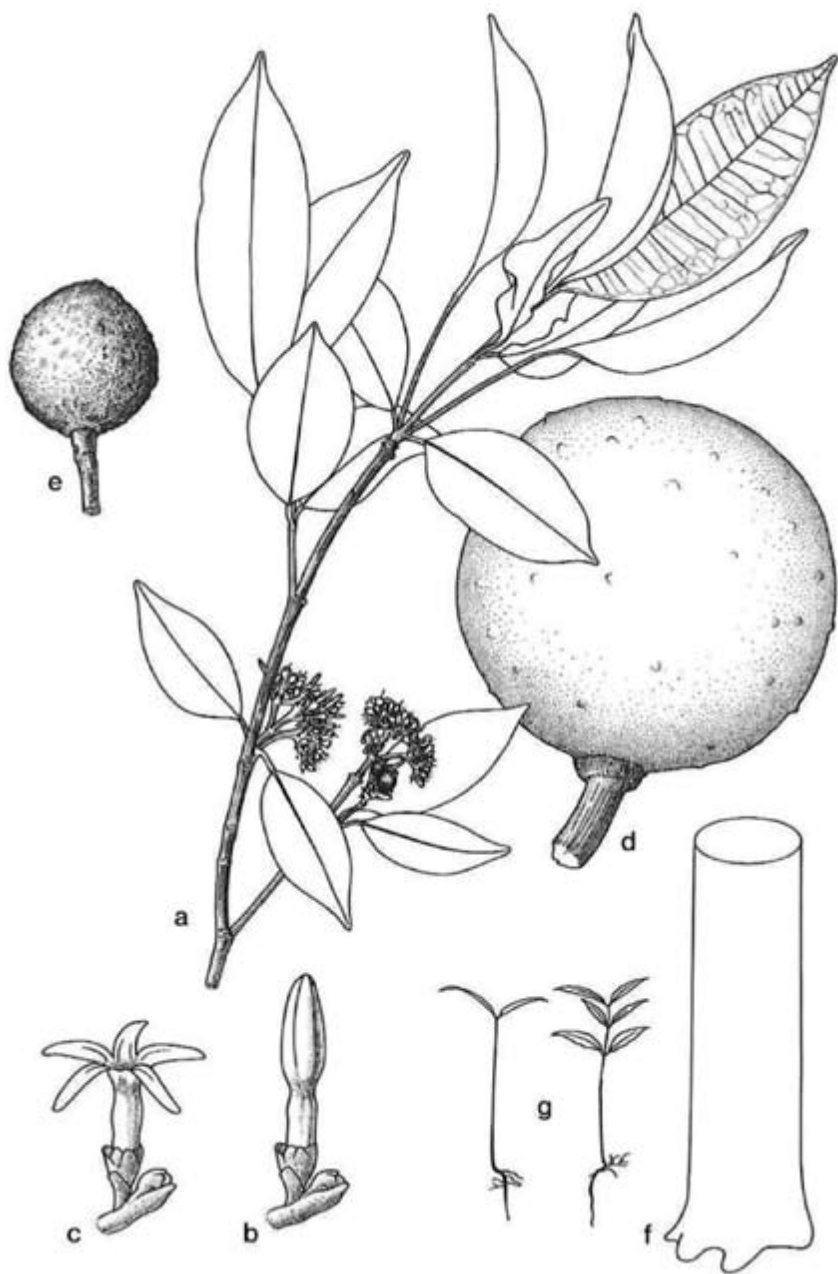
Vernacular name: Dukali (Ar).

Botanical description: Twigs densely white-lenticellate, glabrous, leaves opposite; petiole 0.7-0.8 cm long, grooved above; blades leathery to papery, elliptic, 7-10 x 3-4 cm, glabrous, margin flat, apex shortly acuminate, base gradually narrowed; primary vein prominent on both sides; secondary veins 10-12 pairs, straight, slightly prominent to almost plane above and below. Inflorescences terminal and axillary corymbose cymes; peduncle to 2 cm long; pedicels 1-5 mm long. Calyx cup-shaped, 2-3 mm long, lobes 5, ca. 1 mm long; corolla salver-shaped, white, 10 mm long, lobes 5, ca. 6 mm long; stamens 5, inserted above the middle of the tube in a slight widening. Fruit a berry, green to purple-brown, globose, 4-8 cm in diam., glaucous, slightly roughened; pulp fleshy, yellow, edible; seeds 8-13, elliptic, flattened, ca 15 x 10 x 3 mm.

Field characteristics: Tree (7-)20-25(-40) m tall; trunk 0.25-0.45(-1) m in diam. Base straight or with root spurs. Root spurs 0.4 x 0.4 x 0.15-0.2 m. Bark dark red-brown, or sometimes yellow-brown, lenticellate. Lenticels round, 2-3 mm in diam., quite densely arranged in an irregular pattern. Dead bark 1-2 mm thick, dark red-brown. Living bark ca. 10 mm thick, (light) brown to red-brown, outer part brittle, inner part soft; exudate creamy white, thick, somewhat sticky, somewhat bitter tasting, rapid and copious, flowing over entire slash surface. Sapwood and heartwood not distinguishable, light brown to pink-brown to pale yellow, turning light brown-yellow. Crown rounded, moderately dense, branching erect-spreading. Plate 27.

Ecology and distribution: Locally frequent in small reefs in seasonal forest on brown sand. Occasional in Mora forest and Wallaba forest. Rare to occasional in mixed forest and marsh forest. Occurring in the near interior and southeastern Guyana. Semi-deciduous; flowering mainly from August to November; fruiting mainly from March to May. The seeds are dispersed by e.g. monkeys, particularly spider monkeys, who eat the juicy fruits and defecate the seeds.

Notes: (1) Seedlings of Dukali have white latex in all parts. Stem red-brown. Leaves opposite, with a ca. 1 cm long drip tip; (2) Latex of Dukali can be used to adulterate balata, the latex of Bulletwood (*Manilkara bidentata*). It can also be used as a medicine for diseases of the intestines, as well as for tuberculosis (Monachino, 1943); (3) Differences with Cow-wood (*Bagassa guianensis*) under that species.



Parahancornia fasciculata

a. habit (x 0.6); b. flower bud (x 3); c. flower (x 3); d. fruit, fresh (x 0.6); e. fruit, dried (x 0.6); f. trunk base; g. seedlings (x 0.1).

Literature: Prance, G.T. 1986.

Vernacular names: Broad-leaved burada (Cr), Bu(hu)rada (Ar), Candlewood (Cr). Kupisini (C). Mahaicaballi (Ar), Makarai (Ak), Wamuk (W), Wamuku (M).

Botanical description: Twigs covered with brown woolly hairs when young. Leaves alternate; stipules triangular, 1.5-3 cm long, often twisted; petiole 0.2-0.4(-0.7) cm long, round; blades leathery, ovate, 6-13 x 3-6.5 cm, glabrous and dull above, covered with brown woolly hairs below, margin flat to slightly recurved, apex acuminate, base cordate; primary vein slightly sunken above, prominent below; secondary veins 14-16(-19) pairs, plane to slightly prominent above, prominent below. Inflorescence a terminal or axillary panicle, covered with brown hairs; peduncle 0.5-1.5 cm long; pedicels 1-5 mm long, to 7 mm in fruit. Hypanthium ca. 2 mm long; sepals 5, ca. 2 mm long; petals 5, white, ca. 2 mm long; stamens 7, on 1 side of the hypanthium, staminodes 7-8, opposite stamens, filiform. Fruit a fleshy drupe, grey-purple to dark brown, oblong-ellipsoid to ovoid, (3-)4-6 x 2-3 cm, densely covered with brownish appressed hairs when young, white-lenticellate, middle layer of wall edible, inner layer of wall hard; seeds 2, sweet-tasting, edible.

Field characteristics: Tree (6-)20-35 m tall; trunk 0.2 5-0.7(-1.2) m in diam, Base with root spurs or buttressed. Root spurs low, thick. Buttresses 0.5-1.5(-5?) x 0.51(-2) m. Bark white-grey to grey-brown, lenticellate, scaly to flaky. Lenticels warty, round to linear, 2-5 x 2-3 mm, often split star-like, very densely arranged, rarely more scattered, more or less horizontally oriented. Dead bark 0.5-2 mm thick, rarely to 6 mm thick, grey-brown. Living bark 5-15 mm thick, brown to pink-brown or brown-red, hard, granular. Sapwood pale brown; heartwood yellow-brown or yellowish pink-brown. Crown broad, umbrella-shaped, with many small, round subcrowns; branches spreading, thick. Plate 28 (*Parinari rodolphii*).

Ecology and distribution: Frequent to locally dominant in evergreen seasonal forest in near interior. Occasional to frequent in Mora forest and marsh forest. Occasional in Wallaba forest on white sand. Also occurring as a shrub in savanna. Widely distributed. Flowering mainly from August to October; fruiting mainly from March to April. The seeds are dispersed by spider monkeys, bats, and scatter-hoarding rodents.

Notes: (1) Seedling leaves relatively long and narrow compared to mature leaves, apex long acuminate, tertiary veins inconspicuous. The (upper part of the) stem is densely beset with stipules, often more than would be expected from the number of leaves; (2) The bark is reputed to have aphrodisiac properties; (3) *P. rodolphii* (Burada) differs from *P. campestris* by its acute leaf base and dense cover of sliff, rusty-brown hairs on young twigs.



Parinari campestris

a. habit (x 0.6); b. leaf, lower side (top), and (different leaf) upper side (x 0.6); c. inflorescence (x 3); d. fresh fruit (l) and dried fruit (r) (x 0.6); e. trunk base; f. seedling (x 0.6); g. seedling leaf (x 0.6).

Literature: Silva, M.F. da 1976.

Vernacular names: Purpleheart (Cr). For subsp. *densiflora*: Karawai (Ak), Koroboreli (Ar), Marako (C), Mbak (Ak). For subsp. *venosa*: Kukwi (Ak), Saka (Ar).

Botanical description: Twigs sparsely covered with appressed and erect hairs when young. Leaves alternate, 2-foliolate; stipules ca. 0.5 cm long, caducous; petiole 12.5 cm long, slender; petiolules 0.2-0.5 cm long, longitudinally striate; leaflets opposite; blades papery to leathery, elliptic-oblong, slightly falcate, 7-15(-18) x 4-9 cm, glabrous, glandular-punctate, shiny above, apex acuminate, rounded to obtuse, base asymmetrical, acute, obtuse to gradually narrowed; primary vein plane or sunken above, prominent below; secondary veins 9-11 pairs, slightly to strongly prominent on both sides. Inflorescence a terminal panicle, 8-20 cm long, densely rusty puberulous; peduncle 1-3 cm long; pedicels 5-10 mm long. Flowers pink, white to yellow-white; receptacle cup-shaped, slightly grooved, 5-7 mm long, densely puberulous; sepals 4, 5-12 mm long; petals 5, 7-13 mm long; stamens 10, free. Fruit a leathery to stiff-papery pod, brown, almost circular, 2.5-4 x 2.5-4 x 0.4-0.7 cm, glabrous, wall reticulately veined, upper margin narrowly winged, indehiscent, stipe to 1 cm long; seed 1, circular, 10-15 x 2-3 mm, aril minute.

Field characteristics: Tree (10-)25-35(-55) m tall; trunk 0.45-0.9(-1.5) m in diam. Base buttressed. Buttresses 1-2.5(-4) x 0.5-2.5(-6) x 0.1-0.3 m, often with smaller secondary and tertiary branches, which can interconnect and form cavities in between, sometimes the secondary branches partially free from the soil. Bark red-brown to dark brown, often with yellow-brown to orange-brown scale scars, lenticellate, appearing smooth, but finely scaly. Lenticels round, 0.5-1 mm in diam., very densely arranged. Scales rectangular or irregular, 0.5-3(-5) x 0.5-3 x 0.05-0.1 cm, papery. Dead bark 0.5 mm thick, red-brown. Living bark 4-5 mm thick, finely mottled light brown and pink-brown, hard; inner 1 mm whitish, edges turning black-brown in ca. 5 minutes, producing exudate; exudate scanty, colourless, clear, watery. Sapwood light brown; heartwood dark-brown, gradually becoming purple-brown. Crown large, umbrella-shaped light; branching heavy, erect to spreading. Plate 28.

Ecology and distribution: Locally frequent, often along rivers, in mixed forest, seasonal forest and Mora forest. Often emergent trees. Widely distributed. Semideciduous; flowering throughout the year; fruiting data scarce. According to van Roosmalen (1985) the fruits of *Peltogyne* are dispersed by spider monkeys. Judging by the type of fruit, however, it is not unlikely that wind, and the emergent status of the trees, also play a role in the dispersal.

Notes: (1) In Guyana 2 Subspecies of *P. venosa* occur: subsp. *venosa* and subsp. *densiflora*. According to da Silva (1976). subsp. *venosa* usually is a big tree in mixed forest, with the leaflets 7-15(-18) x 4-9 cm. and a (nearly) glabrous ovary, whereas subsp. *densiflora* usually is a small to medium-sized tree in periodically flooded forest, with the leaflets 6-10(-13) x 2.5-4(-8) cm and a densely pilose ovary; (2) Seedlings with short taproot. Cotyledons pink-brown, lifted from the soil at germination. Leaves like mature leaves but smaller. First pair of leaves opposite, later leaves alternate; (3) Locust (*Hymenaea courbaril*) is closely related to Purpleheart. It has twisted petiolules, and the blade halves are inserted at different levels at the base.



Peltogyne Venosa

a. habit (x 0.6); b. leaf (x 0.6); c. flower (x 0.8); d. part of infructescence (x 0.6); e. fruit (x 0.6); f. seed (x 0.6); g. trunk base; h. seedlings, young (l) and somewhat older (r) (x 0.15).

Literature: Eyma. P.J. 1934.

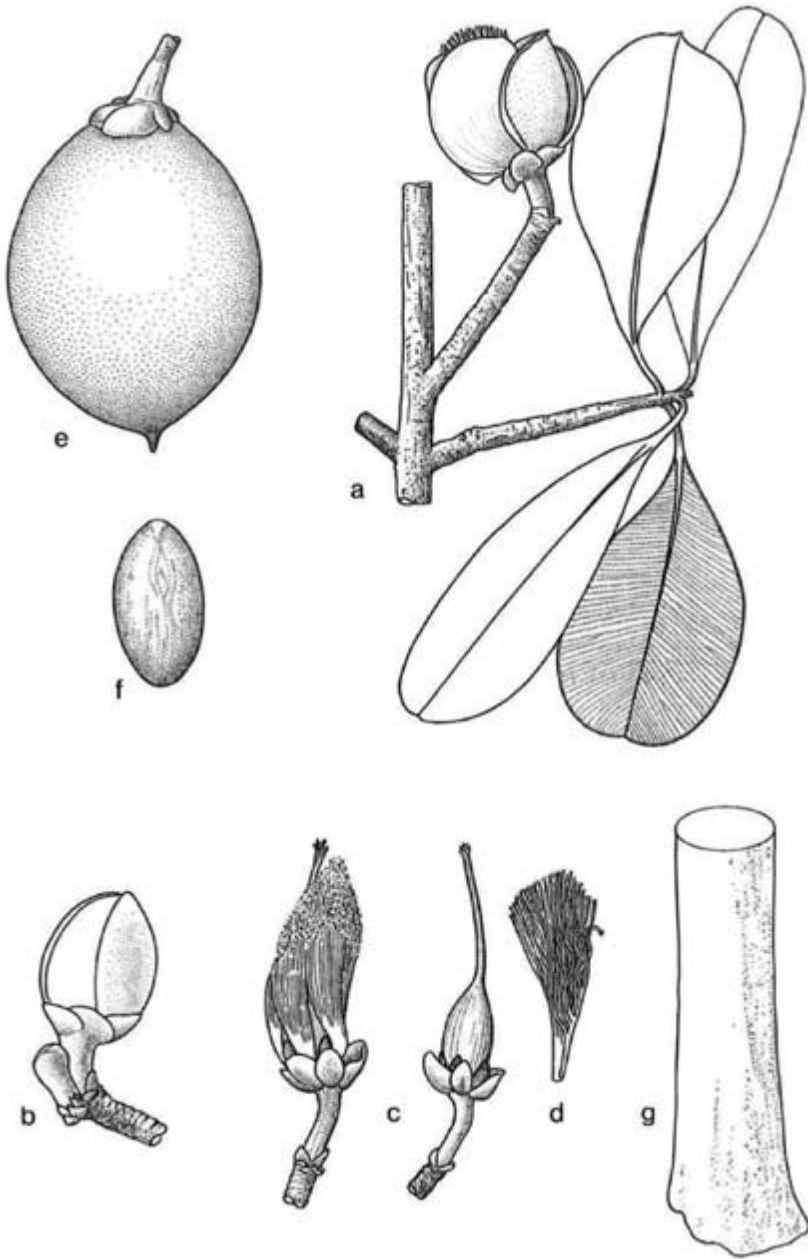
Vernacular names: Pakuri (Ar), Wild mammee apple (Cr).

Botanical description: Twigs stout, angular, glabrous. Leaves opposite, clustered at branch ends and in single pairs on short lateral branchlets; petiole 1-2 cm long, angular, narrowly winged, deeply grooved above; blades (thin) leathery, ovate to obovate, 7-15 x 3.5-8 cm, glabrous and shiny above, margin slightly re-curved, apex rounded, acute to acuminate, base rounded to acute; primary vein plane or sunken above, (strongly) prominent below; secondary veins 50-80 pairs, parallel, very close together, strongly prominent on both sides. Flowers solitary at twig ends, rarely 2-3 together; pedicels 10-30 mm long. Sepals 5, 6-8 mm long, unequal, persistent; petals 5, pink outside, white inside, twisted, 35-40 mm long; stamens numerous, connate at base, in 5 bundles opposite petals. Fruit a berry, golden yellow, more or less globose, 5-10(-12) cm in diam., subglabrous, flesh edible, with yellow latex, which rapidly turns brown; seeds 1-2(-5), brown, leathery, ellipsoid, 35-50 x 20-25 mm. longitudinally ribbed, aril white, fleshy, tasting sweet-sour.

Field characteristics: Tree 20-35 m tall; trunk 0.5-0.8(-1.2) m in diam. Base swollen or with low, thick root spurs. Bark dark grey, (cracked to) fissured, scaly on older trees. Fissures vertical, 10-30 x 0.1-0.5(-1) cm. 1-3 cm apart. Scales to 20 x 5 cm, 0.5-2.5 cm thick. Dead bark 5-15(-25) mm thick, red-brown to dark brown, living bark 6-20 mm thick, light brown, with white layers towards centre, brittle; exudate orange-brown near dead bark, yellow near centre rapidly turning red-orange, gummy, copious. Sapwood light yellow-brown; heartwood dark yellow-brown to orange-brown. Crown broad, round to flattened; branches thick, spreading. Plate 29.

Ecology and distribution: Locally frequent in mixed forest on light sandy soils and in Wallaba forest on white sand. Common in the near interior. Evergreen; flowering in September and October; fruiting mainly in April and May. Seeds are dispersed by spider monkeys, who swallow the fruits and later defecate the seeds.

Notes: (1) Data from the Guyana Forestry Commission indicate that germination of the seeds takes 4-7 months; (2) Amerindians make a drink from the fermented fruits of Pakuri; (3) The yellow exudate is used in veterinary medicine.



Platonia insignis

a. habit (x 0.6); b. flower bud (x 0.6); c. flower, with petals removed (l), and flower with petals and stamens removed (r) (x 0.6); d. stamen bundle (x 0.6); e. fruit (x 0.6); f. seed (x 0.6); g. trunk base.

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

Literature: Pennington, T.D. 1990.

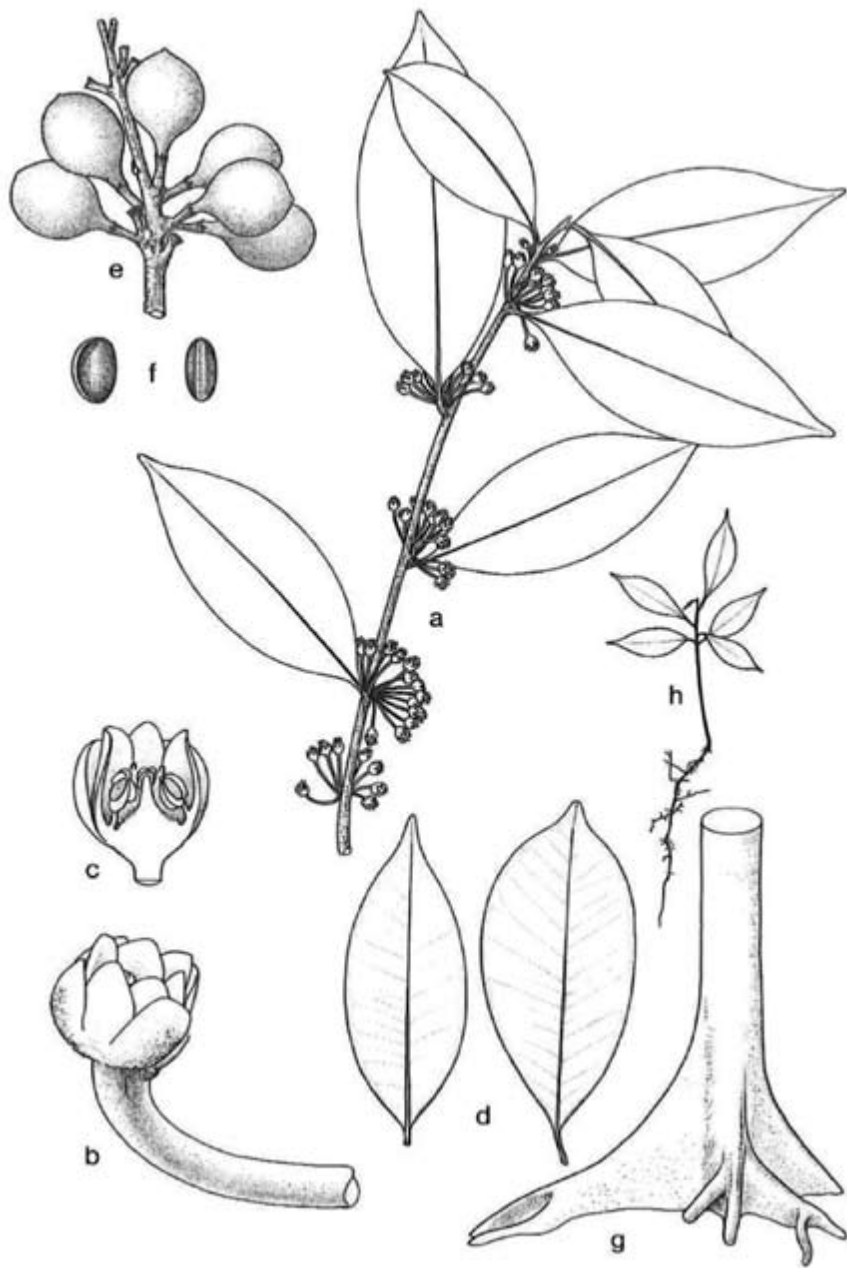
Vernacular names: Bastard kokoritiballi (Cr). Kokoritiballi (Ar).

Botanical description: Twigs more or less glabrous, thinly scaling. Leaves alternate, spaced; petiole 0.4-2 cm long, round or slightly grooved above; blades leathery, elliptic to obovate, (4.5-)6-21 x (2.5-)2.5-8.5 cm, glabrous above, glaucous below (in subsp. *cuspidata*), glabrous or with minute, appressed hairs below, margin plane, apex obtuse, acute or shortly acuminate, sometimes slightly emarginate, base gradually narrowed; primary vein slightly prominent above, prominent below; secondary veins 10-20 pairs, parallel, sunken above, plane or sunken (in subsp. *dura*) below. Inflorescences 2-25-flowered fascicles, axillary and ramiflorous; pedicels 4-10 mm long. Flowers unisexual (plant dioecious), scented; sepals (4-)5(-6), 2-3 mm long; corolla cup-shaped to tubular, (yellow-)white to greenish, 2-3.5(-4) mm long, lobes (4-)5(-8), 1-2.5 mm long; stamens (4-)5(-8), inserted near top of corolla tube. Fruit a berry, yellow to orange or purple, oblongish to ovoid, 2.5-5.5 cm long, almost glabrous; pulp sweet, edible; seeds 1(-2), ellipsoid to broadly oblongish, 15-25 x 5 mm, shiny brown.

Field characteristics: Tree 25-35 m tall; trunk 0.25-0.6 m in diam., cylindrical to fluted. Base straight to buttressed. Buttresses 0.3-1.5 x 0.3-1.2 x 0.05 m, branched. Bark whitish to pale (grey-)brown, smooth to rough-warty, lenticellate, sometimes cracked, sometimes flaky. Lenticels round to elongate, 1-10 x 1-3 mm, in vertical rows. Cracks vertical, 0.5-10 x 0.1-0.2 cm. Flakes vertically oriented, 1-5 x 0.5-3 x 0.5 cm, papery. Dead bark 1-2 mm thick, grey-brown, papery. Living bark 3-5 mm thick, pink-brown to orange-brown to red-brown, layered, somewhat sweet-scented; exudate white, milky, sticky, scanty to copious. Sapwood light brown; heartwood red-brown. Plate 29.

Ecology and distribution: In mixed forest, particularly along rivers (subsp. *cuspidata*) or in Wallaba forest (subsp. *dura*). General in near interior. Flowering mainly from September to November; fruiting mainly from March to April and from October to November.

Notes: (1) In Guyana only subsp. *cuspidata* and subsp. *dura* are known to occur. Although subsp. *robusta* is mentioned in Mennega et al. (1988), and is known from all surrounding countries, it has not (yet) been collected in Guyana. The subspecies are not so clearly defined. In general, subsp. *dura* has smaller leaves (to 7.5 x 3 cm) than subsp. *cuspidata* (to 15 x 5 cm); (2) Seedlings with white latex in all parts stem light brown, smooth. First pair of leaves opposite, later ones alternate. Leaves dull green on both sides, dark above and greyish below, apex long-acuminate.



Pouteria cuspidata

a. habit (x 0.6); b. flower (x 5); c. flower, longitudinal section (x 5); d. leaves. of subsp. *cuspidata* (l) and subsp. *dura* (r) (x 0.6); e. infructescence (x 0.6); f. seed, side view (l) and ventral view (r) (x 0.6); g. trunk base; h. seedling (x 0.2).

Literature: Pennington. T.D. 1990.

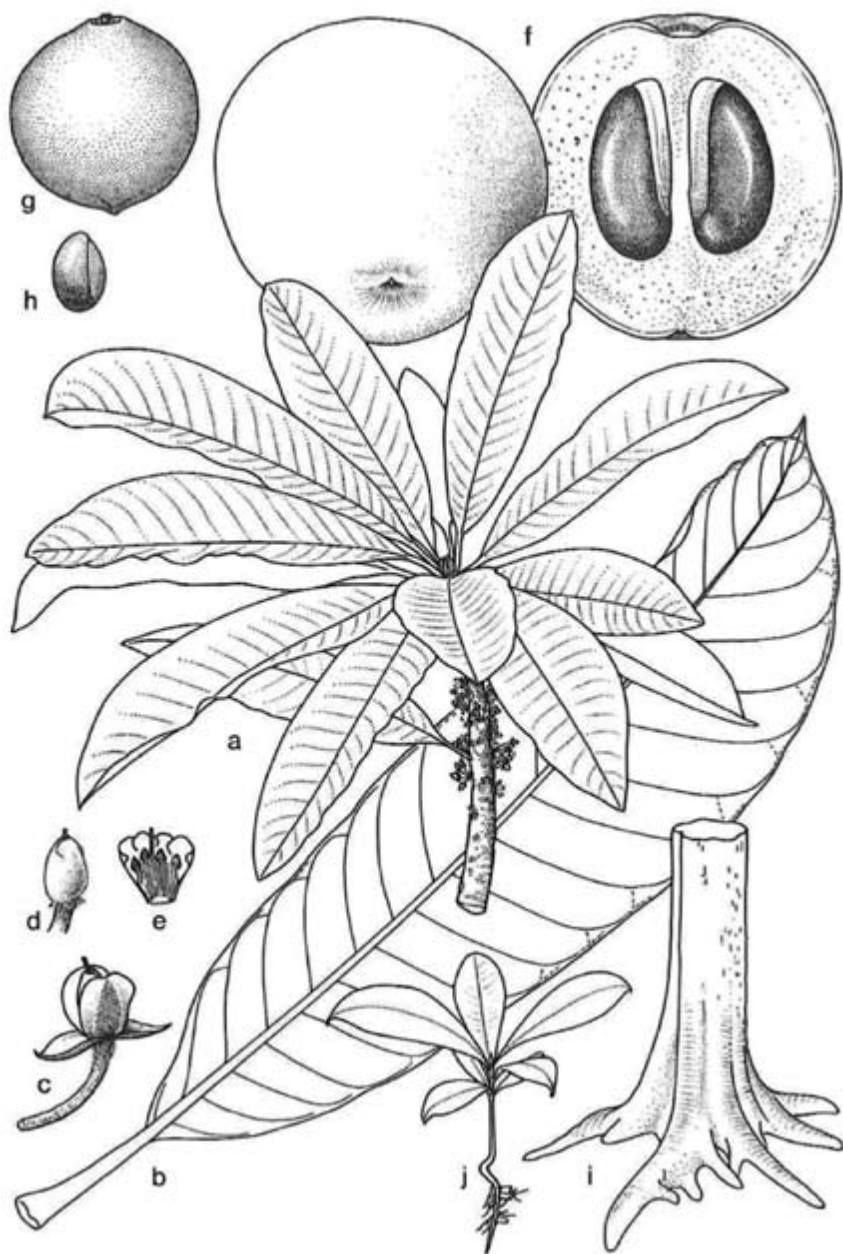
Vernacular names: Asepoko (Ar), Common asepokó (Cr), Marapas mukri (M), Pöyak (Ak).

Botanical description: Twigs stout, grey-brown, covered with short brown appressed hairs when young. Leaves alternate, clustered at twig ends; petiole 1.5-5 cm long, angular, margin plane or slightly revolute; blades leathery, narrowly obovate to narrowly oblong-elliptic, (8-)13-25(-50) x (2.5-)5-10 cm, more or less glabrous above, covered with short, appressed, brown-silky hairs to glabrous below, margin plane, apex shortly acuminate to rounded, base acute, rarely gradually narrowed; primary vein slightly prominent and grooved above, prominent below; secondary veins (11-)13-22 pairs, plane or slightly prominent above, prominent below. Inflorescences 2-5(-10)-flowered fascicles, axillary and below the leaves; pedicels 1-6 mm long. Flowers bisexual; sepals 4, 3-10 mm long, persistent; corolla pale green, widely tubular, 5-14 mm long, lobes 4, 1.5-4 mm long; stamens 4, inserted at 1/4-3/4 from base of corolla tube, 3-6 mm long. Fruit a berry, orange-yellow, globose, 3-7 cm in diam., densely covered with pale brown erect and appressed hairs when young, edible, sweet-tasting; seeds 2-4, ellipsoid, 17-33 x 13-18 mm, shiny brown.

Field characteristics: Tree (8-)20-35(-40) m tall; trunk 0.25-0.9 m in diam., sometimes fluted from the base. Base swollen to buttressed. Buttresses steep, slender, to 1 x 1 m. Bark red-brown, soft, fibrous, fissured or cracked, scaly. Cracks/fissures vertical, 5-30 x 0.2-0.5 cm. Scales 3-5 x 0.5-2 cm, thin-papery. Dead bark 1-3 mm thick, dark brown, papery. Living bark 2-3 mm thick, pink-brown or creamy brown, turning darker on exposure to air, slightly layered, with splintery fibres; exudate white, milky, thin, sticky, slow, scanty. Sapwood light brown; heartwood red-brown to orange-brown. Crown rounded to flattened, dense, branches erect. Plate 30.

Ecology and distribution: Occasional to common in mixed forest in the near interior, but less frequent in northeastern Guyana. Occasional in Mora forest in southeastern Guyana. Evergreen; flowering mainly from October to December and from April to June; fruiting mainly in March and April. The fruits are eaten by e.g. spider monkeys, who defecate the seeds after digestion of the fruit.

Notes: (1) Seedlings with white latex in all parts. Leaves densely covered with rusty hairs in bud, apex long-acuminate; (2) There are many different species of Sapotaceae occurring in the forests of Guyana. Of the genus *Pouteria* ca. 25 species are known to occur in Guyana. Although many different 'types' are recognized by tree spotters, there are quite some vernacular names which 'cover' more than 1 botanical species.



Pouteria guianensis

a. habit (x 0.6); b. leaf, lower side (x 0.6); c. flower (x 3); d. flower, with sepals removed (x 3); e. flower, opened to show stamens and pistil (x 3); f. fresh fruit, complete (l) and in longitudinal section (r) (x 0.6); g. dried fruit (x 0.6); h. seed (x 0.6); i. trunk base; j. seedling (x 0.2) .

Literature: Pennington, T.D. 1990.

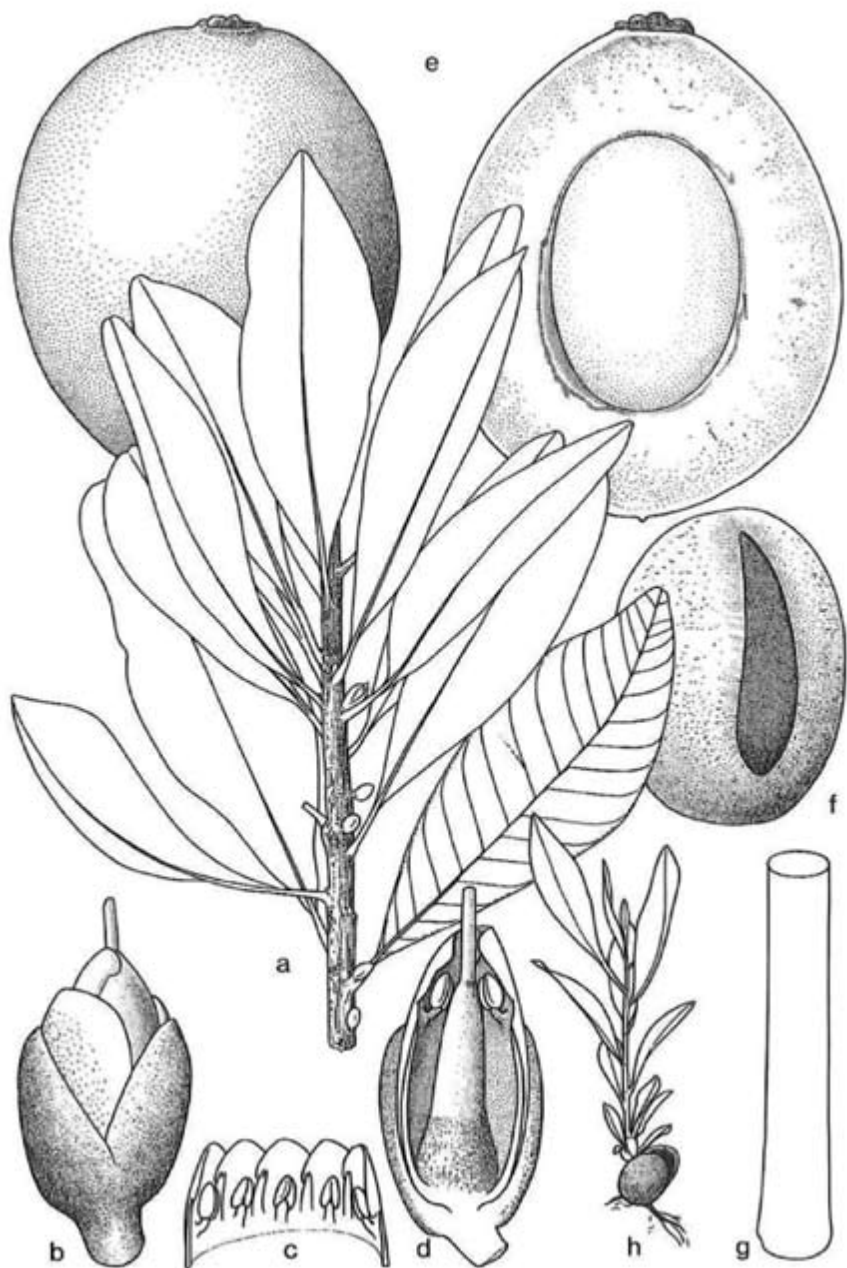
Vernacular names: Chuya (M), Durban pine (Cr), Por (W), Suya (Cr).

Botanical description: Twigs stout, covered with short appressed, rusty hairs when young. Leaves alternate, clustered at twig ends; petiole 0.5-1.5 cm long, round; blades leathery, narrowly obovate, 12.5-25 x 4.5-10 cm, glabrous above, glabrous or with some appressed hairs along primary vein below, margin slightly recurved, apex obtuse, sometimes emarginate, base acute to gradually narrowed; primary vein slightly prominent above, prominent below; secondary veins 14-20 pairs, plane to slightly prominent above, prominent below. Inflorescences 2-3-flowered fascicles, axillary or below the leaves; pedicels 0.5-2 mm long, densely covered with rusty hairs. Flowers sweet-scented, bisexual; sepals 5, 7-12 mm long, unequal; corolla green-white, tubular, 15-18 mm long, lobes 5, 5-6 mm long; stamens 5, inserted at top of corolla tube, 3-5 mm long; staminodes 5, alternating with stamens. Fruit a berry, purple-brown, ovoid-oblongish to globose, 10-20 x 7-10 cm, rusty-velutinous, becoming glabrous, pulp light yellow, granular, sweet, strongly scented; seed 1, broadly ovoid to ellipsoid, 60-90 x 50-60 mm.

Field characteristics: Tree 25-35(-45) m tall; trunk 0.35-0.9(-1.2) m in diam. Base slightly swollen or with low, rounded root spurs. Bark light brown to grey-brown, often appearing smooth from a distance, cracked, sometimes scaly or with scattered pockmarks, sometimes with horizontal rings. Cracks vertical, 0.5-10 x 0.3-1 cm, 0.5-2 cm apart. Dead bark 2-3 mm thick, dark brown. Living bark 25-50 mm thick, dull pink-brown to orange-brown to red-brown, sometimes with red layer on transition to dead bark, granular, soft, sweet-scented; exudate white, milky, thick, sticky, (scarce to) copious, appearing in droplets which gradually accumulate at base of slash. Sapwood and heartwood light brown. Crown oval, moderately dense, branches erect, with conspicuously tufted leaves. Plate 30.

Ecology and distribution: Locally common in mixed and seasonal forest, particularly on lateritic soil in hilly terrain in the near interior, Rupununi district and the Kanuku Mts. Evergreen; flowering from March to June and from August to October; fruiting in August and September and from December to April. It is not unusual to find both flowers and fruits on the same tree. This is probably due to the long period of time needed to form the large fruits.

Note: (1) Seedlings usually present near parent trees, but in low numbers. Seed persistent at stem base for at least one year. Plants stout, almost lacking rusty-brown pubescence of mature trees. Stem and leaves shiny green, leaf apex acute.



Pouteria speciosa

a. habit (x 0.3); b. flower (x 3); c. part of corolla, opened to show stamens and staminodes (x 3);
 d. flower, longitudinal section (x 3); e. complete fruit (l), and fruit in longitudinal section (r) (x 0.6);
 f. seed (x 0.6); g. trunk base; h. seedling (x 0.1).

Literature: Daly, D.C. 1987.

Vernacular names: Common kurokai (Cr), Kurokai (Ar), Maruwa (Ak), Porokai (Ar), Waruwai (Ak).

Botanical description: Twigs slender to rather stout, sparsely covered with erect and appressed hairs. Leaves alternate, imparipinnate, 3-5-foliolate; petiole 1.5-6 (-8.5) cm long, flattened above, transversely wrinkled; rachis 3-8 cm long, round, keeled above; petiolules 0.5-1.5(-2) cm long, to 4 cm in terminal leaflet, grooved above; leaflets opposite; blades papery to leathery, narrowly elliptic to narrowly obovate, slightly oblique (except for terminal one), 8.5-15(-19) x 2-5.5(-7) cm, terminal one slightly larger, glabrous and dull on both sides, margin plane, apex acuminate, base acute to obtuse; primary vein plane to slightly prominent above, prominent below, the central zone distinctly so; secondary veins 10-16 pairs, slightly prominent above, prominent below. Inflorescence an axillary, lax raceme of cymes, 4-10(-17.5) cm long; peduncle 2-3 cm long; pedicels 0.5-1.5 mm long. Flowers unisexual; calyx cup-shaped, 1-1.5 mm long, lobes 0.4-0.5 mm long, persistent; petals 5, white-green, 2-4 mm long; stamens 10. Fruit a drupe, shiny, green, asymmetrical, very broadly ovoid, 1.5-2(-3) x 1.5-2 cm. glabrous, with conspicuously apiculate almost pungent top, valves 2-3, stipe 0.1-0.3 cm long; pyrenes 1(-3), completely covered by white, spongy pulp; seed 1 per pyrene.

Field characteristics: Tree (8-)15-25(-40) m tall; trunk 0.35-0.7 m in diam., somewhat fluted. Base buttressed. Buttresses slender, 1-2.5 x 0.75-1(-1.5) x 0.05-0.15 m, steep, often with secondary branches, partially free from soil. Bark light brown to grey, sometimes tinged orange, smooth, faintly ringed (particularly on buttresses), lenticellate. Lenticels round to linear, 0.5-10 x 0.5-1.5 mm, horizontally oriented, in horizontal rows. Dead bark 0.5 mm thick, brown. Living bark 2-3 mm thick, pink-brown to red-brown, with lighter streaks, sometimes tinged yellowish near sapwood, somewhat fibrous, with a strong aromatic scent; exudate colourless and clear when fresh, turning dull grey-white after exposure, resinous, sticky, scanty, finally becoming a hard clot. Sapwood and heartwood pale grey-brown or pink-brown, discolouring to brown. Crown rounded, moderately dense, branches erect. Plate 31.

Ecology and distribution: Occurring frequently in mixed, Mora and marsh forest. Widely distributed, except in northeastern Guyana. Evergreen; flowering and fruiting all year round. Pollination probably takes place by small, stingless bees from the families Trigonidae and Meliponidae (Daly, 1987). The pyrenes are eaten by e.g. birds (toucans, cotingas) and spider and howler monkeys, who digest the fleshy layer around the pyrene and regurgitate or defecate it afterwards.

Note: (1) Seedlings usually in fairly high numbers near parent trees. Stem light-brown, bark very aromatic. Leaves almost glabrous; first pair opposite, later leaves alternate. Early leaves 1-foliolate, petioles thickened on both ends.



Protium decandrum

a. habit (x 0.6); b. branch of inflorescences (x 3); c. 1-seeded fruit (x 0.6); d. 2-seeded fruit, basal view (top) and side view (bottom) (x 0.6); e. pyrene, covered with pulp (x 0.6); f. trunk base; g. seedling (x 0.1).

Literature: Rojo, J.P. 1972.

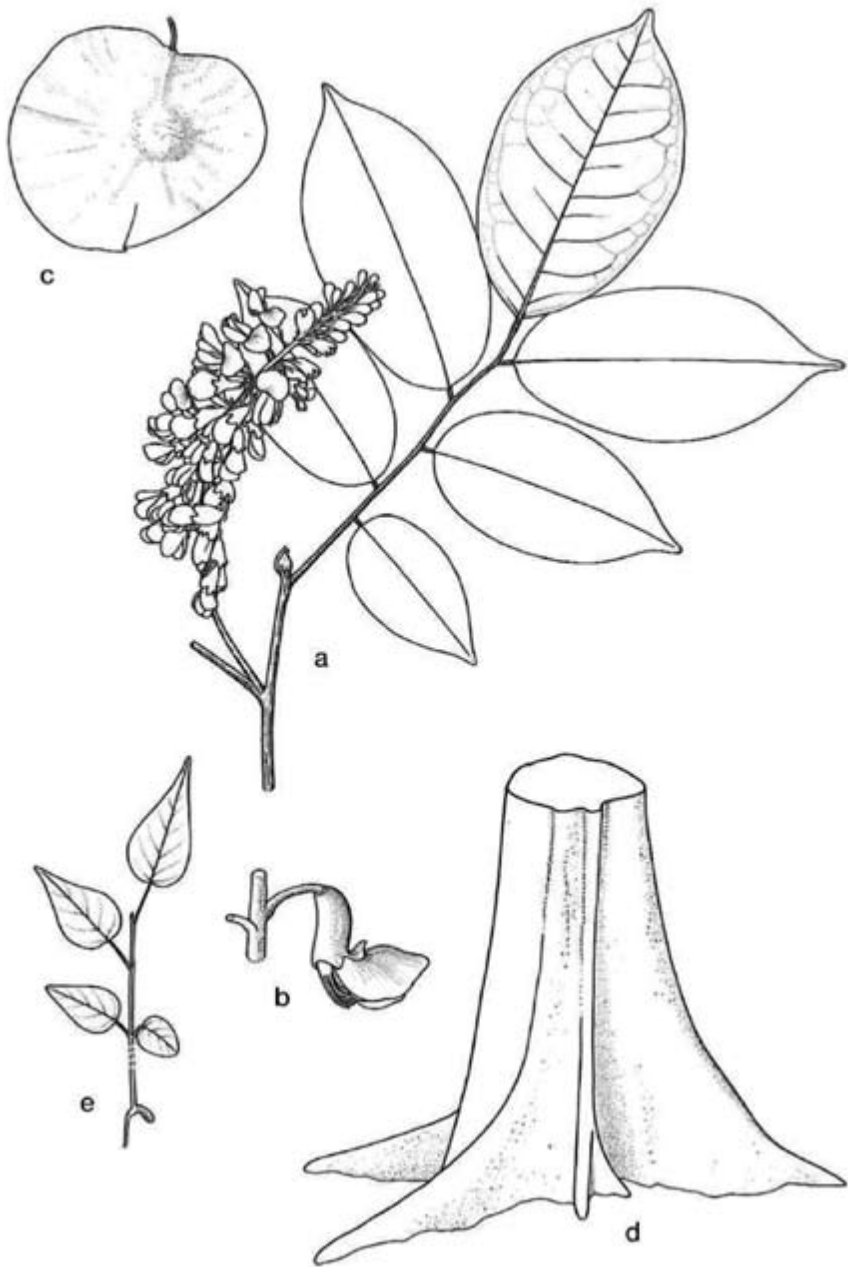
Vernacular names: Hill corkwood (Cr), Itikiboro (Ar), Mutushi (C).

Botanical description: Twigs round, sparsely lenticellate, usually sparsely covered with appressed hairs when young. Leaves alternate, imparipinnate, 3-12-foliolate; stipules caducous, usually linear, 3-10 mm long, covered with brown appressed hairs; petiole 2-5(-8) cm long, round; rachis 3-11-(19) cm long; petiolules 0.3-0.6(-0.9) cm long, grooved above, sparsely to rather densely covered with mainly appressed hairs; leaflets alternate; blades papery to leathery, ovate to elliptic, (1.5-)5-12 (-18) x 2-7 cm, glabrous and shiny above, sparsely covered with appressed hairs below, margin flat apex usually acuminate, base obtuse to acute; primary vein plane to sunken above, prominent below; secondary veins 7-11-(13) pairs, slightly prominent above and below; tertiary veins strongly reticulate on both sides. Inflorescence an axillary or terminal raceme, 10-15 cm long, densely covered with appressed hairs; peduncle 1-5 cm long; pedicels 2.5-12 mm long. Calyx bell shaped, 5-11 mm long, usually densely hairy; petals 5, yellow to orange (standard sometimes with a violet spot in the centre), clawed, ca. 10-20 mm long; stamens 10. Fruit a winged pod, usually yellow, circular, 4-8 x 4-8 x 0.3-0.6 cm, more or less glabrous, reticulately veined, beaked, indehiscent, wing papery, beak lateral, 4 mm long; seeds 1-2(-3), kidney-shaped or more or less oblong-ellipsoid, (10-)14-25 x 5-13mm.

Field characteristics: Tree (6-)20-35 m tall; trunk 0.45-1 m in diam., often angular to flanged. Base buttressed. Buttresses 2.5-4(-6) x 1.5-3 x 0.2 m, with secondary and tertiary branches, sometimes partially free from soil, rather straight, spreading at base. Bark light brown to (light) grey-brown, smooth, lenticellate, sometimes shallowly fissured, flaky. Lenticels round, 1-2 mm in diam., densely arranged. Fissures mainly in buttress axils, vertical, to 10 x 0.3 x 0.2-0.5 cm. Flakes mainly higher on bole, vertically oriented, irregular, 3-15 x 1-8 x 0.1-0.2 cm. Dead bark 1mm thick, grey-brown. Living bark 2-5 mm thick, with alternating pink-brown and orange-brown layers; exudate (dark) red, clear, sticky, in coalescent droplets. Sapwood and heartwood light yellow-white to light brown. Crown light, flat topped, with erect to spreading branching. Plate 31.

Ecology and distribution: Occasional to locally frequent in (dry) mixed forest in near interior, Kanuku Mts. and Rupununi district. Deciduous; flowering mainly from September to November; Fruiting recorded in March and December. The fruits are dispersed by wind.

Notes: (1) *Pterocarpus rohrii* is a very variable species (Rojo. 1972), particularly in shape and indument of the different parts of the plant; (2) Seedling leaves simple, ovate. First pair opposite, later leaves alternate.



Pterocarpus rohrii

a. habit (x 0.6); b. flower (x 1.2); c. fruit (x 0.6); d. trunk base; e. seedling (x 0.3)

Synonym: *Simarouba amara* Aublet

Literature: Jansen-Jacobs, M.J. 1979.

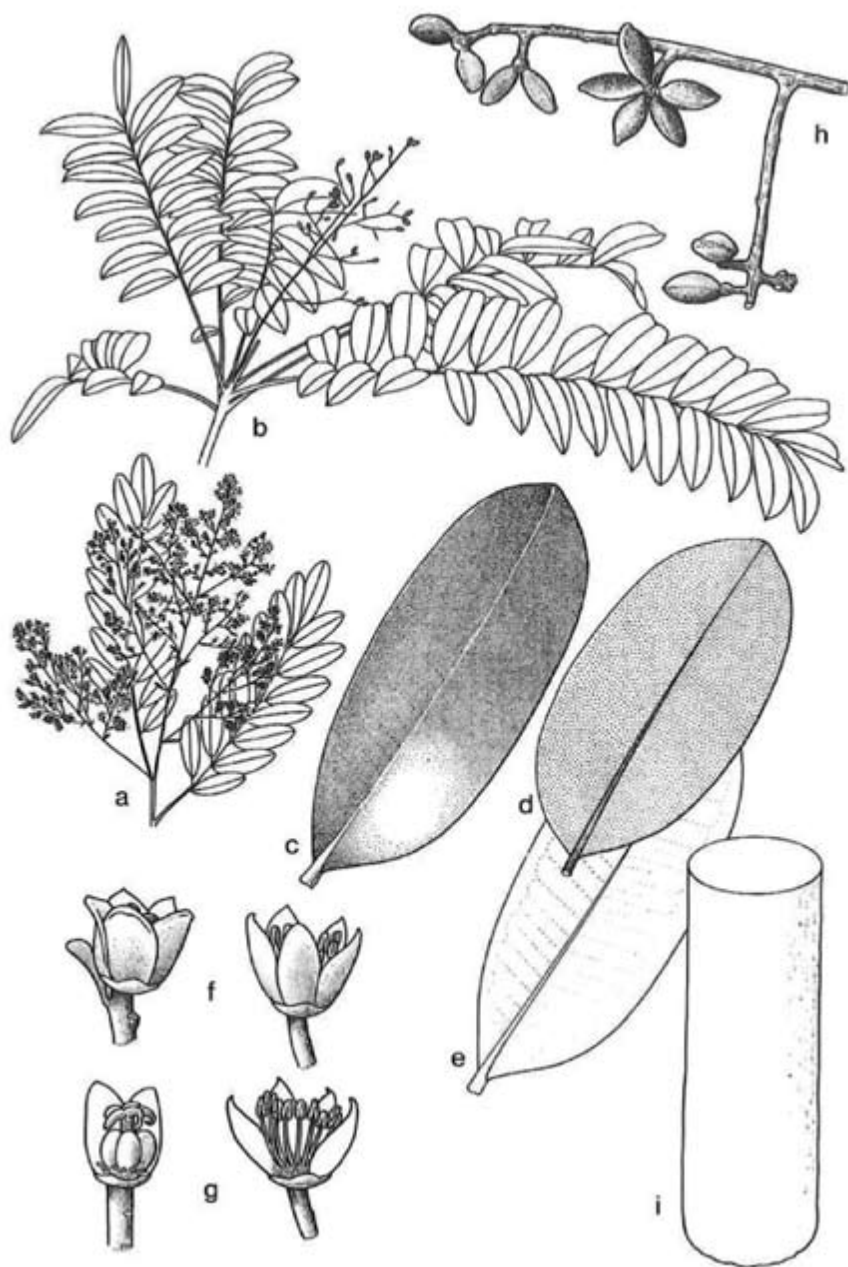
Vernacular names: Aku (Ak), Bitter ash (Cr), Shirima (M), Simarupa (Ar, C), Simere (W), Yaku (Ar).

Botanical description: Twigs stout, glabrous. Leaves alternate clustered at branch ends, imparipinnate, (7-)9-21(-26)-foliolate petiole (4-)5-10 cm long, swollen at base, slightly grooved above; rachis 10-35 cm long; petiolules (0.2-)0.3-0.5(-0.6) cm long, grooved above; leaflets alternate, or rarely some opposite; blades leathery, narrowly obovate to elliptic, (4-)6-15(-21) x 2-6 cm, glabrous and shiny above, dull and roughish or papillate-glaucous below, margin slightly recurved, apex rounded, emarginate, or sometimes apiculate, base acute, often unequal; primary vein slightly sunken above, but central zone slightly raised, prominent below; secondary veins 10-14 pairs, sunken on both sides. Trees with either female or male flowers. Inflorescence a terminal, many-flowered panicle, 25-30 cm long; peduncle 2-4 cm long; pedicels 2-3 mm long, to 6 mm in fruit. Flowers unisexual; sepals connate at the base, ca. 1 mm long, lobes 5, 0.5 mm long, ciliate, rounded; petals green to yellow-green, sometimes white, 3-4.5 mm long; male flowers with 10 stamens, 5 long and 5 shorter ones, with densely hairy appendages. Fruit with several free fruitlets or mericarps on a 1-3 mm long stipe; fruitlets (1-)2-5 fleshy, black drupes, ellipsoid to ovoid, 1-1.6 x 0.5-0.9 cm, glabrous, somewhat flattened, ridged along upper and lower margin; seeds 1(-2) per drupe.

Field characteristics: Tree (7-)15-35(-45) m tall; trunk 0.25-0.75 m in diam. Base straight or swollen. Bark light brown to creamy brown, smooth when young, fissured when older, sometimes scaly. Fissures vertical, 1-20 x 0.1-1 x 0.1-0.5 cm, forming a somewhat irregular pattern. Scales more or less rectangular, 1-10 x 1-2 cm. Dead bark 1-6 mm thick, dark brown, with a yellowish zone on transition to living bark. Living bark 6-20 mm thick, yellow-brown or creamy brown or orange-yellow, with brown streaks, sometimes with black spots, darkening rapidly on exposure to air, soft, (somewhat) granular, with bitter or sweet scent and bitter taste. Sapwood and heartwood very light brown, with bitter scent and taste. Crown broad, moderately light, branches thick, erect to spreading. Plate 32.

Ecology and distribution: Frequent in evergreen seasonal forest on brown sand. Occasional in mixed forest and Wallaba forest. Widely distributed. Seedlings and saplings require sufficient light. Evergreen or semi-deciduous; flowering mainly from September to November; fruiting mainly from January to May. The fruits are eaten by howler and spider monkeys, who defecate the seed after digesting the flesh.

Note: (1) In infusion from the bark (or roots) is used to treat indigestion, dysentery and diarrhoea.



Quassia simarouba

a, b. habit (x 0.1); c. leaflet, upper side (x 0.6); d, e. leaflet, lower side (x 0.6); f flower, female (l) and male (r) (x 3); g. flower, with part of the petals removed, female (l) and male (r) (x 3); h. part of infructescence (x 0.6); i. trunk base.

Literature: Cuatrecasas, J. 1961.

Vernacular names: Dukuria (Ar), Kötöre (Ak), Puire (M), Sand dukuria (Cr), Yapopari (C).

Botanical description: Twigs glabrous to puberulous. Leaves alternate; stipules absent; petiole 0.4-1.2 cm long, grooved above; blades stiff-leathery, elliptic to ovate, 5-15 x 2-6 cm, usually glabrous, margin entire or slightly serrate-crenate, usually with glands, apex acuminate, base obtuse to acute; primary vein plane to slightly sunken above, prominent below; secondary veins 10-12 pairs, plane to slightly prominent above, slightly prominent below. Inflorescence an axillary, dense, dichotomously branched, many-flowered panicle, 2-7 cm long peduncle 1-3 cm long; pedicels 1-2 mm long. Flowers fragrant; calyx 6-7 mm long; petals yellowish green to green, 3-4.5 mm long, rather thick; stamens 10, united at base. Fruit a leathery drupe, dark green turning orange, ellipsoid-oblong to narrowly so, gradually narrowed at base, (1.5-)2-3 x 0.9-2 cm, glabrous wall 1-1.5 mm thick, resinous, flesh edible; pyrene 1, woody, narrowly oblong, obscurely 10-furrowed; seeds 1(-3).

Field characteristics: Tree (4-)20-30 m tall; trunk 0.4-0.6(-0.8) m in diam. Base somewhat swollen. Bark dark brown to red-brown, sometimes grey-brown, cracked to fissured. Cracks / fissures 1-15 x 0.1-0.5 cm. Dead bark 1-2 mm thick, dark (red-)brown. Living bark 8-10 mm thick, dark red, nearly orange near sapwood, sometimes with white vertical streaks near dead bark ('bottom' of fissures), soft fibrous, sticky. Sapwood light yellow-brown; heartwood dark red-brown. Crown rounded; branching erect, moderately heavy. Plate 32.

Ecology and distribution: Occasional in mixed forest, Wallaba forest and savanna, on brown sand or white sand. General in near interior, Rupununi district and southeastern Guyana. Evergreen; flowering mainly from May to July; fruiting mainly from September to November. Seeds are dispersed by monkeys, who eat the fruits and defecate the pyrene.

Notes: (1) The name Dukuria is also used for *Sacoglottis cydonioides*, which can be distinguished from *S. guianensis* by its round fruits and unfissured, lenticellate bark; (2) *S. guianensis* looks like its relative Tauroniro (*Humiria balsamifera*) in the forest, but the slash is different. Compared to Tauroniro the living bark is darker and lacks the colour differentiation (see pictures).



Sacoglottis guianensis

a. habit (x 0.6); b. inflorescence (x 1.8); c. fruit (x 0.6); d. pyrene (x 0.6); e. trunk base.

Synonym: *Schefflera paraensis* Huber ex Ducke.

Literature: Maguire, B., Steyermark, J.A. and Frodin, D.G. 1984.

Vernacular names: Blunt-leaf karohoro (Cr), Karohoro (Ar), Matchwood (Cr).

Botanical description: Twigs round, covered with yellow-brown hairs when young. Leaves alternate, clustered at branch ends, palmate, 7-11-foliolate; stipules axillary, woody, broadly ovate-triangular, 1.5-2 cm long, concave; petiole 20-50 cm long, basally swollen, rough; petiolules 2-14 cm long, the central ones longer than the outer ones; blades leathery, narrowly elliptic to elliptic-oblong, 9-20 x 3-9 cm, the central ones largest, glabrous and shiny above, densely covered with very small yellow-brown appressed hairs below, margin recurved, apex obtuse to acute, often emarginate and apiculate, base acute, gradually narrowed, or obtuse; primary vein prominent on both sides; secondary veins 4-8 pairs, plane or slightly prominent above, prominent below. Inflorescence an axillary panicle of umbels, usually several together, 15-25 cm long, densely covered with very small pale brown appressed hairs; peduncle 1-3.5 cm long; pedicels ca. 5 mm long, to 15 mm in fruit. Flowers densely clustered, ca. 10 mm in diam., creamy green, sometimes partially male; calyx a dentate rim of ca. 1 mm high; petals 5, 3-5 mm long; stamens 5. Fruit a drupe, purple-green, globose, 0.8-1.3 x 0.6-1.2 cm, densely covered with brown-white appressed hairs, becoming glabrous; seeds 5, flat.

Field characteristics: Tree 18-30 m tall; trunk 0.3-0.55 m in diam. Base swollen or with root spurs. Root spurs to 0.3 x 0.3 x 0.2 m. Bark creamy brown to light grey-brown, lenticellate. Lenticels round. 1-3 mm in diam., densely arranged in somewhat irregular, vertical rows, sometimes united in a continuous line, rows 0.51 cm apart. Dead bark 1 mm thick, light (grey-)brown. Living bark 5-10 mm thick, creamy brown to orange-brown, streaked light brown, turning yellow-green at exposure to air, with sweet-aromatic scent; exudate light brown, clear, rapidly turning blue-green, somewhat sticky. Sapwood and heartwood yellow-white or grey-white, discolouring to grey-yellow or brown-yellow. Crown broad, umbrella like, light, branches erect to spreading. Plate 33.

Ecology and distribution: Occasional in Wallaba forest, rare in mixed forest and Mora forest. A common species in the near interior, Rupununi district and southeastern Guyana. Flowering mainly in February and March, fruiting mainly from March to May. The seeds are dispersed by birds.

Notes: (1) Seedlings have alternate leaves; the first 1-7 leaves are simple, later leaves are palmate with 3-5 leaflets. Leaf margin lobed to crenate, apex obtuse to rounded; young leaf buds and the veins below covered with yellow-brown, appressed hairs; (2) The fresh inner bark is used in the treatment of abscesses.



Schefflera decaphylla

a. habit (x 0.2); b leaflet, lower side (x 0.35); c. inflorescence (x 0.3); d. flower bud (x 3); e. flower (x 3); f. fresh fruit, complete (l) and in cross-section (r) (x 0.6); g. dried fruit (x 0.6); h. trunk base; i seedling (x 0.1).

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

Pointed-leaf karohoro

Synonym: *Didymopanax morototoni* Aublet

Literature: Maguire, B., Steyermark, J.A. and Frodin, D.G. 1984.

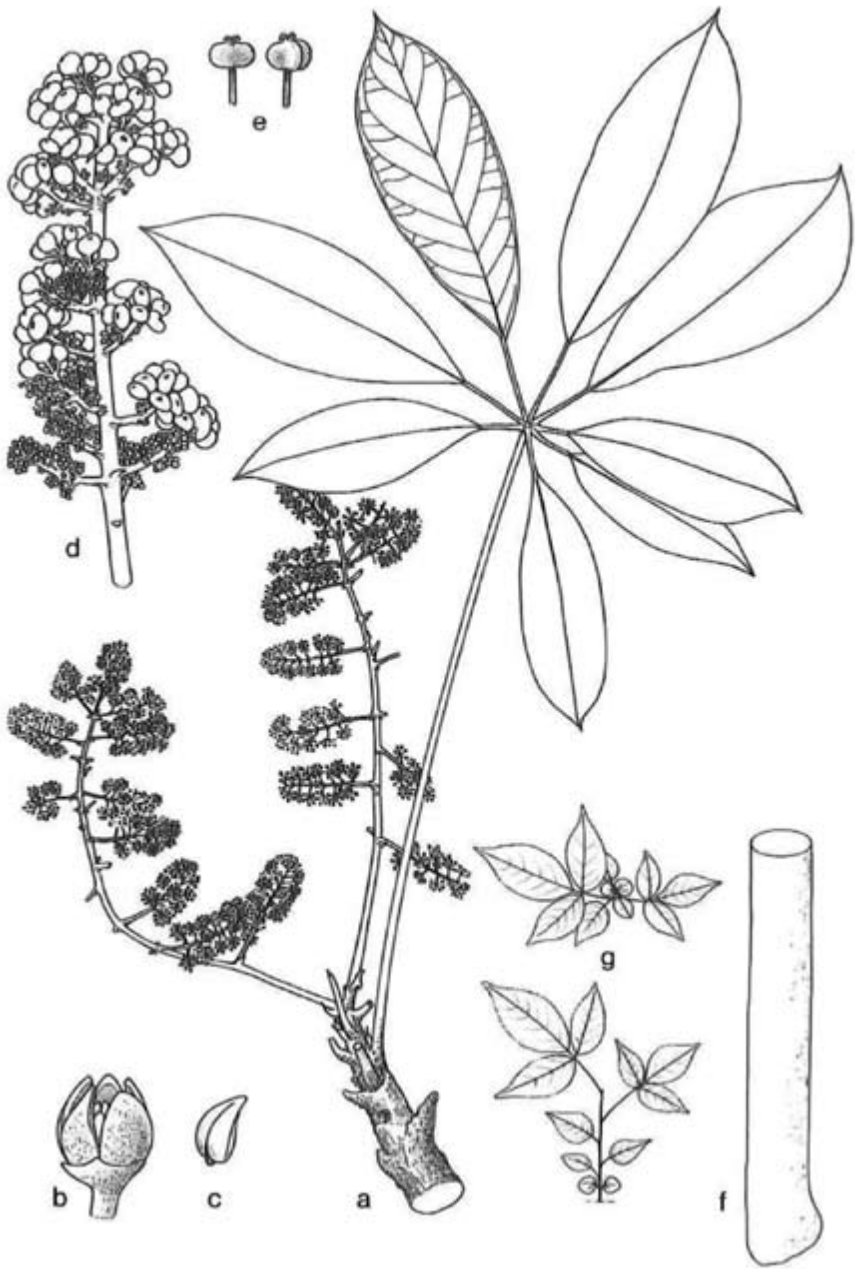
Vernacular names: Karohoro (Ar), Matchwood (Cr), Morototo (C), Pi (W), Pointed-leaf karohoro (Cr), Pörnai (Ak), Puna (M).

Botanical description: Twigs stout, covered with short golden-brown hairs when young. Leaves alternate, clustered at branch ends, palmate, 7-11(-12)-foliolate; stipules axillary, woody, brown, triangular, 1-1.5 cm long; petiole 40-70 cm long, basally swollen; petiolules 3- 10 cm long, the central ones clearly longer than the outer ones, somewhat swollen at both ends; blades leathery, narrowly elliptic-oblong to elliptic, 10-30 x 3-10 cm, the central ones clearly largest glabrous and shiny above, densely covered with short appressed golden-brown hairs below, margin undulate, apex acuminate, apiculate, base obtuse; primary vein slightly prominent above, prominent below; secondary veins 10-12 pairs, weakly prominent above, prominent below. Inflorescence a terminal many-flowered panicle of umbels, usually several together, 25-40 cm long, golden-brown puberulous; peduncle 7-8 cm long; pedicels 2-4 mm long, to 10 mm in fruit. Flowers densely clustered, ca. 3 mm in diam., white to greenish, 5-merous; calyx a dentate rim of ca. 0.5 mm high; petals 5, ca. 2 mm long; stamens 5. Fruit a drupe, shiny, purple-green, subglobose to transversely ovoid, laterally flattened, sometimes 3-lobed, 0.4-0.5 x 0.5-0.7 x 0.2 cm, glabrous, with ca. 10 longitudinal ribs, each side with one median furrow; seeds 2(-3) flat.

Field characteristics: Tree (10-)20-35 m tall; trunk (0.2-)0.35-0.8 m in diam. Base swollen or with short, thick root spurs. Bark light brown, smooth, often horizontally ringed in young trees, lenticellate. Lenticels round to elongate, 1-4 x 1-2 mm. in vertical rows, rows 1-3 cm apart. Dead bark ca. 1 mm thick, light brown. Living bark ca. 4 mm thick, creamy brown to orange-brown, often with light brown streaking, with 1 mm thick green layer just below dead bark, becoming yellow-green after exposure to air; exudate colourless, clear, turning somewhat greenish, slightly sticky. Sapwood and heartwood similar, light brown. Crown broad, flattened, umbrella-shaped; branches relatively few, straight, forking regularly; leaves concentrated in upper part of the crown. Plate: 33.

Ecology and distribution: This species occurs in primary and secondary mixed forest on sandy soil, and in Mora forest. An occasional, but widely distributed species. Semi-deciduous; flowering mainly from February to May and from September to November; fruiting mainly from May to June and from October to November. The seeds are dispersed by e.g. birds (Hladik, 1970) and they are fire-resistant.

Notes: (1) Seedlings are light-demanding. They have round, 3-veined cotyledons, lifted from the ground by the reddish stem. Leaves alternate; the first 1-3 (-5) simple, later ones palmate, with an increasing number of leaflets; leaf margin is provided with conspicuous hairs; (2) The exudate from the bark is used to treat abscesses, a decoction of the bark is used as a relief for itching skin; (3) Apart from the difference in ecological preference with *S. decaphylla*, the following points are useful for identification: the pointed lip at the leaflets (vs. obtuse to rounded), and the flattened, 2(-3)-seeded fruit (vs. globose and 5-seeded).



Schefflera morototoni

a. habit (x 0.25); b. flower (x 6); c. stamen (x 6); d. infructescence (x 0.6); e. fruit. 2-seeded (l) and 3-seeded (r) (x 0.6); f. trunk base; g. seedling, top view (top) and side view (bottom) (x 0.25).

Literature: Dwyer, J.D. 1957.

Vernacular names: Araurama (C), Kaditiri (Ar), Kalili (W), Kata (M), Thick-skin kaditiri (Cr), Wamkoam (W), Warabari (Ak), Yawaredan (Ar).

Botanical description: Twigs angular, densely to sparsely covered with long reddish brown erect hairs when young. Leaves alternate, paripinnate, (8-)10-14-foliolate; stipules 1-1.5 cm long, pinnate with filiform lobes, soon deciduous; petiole 2.5-6 cm long, round or grooved above; rachis 8-30 cm long; leaflets opposite; petiolules 0.4-0.5 cm long; blades leathery, elliptic to ovate, 4-13(-20) x 2.5-5(-8.5) cm, sparsely covered with whitish brown appressed hairs above, sparsely covered with brown erect hairs below, apex acute to acuminate, base obliquely rounded to heartshaped; primary vein plane to weakly prominent above, prominent below; secondary veins 7-9(-10) pairs, slightly prominent to sunken above, (slightly) prominent below. Inflorescence a terminal, lax panicle, 10-20 cm long, often many crowded together densely covered with reddish brown woolly hairs. Flowers subsessile; calyx cup-shaped, 2-3 mm long; petals 5, yellowish to greenish white, 2-3 mm long, linear; stamens 10, exserted, 4-6 mm long, unequal; ovary stipitate. Fruit a pod, leathery to thin-woody, grey-black, narrowly ellipsoid, 5-12 x 2.5-3(-3.5) x 0.1-0.2 cm, flattened, wing-like, indehiscent, but woody outer wall flaking off; seed 1, broadly elliptic to circular, thin, to 20 mm in diam.

Field characteristics: Tree (18-)25-40 m tall; trunk 0.3-0.65(-0.9) m in diam., often with very shallow (2-3 mm deep) longitudinal depressions. Base usually with many buttresses. Buttresses 0.5-1.5(-2) x 0.5-1 x 0.05-0.25 m, often with smaller secondary branches, spreading. Bark red-brown to red-grey, with lighter patches or broad horizontal bands, smooth, with fine cracks, sometimes scaly. Cracks irregular, more or less vertical, 0.5-1 x 0.3-0.5 cm. Scales round, 0.5-1 cm in diam., leaving reddish patches. Dead bark 1-3 mm thick, dark brown. Living bark 3-10 mm thick, (light) orange-brown to creamish; exudate yellow-brown, clear, very sticky, scanty. Sapwood light brown, grooved below the bark; heartwood dark (red-)brown. Crown flat to rounded and spreading, open; branches erect and slender. Plate 34.

Ecology and distribution: Occasional to frequent in mixed forest, rare in Wallaba forest. Widely distributed in the near interior. Semi-deciduous; flowering mainly in October and September; fruiting mainly in March and April. According to files from the Guyana Forestry Commission flowering occurs every 2-3 years for individual trees. The fruits are Wind-dispersed.

Notes: (1) Seedlings often common in gaps in the forest, and easily recognized. Plants densely covered with patent, rusty-brown hairs. Stipules pinnate, with filiform lobes. Young leaves and leaf tips drooping, with blade halves folded upward. Leaflets increasing in size towards leaf apex (upper ones 3 times as large as lower ones), giving the leaf an obovate outline. Rachis prolonged ca. 0.5 cm beyond the terminal pair of leaflets; (2) *Sclerolobium micropetalum* (Thin -skin) kaditiri lacks the erect rusty-brown hairs, and has 14-20-foliolate leaves and smaller flowers; (3) Species of the related genus *Tachigalia* occurring in Guyana are also called Yawaredan. They lack the rusty brown hairs, have a slightly winged leaf rachis, and the calyx remnant at the base of the fruit is more prominent and obliquely cut at the top.



Sclerobium guianense

a. habit (x 0.6); b. leaflet (x 0.6); c. flower (x 2.7); d. complete fruit (l), and fruit without woody wall (r) (x 0.6); e. trunk base; f. seedling, top view (top) and side view (bottom) (x 0.1).

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

Literature: Taylor, E.L. 1989.

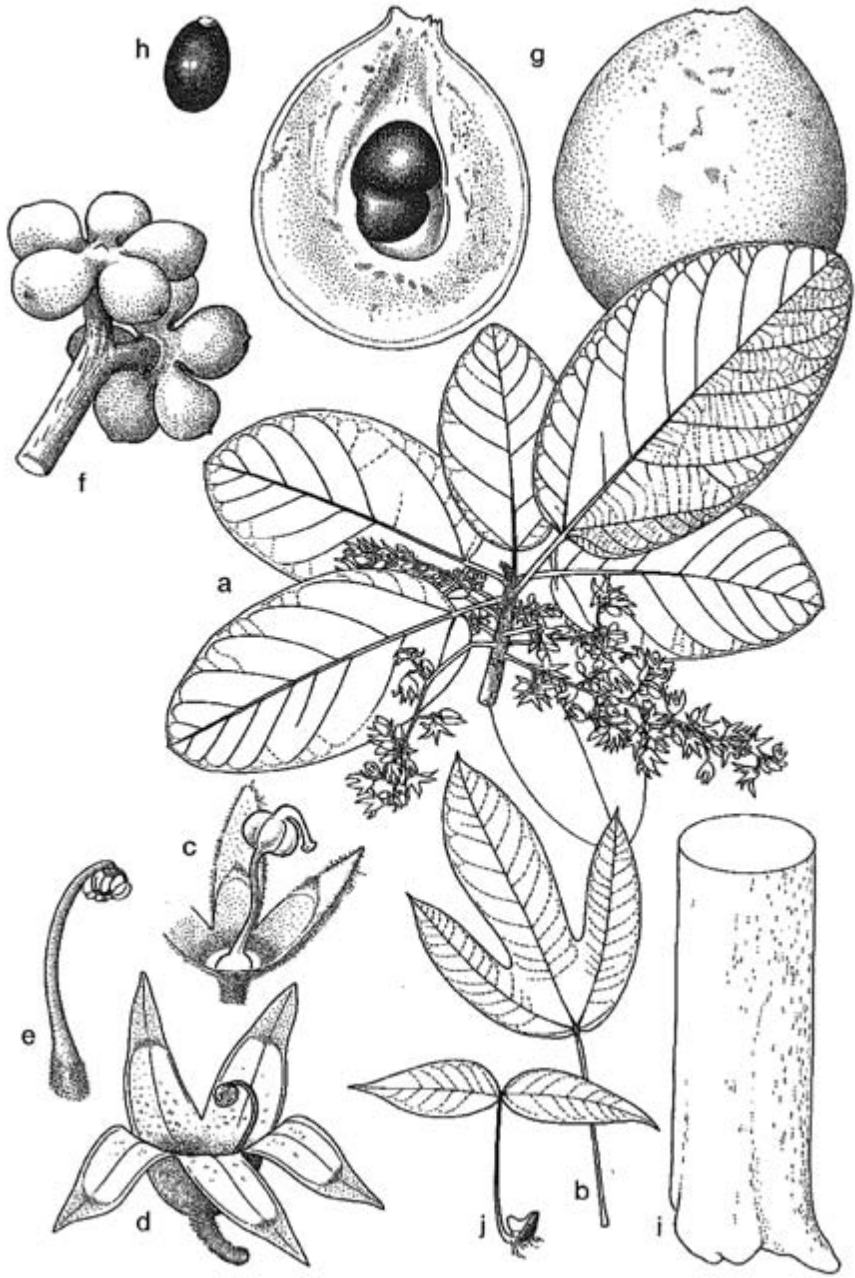
Vernacular names: Kara (M), Maho (Ar), Ranai (W), Rough-leaf maho (Cr), Saraurai (Ak), Sekerau (Ak), Yahu (Ar).

Botanical description: Twigs stout, densely covered with stellate hairs when young, with petiole scars below the leafy part. Leaves alternate, clustered near twig ends; stipules enclosing the young leaf buds, 0.4-1 cm long; petiole 1-10 cm long, thickened towards top and base; blades leathery, (oblong-)elliptic, 4-28 x 2-16 cm, glabrous above, densely covered with stellate hairs below, somewhat glaucous and rugose below, margin plane or slightly recurved, somewhat undulate, apex obtuse or rounded, base obtuse to slightly cordate; primary veins (3-)5-7, slightly prominent to plane above, strongly prominent below; secondary veins (5-)7-8(-10) pairs, sunken above, strongly prominent below; tertiary veins prominent below. Inflorescence a subterminal, axillary panicle, somewhat pendent, 10-15 cm long; peduncle 1-1.5 cm long, to 10 cm in fruit; pedicels 1-7 mm long. Flowers unisexual, both male and female flowers present in an inflorescence; calyx pinkish inside, 5-lobed, 12-13 mm long, lobes erect or spreading, 8-10 mm long, with a rim on inside about halfway the lobe; petals absent; stamens 10, connate into a central column. Fruit composed of 1-5 follicles; follicles woody, mottled brown, yellow, and orange, broadly ellipsoid, 7-10 x (3-)5-7 x 5-6.5 cm, densely brown-velutinous, dehiscent, wall 1-2 cm thick, inside pink to red, with red stellate hairs when young; seeds 3-10, broadly ellipsoid, 15-20 x 10-15 mm, black, shiny, wall fragile.

Field characteristics: Tree 35-40 m tall; trunk 0.25-0.9 m in diam. Base straight or low buttressed, sometimes slightly scalloped. Bark light grey-brown to grey, smooth, lenticellate. Lenticels round, 2-3(-5) mm in diam., split starlike, in vertical rows which are 1-2 cm apart. Dead bark 0.1 mm thick, light brown, papery. Living bark 10-15 mm thick, pink(-brown), turning darker after exposure, with mesh of red lines which gives the slash a dotted appearance, brittle, somewhat fibrous, weakly sweet-scented; exudate colourless, sticky, very slow and scanty. Sapwood and heartwood not clearly separated, light brown. Crown flat to rounded, moderately dense, branching spreading. Plate 34.

Ecology and distribution: Frequent to occasional in mixed forest on brown sand. Occasional in Mora forest. Occurring in the near interior. Semi-deciduous; flowering mainly in July; fruiting mainly from February to May.

Notes: (1) Seedlings with cotyledons hardly escaping from the half buried seed. Cotyledons pink inside, brown outside. Stem light green, brown-hairy, particularly so near top. First pair of leaves opposite, later leaves alternate. Leaves grey-green below. Leaves of young trees 3-lobed, to 50 x 40 cm, petiole to 40 cm long; (2) *S. rugosa* was transferred to the new genus *Xylosterculia* by Kostermans (1972), which was criticized by Gentry (1976). Taylor (1989), in her revision of the genus *Sterculia*, does not accept *Xylosterculia*, and this opinion is followed here; (3) *Sterculia pruriens* (Smooth-leaf maho) has leaves with an acuminate apex, and much less conspicuous tertiary veins. Fruits in general smaller, ca. 4 x 3.5 (maximum 7 x 5.5) cm, with acuminate apex, and yellowish hairs inside.



Sterculia rugosa

a. habit (x 0.25); b. leaf of young tree (x 0.1); c. female flower, opened to show pistil (x 3); d. male flower (x 3); e. staminal column (x 6); f. immature fruit (x 0.6); g. halves of dehiscent follicle, outside (r) and inside (l) 9X 0.6; h. seed (x 0.6); i. trunk base; j. seedling (x 0.15).

Literature: Cowan, R.S. and Lindeman, J.C. 1989.

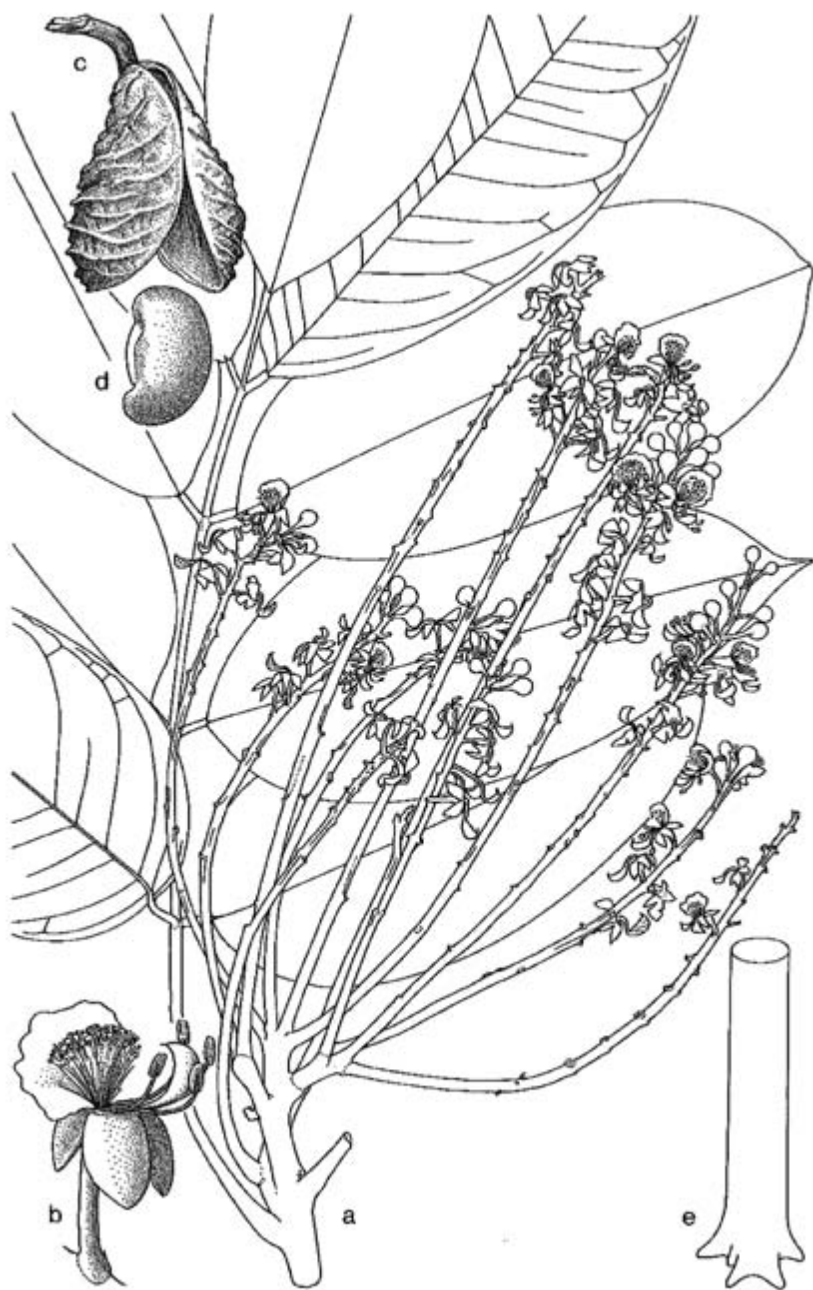
Vernacular names: Itikiboroballi (Ar), Morompo (M), Okraprabu (Ak).

Botanical description: Twigs round, puberulous and glaucous when young. Leaves alternate, imparipinnate, (3-)5-9-foliolate; stipules triangular, less than 0.1 cm long, caducous; petiole 2-10 cm long, basally swollen; rachis 2-6.5 cm long; leaflets opposite; petiolules 0.4-0.8 cm long; blades leathery, ovate to oblong-elliptic, 7-16 x 3-7 cm (basal pairs smaller), glabrous above, glaucous and sparsely covered with minute appressed hairs below, apex acute to acuminate, base obtuse to rounded; primary vein sunken above, prominent below; secondary veins ca. 10 pairs, obscure, slightly prominent below. Inflorescence an axillary or terminal, many flowered raceme, or a panicle of racemes, 15-20 cm long, sparsely to densely covered with small, yellow-brown, appressed hairs; peduncle 2-5 cm long; pedicels 4-7 mm long. Flowers strong-scented; calyx warty in bud, lobes 4-5, 4-5 mm long, connate in bud, soon reflexed; petal 1, white (or sometimes pinkish), 6-9 mm long, clawed; 2-4 larger stamens and numerous smaller ones. Fruit a woody pod, yellow-brown to grey-brown, ellipsoid to obovoid, 5.5-8 x 3-6 x 1-3.5 cm, densely covered with brownish appressed and erect hairs when young, with anastomosing, strongly salient ridges, dehiscent along both sutures from the apex, stipe 0.8-0.9 cm long; seed 1, dark brown, reniform, 30-40 x 15-20 mm, (somewhat) shiny; aril crenulate, white.

Field characteristics: Tree (6-)20-30 m tall; trunk 0.2-0.6 m in diam. Base often swollen. Bark yellow-brown to grey-brown, on older trees grey-black, rough, cracked, scaly to flaky. Cracks rather irregular, both vertical and horizontal, 0.5-5 x 0.1-0.2 cm. Scales irregular, vertically oriented, 1-5(-10) x 0.5-3 cm. Dead bark 1-6 mm thick, grey-brown, more dark rusty-brown towards living bark, with a 1-2 mm thick, yellow-brown layer next to living bark. Living bark 1-8 mm thick, creamish to light brown, with numerous black (outer part) to red (inner part) layers, hard, granular, weakly sweet-scented; exudate (light) red, clear, sticky, appearing in droplets on inner part of living bark, finally forming a red film on slash. Sapwood light-brown; heartwood dark (purple-)brown, Crown small, light, branches erect to spreading. Plate 35.

Ecology and distribution: Occasional in Wallaba forest, rare in mixed forest. Occurring in north-central and northeastern Guyana, and in the Pakaraima Mts. Semi-deciduous; flowering mainly in October and November; fruiting mainly in January and October. Parrots often already eat the seeds out of the pods, when these are still unripe.

Note: (1) *Swartzia xanthopetala* (Itikiboroballi) differs from *S. benthamiana* by the much more smooth bark and the more diffuse red layers in the living bark. It also occurs in Wallaba forest. *Swartzia sprucei* (Itikiboroballi) has a rough bark. It occurs in mixed forest. Its ovate to nearly round, 1-1.5 cm long stipules can often be found under the tree.



Swartzia benthamiana

a. habit (x 0.6); b. flower (x 3); c. dehiscent fruit (x 0.6) d. seed (x 0.6); e. trunk base.

Literature: Cowan, R.S. and Lindeman, J.C. 1989.

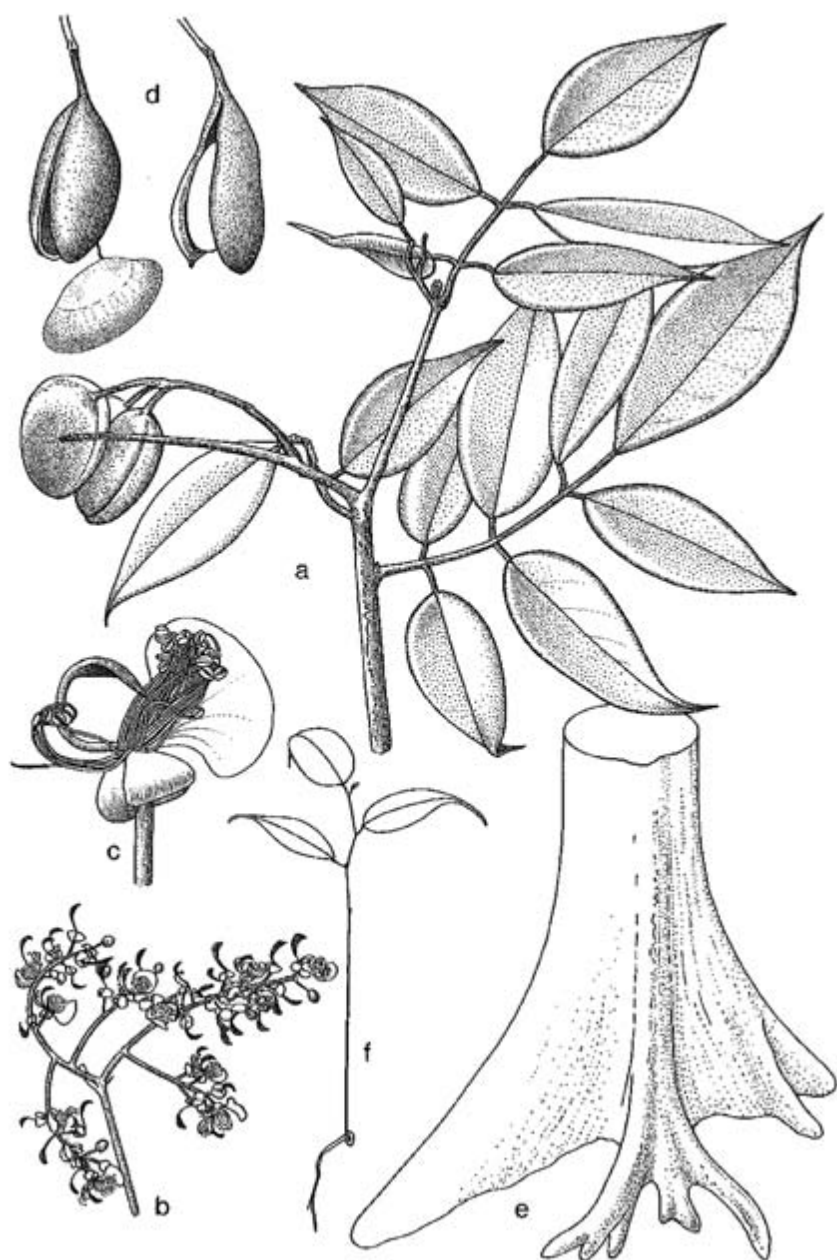
Vernacular names: Awartu (M), Brown ebony (Cr), Clubwood (Cr), Ironwood (Cr), Shiraip (W), Wamara (Ar).

Botanical description: Twigs, round, densely covered with short, yellow-brown to rusty, mainly appressed hairs when young. Leaves alternate, imparipinnate, (3-)5-7-foliolate; stipules triangular, 0.5-0.6 cm long, caducous; petiole 1-2 cm long, round; rachis 3-7.5 cm long; petiolules 0.3-0.8 cm long; leaflets opposite; blades leathery, narrowly ovate to narrowly elliptic, 4.5-16.5 x 1.5-5.5 cm, glabrous and shiny above, densely covered with small, rusty, mainly appressed hairs below, margin recurved, apex acuminate, base acute to obtuse; primary vein sunken above, prominent below; secondary veins inconspicuous. Inflorescence an axillary panicle, 4.5-15 cm long, covered with small, rusty, mainly appressed hairs; peduncle 0.5-3 cm long; pedicels 5-8 mm long. Flowers sweet-scented; calyx ellipsoid in bud, glabrous, lobes 3(-4), 3-5 mm long, connate in bud, soon reflexed; petal 1, (pale) yellow, clawed, 10-15 mm in diam., claw ca. 5 mm long; stamens yellow, 2-6 larger ones and numerous smaller ones. Fruit a leathery pod, glaucous, dark green, broadly oblong-ellipsoid, beaked, 2.5-4 x 1.5-3 x 1 cm, glabrous, wall with brown, sticky resin, dehiscent along both sutures, stipe ca. 1 cm long; seed green-white, aril white, fleshy, covering basal half of seed.

Field characteristics: Tree 20-35(-45) m tall; trunk 0.4-0.75 m in diam., often slightly fluted. Base buttressed. Buttresses 0.5-3 x 0.5-1.0 x 0.05-0.15 m, rather steep, concave, sometimes with smaller secondary buttresses. Bark grey-brown or black-brown, often patchy, lenticellate, smooth, cracked, scaly to flaky on older trees. Lenticels round, 0.5-2 mm in diam., whitish, densely arranged. Cracks vertical and horizontal, 1-20 x 0.1-0.5 x 0.1-0.2 cm. Scales / flakes irregular, 1-30(-50) x 0.2-15 x 0.1-0.2 cm. Dead bark 1-3 mm thick, (dark) brown. Living bark 1-3 mm thick, light brown to pink-brown, with diffuse black layer(s) below dead bark, scented somewhat cucumber-like; exudate red, clear, sticky, scanty. Sapwood light brown; heartwood dark purple or dark brown. Crown dense, oval to rounded, branches erect. Plate 35.

Ecology and distribution: Dominant in seasonal forest, together with Yaruru (*Aspidosperma excelsum*). Frequent in other types of seasonal forest and in mixed forest, occasional in Mora forest. Occurring on loam and laterite. Widely distributed, except in parts of the N.W.-district; apparently endemic to Guyana. Evergreen; flowering mainly from December to February and in June and July fruiting mainly from March to May and in September and October. Seed dispersal probably by monkeys and birds.

Notes: (1) Although Wamara is dominant in some forest types, Cowan and Undeman (1989) mention that only two collections exist. One was made in the Mabura Hill area, the other one along the Essequibo River without more precise indication; (2) The seeds germinate within one month. Cotyledons spreading out flat on the soil, exposing the shiny green inside. Stem brown-green, often slightly bent over. First leaves 1-foliolate, blade halves folded upward in bud, showing brown-green lower side. Even in saplings 1-foliolate leaves are common, with blades to 27.5 x 12 cm.



Swartzia leiocalycina

a. habit (x 0.5); b. inflorescence (x 0.3); c. flower (x 1.4); d. dehiscent fruit (r), and dehiscent fruit (l), with seed hanging out on funicle (x 0.6); e. trunk base; f. seedling (x 0.25).

Literature: Eyma, P.J. 1934.

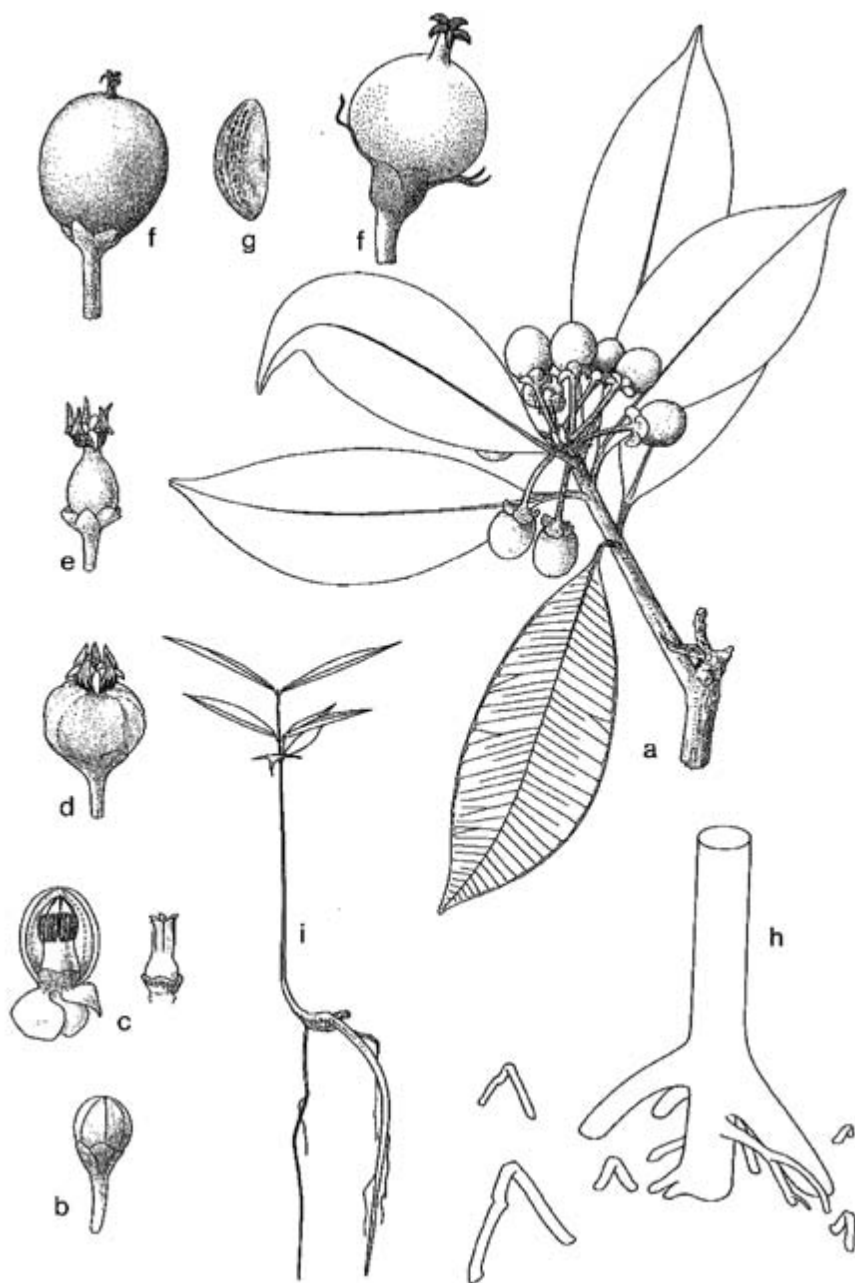
Vernacular names: Buckwax tree (Cr), Karamanni (M), Maitakin (Ak), Manni (Ar).

Botanical description: Twigs angular, glabrous. Leaves opposite; petiole 0.5-0.8 cm long, grooved above; blades (more or less) leathery, narrowly ovate to narrowly obovate, 6-12 x 2-4 cm, glabrous, shiny above, dull below, margin slightly revolute, apex long acuminate with blunt tip, base narrowed, acute; primary vein slightly sunken above, strongly prominent below; secondary veins 35-50 pairs, parallel, close together, plane above, slightly prominent to plane below. Inflorescence axillary or terminal, more or less umbelliform cymes; pedicels 4-13 mm long, up to 25 mm long in fruit, reddish; sepals 5, 2-8 mm long, overlapping, reddish, persistent; petals 5, red, 11-14 mm long, twisted, only slightly spreading during flowering; stamens united into a 5-lobed tube, which is split to halfway from the top. Fruit a berry, brown to purple, with yellow latex, ellipsoid-globose to globose, 2-4 cm long, glabrous, crowned by the persistent style (5-lobed at the top); seeds 1-3, with marbled surface, ca. 20 x 10 mm.

Field characteristics: Tree (10-)15-25(-40) m tall; trunk 0.3-0.55(-1.2) m in diam. Base with root spurs, stilt-rooted, in marshy and swamp forest with pneumatophores. Root spurs to 0.5 m high. Stilt roots 0.4-1(-2) m high, reaching soil at 0.5-1(-1.5) m from trunk, flattened laterally, 0.05-0.45 m high, 0.05-0.2 m wide, often with secondary and tertiary branches. Pneumatophores looped, sharply bent, 0.2-0.8 m high, 0.5-2 cm thick, up to ca. 5 m from tree. Bark grey-brown or yellow-brown, lenticellate, cracked, scaly. Lenticels round, 3-5 mm in diam., scattered or in vertical rows, rather inconspicuous. Cracks vertical, 1-5(-20) x 0.1-0.5 x 0.1-0.5 cm. Scales 1-10(-15) x 1-5 x 0.1-1 cm, consisting of more or less papery layers. Dead bark 1-5 mm thick, light brown. Living bark 10-20 mm thick, white to yellow-brown, or striated light brown and orange-brown, with a 1-2 mm thick white layer next to dead bark and sapwood, soft; exudate a light yellow latex, very sticky, copious. Sapwood yellow-brown to light brown; heartwood grey-brown, yellow-brown, or light brown, sometimes tinged pinkish. Crown pyramidal to round, open, branches more or less horizontally spreading. Plate 36.

Ecology and distribution: Dominant to common in swamp and marsh forest. Less frequent in mixed forest, mainly near creeks. Occasional in Mora forest, rare in Wallaba forest. Widely distributed and one of the characteristic species of swamp and marsh forests. Evergreen; flowering mainly from July to October; fruiting mainly from February to April. The flowers are pollinated by birds. The seeds are animal-dispersed, e.g. by bats (Sabatier, 1983).

Notes: (1) In mixed forest on less swampy soil the pneumatophores are lacking. Furthermore the leaves are smaller (4-6 x 1.5-2.5 cm) and the flowers too (ca. 0.5 cm in diam.); (2) Seedlings with coarse taproot, often scarcely branched, with yellow latex in all parts. Stem green, with (sub) opposite, linear, ca. 0.5 cm long scales in the part below the leaves. First pair of leaves with a relatively wide blade compared to later leaves; (3) The gum can be made into Karaman, used for caulking boats and canoes and for fixing arrow and spear heads. This is a mixture of the gum of Manni, powdered charcoal, burned leaves of Truli (*Manicaria saccifera*) or Buruma (*Pourouma* spp.), and bees wax or tallow, and sometimes also the gum of Kufa (*Clusia* spp.).



Symphonia globulifera

a. habit (x 0.6); b. flower bud (x 0.6); c. flower bud, partly opened to show staminal tube and pistil (x 0.6); d. flower (x 0.6); e. young fruit (x 0.6); f. fruit, dried (l) and fresh (r) (x 0.6); g. seed (x 0.6); h. trunk base, with pneumatophores; i. seedling (x 0.2).

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

White cedar

Literature: Gentry, A.H. 1992.

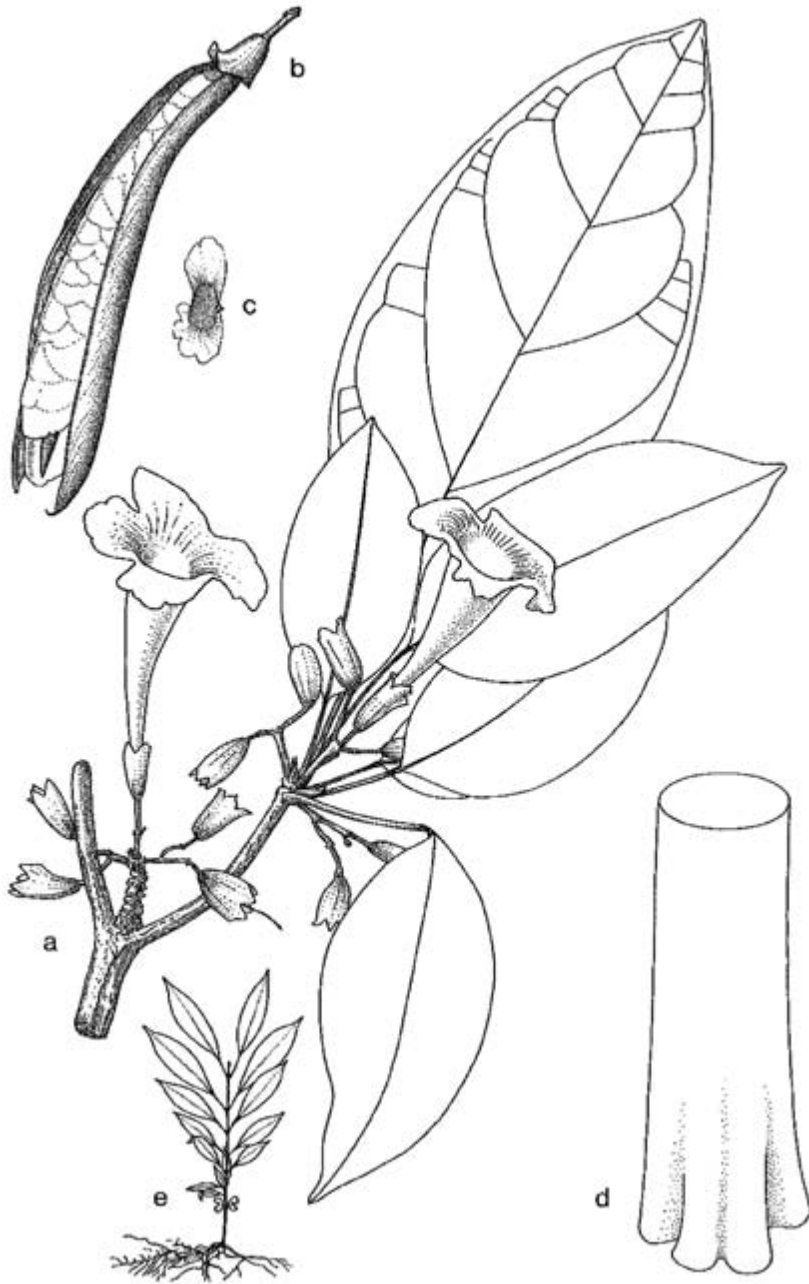
Vernacular names: Panda (C), Warakuri (Ar), White cedar (Cr) (see note 3).

Botanical description: Twigs ribbed, with U-shaped leaf-scars, grey, covered with brown scales when young. Leaves opposite, 1-foliolate (see note below); petiole 3-10 cm long; blades (stiff-)leathery, elliptic, 15-27 x 7-11 cm, glabrous above, covered with very small scales below, margin somewhat recurved, apex acute to long-acuminate, often apiculate, base acute; primary vein sunken above, prominent below; secondary veins 7-9 pairs, sunken above, strongly prominent below. Inflorescence a terminal, few-flowered, forked cyme, ca. 15 cm long; peduncle ca. 2 cm long; pedicels ca. 5 mm long. Calyx cup-shaped, 2-lipped, 10-25 mm long, persistent, covered with very small scales; corolla white, tubular, 40-100 mm long, hairy inside at the throat. Fruit a more or less woody capsule, linear, 10-20 x 0.8-1.5 cm, apiculate, densely covered with scales; seeds numerous, oblong, winged, body 5-7 x 8-11 x 1 mm; wings papery, 10-15 mm long.

Field characteristics: Tree (4-)20-30(-40) m tall; trunk 0.2-0.5(-1) m in diam., often fluted at the base, tapering. Base swollen or buttressed. Buttresses 1-2(-4) x 0.2-0.5 m. Bark grey-brown to black-brown, lenticellate, fissured. Lenticels round, 5-10 mm in diam., scattered. Fissures vertical, 2-20 x 0.2-1 x 0.2-0.4 cm. Dead bark 3-10 mm thick, dark grey-brown, layered, soft. Living bark 3-10 mm thick, light brown to orange-brown, sometimes with pinkish stripes, turning somewhat lighter after exposure, layered, soft, fibrous, scented somewhat tobacco-like. Sapwood and heartwood light grey-brown. Crown rounded, branches erect to spreading. Plate 36.

Ecology and distribution: Occurring abundantly in marsh forest. Occasional to frequent on boggy savanna as a shrub or small tree. Widely distributed in the near interior, the Rupununi district and southeastern Guyana. Preferring sandy soils. An evergreen tree; flowering all year round, with a peak from February to May; fruiting from December to April. The seeds are dispersed by wind and germinate within 2 months.

Notes: (1) Cotyledons somewhat fleshy, with a heart-shaped blade, ca. 1 x 2 cm. Seedlings with opposite leaves, more or less glabrous. Later leaves more similar to mature leaves, borne on a slender petiole and with an elliptic blade, ca. 3 x 1 cm in the first pair, later leaves larger; (2) An infusion of the bark produces a drink with dark red colour and a bitter taste, which is used to treat skin diseases and syphilis; (3) There are two varieties of *Tabebuia insignis* occurring in Guyana, var. *insignis* and var. *monophylla*. The latter, called White Cedar, has 1-foliolate leaves, occurs in swampy vegetations, and is the most widespread variety. The other variety has 3-5-foliolate leaves, occurs in dry forest, and is confined to the far interior. No vernacular name is given for it in Mennega et al. (1988).



Tabebuia insignis var. *monophylla*

a. habit (x 0.6); b. dehiscent fruit (x 0.6); c. seed (x 0.6); d. trunk base; e. seedling (x 0.1).

Literature: Gentry, A.H. 1992.

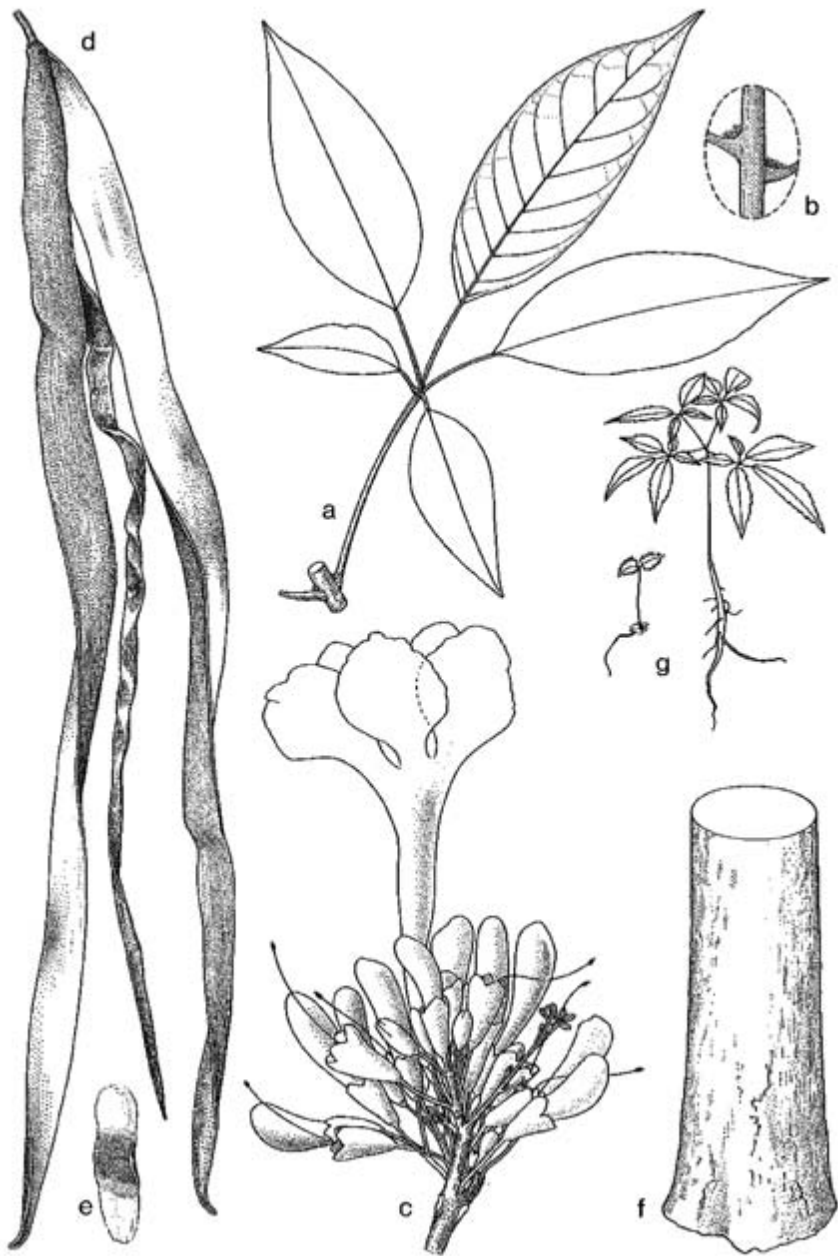
Vernacular names: Aruain (Ak), Arawnig (Ak), Hakia (Ar), Ironwood (Cr), Konawadranup (W), Ranoi (M).

Botanical description: Twigs round, striate, glabrous or nearly so. Leaves opposite, digitate, 5-7-foliolate, central leaflet largest; petiole 3-11 cm long, slender, striate; petiolules 0.5-5 cm long, grooved above; blades papery, elliptic to narrowly elliptic-ovate, 5-18 x 3-7 cm, stellate-hairy when very young, glabrescent with age, below with domatia fringed by a tuft of hairs, margin entire to conspicuously serrate, apex acute to acuminate, base acute, obtuse, or gradually narrowed; primary vein plane above, prominent below; secondary veins (7-)9-12 pairs, slightly prominent above and below. Inflorescence a terminal corymbose, many-flowered panicle; densely covered with brown, scurfy scale-like and stellate hairs; peduncle tomentose, 2-5 cm long; pedicels 3-15 mm long. Calyx bell-shaped, (3-)5-lobed, ca. 10 x 10 mm, stellate-hairy outside; corolla yellow, tubular to funnel-shaped, 80-120 mm long, tube 60-90 mm long, hairy inside where stamens are inserted; stamens in 2 pairs. Fruit a more or less woody capsule, linear, (8-)12-65 x 1.5-2.5 cm, glabrous or nearly so; seeds numerous, 10 x 25-35 mm, 2-winged, body dark brown, ca. 10 x 10 mm, wings light brown, papery, 10-15 mm long.

Field characteristics: Tree (6-)25-30(-40) m tall; trunk (0.2-)0.5-1 m in diam. Base with root spurs to buttressed. Root spurs 0.3 -0.4 x 0.3-0.4 x 0.2-0.3 m. Buttresses 0.5-1 x 0.5-1 m. Bark light brown to red-brown or grey with light and dark patches, lenticellate, fissured, scaly to flaky. Lenticels round, 2 mm in diam. Fissures vertical, 5-20(-50) x 0.5-1 .5(-3) x 0.3-0.5 cm, connected by inconspicuous horizontal cracks. Scales / flakes vertical, 10-30 x 5-10 cm, papery. Dead bark 2-5 mm thick, red-brown to dark brown, many-layered. Living bark 5-20 mm thick, yellow-brown to pink-brown, often somewhat darker orange-brown near dead bark, sometimes with a green layer just below dead bark, layered, easily pulled down in thin strips, bitter-tasting. Sapwood light (yellow-) brown, sometimes tinged pinkish; heartwood red-brown to grey-brown, slowly turning darker after exposure. Crown rounded, moderately dense, branching erect to spreading. Plate 37.

Ecology and distribution: Occasional in mixed forest, particularly on ridges, and sometimes in marsh forest and Mora forest. General in near interior and southeastern Guyana. Deciduous; flowering very conspicuously when leafless, mainly from March to April; fruiting pattern unknown. Seeds are wind-dispersed.

Note: (1) Seedlings grow rapidly in good light conditions, also able to withstand shade. Stem light brown with a fine-scaly bark. Leaves opposite, at first simple, later leaves 3-5-foliolate; petiole and petiolules puberulous; leaf margin coarsely serrate.



Tabebuia serratifolia

a. leaf (x 0.4); b. leaf detail, showing domatia on lower side (x 3); c. inflorescence (x 0.6); d. dehiscent fruit (x 0.6); e. seed (x 0.6); f. trunk base; g. seedlings, young (l) and somewhat older (r).

Literature: Kramer, K.U. 1976.

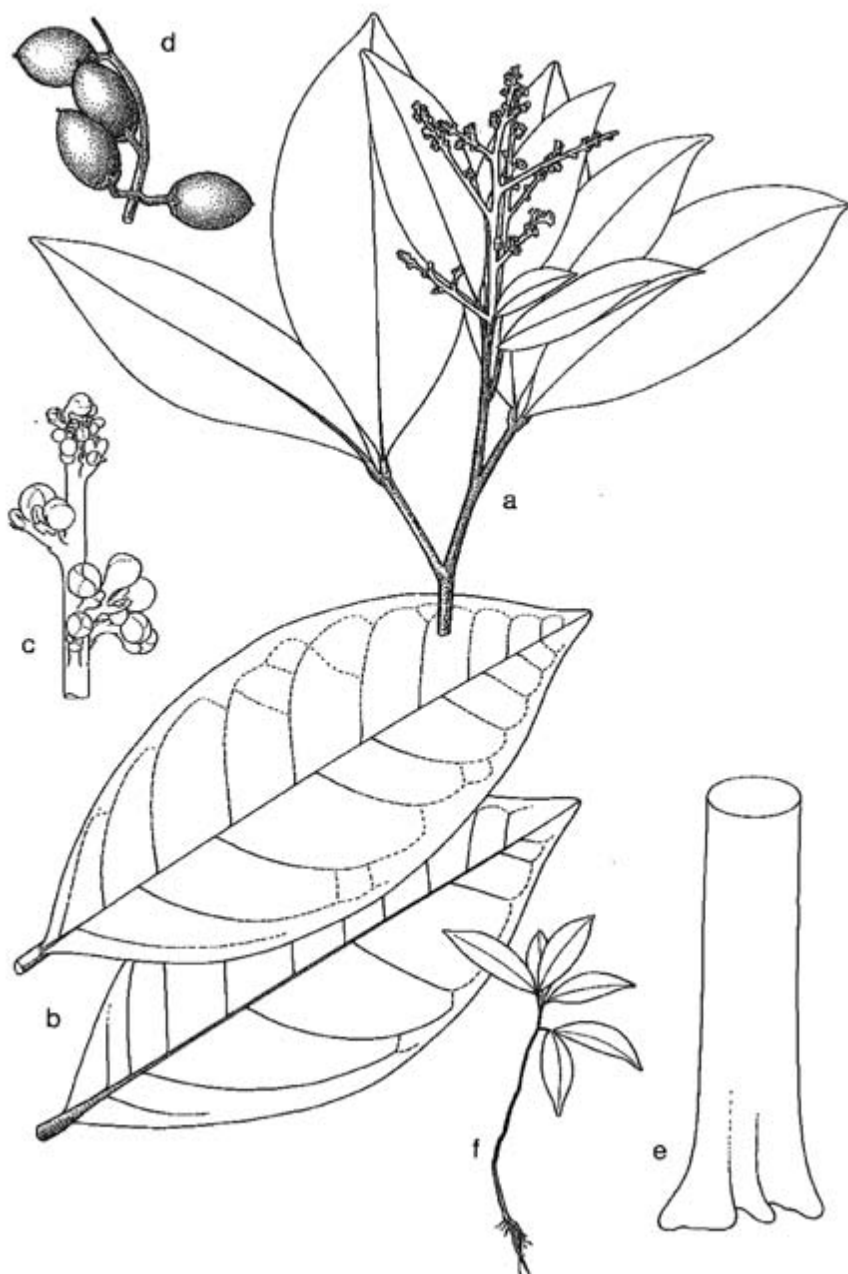
Vernacular names: Candlewood (Cr). Karimora(-yek) (Ak), Moroballi (Ar), Sand mora (Cr).

Botanical description: Twigs glabrous. Leaves alternate, 2-foliolate; petiole 1.5-3.5 cm long, round or flattened above, rudimentary rachis present as a free tip between bases of petiolules; leaflets opposite; petiolules 0.3-0.5 cm long, grooved above, dark brown; blades stiff-leathery, narrowly ovate, 7-14 x 2.5-6 cm, glabrous, shiny above, margin plane or sometimes slightly recurved, apex acute to obtuse, base acute; primary vein prominent in lower half to slightly sunken above, prominent below; secondary veins 5-10(-13) pairs, plane above, plane or slightly prominent below. Inflorescences axillary panicles near twig ends, 10-25 cm long, grey-puberulous; peduncle (0-)2.5-5 cm long; pedicels 1.5-4 mm long. Flowers bisexual; sepals 5, almost free, ca. 2.5 mm long, persistent; petals 5, white, 3.5-4 mm long, each one with scales of equal length at inner base; stamens 8. Fruit a berry, ovoid, 0.9-2.4 x 0.7-1.2 cm, apiculate, densely covered with small, appressed brownish hairs, pulp white, juicy, edible; seed 1, ellipsoid, 2 x 6 mm.

Field characteristics: Tree 20-35 m tall; trunk 0.3-0.6(-0.75) m in diam. Base buttressed. Buttresses 0.6-1.5 x 0.2-0.4 x 0.1-0.2 m. Bark light brown to greybrown, lenticellate, cracked, flaky. Lenticels round, 1-2(-3) mm in diam. very densely arranged, sometimes connected to rows which form a kind of ridges. Cracks vertical, 0.5-5 x 0.1-0.3 cm. Flakes more or less vertically arranged, irregular, 1-1.5 x 1-5 x 0.2-0.3 cm. Dead bark 1-3 mm thick, light brown. Living bark 3-6 mm thick, pink-brown to orange-brown, turning lighter at exposure, hard, granular; exudate colourless, very scanty, from inner part of living bark. Sapwood light brown; heartwood dark brown, with black-brown streaks. Crown rounded, light to moderately dense, branching erect. Plate 37.

Ecology and distribution: Frequent in Wallaba forest on white sand. Occasional in mixed forest on brown sand and in Clump wallaba (*Dicymbe altsonii*) forest on white sand. Occurring in the near interior (but rare in the N.W.-district). and the Pakaraima Mts. Semi-deciduous; flowering mainly in September and October; fruiting mainly in November and December. It has been observed that the flowers are visited by small bees, but it has not been proved whether these bees are the pollinators.

Notes: (1) Seedlings with light brown, fine-lenticellate stem. Leaves 2-foliolate. Petiole basally swollen. First pair of leaves opposite, later leaves alternate. Rachis prolonged beyond the leaflets. Leaflets with unequal base and acuminate apex with rounded tip; (2) Bark containing poisonous sap, used as fish poison. A decoction from the bark or a jelly prepared from it is used to treat ulcers; (3) The 2-foliolate leaves of *Talisia squarrosa* are unusual for Sapindaceae, as most species have leaves with more leaflets.



Talisia squarrosa

a. habit (x 0.4); b. leaflet, upper side (top) and lower side (bottom) (x 0.6); c. branch of inflorescence with flower buds (x 1.4); d. part of infructescence (x 0.6); e. trunk base; f. seedling (x 0.25).

Literature: Exell. A.W. 1935.

Vernacular names: Fukadi (Ar), Hill fukadi (Cr), Kwai (C), Matora (M), Tamarotan (W).

Botanical description: Twigs glabrous. Leaves alternate, clustered in spaced tufts at twig ends; petiole to 0.5 cm long, often with indistinct transition to blade; blades stiff-leathery, obovate, (2-)5-10(-14) x (2-)3-5 cm, glabrous, with tufts of hairs enclosed in a membrane in the axil of the secondary veins (so-called domatia) below, slightly shiny above, margin plane or slightly recurved, apex rounded to obtuse, apiculate, base gradually narrowed; primary vein plane to slightly prominent above, prominent below; secondary veins 3-4(-6) pairs, plane above, slightly prominent below. Inflorescences axillary spikes, 2-6 cm long, to 10 cm in fruit; peduncle 0.5-2 cm long. Flowers 5-merous, yellow-green to white, sweet-scented; receptacle cup-shaped; sepals 1.5 mm long; corolla absent; stamens ca. 10, exserted, ca. 2.5 mm long. Fruit a drupe, yellow-brown. 0.5-0.6 x 1.2 x 0.2 cm, sparsely covered with white, appressed hairs, 5-angular, 5-winged, 3 wings 0.1-0.2 cm wide, 2 wings 0.5-0.8 cm wide, membranous; pyrene 1; seed 1.

Field characteristics: Tree 20-35(-50) m tall; trunk 0.3-0.75(-1.2) m in diam., sometimes fluted at base. Base buttressed. Buttresses 1-2.5(-7) x 0.5-3 x 0.1-0.2 m, branched, often fissured parallel to the edge. Bark creamy brown to dark brown, often lighter on buttresses, fissured, flaky on older trees. Fissures vertical, (1-)5-25 x 0.1-1 x 0.1-0.5 cm. Flakes vertical, more or less rectangular, 1-20 x 0.5-3 x 0.1-0.5 cm. Dead bark 1-5 mm thick, grey-brown, layered, soft. Living bark 3-5 mm thick, (red-)pink outside, more light brown inside, layered, fibrous, sweet-scented, rarely somewhat cucumber-like scented. Sapwood light brown; heartwood dark (grey-)brown, often with lighter streaks. Crown obconical to flattened, moderately dense, branches erect-spreading. Plate 38.

Ecology and distribution: Common in evergreen seasonal forest and Wallaba forest. Occasional to frequent in mixed forest on coloured sands. General in the near interior, the Rupununi, southeastern Guyana, and the Kanuku Mts. Semi-deciduous; flowering mainly from February to June; fruiting mainly from March to May. The fruits are wind-dispersed.

Note: (1) According to files of the Guyana Forestry Commission, the seedlings need much light for early development. They have a type of cotyledons which has been observed in several species of *Terminalia* and *Buchenavia*: opposite and triangular, forming a butterfly-shape. Later leaves are alternate and more or less elliptic, with the margin fringed with hairs when young.



Terminalia amazonia

a. habit, sterile (x 0.35); b. leaf (x 0.6); c. leaf detail, showing domatia on lower side (x 3); d. habit, flowering (x 0.6); e. flower (x 9); f. infructescence (x 0.6); g. fruit, side view (top), and bottom view (bottom) (x 1.5); h. trunk base; i. seedling (x 0.25).

Literature: Exell. A.W. 1935.

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

Botanical description: Twigs with somewhat scaly bark, sparsely covered with brownish, appressed and erect hairs. Leaves alternate, clustered in spaced tufts at twig ends; petiole to 2 cm long, often with indistinct transition to blade; blades leathery, obovate to narrowly so, 10-18 x 3-8 cm, more or less glabrous, shiny above, margin plane or slightly recurved, apex rounded to obtuse, apiculate, base gradually narrowed, decurrent along petiole; primary vein slightly prominent above, prominent below; secondary veins 4-5 pairs, plane above, slightly prominent below. Inflorescences axillary spikes, 5-10 cm long; peduncle 2-4 cm long. Flowers 5-merous, white or yellow-green, sweet-scented; receptacle cup-shaped, 2-3 mm long; sepals ca. 1 mm long, recurved at maturity, densely covered with woolly hairs inside; corolla absent; stamens ca. 10, exerted, 5-7 mm long. Fruit a fleshy drupe, dark green, globose to obovoid, flattened, 2.5-5 x 3-5 x 0.9 cm, glabrous, shiny, with 2(-3) thickened wings; pyrene 1; seed 1.

Field characteristics: Tree (6-)20-35(-45) m tall; trunk (0.2-)0.5-1 m in diam. Base buttressed. Buttresses 1-1.8 x 1-2 m, spreading. Bark grey-brown to brown, lenticellate, fissured, flaky on older trees. Lenticels round, 2-4 mm in diam., scattered, inconspicuous. Fissures vertical, 10-20(-40) x 0.1-0.3(-0.5) cm. Flakes irregular to rectangular, to 30 x 5 cm. Dead bark 0.5-1 mm thick, light brown. Living bark 2-3 mm thick, creamy brown to yellow-brown, layered, darker towards dead bark, soft, fibrous. Sapwood light brown; heartwood light creamy brown, often with darker streaks. Crown rounded, moderately dense, branches erect-spreading. Plate 38 (*Buchenavia fanshawei*).

Ecology and distribution: Frequent in Mora forest. Occasional in mixed forest and marsh forest. Widely distributed species in the near interior, the Rupununi district and the Kanuku Mts. Semi-deciduous, flowers appearing with young leaves; flowering mainly from June to October; fruiting mainly from February to March. The fruits are potentially dispersed by water. If, however, the trees do not grow along water courses or if their growth places are not periodically flooded, the seeds will just germinate under the trees.

Notes: (1) *Buchenavia fanshawei* (Fukadi) has a bark which is similar to that of *Terminalia dichotoma*, but it has darker brown sapwood; (2) Seedlings similar to those of *Terminalia amazonia*; (3) The genera *Terminalia* and *Buchenavia* are very closely related to each other, and cannot be distinguished by the leaves only. Both also possess the same pattern in leaf arrangement: the leaves are borne in many small tufts at a regular distance along the terminal part of the twigs. Native species in Guyana can be distinguished by the fruits, which are winged in *Terminalia* spp., and unwinged in *Buchenavia* spp.



Terminalia dichotoma

a. habit (x 0.6); b. leaf (x 0.6); c. detail of inflorescence (x 15); d. fruit, side view (x 0.6); e. fruit, bottom view (x 0.6); f. trunk base; g. seedling (x 0.2).

Literature: Swart, J.J. 1951.

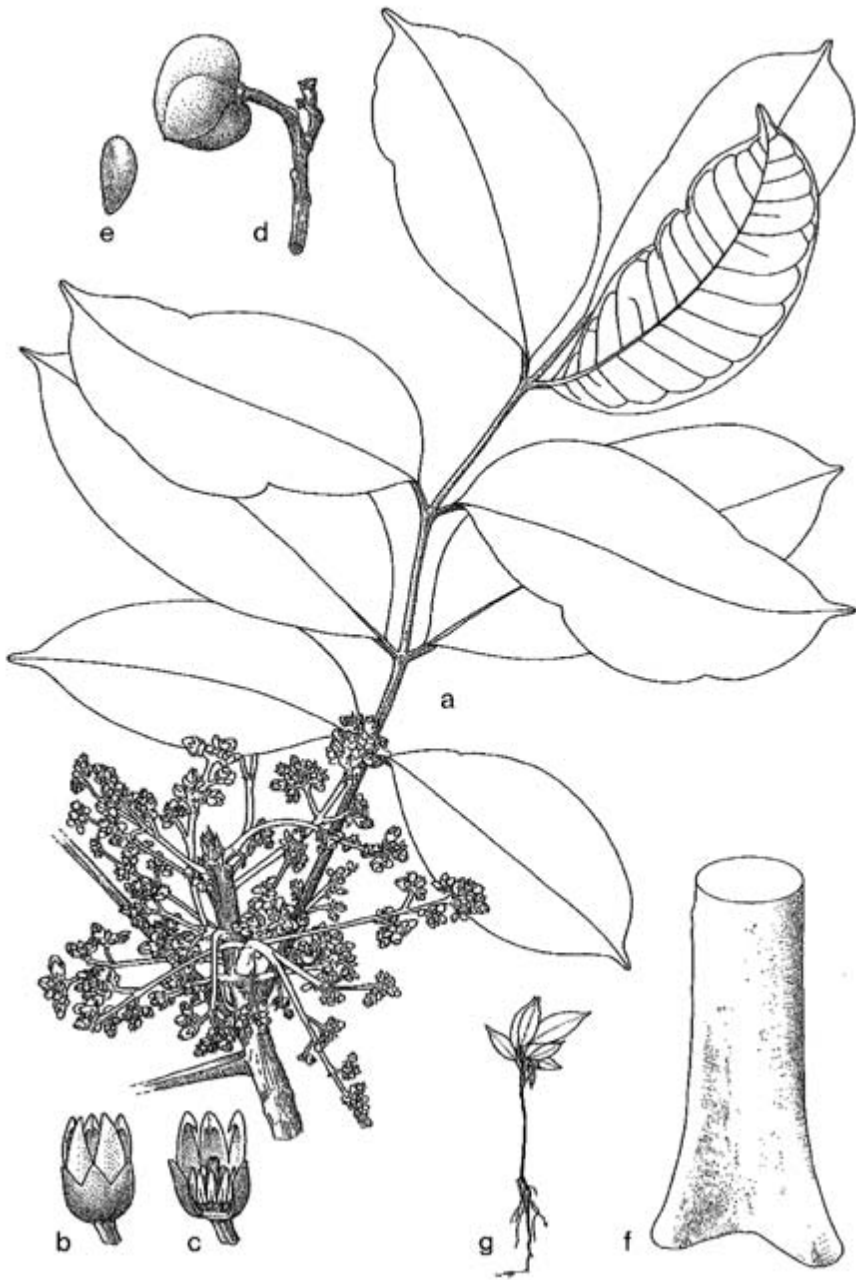
Vernacular names: Asau (W), Haiawaballi (Ar), Kamaragwa (M).

Botanical description: Twigs angular to grooved, stout, covered with short brown hairs when young. Leaves alternate, imparipinnate, 5-11(-15)-foliolate; petiole 8-14 cm long, flattened above, basally swollen; rachis 6-15 cm long; petiolules 0.5-0.7 cm long; leaflets opposite; blades papery, narrowly elliptic, 12-21 x 4-8 cm, shiny on both sides, margin slightly revolute, apex acuminate, base obliquely acute; primary vein prominent above, with 2 grooflets alongside, prominent below; secondary veins 12-16 pairs, weakly prominent above, prominent below. Inflorescence a terminal panicle, to 20 cm long; peduncle 4-7 cm long; pedicels 3-5 mm long. Flowers functionally either male or female; calyx cup-shaped, ca. 2 mm long, 2-5-lobed; petals 5, green-white, connate, tube 2.5-3 mm long, lobes 2.5-3 mm long. Fruit a fleshy drupe, red, globose to obliquely broadly ovoid, weakly 2-5-lobed, 2.5-3.5 x 2-4 cm, glabrous, valves 2-5, bright red inside; pyrenes 1-5, depressed ovoid, trigonous, completely covered by white, fleshy, soft, sweet pulp; seed 1 per pyrene.

Field characteristics: Tree (15-)25-30 m tall; trunk 0.5-0.6(-1) m in diam., slightly fluted. Base with root spurs or buttresses. Root spurs 0.1-0.3 x 0.05-0.2 m. Buttresses 1.8-3 m high, straight, often with secondary buttresses near the ends. Bark grey-brown, with red-brown flake-scars, lenticellate, cracked, scaly or flaky with age. Lenticels round, 1-2 mm in diam., scattered. Cracks vertical, irregular, 1-5 x 0.1-0.2 cm. Flakes irregular, 1-15 x 1-5 x 0.5 cm, papery. Dead bark 0.5-1 mm thick, light brown. Living bark 2-5(-12) mm thick, red-brown to dark-purple with lighter streaks, sometimes with very thin green layer just below dead bark, soft, with aromatic scent; exudate colourless, clear, turning dull grey-white, scanty. Sapwood light (yellow-)brown or greyish pink-brown; heartwood orange-brown to red-brown. Crown rather dense, branches spreading. Plate 39.

Ecology and distribution: In mixed forest on brown sand. Occurring in the N.W. district and the further interior. Phenology data too scarce for indicating a pattern. The pyrenes are eaten and defecated after digestion of the pulp by toucans, cotingas, tortoises, and by spider and howler monkeys.

Notes: (1) By some tree spotters the name Yuriballi is used for *Tetragastris altissima*. According to Mennega et al. (1988), however, the name Yuriballi applies to *Trichilia* spp. (Meliaceae); (2) Seedling leaves simple; petiole flattened above, blade with long-acuminate apex.



Tetragastris altissima

a. habit (x 0.6); b. flower (x 3); c. flower, with part of calyx and corolla removed (x 3); d. fruit (x 0.6); e. pyrene (x 0.6); f. trunk base; g. seedling (x 0.1).

Literature: Swart, J.J. 1951.

Vernacular names: Bastard kurokai (Cr), Thin-skin ulu (Cr), Ulu (Ar), Wayama (Ak).

Botanical description: Twigs stout, grooved, densely covered with rusty brown hairs when young. Leaves alternate, imparipinnate, 9-15-foliolate; petiole 6-15 cm long, stout, basally swollen and flattened above, transversely wrinkled; rachis 6-30 cm long, round, keeled above; petiolules 0.5-1.5 cm long, to 4 cm in terminal round, thickened near apex, grooved above, transversely wrinkled; leaflets opposite; blades leathery, ovate-triangular to oblong-ovate, 10-15(-24) x 4.5-6(-8) cm, terminal one slightly larger, glabrous and rough on both sides, margin plane to slightly recurved, apex long-acuminate, base more or less heart-shaped; primary vein sharply prominent above, prominent below; secondary veins 12-18 pairs, slightly prominent above, strongly prominent below. Inflorescence an axillary, many-flowered panicle, 7-22 cm long; branches densely covered with rusty brown hairs; pedicels 1-2 mm long, to 5 mm in fruit. Flowers functionally unisexual. Calyx bell-shaped, ca. 4 mm long, lobes oblong-triangular; petals 3, pale green, fleshy, connate, tube ca. 4 mm long, lobes 2-3 mm long, outer side densely covered with appressed hairs. Fruit a drupe, (more or less) globose, 1-1.5 x 0.8-1.5 cm, glabrous, dehiscent with 2 valves; pyrenes 2, brown, woody, surface wrinkled, completely covered by thin, white, fleshy pulp; seed 1 per pyrene.

Field characteristics: Tree (8-)20-30(-40) m tall; trunk (0.2-)0.4-1 m in diam. Base swollen or buttressed. Buttresses 1-1.7 x 0.5-0.7 x 0.4-0.5 m. Bark creamy grey, lenticellate, cracked, on older trees somewhat scaly. Lenticels round, 3-5 mm in diam., scattered or in irregular vertical rows. Cracks more or less vertical, irregular, 2-5(-10) x 0.2-0.5 cm. Scales ca. vertical, more or less rectangular, 2-5 x 1-2 x 0.2-0.3 cm. Dead bark 1-2(-10) mm thick, red-brown. Living bark 3-10(-20) mm thick, orange-brown to brown, with whitish or orange streaks, with white layer next to sapwood, soft, with a strong aromatic scent; exudate colourless and clear when fresh, turning grey-white, thick, scanty. Sapwood and heartwood pale grey-brown or pink-brown, discolouring to yellow-brown. Crown large, rounded, light to moderately dense, branches erect to spreading. Plate 39.

Ecology and distribution: Occasional in mixed and seasonal forest. Widely distributed. Evergreen or semi-deciduous; flowering from August to November; fruiting from January to July. The seeds (actually the pyrenes) are animal dispersed, e.g. by birds, which defecate the pyrene after digestion of the pulp.

Note: (1) *T. demerarae*, (Thick-skin) ulu, differs from *T. rhoifolia* in the following aspects: the leaflets have an acute base and the secondary veins are plane on both sides.



Trattinickia rhoifolia

a. habit (x 0.4); b. leaflet (x 0.6); c. inflorescence, schematic; d. flower (x 7.5); e. dissected male flower (l) and female (r) flower (x 7.5); f. fruits (x 0.6); g. trunk base.

Synonym: *Vatairea surinamensis* Kleinh.

Literature: Amshoff, G.J.H. 1939.

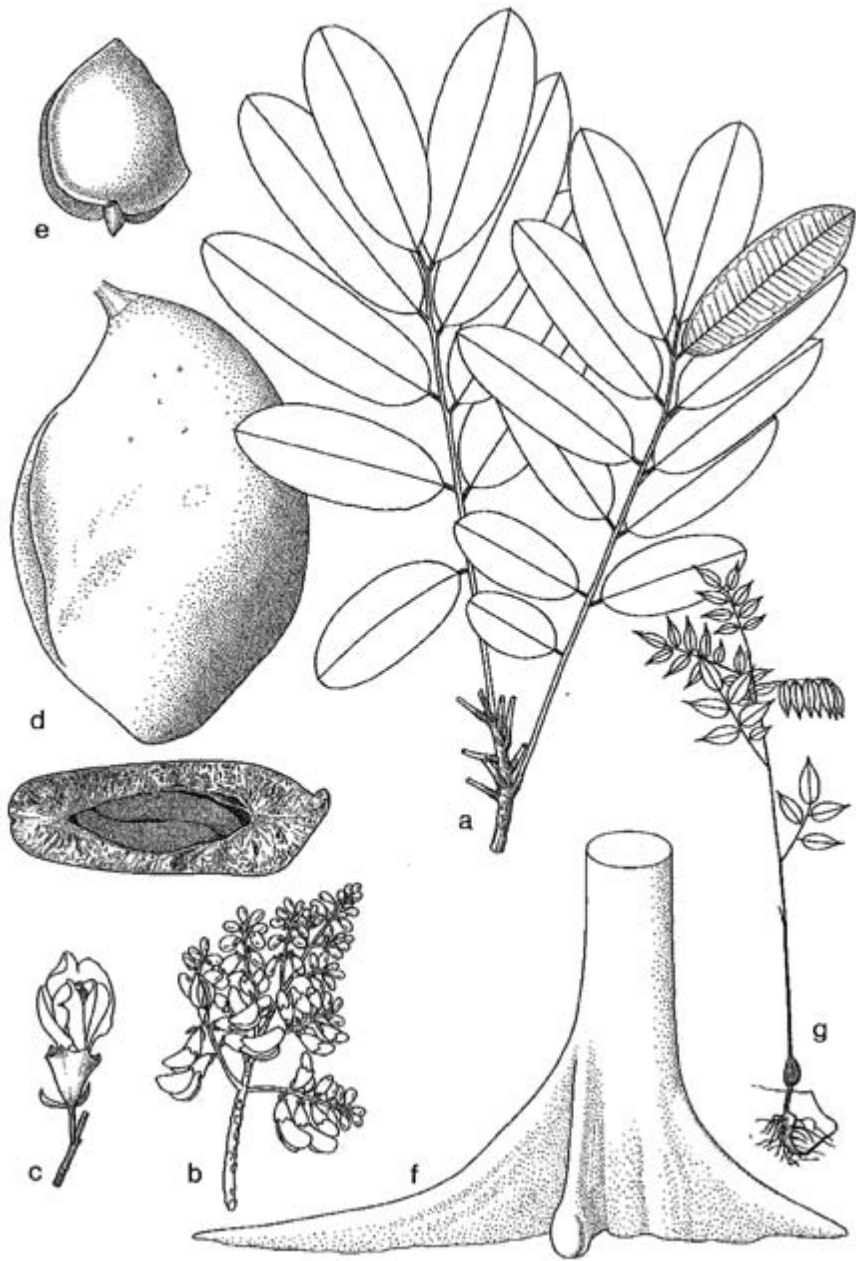
Vernacular names: Arakaka(-yek) (Ak), Arisauro (Ar).

Botanical description: Twigs rough, densely whitish puberulous when young. Leaves alternate, clustered at branch ends, imparipinnate, 9-13(-15)-foliolate; stipules triangular, ca. 0.1 cm long, caducous; petiole 3-7 cm long; rachis 7-15 cm long; leaflets alternate; petiolules 0.4-0.6 cm long, grooved above; blades leathery, elliptic to narrowly obovate, 6-12 x 2-5 cm, glabrous above, rather densely covered with appressed hairs below, margin revolute, apex obtuse to emarginate, base rounded; primary vein sunken above, prominent below; secondary veins 10-12 pairs, plane above, slightly prominent below. Inflorescence a terminal, showy panicle, 15-20 cm long, densely brownish velutinous; pedicels 2-4 mm long. Calyx bell-shaped, 10-12 mm long, persistent; petals 5, purple, clawed, ca. 20 mm long; stamens 10. Fruit a corky pod, blue-green, almost circular, flattened, 10-16 x 8 x 2.5-3.5 cm, with a remnant of a lateral wing, stipe 2-3 mm long; seed 1, yellow, 45-65 x 40-50 x 20 mm, furrowed.

Field characteristics: Tree 15-30 m tall; trunk 0.2-0.5(-0.7) m in diam. Base with low root spurs or buttressed. Buttresses 0.8-1.7 x 0.6-0.8(-2) x 0.05-0.1 m. Bark black-grey to grey-brown, smooth, lenticellate mostly on lower part of trunk, shallowly fissured in higher part of trunk. Lenticels round, 2-5 mm in diam., in vertical rows. Fissures vertical, 5-40 x 0.2-0.5 x 0.2 cm. Dead bark 1 mm thick, dark brown. Living bark 5-10 mm thick, orange-pink, yellow near sapwood, vertically striate, with some 1-3 mm wide, pink or yellow vertical bands, soft, aromatic. Sapwood light brown to reddish brown-yellow, ca. 5 cm thick; heartwood yellow, turning dark yellow-brown. Crown moderately dense, branching erect to spreading. Plate 40.

Ecology and distribution: Frequent in swamp forest, marsh forest and Mora forest. Often growing together with Mora (*Mora excelsa*) and Swamp dalli (*Viola surinamensis*). General in the near interior. Deciduous, leafless during flowering and fruiting; flowering mainly in January and February and from June to August; fruiting mainly from July to October. The seeds are dispersed by water.

Notes: (1) Wood and seeds are poisonous. A decoction from the bark is used for cleansing ulcers. Scrapings from the seeds are used to cure ground or water itch (athlete's foot). Juice squeezed from the fruit is mixed with coconut oil and used as a cure for ringworm and eczema; (2) Cotyledons fleshy, lifted from soil by stem at germination. Plants bearing few leaves at top of stem. Leaflets long-acuminate, glaucous green below.



Vatairea guianensis

a. habit, sterile (x 0.3); b. inflorescence (x 0.3); c. flower (x 0.6); d. complete fruit, and fruit in cross-section (r) (x 0.6); e. seed (x 0.6); f. trunk base; g. seedling (x 0.1).

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

Literature: Smith, A.C. and Wodehouse, R.P. 1937.

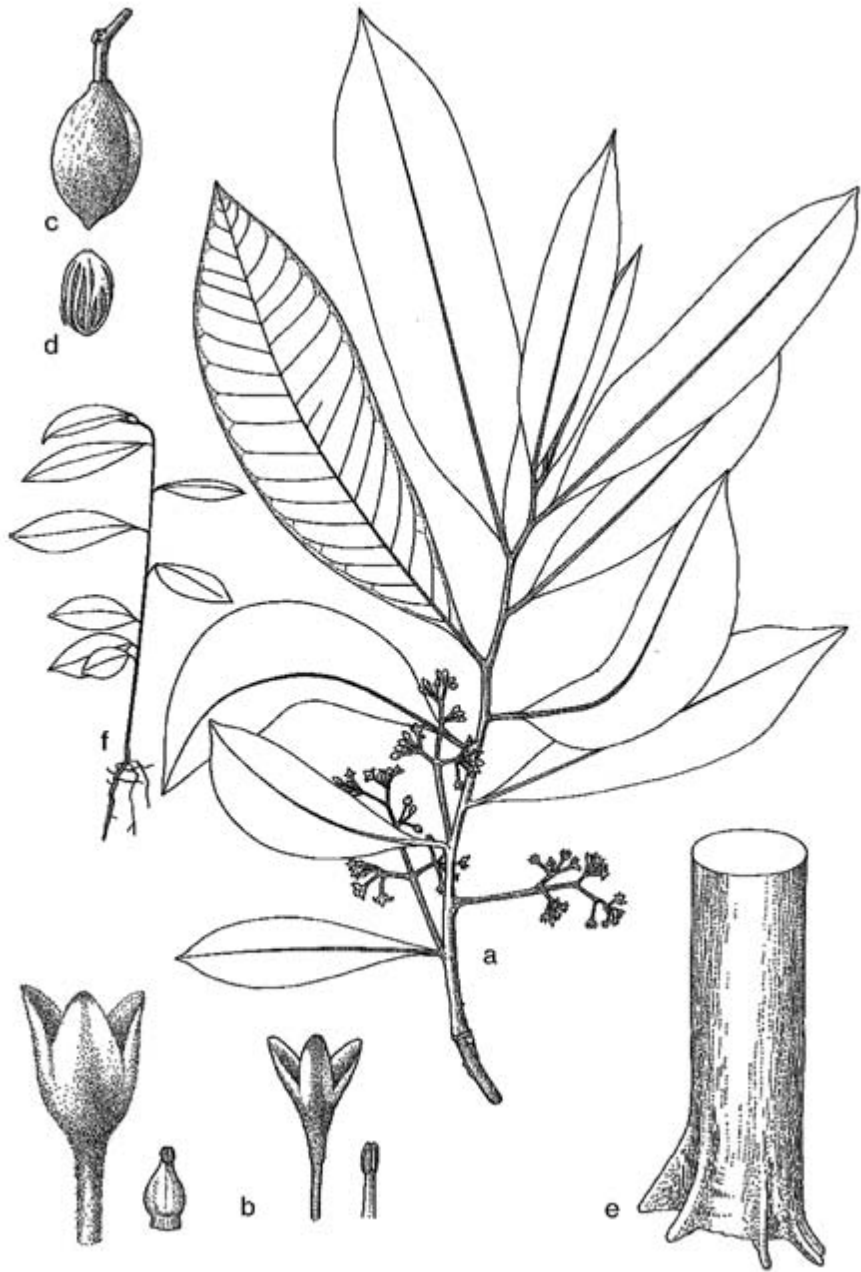
Vernacular names: Dalli (Ar), Hill dalli (Cr), Irikwa (M, W).

Botanical description: Twigs angular, striate, covered with short brown hairs when young. Leaves alternate, in 2 rows; petiole 0.4-1 cm long, deeply grooved above; blades papery, narrowly elliptic to oblong-elliptic, (6-)9-18(-22) x 2-6 cm, glabrous above, covered with dull grey, minute (< 0.1 mm in diam.), stellate hairs below, margin flat, apex acuminate, base acute to gradually narrowed; primary vein plane or sunken above, prominent below; secondary veins 12-22 pairs, plane or slightly sunken above, prominent below. Trees with either male or female inflorescences. Inflorescences axillary panicles, male ones (1.5-)2-9 cm long, female ones 4-6 cm long; densely covered with rusty or grey stellate hairs; peduncle to 2.5 cm long, often slightly flattened; bracts surrounding clusters in bud; pedicels to 3 mm long, to 9 mm in fruit. Flowers clustered at branch ends, male clusters 5-15-flowered, female ones 2-4-flowered; perianth 3-lobed nearly to the base, pale yellow, fleshy, 2-3.5 mm long; anthers 3(-4). Fruit a woody capsule, green to yellow, ellipsoid, 2.5-3.5(-5) x 1.5-2.5 cm, keeled on 1 side, densely covered with dark brown appressed hairs, dehiscing with 2 valves; seed 1, black-brown, ellipsoid, 25 x 15 mm, smooth, aril waxy, red, with numerous slits.

Field characteristics: Tree (10-)25-35 m tall; trunk 0.2-0.6(-1) m in diam. Base straight or buttressed. Buttresses 0.25-0.5(-1) x 0.2-0.4(-0.7) x 0.05-0.1 m. Bark grey-black to black, sometimes transversely ringed near base, fissured, rarely scaly. Fissures vertical, 1-20 x 0.1-0.3 x 0.2 cm, ca. 0.5 cm apart. Dead bark 1-2 mm thick, black to black-brown, hard, charcoal-like. Living bark 2-8(-20) mm thick, creamy pink to yellow-brown, sometimes with vertical white bands, slightly layered, granular, rapidly turning darker at exposure; exudate red, clear, watery, slightly sticky, copious, rarely scanty, appearing in droplets, but rapidly covering slash. Sapwood and heartwood light brown. Crown pyramidal; branches horizontal, whorled. Plate 40.

Ecology and distribution: Locally occasional in mixed forest on loamy soil. Occurring in north-central and northeastern Guyana, Rupununi district and the Kanuku Mts. Evergreen; flowering mainly in October and November; fruiting mainly in February and March. The seeds are eaten by toucans, howler monkeys, and spider monkeys, who swallow the seeds and defecate them after having digested the aril.

Notes: (1) Seedlings are similar to those of *V. surinamensis*; (2) *Virola sebifera* is another, more rare species of *Virola* occurring in Guyana which is also called Hill dalli. Its leaves have a heart-shaped base; (3) Apart from the vegetative differences between *Virola* spp. (Dalli) and *Iryanthera* spp. (Kirikaua) already mentioned in the identification keys, the following differences in inflorescences and fruits exist, *Virola* spp. have flowers in panicles, and ellipsoid fruits, whereas *Iryanthera* spp. have flowers in racemes of fascicles, and transversely ellipsoid fruits.



Virola michelii

a. habit (x 0.6); b. female flowers, with pistil (l) and male flowers, with staminal column (r) (x 6); c. fruit (x 0.6); d. seed, with aril (x 0.6); e. trunk base; f. seedling (x 0.1).

Literature: Smith, A.C. and Wodehouse, R.P. 1937.

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

Botanical description: Twigs densely covered with brown woolly stellate hairs when young. Leaves alternate, in 2 rows; petiole 0.2-0.9 cm long, grooved above; blades leathery, narrowly oblong-elliptic, 10-22(-35) x 2-4(-6) cm, glabrous above, sparsely covered with yellow-brown, appressed, stellate (0.1-0.3 mm in diam.) hairs below, primary vein more densely so, margin revolute, apex acute to acuminate, base obtuse, rounded, cordate, sometimes acute; primary vein plane or slightly sunken above, prominent below; secondary veins 16-30 pairs, plane or slightly sunken above, prominent below. Trees with either male or female inflorescences. Inflorescences somewhat above (upper) leafaxils, many-flowered panicles, to 15 x 15 cm; densely covered with golden or light grey stellate hairs; peduncle to 4.5 cm long, often slightly flattened; bracts surrounding clusters of 5-20 (male) or 3-8 (female) flowers in bud, 3-8 mm long, conspicuous in young inflorescences; pedicels slender, 2 mm long, to 3-7 mm in fruit. Flowers clustered at branch ends; perianth 3-lobed, creamish to yellow, 1.5-2.5 mm long; anthers 3(-4). Fruit a leathery capsule, green, (sub)globose to broadly ellipsoid, 1.5-2 x 0.8-2 cm, keeled, often apiculate, densely covered with brownish stellate hairs, dehiscing with 2 valves; seed 1, black brown, ellipsoid, ca. 15 x 10 mm, aril fleshy, red, with numerous slits, aromatic.

Field characteristics: Tree (10-)20-25(-40) m tall; trunk (0.2-)0.4-0.8(-1.5) m in diam. Base heavily buttressed, often with flying buttresses. Buttresses 1-2.5(-4.5) x 1-2.5 x 0.1-0.2 m, often with secondary branches and some tertiary branches; flying buttresses inserted 0.1-0.5 m above soil. Bark grey to grey-brown or sometimes black, tinged red-brown on buttress edges, smooth or cracked. Cracks 5-30 x 0.2-0.5 x 0.2-0.5 cm, vertical. Dead bark 0.5-1 mm thick, grey-brown, hard, granular, somewhat charcoal-like. Living bark 5-20 mm thick, pink to orange-brown, somewhat fibrous, soft, slightly sweet-scented; exudate red to purple-red, clear, watery, copious. Sapwood and heartwood light brown. Crown pyramidal, with horizontally spreading, whorled branches. Plate 41.

Ecology and distribution: Abundant to frequent in marsh forest, Mora forest, and swamp forest, often together with Manni (*Symphonia globulifera*) in marsh forest. Rare in Greenheart forest. Occurring in near interior and Rupununi district. Evergreen; flowering mainly from June to November, except for August; fruiting mainly in November, March and April. The seeds are dispersed by monkeys, cotingas and toucans, who defecate the seeds after digesting the aril.

Notes: (1) At germination the seed is carried ca. 2.5 cm above the ground. Seedling leaves similar to mature leaves, folded upward in bud, with stellate hairs, glaucous green below; (2) Oil from the seeds is inflammable. It produces a sulphurous odour.



Virola surinamensis

a. habit (x 0.6); b. leaf (x 0.6); c. flower, male (l) and female (r) (x 6); d. dehiscent fruit, side view (l) and top view (r) (x 0.6); e. seed, with aril (x 0.6); f. trunk base; g. seedling (x 0.6).

Literature: Jansen-Jacobs, M.J. 1988.

Vernacular name: Hakiaballi (Ar).

Botanical description: Twigs more or less glabrous. Leaves opposite, digitate, (3-)5-foliolate; petiole 5-16 cm long; petiolules to 1 cm long; blades membranous to papery, elliptic to narrowly elliptic, 5-24 x 1.5-10 cm, glabrous above, more or less glabrous below, margin entire, plane, apex long-acuminate, base acute to gradually narrowed; primary vein sunken above, prominent below; secondary veins 10-14 pairs, plane above, prominent below. Inflorescences axillary, more or less umbellate cymes, 2-3 cm in diam.; peduncle 1-6 cm long; pedicels 3-4 mm long. Calyx cupshaped, 1-2 mm long, teeth ca. 0.5 mm long, persistent and somewhat enlarging in fruit corolla trumpet-shaped, blue, violet, or purple, throat white with violet lines, ca. 10 mm long, lobes 5, 4 mm long, except for 8 mm long lower lobe. Fruit a drupe, black, shiny, oblongish, to 1.5 cm long; flesh juicy, sweet-tasting, edible; pyrene 1, grooved longitudinally, 4-locular; seeds (2-)4.

Field characteristics: Tree (15-)20-40(-45) m tall; trunk 0.3-0.6 m in diam. Base with root spurs. Root spurs 0.3-0.4 x 0.2-0.3 x 0.1 m. Bark light grey-brown, cracked, somewhat flaky. Cracks vertical, 1-20 x 0.1-0.3 cm, vertical. Flakes vertically oriented, ca. rectangular, 1-15 x 1-4 x 0.1-0.2 cm, papery, consisting of many thin layers. Dead bark 3-5 mm thick, very light brown, with many thin layers, soft. Living bark ca. 5 mm thick, outer layers pink-orange, inner layers lighter, innermost layer light brown, particularly the inner part of the slash turning brown-green after exposure; exudate colourless, turning brown rapidly, clear, not sticky, scanty. Sapwood light brown, turning dark green-brown after exposure; heartwood very dark brown. Crown open, with erect branching. Plate 41.

Ecology and distribution: Occasional in mixed forest on lateritic and granitic soil. Occurring in the near interior and the Rupununi district. Deciduous, leafless during flowering; flowering mainly in March and April; fruiting mainly from May to July. Dispersal of the seeds by spider monkeys and howler monkeys.

Note: (1) In the herbarium of Utrecht (U) there is a seedling collection from the Mazaruni Station forest nursery, FD 5024, which has the name *Virex stahelii* on the label. The identity of this collection could not be confirmed. The leaves of the plant are opposite, simple or digitate, and have a conspicuously serrate margin.



Vitex stahelii

a. habit, sterile (x 0.3); b. habit, flowering (x 0.6); c. leaflet (x 0.6); d. flower (x 3); e. fruit (x 0.6); f. pyrene (x 0.6).

Literature: Marcano-Berti, L. in prep.; Stafleu, F.A. 1951.

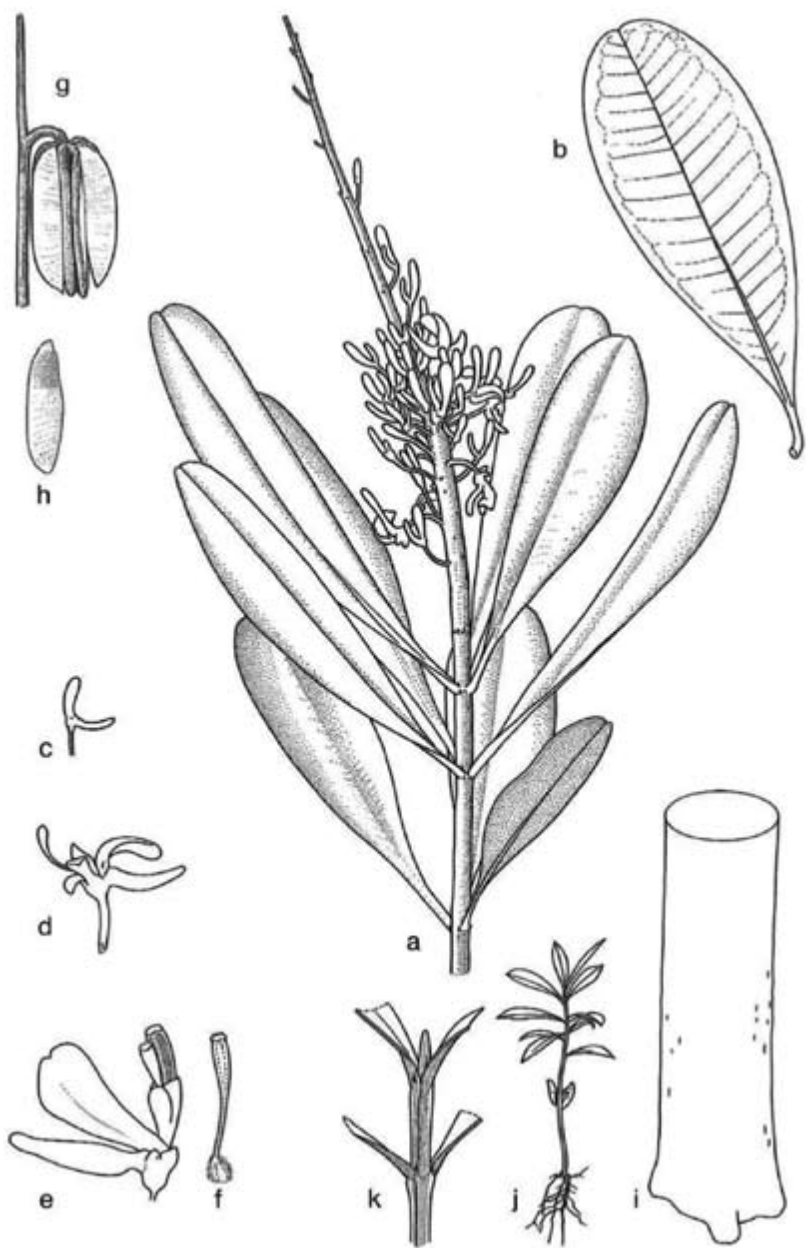
Vernacular names: Deokunud (W), Hill iteballi (Cr), Iteballi (Ar).

Botanical description: Twigs angular, blackish, glabrous. Leaves in whorls of 3, rarely 4; stipules triangular, to 0.5 cm long, caducous; petiole 1-1.5 cm long, grooved above; blades leathery, narrowly obovate to narrowly elliptic-obovate, 5-13(-15) x 1.5-5(-6) cm, glabrous, margin revolute, apex obtuse, emarginate, base acute; primary vein sunken above, prominent below; secondary veins 15-20 pairs, slightly prominent to plane on both sides; tertiary veins often distinctly reticulate above. Inflorescence a terminal or axillary panicle of cincinni, 20-30 cm long; branches rather densely puberulous; pedicels 4-5 mm long, to 8 mm in fruit. Flowers (1-)2-3 together. Receptacle tubular, 2.5-3 mm long; sepals 5, subequal, except for spurred one, 2.5 mm long, spurred one 10-12 mm long, spur straight or somewhat curved, swollen at tip; petals 3, yellow, 5-10 mm long; stamen 1, 10 mm long; staminodes 2. Fruit a leathery to woody capsule, green to brown, 3-locular, cylindrical, 3.5-4.5 x 1-2 x 1-1.5 cm, 3-ribbed, pendent; valves orange-brown inside; seeds 3, oblongish, to 40 x 7 x 2 mm, orange-brown, winged, seed body to 15 mm long.

Field characteristics: Tree (5-)25-30(-40) m tall; trunk 0.3-0.55(-0.9) m in diam. Base swollen or with root spurs. Root spurs to 0.4 x 0.4 x 0.2 m. Bark light brown to light orange-brown to grey-brown, sometimes inconspicuously lenticellate, cracked, scaly to flaky, sometimes ringed. Lenticels round, 2-5 mm in diam. Cracks vertical and horizontal, 0.5-5 x 0.1-0.2 cm. 0.1-0.3(-0.5) cm apart. Flakes irregular, (2-)15-20 x (1-)8-10 x 0.2-0.3(-0.6) cm. Rings horizontal, 0.5-1 cm wide. Dead bark 0.5-3 mm thick, light grey-brown to dark-brown, somewhat papery. Living bark 7-15 mm thick, orange-brown to pink-brown, with fine light brown streaks, on transition to sapwood with a 1 mm thick orange-yellow layer, granular, slightly sweet-scented; exudate colourless, turning light brown, clear, (very) slightly sticky, slow, appearing from inner part of living bark. Sapwood light brown; heartwood dark brown. Crown umbrella-shaped, with numerous small, rounded subcrowns, branches thick, erect. Plate 42.

Ecology and distribution: Locally frequent in seasonal forest, occasional in mixed forest on brown sand, rare in Morabukea forest. Occurring in north-central and eastern Guyana (east of Essequibo R.), Kanuku Mts., and in further interior. Evergreen; flowering mainly from September to December; fruiting mainly in October and November. The seeds are wind-dispersed.

Notes: (1) Seedlings with broadly obtriangular cotyledons, ca. 1.5 x 4 cm. Stem quadrangular, slightly winged, with scaly bark. Leaves opposite; blades with long-acuminate apex, often with excurrent primary vein; (2) *V. schomburgkii* (Iteballi) has opposite leaves, *V. rerraphylla* (Iteballi) has leaves in whorls of 4; in both species the blade has a rounded to obtuse base and an acuminate apex; (3) *Ruizterania albiflora* (formerly named *Qualea albiflora*), also belonging to the Vochysiaceae, is a much-logged tree along the Courantyne River, in those areas where trees of the usually logged hardwood species have become rare. It is called Muniridan, a name which is usually given to the small trees of the genus *Siparuna* (Monimiaceae). Pictures of bark and slash of *Ruizterania albiflora* can be found in 'Bois de Dom-Tom' (C.T.F.T., 1989).



Vochysia surinamensis

a. habit (x 0.6); b. leaf (x 0.6); c. flower bud (x 0.6); d, e. flower (x 1.2 and x 2.4, resp.); f. pistil (x 2.4); g. dehiscent fruit (x 0.6); h. seed (x 0.6); i. trunk base; j. seedling (x 0.15); k. detail of seedling stem (x 0.4).

Literature: Sandwith. N.V. 1937 .

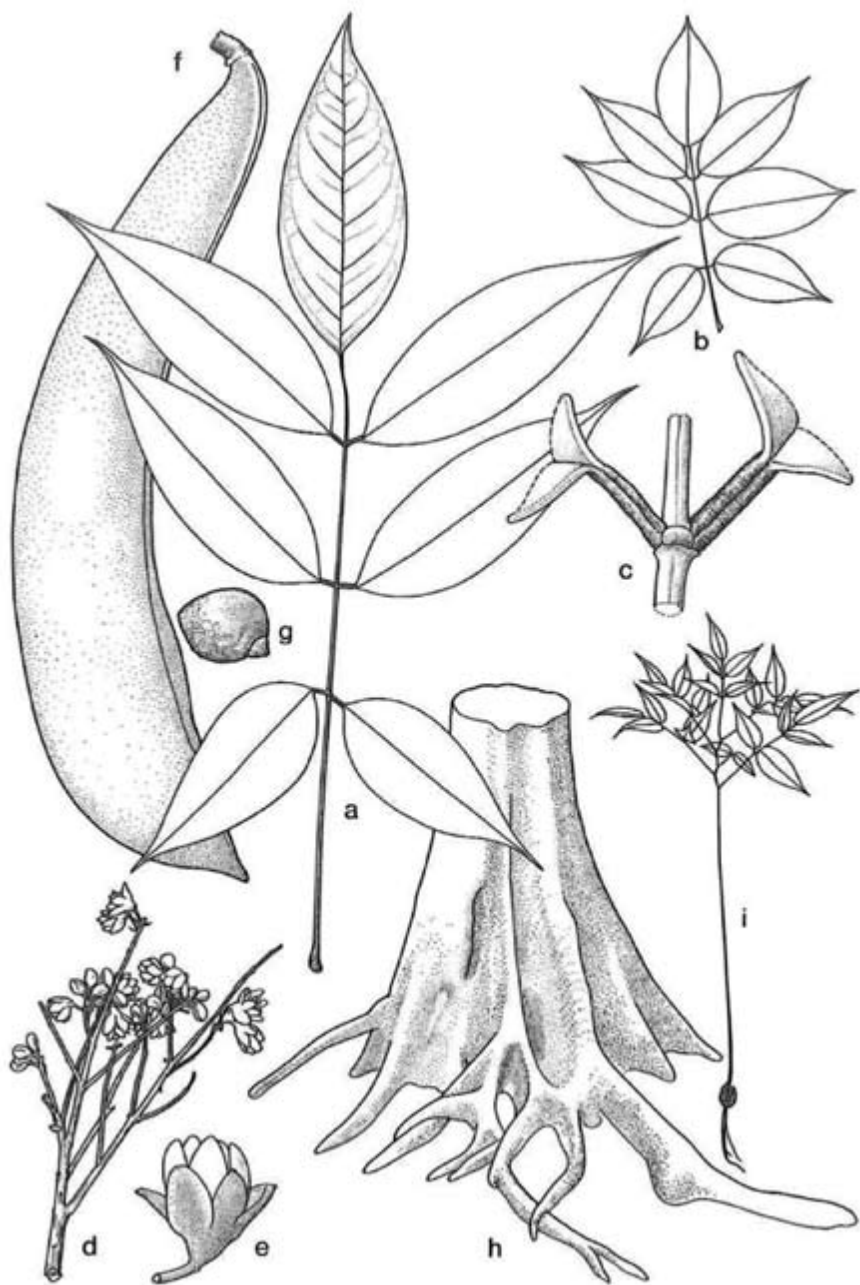
Vernacular names: Sarebebeballi (Ar).

Botanical description: Twigs angular, striate, covered with rusty hairs when young. Leaves alternate, imparipinnate, 7-foliolate; stipules not observed; petiole 4-11 cm long, basally swollen and with glands above; rachis 6-16 cm long, grooved above, with transverse ridge between leaflets; leaflets opposite; petiolules 0.4-0.7 cm long; blades stiff papery, narrowly elliptic-oblong, rarely narrowly ovate, 9-18.5 x 3-7.5 cm, glabrous, more or less glaucous below, margin plane, apex long acuminate, base rounded; primary vein slightly prominent to plane above, prominent below; secondary veins 7-9 pairs, plane above, slightly prominent below. Inflorescence a terminal panicle, 15-30 cm long, covered with yellow hairs; peduncle 1.5-3.5 cm long; pedicels 2.5-4 mm long. Calyx bell-shaped, orange buff, 7-7.5 mm long, lobes 5-5.5 mm long; petals 5, yellow, ca. 8 mm long; stamens 10. Fruit a pod, brown-velutinous, to 15 x 4 x 3 cm, pointed at both ends, swollen over seeds; seeds 1-3, chestnut-brown, oblong-globose, glossy.

Field characteristics: Tree 25-30 m tall; trunk 0.4-0.6 m in diam., often flanged near base. Base buttressed. Buttresses 1-2 x 0.4-1.5 x 0.05-0.1 m. Bark red-brown, finely lenticellate, sometimes scaly. Lenticels round, 1 mm in diam., or sometimes linear and to 2 x 1 mm, densely arranged, horizontally oriented if linear. Dead bark 0.5 mm thick, very dark red to dark brown. Living bark 2-3 mm thick, orange-brown to (pale) red-brown, turning somewhat lighter after exposure, with light brown layer near dead bark, fine-granular, sweet-scented. Sapwood light (yellow-)brown; heartwood dark brown. Plate 42.

Ecology and distribution: Locally common in mixed forest in the near interior, growing in reefs on rocky hills or sandy clay, and in swamp forest on alluvial flats in southeastern Guyana. Occasional in Kakaralli-Clump wallaba forest in the near interior. Phenology data very limited, flowering and fruiting have been recorded in October. Probably restricted to Guyana.

Notes: (1) Seedlings have a very slender habit. The glossy seed remains present for some time at the base of the stem. Leaves 3-5-foliolate, petiole with glands at the base on the upper side; leaflets somewhat glaucous above; (2) Very little information is available in botanical literature and only few collections have been made. Much more information can be found on the closely related *V. americana*, which occurs in, among other countries Surinam and French Guiana.



Vouacapoua macropetala

a, b. leaf (x 0.3); c. detail of leaf rachis (x 3); d. inflorescence (x 0.6); e. flower (x 1.5); f. fruit (x 0.6); g. seed (x 0.6); h. trunk; i. seedling (x 0.1).

8. PICTURES OF BARK AND SLASH

Pictures are given here which show bark and slash or the 83 species which are treated in full in this field guide, except for a few cases where pictures of closely related species with a similar bark and slash have been used. In the descriptive part the names of these related species are given behind the plate number indicated under the heading 'Field characteristics'. The sequence of the pictures conforms to the sequence or the descriptions. The diameter of the red push pin which can be seen in part or the pictures is 1 cm.

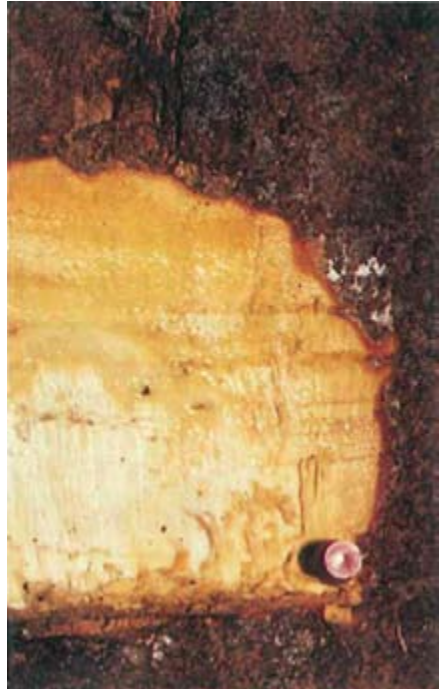


Plate 1. *Abarema jupunba* (Huruasa)



Plate 2. Top: *Acosmium praeclarum* (Blackheart)
Bottom: *Alexa imperatricis* (Haiariballi)



Plate 3. Top: *Andira coriacea*
Bottom: *Aniba hypoglauca* (Yellow silverballi)



Plate 4. Top: *Antonia ovata* (Inyak)
Bottom: *Aspidosperma cruentum* (Shibadan)

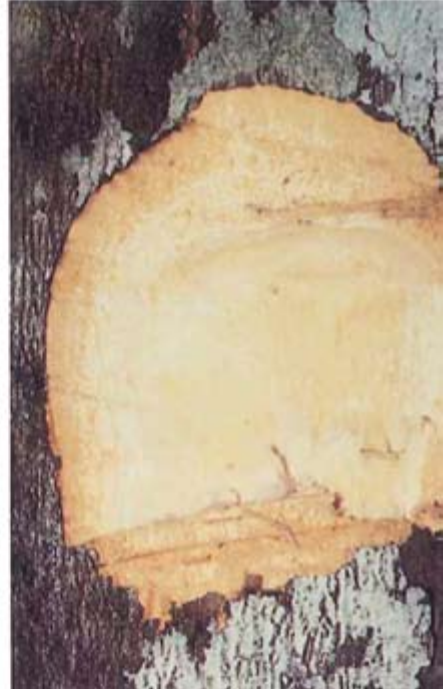


Plate 5. Top: *Aspidosperma vargasii* (Currywod)
Bottom: *Astronium ulei* (Bauwaua)

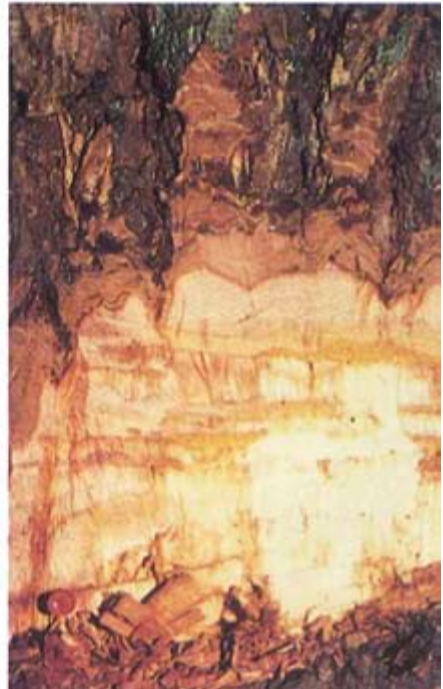


Plate 6. Top: *Bagassa guianensis* (Cow-wood)
Bottom: *Calophyllum lucidum* (Kurahara)



Plate 7. Top: *Carapa guianensis* (Crabwood)
Bottom: *Catostemma commune* (Common baromalli)

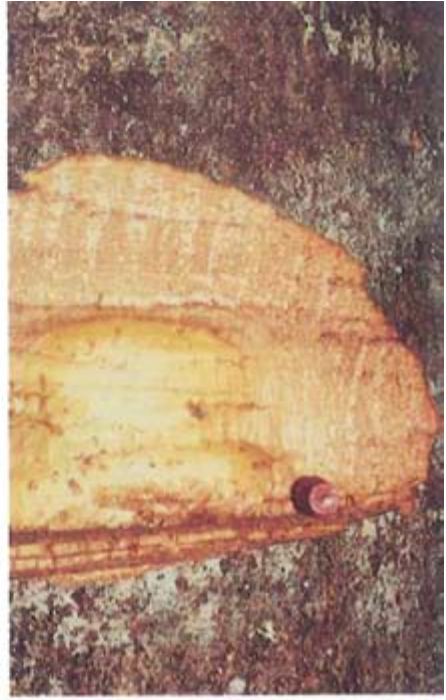


Plate 8. Top: *Catostemma fragrans* (Sand baromalli)
Bottom: *Cedrela odorata* (Red cedar)

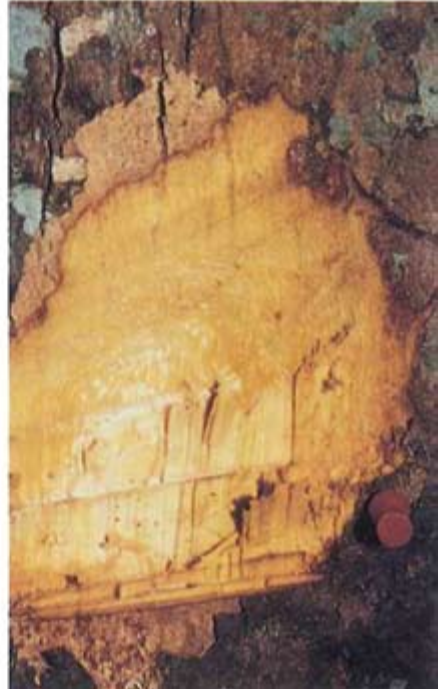


Plate 9. Top: *Chlorocardium rodiei* (Greenheart)
Bottom: *Chrysophyllum pomiferum* (Limonaballi / Paripalli)



Plate 10. Top: *Clathrotropis macrocarpa* (Aromata)
Bottom: *Couratari guianensis* (Wadara)



Plate 11. Top: *Dimorphandra conjugata* (Dakama)
Bottom: *Diplotropis purpurea* (Tatabu)



Plate 12. Top: *Dipteryx odorata* (Tonka bean)
Bottom: *Eperua falcata* (Soft wallaba)



Plate 13. Top: *Eperua grandiflora* (Ituri wallaba)
Bottom: *Eperua rubiginosa* (Watapa)

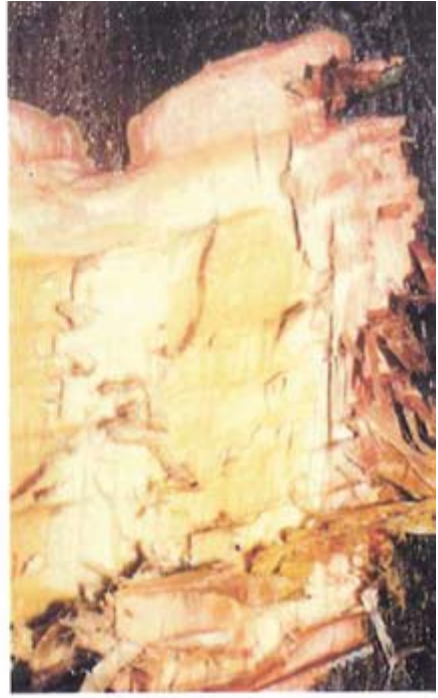


Plate 14. Top: *Eschweilera alata* (Guava-skin kakaralli)
Bottom: *Eschweilera decolorans* (Smooth-leaf kakaralli)

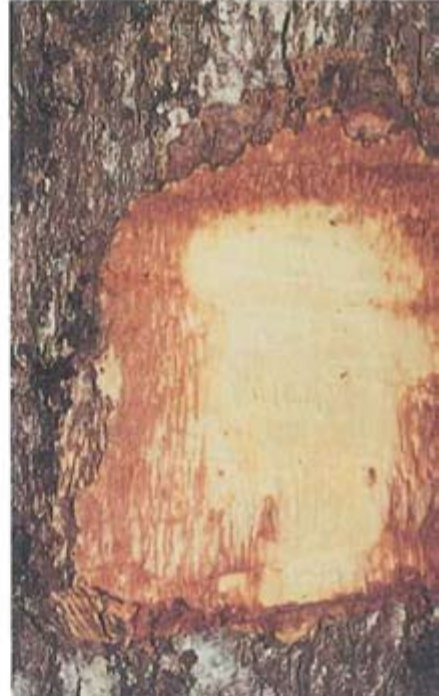


Plate 15. Top: *Eschweilera sagotiana* (Common black kakaralli)
Bottom: *Goupia glabra* (Kabukalli)



Plate 16. Top: *Humiria balsamifera* var. *balsamifera* (Tauroniro)
Bottom: *Hyeronima alchorneoides* (Suradan)

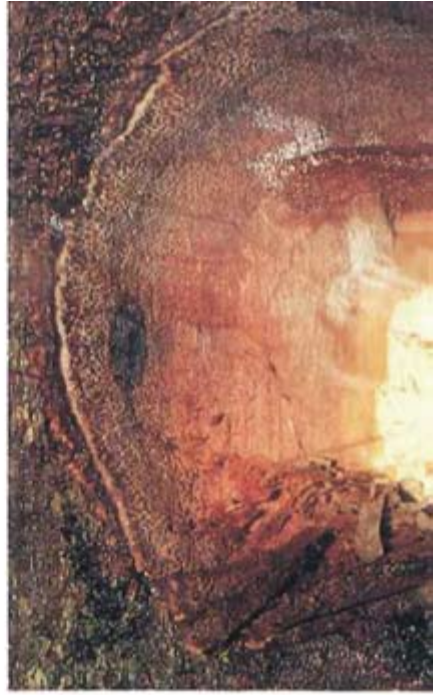


Plate 17. Top: *Hymenaea courbaril* (Locust)
Bottom: *Hymenolobium flavum* (Koraroballi)



Plate 18. Top: *Inga alba* (Maporokon)
Bottom: *Iryanthera lancifolia* (Kirikaua)



Plate 19. Top: *Jacaranda copaia* (Futui)
Bottom: *Laetia procera* (Warakairo)



Plate 20. Top: *Lecythis confertiflora* (Wirimiri)
Bottom: *Lecythis corrugata* (Wina)



Plate 21. Top: *Lecythis zabucajo* (Monkey pot)
Bottom: *Licania alba* (Kautaballi)



Plate 22. Top: *Licaria cannella* (Brown silverballi)
Bottom: *Loxopterygium sagotii* (Hububalli)

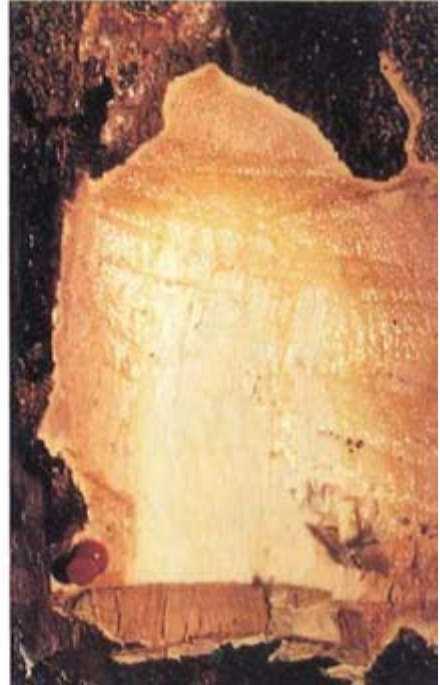
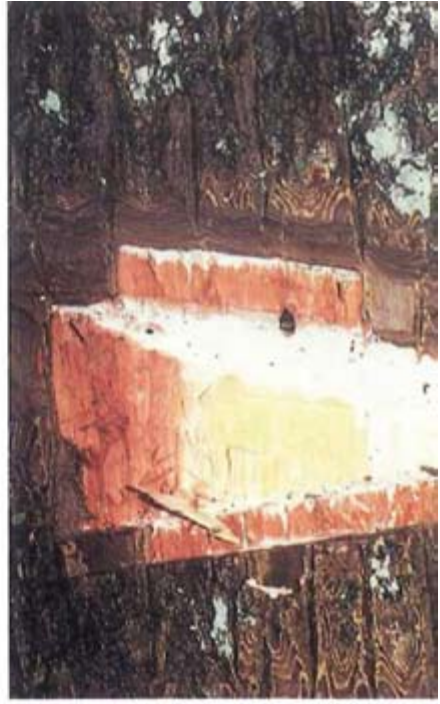


Plate 23. Top: *Manilkara bidentata* (Bulletwood)
Bottom: *Mora excelsa* (Mora)



Plate 24. Top: *Mora gonggripui* (Morabukea)
Bottom: *Moronobeia coccinea* (Manniballi)



Plate 25. Top: *Ocotea canaliculata* (White silverballi)
Bottom: *Ocotea rubra* (Determa)



Plate 26. Top: *Ocotea tomentella* (Baradan)
Bottom: *Ormosia paraensis* (Barakaro)



Plate 27. Top: *Ormosia coulinhoi* (Korokororo)
Bottom: *Parahancornia fasciculata* (Dukali)



Plate 28. Top: *Parinari rodolphii* (Burada)
Bottom: *Peltogyne venosa* (Purpleheart)



Plate 29. Top: *Platonia insignis* (Pakuri)
Bottom: *Pouteria cuspidata* (Kokoritiballi)



Plate 30. Top: *Pouteria guianensis* (Asepoko)
Bottom: *Pouteria speciosa* (Suya)



Plate 31. Top: *Protium decandrum* (Kurokai)
Bottom: *Pterocarpus rohrii* (Hill corkwood)

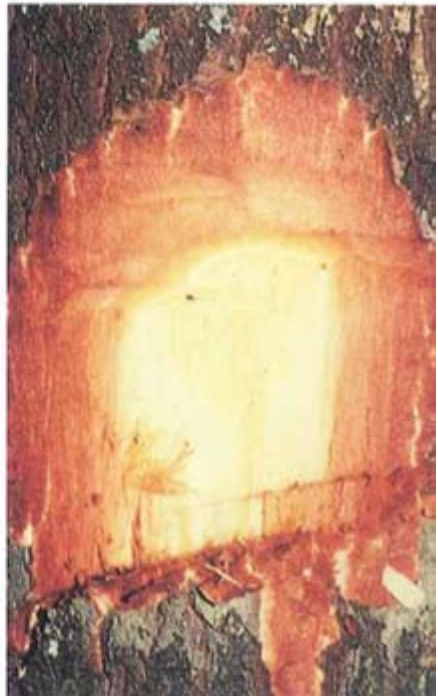
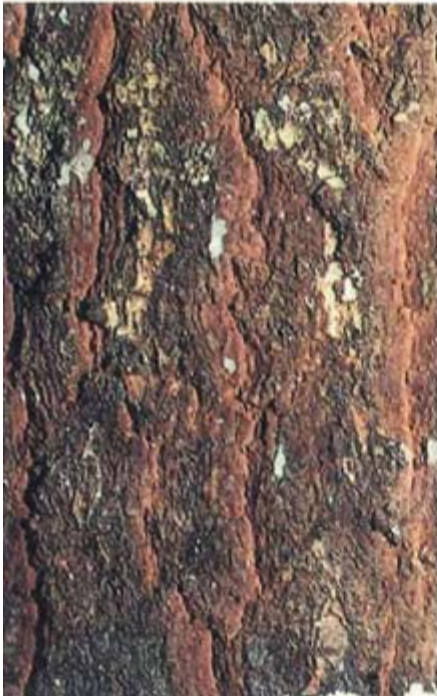


Plate 32. Top: *Quassia simarouba* (Simarupa)
Bottom: *Sacoglottis guianensis* (Sand dukuria)



Plate 33. Top: *Schefflera decaphylla* (Blunt-leaf karohoro)
Bottom: *Schefflera morototoni* (Pointed-leaf karohoro)



Plate 34. Top: *Sclerolobium guianense* (Kadititi)
Bottom: *Sterculia rugosa* (Rough-leaf maho)



Plate 35. Top: *Swartzia benthamiana* (Itikiboroballi)
Bottom: *Swartzia leiocalycina* (Wamara)

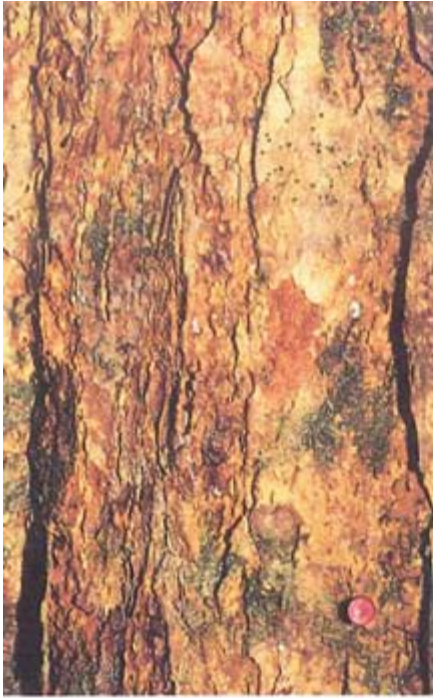


Plate 36. Top: *Symphonia globulifera* (Manni)
Bottom: *Tabebuia insignis* var. *monophylla* (White cedar)

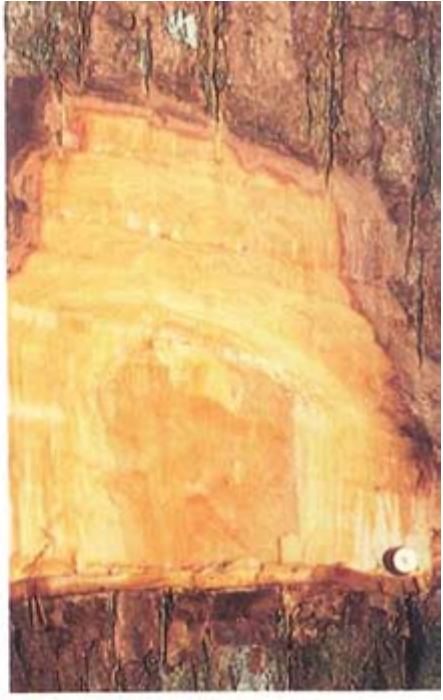
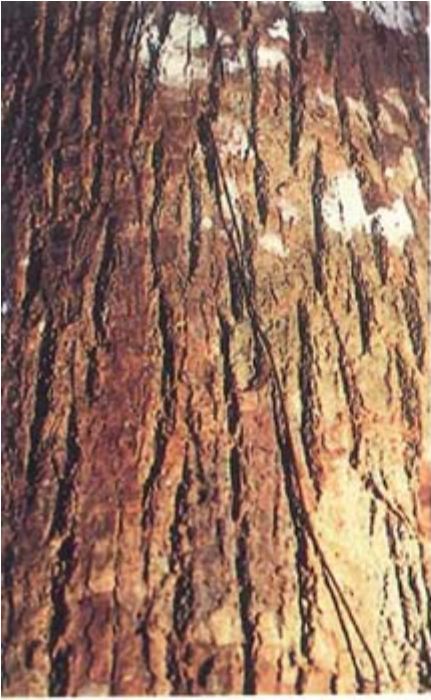


Plate 37. Top: *Tabebuia serratifolia* (Hakial)
Bottom: *Talisia squarrosa* (Moroballi)



Plate 38. Top: *Terminalia amazonia* (Hill fukadi)
Bottom: *Buchenavia fanshawei* (Fukadi)

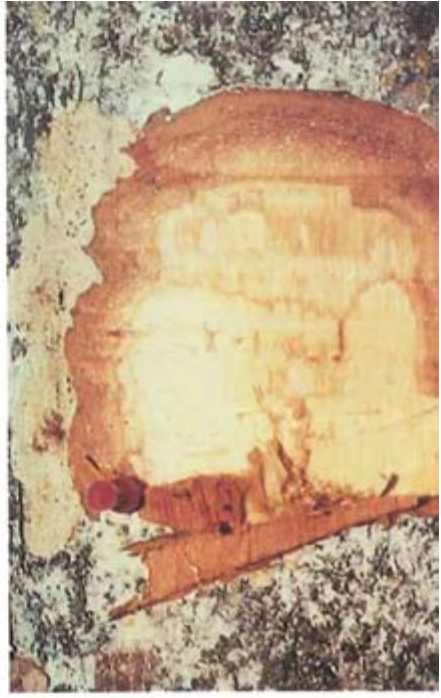


Plate 39. Top: *Tetragastris altissima* (Haiawaballi)
Bottom: *Trattinickia rhoifolia* (Ulu)

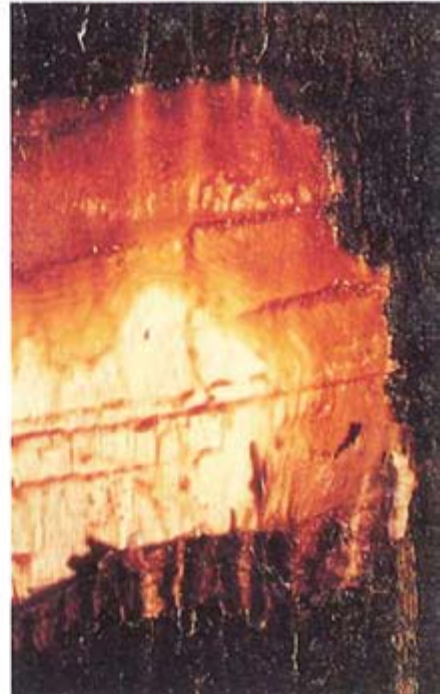


Plate 40. Top: *Vatairea guianensis* (Arisauro)
Bottom: *Virola michelii* (Hill dalli)

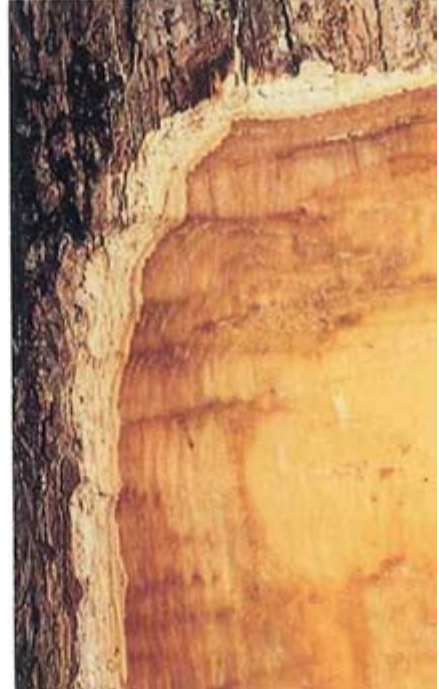


Plate 41. Top: *Virola surinamensis* (Swamp dali)
Bottom: *Vitex stahelii* (Hakiaballi)



Plate 42. Top: *Vochysia surinamensis* (Iteballi)
Bottom: *Vouacapoua macropetala* (Sarebebeballi)

9. GLOSSARY

In this glossary explanations are given for the technical terms used in the descriptions. Sometimes the structure to which a particular term applies is given in parentheses after the explanation. For terms not found in this list one might use the publications by e.g. Jackson (1949), Lawrence (1951), and Stearn (1973). The latter two publications also provide illustrations of many terms. The ratios indicated behind terms applying to particular shapes are length-width ratios.

acuminate	- having a gradually diminishing point
acute	- sharp at the base or apex at an angle of less than 90°
alternate	- inserted at different levels along the stem, not opposite (leaves or branches)
anterior	- on the front side
anther	- part of a stamen containing the pollen
apex	- tip
apically	- at the apex/tip
apiculate	- furnished with a short point at the end (leaf, fruit)
aril	- layer, often fleshy, (partially) surrounding seed
axillary	- growing in an axil of, e.g., a branch, leaf, or vein
bark	- the phloem tissue formed on the outside by the cambium
berry	- fruit with seeds immersed in pulp
bisexual	- containing both stamens and ovaries (flowers)
blade	- limb of a leaf
bract	- small leaf subtending the flower stalk
buttress	- flattened outgrowth of the trunk, connected for its entire length with the trunk, usually triangular in side view
caducous	falling off early
calyx	- outer whorl of perianth leaves (sepals), often green
cambium	- the layer between wood and bark which forms these two tissues, often difficult to see in a slash
capitate	- head-like; consisting of stalkless, clustered flowers (inflorescence)
capsule	- dry fruit which splits open (dehiscence) to release the seeds
ciliate	- fringed with hairs (of margins)
circular	- round
clawed	- with a narrowed base (of a petal)
concave	- hollow-sided
cannate	- fused, grown together
connivent	- coherent, but not fused
convex	having a more or less rounded surface
cordate	- heart-shaped
corolla	- inner whorl of perianth leaves (petals), often coloured
carymb	- more or less flat-topped inflorescence in which the branches and sometimes also the pedicels start from different points but all reach to about the same level
cotyledons	- seed-lobes, first leaves of the embryo
cracked	- with fine, shallow grooves (see 'fissured')
crenate	- with rounded notches (leaf margin)
crenulate	- finely crenate, notched (leaf margin)
cyme	- inflorescence in which the central flowers opens first (centrifugal), and in which at least the first branches are forked or opposite

dbh	- diameter at breast height (1.30 m)
dead bark	- the outer part of the bark in which no living tissue is present any more
deciduous	- falling off eventually (tree standing leafless part of the year)
dehiscent	splitting up, opening (fruit)
dentate	- having a toothed margin
depressed	- flattened from above, as if pressed down
dichotomous	- with 2-branched forks (branching pattern of twigs, inflorescences)
digitate	- hand-like, with the petiolules arising from 1 point (of a compound leaf)
dioecious	- with male and female flowers on different plants
dimpled	- with shallow, more or less round depressions in the bark, which are scars left by scaling off bark
domatium	- membrane in the axil of the secondary veins, enclosing tufts of hairs
drupe	- fleshy fruit with seeds surrounded by a stony layer (pyrene) drupes may contain 1 or 2-many pyrenes
elliptic;	- greatest width in the middle, oval (2:1 - 3:2); narrowly elliptic (6:1 - 3:1); transversely-elliptic (2:3 - 1:2); narrowly transversely-elliptic (1:3 - 1:6)
emarginate	- having a notch, usually at the apex
endemic	- occurring in a restricted area
endocarp	- innermost layer of the seed wall
entire	- without incisions (leaf margin)
exudate	- sap appearing on a cut surface
falcate	- sickle-shaped
filament	- stalk of a stamen
fissured	- with coarse, deep grooves; in fact a further developed stage of 'cracked', and therefore not strictly separated from it; actual sizes should therefore be given
flaky	- with large patches of dead bark which fall off the trunk. There is no sharp differentiation between flakes and scales. A piece of bark of 10 x 15 cm might be considered a 'flake' on a 0.2 m thick tree, but a scale on a 1 m thick tree. Therefore the indication 'flaky' or 'scaly' should be provided with the actual size of the structures indicated
foliolate	- with a particular number of leaflets
follicle	- dry fruit formed by a single carpel and usually splitting along one side only
funicle	- stalk of an ovule
fusiform	- spindle-shaped
glabrescent	- becoming glabrous or nearly so
glabrous	- smooth, without hairs or scales
glandular	- with glands
glaucous	- with a greyish tinge, usually caused by a waxy layer
hemiepiphyte	plant which grows on trunk or branches of a tree, i.e. an epiphyte, but which is in contact with the soil in some stage of its life; either a climber that only roots in the soil when young, or an epiphyte that sends down roots to enter the soil after an initial truly epiphytic period (e.g., part of the <i>Clusia</i> spp.)

hilum	- scar left on a seed marking the point of attachment to the stalk of the ovule
hypanthium	- enlargement or development of the receptacle under the calyx (flower)
imbricate	overlapping
imparipinnate	compound leaf with pinnate leaflets and one apical leaflet
indehiscent	- not opening when ripe (fruit)
inequilateral	- with the two halves of the blade meeting at different levels with the primary vein (leaf)
inflorescence	- arrangement of the flowers on a plant
infructescence	- inflorescence in fruiting stage
interpetiolar	- between the petiolules
jugate	- with a yoke; 2-jugate: leaf composed of 2 pairs of opposite leaflets
keeled	- narrowly winged
latex	- milky juice
leaflet	- the ultimate unit of a compound leaf
lenticellate	- with lenticels: small openings with thickened margin (twig, branches, trunk)
lenticular	- lens-shaped
linear	- line-shaped
living bark	- the inner part of the bark; bark recently formed by the cambium which still contains living tissue
membranous	- very thin, membrane-like
mericarp	- portion of a fruit which splits up as if it were a complete fruit
oblique	- asymmetrical, with unequal sides (blade of leaf(let) fruit)
oblong	- rectangle-shaped (2: 1 - 3: 1); narrowly oblong (6: 1 - 3: 1); transversely-oblong (2: 3 - 1: 2); narrowly transversely-oblong 11:3 - 1:6)
obovate	- reversed ovate, greatest width above the middle (2: 1 - 3: 11; depressed obovate 12:3 - 1:2)
obtuse	- blunt or rounded at the base or apex, at an angle of more than 90°
ovary	- part of a carpel containing the ovules and eventually becoming the fruit
ovate	- egg-shaped (of a flat surface), greatest width below the middle (2:1 . 3:2); depressed-ovate (2:3 - 1:2)
ovoid	- egg-shaped (three-dimensional)
palmate	- digitate, finger-like compound (leaf)
panicle	- inflorescence, in which the main axis bears several side branches with several flowers
papillate	- covered with soft superficial glands or protuberances
paripinnate	- compound leaf with pinnate leaflets, without a terminal one
patent	- spreading, directed away <i>from</i> the surface
pedicel	- stalk of a single flower
peduncle	- stalk of an inflorescence
pendent	- hanging vertically
perianth	- flower leaves (tepals; sepals and petals)
petals	- corolla leaves: inner whorl of often coloured perianth leaves
petiole	- leaf stalk

petiolule	- the stalk (petiole) of a leaflet of a compound leaf
pinna(e)	- yoke(s) of a compound leaf
pinnate	- with leaflets arranged along both sides of a common rachis
pistil	- the female organ of a flower (ovary, style, and stigma)
pneumatophores	- aerial roots, intended for gas exchange between roots and air in case of inundation
pod	- dry and 1- to many-seeded fruit, dehiscing along margin or indehiscent
puberulous	- beset with soft, short, erect hairs
pulvinulus	- swollen base or apex of petiolule
pulvinus	- swollen base or apex of petiole
pyrene	- stone, seed lying in stony layer
pyxidium	- a woody capsule, with the upper portion acting as a lid (Lecythidaceae)
raceme	- inflorescence, in which the flowers are borne on pedicels along a main axis
rachis	- main axis of inflorescence or compound leaf
ramiflorous	- borne on the branches, usually below the leaves (flowers)
receptacle	- part of the stem from which all flower parts arise
reflexed	- bent downwards or backwards
reticulately veined	- net-like veined
revolute	- curved outward toward lower leaf surface (leaf margin)
rhombic	- rhomb-shaped (2:1 - 3:1); narrowly rhombic (6:1 - 3:1); transversely-rhombic (2:3 - 1:2); narrowly transversely-rhombic (1:3 - ,:6)
rhomboid	three-dimensionally rhombic, diamond- or lozenge-shaped
scaly	- scale-like, or with scales (hairs, bark); with small patches of dead bark which fall off the trunk (see flaky)
sepals	- calyx leaves: outer whorl of usually green perianth leaves
serrate	- toothed like a saw
serrulate	- finely serrate
sessile	- without stalk (flower, leaf)
slash	- cut. blaze: the surface that becomes visible after a piece of bark has been chopped off
spicate	- inflorescence a spike
spike	- inflorescence with sessile flowers along an elongate axis
stamen	- male reproductive organ of a flower, consisting of a filament and an anther
staminode	- sterile stamen
standard	- the upper petal of a corolla (flowers of Papilionaceae)
stellate	- star-shaped (of hairs)
stem-clasping	- when the leaf is widened at the base, and embraces the stem
stipe	- short stalk (fruit)
stipel	- stipule of a leaflet of a compound leaf
stipule	- leaf-like or scar-like appendage of a leaf, usually at both sides at the base of the petiole
stilt root	- lateral <i>root</i> of the trunk, arising above the ground and entering the soil at some distance from the trunk base
striate	- with fine longitudinal stripes or grooves
style	mostly elongate part of a carpel at apex of ovary
tepa's	- perianth leaves, not distinguishable as either a sepal or a petal
terminal	- proceeding from or belonging to the end or apex

thyrses	- dense, panicle-like, compound inflorescence
thyrsoid	- thyrses-like
triangular	- two-dimensionally triangle-shaped (sepals, bracts)
truncate	- more or less squarely cut off at the base or apex
umbel	- inflorescence with rays or pedicels arising from the same point, like the ribs of an umbrella
umbellate	- umbel-like (inflorescence)
undulate	- wavy (leaf margin)
valves	- pieces into which a capsule naturally separates at maturity
velutinous	- with velvety hair cover
ventral	- on the lower side (abaxial)
yoke	- a pair of opposite leaflets
zygomorphic	- divisible in equal parts in one plane only (flowers, occurring in, e.g., Papilionaceae)

10. LITERATURE

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Barakaro IAr)	<i>Ormosia paraensis</i>	140, 231
Barakaro (Ar)	<i>Ormosia stipularis</i>	140

See chapter 'Explanatory notes' for an explanation of the abbreviations used here.

Vernacular name	Scientific name	Page
Baramanni (Cr)	Catostemma commune	64
Baramanni (Cr)	Catostemma fragrans	66
Baromalli (Ar)	Catostemma altsonii	66
Baromalli (Ar)	Catostemma commune	64
Baromalli (Ar)	Catostemma fragrans	66
Bastard bulletwood (Cr)	Humiria balsamifera	98
Bastard kabukalli (Cr)	Laetia procera	112
Bastard kokoritiballi (Cr)	Pouteria cuspidata	152
Bastard kurokai (Cr)	Trattinickia rhoifolia	192
Bastard purpleheart (Cr)	Astronium ulei	56
Bat seed (Cr)	Andira surinamensis	46
Bauwana (W)	Astronium ulei	56
Bauwaua (M)	Astronium ulei	56,210
Bee/wood (Cr)	Manilkara bidentata	126
Bibiro (Ar)	Chlorocardium rodiei	70
Biburu (Ar)	Chlorocardium rodiei	70
Bitter ash (Cr)	Quassia simarouba	162
Black kakaralli (Cr)	Eschweilera sagotiana	16, 17, 94, 130, 220
Black kakaralli (Cr)	Eschweilera subglauca	17,94
Blackheart (Cr)	Acosmium praeclarum	42, 207
Blackheart (Cr)	Chamaecrista adiantifolia var. pteridophylla	42
Blunt-leaf karohoro (Cr)	Schefflera decaphylla	166, 238
Broad-leaved burada (Cr)	Parinari campestris	146
Brown ebony (Cr)	Swartzia leiocalycina	176
Brown silverballi (Cr)	Licaria cannella	18, 122, 227
Buckwax tree (Cr)	Symphonia globulifera	178
Buhurada (Ar)	Parinari campestris	146
Bulletwood (Cr)	Manilkara bidentata	13, 98, 126, 144, 228
Bully tree (Cr)	Manilkara bidentata	126
Burada (Ar)	Exeliodendron barbatum	17
Burada (Ar)	Parinari campestris	18, 146
Burada (Ar)	Parinari rodolphii	146, 233
Buruma (Ar)	Pourouma spp.	178
Candlewood (Cr)	Parinari campestris	146
Candlewood (Cr)	Talisia squarrosa	184
Chuya (M)	Pouteria speciosa	156
Clubwood (Cr)	Swartzia leiocalycina	176
Clump wallaba (Cr)	Dicymbe altsonii	15, 84, 184, 204
Clump wallaba (Cr)	Dicymbe corymbosa	15
Coffee mortar (Cr)	Terminalia dichotoma	188
Cogwood (Cr)	Chlorocardium rodiei	70
Cokerwood (Cr)	Terminalia dichotoma	188
Common asepokoi (Cr)	Pouteria guianensis	154
Common baromalli (Cr)	Catostemma commune	16-18,64,212
Common black kakaralli (Cr)	Eschweilera sagotiana	94, 220
Common kurokai (Cr)	Protium decandrum	158
Copaiba balsam (Cr)	Copaifera pubiflora	132
Countabatli (Cr)	Licania alba	120
Counter (Cr)	Licania alba	120
Cow-wood (Cr)	Bagassa guianensis	58, 144, 211

Vernacular name	Scientific name	Page
Crabwood (Cr)	<i>Carapa guianensis</i>	16, 62, 212
Crabwood (Cr)	<i>Carapa procera</i>	16,62
Crook (Cr)	<i>Alexa Imperatricis</i>	44
Crook (Cr)	<i>Ormosia coutinhoi</i>	142
Currywood (Cr)	<i>Aspidosperma vargasii</i>	54,210
Dakama (Ar)	<i>Dimorphandra conjugata</i>	78,216
Dakamaballi (Ar)	<i>Aldina insignis</i>	15
Dalli (Ar)	<i>Virola</i> spp.	196
Darina (Ar)	<i>Hymenolobium</i> spp.	104
Deokunud (W)	<i>Vochysia surinamensis</i>	202
Determa (Cr)	<i>Ocotea rubra</i>	136, 230
Dollywood (Cr)	<i>Virola surinamensis</i>	198
Dukali (Ar)	<i>Parahancornia fasciculata</i>	58, 144, 232
Dukuria (Ar)	<i>Sacoglottis cydonioides</i>	164
Dukuria (Ar)	<i>Sacoglottis guianensis</i>	18,164,237
Durban pine (Cr)	<i>Pouteria speciosa</i>	156
Duru (Ar)	<i>Apeiba petoumo</i>	16
Epik rik (Ak)	<i>Orrnosia coccinea</i>	140
Fine smooth-leaf kakaratli (Cr)	<i>Eschwelleria parviflora</i>	92
Fine-leaf kakaralli (Cr)	<i>Eschweilera wachenheimii</i>	17,92
Fine-leaf wadara (Cr)	<i>Couratari guianensis</i>	76
Fukadi (Ar)	<i>Buchenavia fanshawei</i>	188, 243
Fukadi (Ar)	<i>TerniniaJia amazonia</i>	18,186, 243
Fukadi (Ar)	<i>Terminalia dichotoma</i>	16,18,188
Futui (Ar)	<i>Jacaranda copaia</i>	17,110, 224
Gale (Cr)	<i>Aniba</i> spp.	134
Goupi (Cr)	<i>Goupia glabra</i>	96
Greenheart (Cr)	<i>Chlorocardium rodiei</i>	15-17, 42, 70. 72. 130, 134, 136. 198, 214
Guava-skin (kakaralli) (Cr)	<i>Eschweilera alata</i>	90. 219
Hachiballi (Ar)	<i>Pera schomburgkiana</i>	18
Haiari (Ar)	<i>Lonchocarpus</i> spp_	44
Haiariballi (Ar)	<i>Alexa imperatricis</i>	17,44. 207
Haiariballi (Ar)	<i>Alexa leiopetala</i>	44
Haiawaballi (Ar)	<i>Tetragastris altissima</i>	190. 244
Hakia (Ar)	<i>Tabebuia serratifolia</i>	182. 242
Hakiaballi (Ar)	<i>Vitex compressa</i>	18
Hakiaballi (Ar)	<i>Vitex stahelii</i>	200, 246
Hard kereti (Cr)	<i>Ocotea wachenheimii</i>	134
Hariraro shiruaballi (Ar)	<i>Ocotea canaliculata</i>	134
Hatti (Ar)	<i>Hevea pauciflora</i>	16
Heburu (W)	<i>Ocotea canaliculata</i>	134
Hill corkwood (Cr)	<i>Pterocarpus rohrii</i>	160, 236
Hill dalli (Cr)	<i>Virola michelli</i>	196, 245
Hill dalli (Cr)	<i>Virola sebifera</i>	196
Hill fukadi (Cr)	<i>Terminalia amazonia</i>	18,186,243
Hill ileballi (Cr)	<i>Vochysia surinamensis</i>	202
Horse-eye (Cr)	<i>Mucuna urens</i>	142
Horse-eye (Cr)	<i>Ormosia coutinhoi</i>	142
Hububalli (Ar)	<i>Loxopterygium sagotii</i>	18.124,227

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Huruasa (Ar)	Abarema jupunba	18, 40, 206
Huruereroko (Ar)	Tococa aristata	19
HUluhurudan (Ar)	Dimorphandra polyandra	7B
Ileng (Ak)	Ocotea canallculata	134
Imirimiaballi (Ar)	Chamaecrista adiantifolia var. pteridophylla	42
Inyak (W)	Antonia ovata	50, 209
Iliar (W)	Manilkara bidentata	126
Irikwa (M, W)	Virola michelii	196
Irikwa (M, W)	Virola surinamensis	19B
Irimariye (M)	Couratan guianensis	76
Irimiyar (W)	Couratan guianensis	76
Iron Mary (Cr)	Clathrotropis paradoxa	17
Ironwood (Cr)	Swartzia leiocalycina	176
Ironwood (Cr)	Tabebuia serratifolia	182
Ite (Ar)	Mauritia flexuosa	13, 19
Iteballi (Ar)	Vochysia schomburgkii	13, 202
Iteballi (Ar)	Vochysia surinamensis	1a, 202, 247
Iteballi (Ar)	Vochysia tetraphylla	202
Itik (Ak)	Llicaria cannella	122
Itikiboro (Ar)	Pterocarpus rohrii	13, 160
Itikiboroballi (Ar)	Swartzia benlhamiana	13, 15, 174, 240
Itikiboroballi (Ar)	Swartzia sprucei	174
Itikiboroballi (Ar)	Swartzia xanthopetala	174
Ituri wallaba (Cr)	Eperua grandiflora	15, 86, 21B
Ituri wallaba (Cr)	Eperua jenmanii	15, B6
Itur; wallaba (Cr)	Eperua schomburgkiana	B8
Jumbi bead tree (Cr)	Ormosia coccinea	140
Kabiuk (Ak)	Goupia glabra	96
Kabukalli (Ar)	Goupia glabra	17.1B, 96.100, 112, 220
Kaditiri (Ar)	Sclerobium guianense	1B, 170, 239
Kaditiri (Ar)	Sclerobium micropetalum	170
Kairiballi (Ar)	Licania heteromorpha var. perplexans	17
KakaraJli (Ar)	Eschweilera alata	90
Kakaralli (Ar)	Eschweilera pedicellata	94
Kakarua (Ar)	Padosia schomburgkiana	1B
Kalili (W)	Sclerobium guianense	170
Kamakuti (Ar)	Bombax flavillorum	13, 15
Kamaragwa (M)	Tetragastris altissima	190
Kamarai (Ak)	Licaria cannella	122
Kamarakata (Ar)	Acosmium nitens	42
Kamatana (M)	Catostemma fragrans	66
Kapai (Ak)	Alexa imperaricis	44
Kara (M)	Sterculia rugosa	172
Karaba (Ar, P, Ak)	Carapa guianensis	62
Karamanni (M)	Symphonia globulifera	17B
Karapa-yek (Ak)	Calapa guianensis	62
Karapai (Ak)	Carapa guianensis	62
Karawai (Ak)	Peltogyne venosa subsp. densitlora	148
Karimora(-yek) (Ak)	Talisia squarrosa	184

Vernacular name	Scientific name	Page
Karoholo (Ar)	Schettflefa decaphylla	166
Karohoro (Ar)	Schefflera morototoni	168
Kaserena (M)	Hymenolobium spp.	104
Kata (M)	Sclerolobium guianense	170
Katama (Ak)	Catostemma commune	64
Karowal (W)	Bagassa guianensis	58
Kauada (M)	Licania alba	120
Kaudanaro (Ar)	Licania alba	120
Kauta (Ar)	Licania laxillora	17,120
Kautaballi (Ar)	Licania alba	17, 120,226
Kautaballi (Ar)	Licania majuscula	t8, 120
Kauwi (Ak)	Cia throtropis macrocarpa	74
Kawanari (Ar)	Hymenaea oblongitolia	102
Kawioi (Ak)	Aniba hypoglauca	48
Kereti (Ar)	Lauraceae spp.	134
Kharemero shiruaballi (Ar)	Licaria cannella	122
Kirikaua (Ar)	Iryanthera lancitolia	18,108,196,223
Kirikaua (Ar)	Iryanthera macrophylla	108
Klaipio (C)	Abarema jununba	40
Koatoi (Ak)	Alexa imperatricis	44
Kobero (Wr)	Manilkara bidentata	126
Kokorite (Ar)	Attalea regia	18, 19
Kokoritiballi (Ar)	Pouteria cuspidata	152, 234
Konatopo (C)	Diplotropis purpurea	80
Konawadranup (W)	Tabebuia serratifolia	182
Kopaia (C)	Jacaranda copaia	110
Koperi (Ak)	Cedrela odorata	68
Kopb (Ak)	Calophyllum lucidum	60
Koralo (Ar)	Andira Inermis	46
Koraro (Ar)	Andira surinamensis	46
Koraroballi (Ar)	Hymenolobium flavum	104, 222
Koraroballi (Ar)	Hymenolobium petraeum	104
Koraroballi (Ar)	Hymenolobium sp.	104
Koreko (C)	Clathrolropis macrocarpa	74
Koroboreli (Ar)	Peltogyne venosa	148
	subsp. densiflora	
Korokororo (Ar)	Ormosia coutinhoi	15,142,232
Koran (W)	Carostemma fragrans	66
Korongpinbiu (Ak)	Ormosia coutinhoi	142
Kotik (Ak)	Hymenolobium spp.	104
Kötöre (Ak)	Sacoglottis guianensis	164
Koyarakushi (Ar)	Faramea spp.	17
Koyechiballi (Ar)	Lueheopsis rugosa	15
Krapabosi (C)	Dipteryx odorata	82
Kufa (Ar)	Clusia spp.	178
Kukwi (Ak)	Peltogyne venosa	148
	subsp. venosa	
Kulishiri (Ar)	Matayba opaca	15
Kumaru (Ar)	Dipteryx odorata	82
Kume (Ak)	Lecythis zabucajo	118
Kunawaru (Ak)	Miconia lateriflora	19
Kunawaru (Ak)	Miconia pubipetala	19
Kupisini (C)	Parinari campestris	146
Kupiye (C)	Goupia glabra	96
Kurahara (Ar)	Calophyllum lucidum	60,134,211

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Kurahara silverballi (Cr)	Ocotea glomerata	134
Kurana (An)	Cedrela odorata	68
Kurang (Ak)	Inga alba	106
Kurero silverballi (Cr)	Aniba hypoglauca	48
Kurihikoyoko (Ar)	Anaxagorea dolichocarpa	16, 17
Kurokai (Ar)	Protium decandrum	17, 158, 236
Kut (Ak)	Chlorocardium rodiei	70
Kwai (C)	Terminalia amazonia	186
Kwako (Ar)	Marliera montana	19
Kwari (Ak)	Inga alba	106
Kwariye (M)	Inga alba	106
Kwatapuna (M)	Abarema jupunba	40
Kwateri (C)	Eschweilera decolorans	92
Kwateri (C)	Eschweilera sagotiana	94
Kwatpain (W)	Abarema jupunba	40
Kwtru (M)	Eschweilera decolorans	92
Kwtru (M)	Eschweilera sagotiana	94
Kwikpa (Ak)	Chrysophyllum pomiferum	72
Kwipari (C)	Loxopterygium sagotii	124
Kwipariye (M)	Loxopterygium sagotii	124
Limonaballi (Ar)	Chrysophyllum pomiferum	72, 214
Liquorice tree (Cr)	Pradosia schomburgkiana	18
Locust (Cr)	Hymenaea courbaril	18, 102, 126, 148, 222
Locust (Cr)	Hymenaea oblongifolia	102
Locust (Cr)	Hymenaea spp.	126
Lucky seed (Cr)	Ormosia coccinea	140
Maats (W)	Andira surinamensis	46
Mabinanero (Ak)	Hymenolobium spp.	104
Mahaicaballi (Ar)	Parinari campestris	146
Maho (Ar)	Sterculia rugosa	172
Maitakin (Ak)	Symphonia globulifera	178
Maiuarai (Ak)	Licania alba	120
Makang (Ak)	Sandwithia guianensis	17
Makarai (Ak)	Parinari campestris	146
Mamusare (Ar)	Rinorea endotricha	18
Mamusare (Ar)	Rinorea riana	18
Manicole (Cr)	Euterpe edulis	16, 19
Manni (Ar)	Symphonia globulifera	16, 18, 178, 198, 241
Manniballi (Ar)	Moronobea coccinea	17, 132, 229
Manobodin (Ar)	Emmotum fagifolium	18
Manyokinaballi (Ar)	Gelssospermum sericeum	18
Maporokon(i) (Ar)	Inga alba	106, 223
Marako (C)	Peltogyne venosa	148
Marapasmukri (M)	subsp. densiflora	
Marawaro (Ak)	Pouteria guianensis	154
Marbuk (Ak)	Calophyllum lucidum	60
Maribuk (Ak)	Iryan\hera lancifolia	108
Marimari (Wr)	Couratari guianensis	76
Marishiballi (Ar)	Licania densiflora	18
Maruwa (Ak)	Protium decandrum	158
Masawi (Ak)	Pausandra martinii	17

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Matchwood (Cr)	<i>Schefflera decaphylla</i>	166
Matchwood (Cr)	<i>Schefflera morototoni</i>	168
Matora (M)	<i>Terminalia amazonia</i>	186
Meri (Cr)	<i>Humiria balsamifera</i>	98
Moire (M)	<i>Hymenaea courbaril</i>	102
Mok (Ak)	<i>Peltogyne venosCl</i> subsp. <i>densiflora</i>	148
Monkey pot (Cr)	<i>Lecythis zabucajo</i>	16, 118, 226
Mora (Ak, Ar)	<i>Mora excelsa</i>	14-16, 128, 130, 228
Mora-yek (Ak)	<i>Mora excelsa</i>	128
Morabukea (Ar)	<i>Mora gonggrijpii</i>	15, 16, 70, 130, 229
Moroballi (Ar)	<i>Talisia squarrosa</i>	15, 184, 242
Morombo-rai (Ak)	<i>Moronobea coccinea</i>	132
Morompo (M)	<i>Swartzia benthamiana</i>	174
Morototo (C)	<i>Schefflera morototoni</i>	168
Mukru (Ar)	<i>Ischnosiphon</i> spp.	17
Muniridan (Ar)	<i>Ruizterania albiflora</i>	202
Muniridan (Ar)	<i>Siparuna</i> spp.	202
Murewa (C)	<i>Laetia procera</i>	112
Muri (Ar)	<i>Humiria balsamifera</i> var. <i>guianensis</i>	98
Mutushi (C)	<i>Pterocarpus rohrii</i>	160
Mutuwali (Ak)	<i>Clathrotropis macrocarpa</i>	74
Naharu (Cr)	<i>Terminalia dichotoma</i>	188
Napo (Ak)	<i>Hyeronima alchorneoides</i>	100
Not (W)	<i>Hymenaea courbaril</i>	102
Ogoru (Ak)	<i>Diploptropis purpurea</i>	80
Okokonshi (Ar)	<i>Quiina guianensis</i>	17
Okokonshi (Ar)	<i>Quiina indigofera</i>	17
Okoromai (Ak)	<i>Eschweilera alata</i>	90
Okraprabu (Ak)	<i>Swartzia benthamiana</i>	174
Olgoi (Ak)	<i>Oiploptropis purpurea</i>	80
örükorong (Ak)	<i>Abarema jupunba</i>	40
Paku (An)	<i>Catostemma commune</i>	64
Paku (An)	<i>Catostemma Jragrans</i>	66
Pakuri (Ar)	<i>Platonia insignis</i>	132, 150, 234
Panda (C)	<i>Tabebuia insignis</i>	180
Parakaua (C)	<i>Mora excelsa</i>	128
Parakusan (Ar)	<i>Swartzia jenmanii</i>	17
Parakwa (W)	<i>Oinizia excelsa</i>	128
Parakwai (Ak)	<i>Mora gonggrijpii</i>	128, 130
Parank (W)	<i>Cedrela odorata</i>	68
Paranka (M)	<i>Cedrela odorata</i>	68
Parewe (Cl)	<i>Eperua falcata</i>	84
ParipibaJli (Ar)	<i>Chrysophyllum pomiferum</i>	72, 214
Pasa (Ak)	<i>Jacaranda copaia</i>	110
Pero-ishi-lokodo (Ar)	<i>Tabernaemontana undulata</i>	17, 18
Phootee (Cr)	<i>Jacaranda copaia</i>	110
Pi (W)	<i>Schefflera morototoni</i>	168
Pointed-leaf karohoro (Cr)	<i>Schefflera morototoni</i>	168, 238
Pökö (Ak)	<i>Eschweilera sagotiana</i>	94
Por (W)	<i>Pouteria speciosa</i>	156

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Pörnai (Ak)	Schefflera morototoni	168
Porokai (Ar)	Protium decandrum	158
Pöyak (Ak)	Pouteria guianensis	154
Prukoi (P)	Eschweilera sagotiana	94
Puire (M)	Sacoglottis guianensis	164
Puna (M)	Schefflera morototoni	168
Purpleheart (Cr)	Peltogyne venosa	148, 233
Purue (M)	Manilkara bidentata	126
Ranai (W)	Sterculia rugosa	172
Ranoi (M)	Tabebuia serratifolia	182
Red cedar (Cr)	Cedrela odorata	68, 213
Roral-yekl (Ak)	Chlorocardium rodiei	70
Rough-leaf maho (Cr)	Sterculia rugosa	17, 172, 239
Saka (Ar)	Peltogyne venosa subsp. venosa	148
Sand baromalli (Cr)	Catostemma fragrans	15, 18, 66, 213
Sand dukuria (Cr)	Sacoglottis guianensis	18, 164, 237
Sand mora (Cr)	Talisia squarrosa	184
Saraurai (Ak)	Sterculia rugosa	172
Sarebebe (Ar)	Macrolobium bifolium	16, 18
Sarebebeballi (Ar)	Vouacapoua macropetala	17, 204, 247
Sawariskin silverballi (Cr)	Ocotea canaliculata	134
Sekerau (Ak)	Sterculia rugosa	172
Serena (M)	Calophyllum lucidum	60
Shibadan (Ar)	Aspidosperma alburn	52
Shibadan (Ar)	Aspidosperma cruentum	52, 54, 209
Shibadan (Ar)	Aspidosperma ulei	54
Shibadan (Ar)	Aspidosperma vargasii	54
Shiraip (W)	Swartzia leiocalyeina	176
Shirima (M)	Quassia simarouba	162
Shirua (Ar)	Lauraceae spp.	134
Shirua (Ar)	Nectandra spp.	13, 134
Shirua (Ar)	Ocotea guianensis	13
Shiruaballi (Ar)	Aniba spp.	13
Shiruaballi (Ar)	Lauraceae spp.	134
Shiruaballi (Ar)	Licaria spp.	13
Shiruaballi (Ar)	Ocotea spp.	13
Silverballi (Cr)	Lauraceae spp.	134
Simana (Ak)	Catostemma commune	64
Simana (Ak)	Catostemma fragrans	66
Simarupa (Ar, C)	Quassia simarouba	18, 162, 237
Simere (W)	Ouassia simarouba	162
Simia Chimi (Ak)	Terminalia dichoroma	18B
Simiri (Ar)	Hymenaea courbaril	102
Sipiri (An)	Chlorocardium rodiei	70
Sipu (C)	Chlorocardium rodiei	70
Smooth-leaf Kakaralli (Cr)	Eschweilera coriacea	92
Smooth-leaf kakaralli (Cr)	Eschweilera deolorans	16, 17, 92, 94, 219
Smooth-leaf maho (Cr)	Sterculia pruriens	17, 18, 172
Smooth-leaf wadara (Cr)	Couratari multillora	76
Soapwood (Cr)	Abarema jupunba	40
Soft kereti (Cr)	Ocotea oblonga	134

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Soft wallaba (Cr)	<i>Eperua falcata</i>	15-18,84, 86,217
Stinking toe (Cr)	<i>Hymenaea courbaril</i>	102
Srinkwood (Cr)	<i>Goupia glabra</i>	96
Suradan (Ar)	<i>Hyeronima alchorneoides</i>	100,221
Suya (Cr)	<i>Pouteria speciosa</i>	156, 235
Swamp corkwood (Cr)	<i>Plerocarpus officinalis</i>	16, 18
Swamp dalli (Cr)	<i>Viola surinamensis</i>	16, 18, 194, 198, 246
Swamp fukadi (Cr)	<i>Terminalia dichotoma</i>	16, 18, 188
Swamp kirikaua (Cr)	<i>Iryanthera lancifolia</i>	108
Swinle-stick (Cr)	<i>Mabea speciosa</i>	17
Tamad (W)	<i>Eschweilera sagoliana</i>	94
Tamanokware (C)	<i>Antonia ovata</i>	50
Tamarotan (W)	<i>Terminalia amazonia</i>	186
Tatabu (Ar)	<i>Diploptropis purpurea</i>	18,80,216
Tauaranru (Ar)	<i>Humiria balsamifera</i>	98
Tauroniro (Cr)	<i>Humiria balsamifera</i>	18, 98, 112, 126, 164,221
Tekrbma (Ak)	<i>Eschweilera alata</i>	90
Teteruma (Ar)	<i>Ocotea rubra</i>	136
Thick-skin kaditiri (Cr)	<i>Sclerolobium guianense</i>	170
Thick-skin ulu (Cr)	<i>Trattinickia demerarae</i>	192
Thin-skin kaditiri (Cr)	<i>Sclerolobium micropetalum</i>	170
Thin-skin ulu (Cr)	<i>Trattinickia rhoifolia</i>	192
Tiniari (C)	<i>Licaria Cannella</i>	122
Toker (W)	<i>Licania alba</i>	120
Tonka Bean (Cr)	<i>Dipteryx odorata</i>	82.217
Truli (Cr)	<i>Manicaria saccifera</i>	19, 178
Trysil (Cr)	<i>Penlaclethra macroloba</i>	16,17
Turu (Ar)	<i>Jessenia bataua</i>	19
Tuwne (MI)	<i>Bagassa gUJanensis</i>	58
Ulu (Arl)	<i>Trattinickia demerarae</i>	192, 244
Ulu (Ar)	<i>Trattinickia rhoifolia</i>	192
Urimari (C)	<i>Couratari guianensis</i>	76
Wabaima (Ar)	<i>Licaria cannella</i>	122
Wadaduri (Ar)	<i>Lecythis zabucajo</i>	118
Wadara (Ar)	<i>Couratari gloriosa</i>	16, 76
Wadara (Ar)	<i>Couratari guianensis</i>	76,215
Wamara (Ar)	<i>SW3rtzia leiocalycina</i>	17, 18, 126, 176, 240
Wamkoam (W)	<i>Sclerolobium guianense</i>	170
Wamuk (W)	<i>Parinari campestris</i>	146
Wamuku (M)	<i>Parinari campestris</i>	146
Wanaka (M)	<i>Ormosia coutinhoi</i>	142
Wanu (C)	<i>Ocotea rubra</i>	136
Warabari (Ak)	<i>Sclerolobium guianense</i>	170
Warakai(o)ro (Ar)	<i>Laetia procera</i>	18, 112, 138, 224
Warakuri (Ar)	<i>Tabebuia insignis</i>	180
Waramai (Ak)	<i>Goupia glabra</i>	96
Waranaka (Ak)	<i>Couratari guianensis</i>	76
Warimia (Ar)	<i>Tapirira guianensis</i>	18
Warishi (C)	<i>Viola surinamensis</i>	198

Vernacular name	Scientific name	Page
Waruwai (Ak)	<i>Protium decandrum</i>	158
Watata (Ar)	<i>Eperua rubiginosa</i>	88
Watapa (Ar)	<i>Eperua rubiginosa</i>	16, 88, 218
Water wallaba (Cr)	<i>Eperua rUbiginosa</i>	16,88
Water wallaba (Cr)	<i>Eperua sChomburgkiana</i>	88
Water wallaba (Cr)	<i>Macrolobium bitolium</i>	16,88
Watschir (W)	<i>Calophyllum lucidum</i>	60
Watuwai (Ak)	<i>Laetia procera</i>	112
Wayama (Ak)	<i>Trattinickiil rhoifolia</i>	192
We (Ak)	<i>Virola surinarnensis</i>	198
Weputana (C)	<i>Iryanthera lancifolia</i>	108
Whire cedar (Cr)	<i>Tabebuia insignis</i> var. <i>monophylla</i>	16,18, 180,241
White silverballi (Cr)	<i>Ocotea canaliculara</i>	18.134.230
White w;illaba (Cr)	<i>Eperua falcata</i>	84
Wild mammee apple (Cr)	<i>Platonia insignis</i>	150
Wild mangrove (Cr)	<i>Tovomita</i> spp.	15
Wild pine (Cr)	<i>Bromelia karatas</i>	18
Wina (Ar)	<i>Lecyrhis corrugata</i>	15,116,225
Wirimiri (Ar)	<i>Lecythis confeniflora</i>	17,114,225
Wopa (A)	<i>Eperua falcata</i>	84
Yahu (Ar)	<i>Sterculia rugosa</i>	172
Yaku (Ar)	<i>Ouassia simarouba</i>	162
Yaneau (Ak)	<i>Ocotea romentella</i>	138
Yapopari (C)	<i>Sacoglottis guianensis</i>	164
Yarriyarri (Cr)	<i>Duguetia calycina</i>	17
Yarriyarri (Cr)	<i>Duguetia decurrens</i>	17
Yarriyarri (Cr)	<i>Duguetia neglecta</i>	17
Yarriyarri (Cr)	<i>Duguetia pycnastera</i>	16
Yaruru (Ar)	<i>Aspidosperma excelsum</i>	17, 18,52,176
Yawahudan (Ar)	<i>Bagassa guianensis</i>	58
Yawaredan (Ar)	<i>Sclerolobium guianense</i>	170
Yawaredan (Ar)	<i>Tachigalia</i> spp.	170
Yellow silverballi (Cr)	<i>Aniba hypoglauca</i>	15, 48, 208
Yoboko (Ar)	<i>Eperua grandiflora</i>	86
Yokar (W)	<i>Ilga alba</i>	106
Yuriballi (Ar)	<i>Trichilia</i> spp. ¹	190
Yuruwe (Ar)	<i>Bactris humiis</i>	18

¹ See note under description of *Tetragasrris altissimB.*