

# *Digitizing in Guide to Trees of Papua New Guinea*



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# Introduction

- This project to document the trees of Papua New Guinea began in March 2003, with the initial phase of the project concentrated on preparing an interactive identification tool for the commercial trees of the Morobe Province of Papua New Guinea.
- The Guide to tree species of PNG project was an initiative of PNG National Herbarium together with the Forestry Research Institute, Lae, Papua New Guinea and the National Herbarium of New South Wales, Royal Botanic Gardens and Domain Trust, NSW, Australia in 2003.
- This was a three-year project to evaluate the feasibility of preparing a complete account of the trees occurring in the entire country. During 2006, the scope of this project was expanded to include many species that occur in other regions of Papua New Guinea.
- The continuation of the project was made possible by ACP EU FORNET Funding in 2009.



## Aim of Project

1. Documentation of Flora of Papua New Guinea
2. Provide Identification Tools

**> 3,000 Tree species**



# Target groups

- 1. Institutions and schools
- 2. PNG National Forest Authority
- 3. NGOs
- 5. Scientists (Biologist, Ecologists, Antropologists , Linguists etc.
- 6. Forest Industry (loggers)
- 7. General public

> 3,000 Tree species



# Number of Commercial trees



## Miss identifications of species

- Lumping of species in the logging industry has been depriving resource owners and the Government revenue.

> 3,000 Tree species



# Tree species data gathering for the data base

## 125 identification characters

### ■ Vegetative Features

- Outer Bark
- Inner Bark
  - Colour
  - Texture
  - Odour
- Leaf
  - Arrangement
  - Simple/Compound
  - Shape
  - Size



# 125 identification characters

## ■ Floral and Fruiting Features

- Number of parts
- Flower and fruit types





# IMAGING

- Images taken includes:-
- 1. tree form
- 2. bark – outer / inner
- 3. leaves, flower and fruit



# FIELD DATA SHEET

Data can be entered remotely

## WEB Entry Forms

### PNGTrees –

*Barry Conn (NSW) & Kipiro Damas (LAE).  
Guide to trees of Papua New Guinea  
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Go to: [Literature](#) – [Habit](#) – [Field Characters](#) – [Habit](#) – [Indumentum](#) – [Leaves](#) – [Flowers](#) – [Fruits](#) – [Administration](#) –  
(Return to the [index of all items of the project](#))

**Taxon name:**

**Literature** [\[back to top\]](#)

1. Protologue <journal/book title>

2. Protologue <volume/part>

3. Protologue <page>

Min: Lower range: Mean: Upper range: Max:

4. Protologue<year>

Min: Lower range: Mean: Upper range: Max:

5. Protologue <figure>

Min: Lower range: Mean: Upper range: Max:

Modified version used as  
field data sheet

Load data into IntKey (DELTA), LucID or NaviKey  
software

# Field data sheet (modified)

**18. Habit:** 1. emergent trees 2. large trees (those making up the canopy of the forest) 3. small trees (sub-canopy sized trees)

**19. Trunk <bole shape in section>** 1. cylindrical 2. markedly fluted

**20. Trunk <bole shape straight, or not>** 1. crooked 2. straight

**21. Buttresses <present/absent>** 1. present 2. absent U. unknown

If Spines **absent**

**22. Spines <present/absent>** 1. present 2. absent **23. Spines <location>** 1. on trunk 2. on branches

**24. Aerial roots <present/absent>** 1. present 2. absent

**25. Stilt roots <present/absent>** 1. present 2. absent

**All field data sent to  
Sydney and is managed  
there**

# Management of Data

DeltaAccess - [PNG TreesKey: Item editor]

File Edit View Insert Format Records Tools Window Help

Type a question for help

1. Main attributes 2. By character view 3. Continuous view 4. Resource links

IID: 43 ItemName: Bombax ceiba

CID	Type	CharName
1	TE	protologue <journal/book title>
2	TE	protologue <volume/part>
3	IN	protologue <page>
4	IN	protologue <year>
5	IN	protologue <figure>
6	TE	literature1 <author(s)>
7	TE	literature1 <journal/book title>
8	IN	literature1 <volume/part>
9	IN	literature1 <page>
10	IN	literature1 <year>
11	IN	literature1 <figure>
12	UM	family
13	UM	group
14	UM	timber tree <yes/no>
15	UM	timber groups <hardwoods, or not>
16	TE	tradenname <forestry/timber name>
17	UM	habit
18	UM	trunk <bole shape in section>
19	UM	trunk <bole shape straight, or not>
20	UM	buttresses <present/absent>
21	UM	spines <present/absent>
22	UM	spines <location>
23	UM	aerial roots <present/absent>
24	UM	stilt roots <present/absent>
25	UM	bark <outer - colour use only for trees greater than 50 cm dbh>
26	UM	bark <continuity-rough or smooth>
27	UM	bark <texture>
28	UM	bark lenticels (pustules) <shape>
29	UM	bark subrhynchidome <colour>
30	UM	bark <thickness (mm)>

(1) white
(2) cream-coloured
(3) yellow
(4) green
(5) orange
(6) red
(7) grey
(8) brown
(9) black
(10) purplish
(U) unknown
(V) variable
(-) not applicable

Record: 43 of 440

bark <outer - colour use only for trees greater than 50 cm dbh>

NUM

Start Microsoft PowerPoint ... From\_Trees\_to\_Desc... Adobe Photoshop Switchboard PNG TreesKey: It... EN 11:33 AM

➤ *Ease of data entry*

# Data available: Automated Taxonomic Descriptions

***Calophyllum papuanum*** Laut. Bot. Jarb. Vol. 58: 9 (1922). Fig. 2. Other Literature: P.F. Stevens *Handbooks Fl. Papua New Guinea* Vol. 3: 90-91 (1995)

Clusiaceae; Dicot. Tradename: Calophyllum.

Timber species.

Small trees or large trees. Buttresses sometimes present; spines absent; aerial roots absent; stilt roots absent. Bark dark grey or brown; rough; fissured or scaly or flaky; exudate present; very light yellow; not changing colour on exposure to air. Terminal buds not enclosed by leaves; complex hairs absent; stinging hairs absent; mature twig hairy; hairs dense or hairs sparse. Leaves opposite, simple; petiole present, not winged, attached to base of leaf blade <not peltate>, not swollen; (2.4-)6.5-17(-22) cm long, (1.4-)3.5-8(-11) cm wide; glands absent, lamina symmetric; margin entire; apex rounded or sub acute; venation pinnate <secondary veins arising from the midrib along its length>, secondary veins closed <spaced so close together that tertiary veins cannot be easily seen between them>, prominent or not prominent, but visible; stipules absent; domatia absent; hairs present; sparse or dense. Inflorescence axillary <from between a leaf and branch>, usually flowers on an unbranched axis; flowers unisexual, probably with male and female flowers on different plants <dioecious>, flowers stalked, with many planes of symmetry <actinomorphic>, about 5 mm long or across or to about 30 mm long or across; Perianth present; with all sepals and/or petals (hence tepals) similar; usually 8.0, free; Stamens (70-)150-300, filaments present, free of each other, free of the perianth; Ovary superior <seated above petals and sepals; hypogenous>, carpels joined (when more than one) <syncarpous>, locules 1; styles solitary <including joined together>, 1. Usually fruits arranged on unbranched axis; Fruit brown, non-fleshy. Seeds 1, much more than 10 mm long, not winged.



# Standardisation Data Presentation

PNGtrees Home >> Tree Descriptions >> Taxa Listed by Species | Taxa Listed by Family >> Data Sheets

## PNGTreesKey – *Calophyllum pauciflorum* A.C.Sm.

Barry Conn (NSW) & Kipiro Damas (LAE).

*Guide to trees of Papua New Guinea*

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### *Calophyllum pauciflorum* A.C.Sm.

*Journal of the Arnold Arboretum* Vol. 22: 341 (1941)

**Other Literature:** P.F. Stevens, *Handbooks of the Flora of Papua New Guinea* 92-95 (1995) Fig. 19

**Family:** Chusiaceae  
Dicotyledon

**Timber Group:** Major exportable hardwood

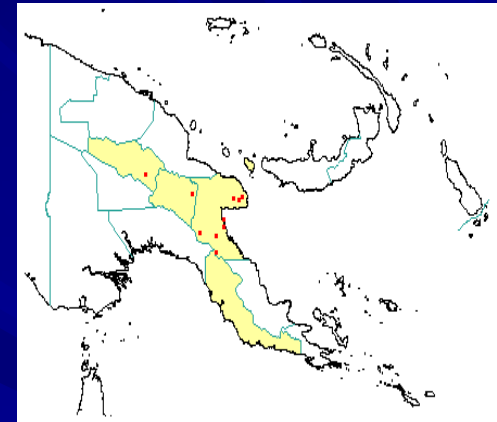
**Field Characters:** Large canopy tree (up to 36 m high) or Small sub-canopy tree; Bole cylindrical (up to c. 50 cm diam.); straight; buttresses absent; stilt roots absent; Bark grey or brown (pale to dark brown), rough, scaly or flaky or fissured; Subrhytidome (under-bark) dark brown; inner bark of one layer; faintly to non-aromatic; outer blaze red or brown, markings absent; inner blaze red or brown, markings absent; bark exudate (sap) flowing (spotty), colour not changing on exposure to air, sticky; terminal buds not enclosed by leaves.

**Indumentum:** Complex hairs absent; stinging hairs absent; mature twig indumentum (hairs) present or absent, hairs sparse.

**Leaves:** Leaves spaced along branches, opposite (in pairs, opposite one another on the branchlet), simple (a leaf composed of a single blade); swollen; leaves broadest above middle or broadest at or near middle, (2.0-) 2.5-5.5 (-9.5) cm, 0.9-2.5 (-4.0) cm; symmetric, entire, not dissected; veins closed, not prominent, but visible, intramarginal veins absent; leaves lower surface dark green, upper surface green, indumentum (hairs) present; stipules absent.

**Flowers:** Inflorescence axillary, flowers on an unbranched axis, cones absent; flowers unisexual, unisexual probably with male and female flower symmetry, 3.5-4.0 mm long, diameter small (up to 10 mm diam.) (c. 3.5 mm diam.); perianth present, with all sepals and/or petals (hence tepals) present, free of each other, free of the perianth; ovary superior, carpels joined (when more than one), locules 1; styles solitary, 1.

**Fruits:** Infructescence arranged on unbranched axis, fruit 15.0-19.0 mm long, dark blue or brown (when dry), not spiny, non-fleshy, simple, indehiscent (as wide as long), seed 1-10 mm diam. (10-13 mm diam.).

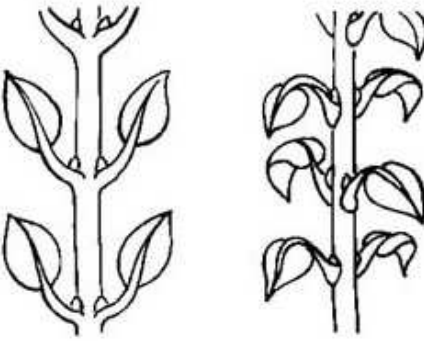
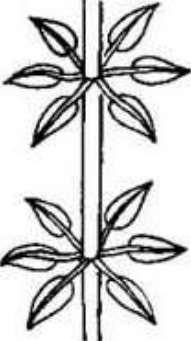
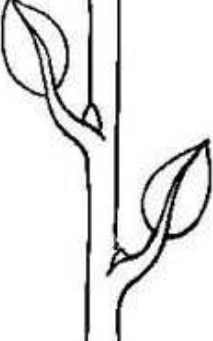


# Controlled Vocabulary

- Data Dictionary
  - Standardisation of data gathering

## Leaves (insertion/arrangement)

This feature describes how the leaves are inserted on to the branchlet. The leaves are recorded as:

<b>opposite</b> (in pairs, opposite one another on the branch)	<b>whorled</b> (with more than two leaves inserted at one node of a branch; arising from one level)	<b>spiral</b> (leaves occurring singly at a node/level and arranged spirally up the branch)
		



# Interactive Identification

## PNGtrees - Key to trees of Papua New Guinea

Guide to trees of Papua New Guinea

Barry J. Conn and Kipiro Q. Damas

[Data Dictionary](#) [Tree Descriptions](#) [PNGtrees HOME](#)

**NaviKey**

Identification Options About

Characters available

- family
- group
- timber tree <yes/no>
- timber groups <hardwoods, or not>
- habit
- trunk <bole shape in section>
- trunk <bole shape straight, or not>
- buttresses <present/absent>
- spines <present/absent>
- spines <location>
- aerial roots <present/absent>
- stilt roots <present/absent>
- bark <outer - colour use only for trees greater than 50 cm

Character states available

Select

Selection criteria

Resulting items

- Aceratium muellerianum Schltr.
- Aceratium oppositifolium DC.
- Aceratium parvifolium Schltr.
- Aceratium pittosporoides Schltr.
- Aceratium tomentosum Coode
- Acronychia murina Ridl.
- Actinodaphne nitida Teschner
- Adenanthera pavonina L.
- Adinandra forbesii Baker f.
- Agathis robusta (F.Muell.) F.M.Bailey var. nesophila Whitm
- Aglaia argentea Blume
- Aglaia cucullata (Roxb.) Pellegr.
- Aglaia rimosa (Blanco) Merr.

Remove Selection Remove All

All items: 440 Resulting items: 440

List of Features

List of Tree Species



# PNGtrees - Key to trees of Papua New Guinea

## Guide to trees of Papua New Guinea

PNGtrees HOME

bark blaze <layering>

### Selection criteria

trunk <bole shape in section>: cylindrical  
buttresses <present/absent>: present  
bark <continuity-rough or smooth>: smooth

### Character states available

bark <outer colour use only for trees greater than 50 cm>  
bark <texture>  
bark lenticels (pustules) <shape>  
bark subhydrome <colour>  
bark <thickness (mm)>  
bark <thickness measurement (mm)>  
bark blaze <layering>

Select

### Selection criteria

trunk <bole shape in section>: cylindrical  
buttresses <present/absent>: present  
bark <continuity-rough or smooth>: smooth

### Resulting items

Adenanthera pavonina L.  
Agathis robusta (F.Muell.) F.M.Bailey var. nesophila Whitmore  
Aglaia argentea Blume  
Aglaia sapindina (F.Muell.) Harms  
Antiaris toxicaria (Pers.) Lesch. var. macrophylla Blume  
Artocarpus sepicanus Diels  
Atuna racemosa Raf. subsp. racemosa  
Calophyllum vexans P.F.Stevens  
Canarium macadamii Leenh.  
Celtis hildebrandii Soepadmo  
Celtis latifolia (Blume) Planch.  
Chisocheton longistipitatus (Bailey) L.S.Sm.  
Decaspermum bracteatum (Roxb.) Scott

49

600

Remove Selection

Remove All

All items:

440

Resulting items:

49

# Impediments in data gathering and processing...

- **Travel logistics**
- **Social Unrest**
- **Weather conditions**
- **Resource limitations**
  - Technical equipment
  - IT problems
  - Current Literature
  - Taxonomic skills
- **Finance**



# Conclusion

- Documented 600 tree species
- Data is now accessible through
  - <http://www.pngplants.org/PNGtrees>
- Book in Manuscript and will be published soon



# Acknowledgements

Dr. Shelley James and the Bishop  
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from Florida State University



**Maloha  
to  
everyone**

