



Forest Types of Suriname

Marsh Forest

Based upon the knowledge of Frits van Troon

Manual
#3

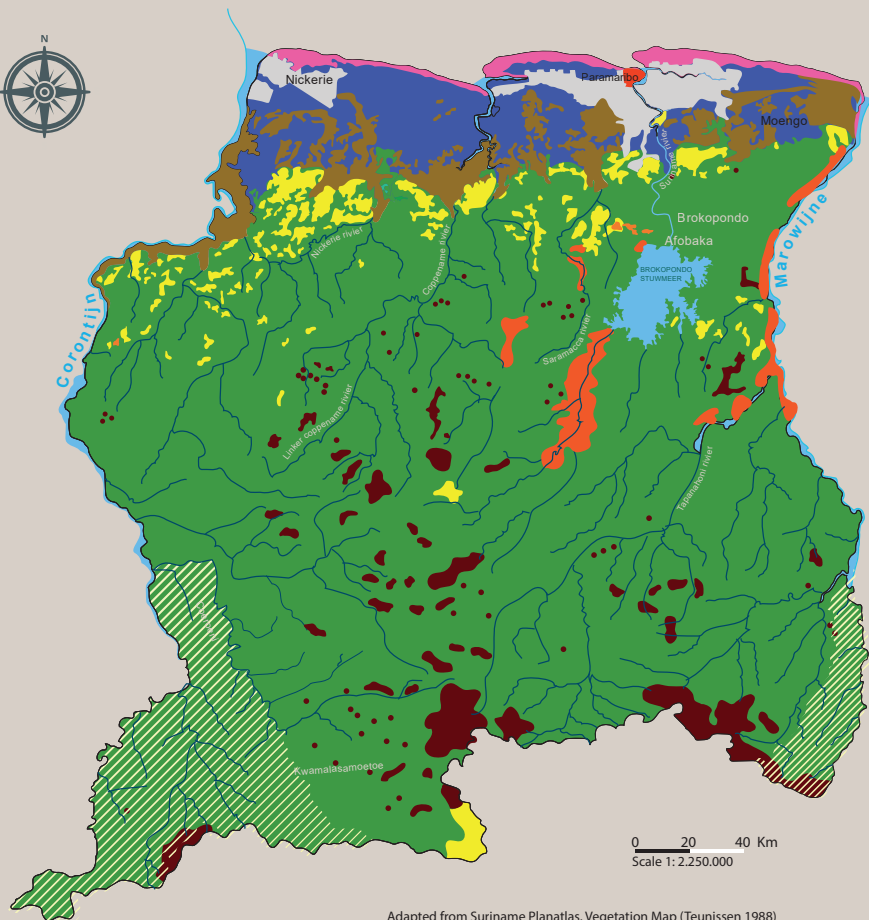


Frits van Troon

'Kaw-futu' soils

'Kaw-futu' soils (hogwallow micro-structure) are a common indicator of marsh forest. Some marsh soils have larger depressions (0.6 m deep) occurring at regular intervals across the forest floor.





Adapted from Suriname Planatlas, Vegetation Map (Teunissen 1988)

Forest Types of Suriname

Coastal Plain	Mangrove Forest w/ brackish lagoons and herbaceous brackish swamps
Coastal Plain	Swamp Forest w/ herbaceous freshwater swamps
Coastal Plain	Marsh Forest w/ high dryland forest
Savanna-areas	Savanna Forest & Savanna
Guiana Shield	Secondary Forest
Guiana Shield	High Dryland Forest
Guiana Shield	Mountain Forest (> 500 m)
Sipaliwini-savanne	Sipaliwini Savanna (at border with Brazil)
	Urban area, agricultural land and abandoned plantations
	Disputed area

This training manual and map is one of a series in the Forest Types of Suriname project conducted with Mr. Frits van Troon. Please refer to the Introductory Manual of the series for more information.



Marsh Forests on the Coastal Plain

In Suriname, freshwater Marsh forest ecosystems occur mostly in the Old Coastal Plain (Pleistocene Epoch), near the Zanderij Belt (Manual 4), but also extend north into the lower, swampy Young Coastal Plain (Holocene, Manual 2). See the Introductory Manual for further explanation of the Coastal Plain.

Marsh forests occur along an 'ecotone' - a intermediate zone in-between inundated (hydrophytic) Swamp forest and never-inundated (mesophytic) Dryland forest or very dry (xerophytic) Savanna forest (See De Dijn 2018, pp. 73-77).

A comparison of marsh and swamp forest is provided below in Tables 1 & 2.



Table 1. Swamp forest vs. Marsh forest - Defining characteristics

Swamp Forest (Manual 2) Young Coastal Plain (YCP) and Old Coastal Plain (OCP)	Marsh Forest (Manual 3) Mostly Old Coastal Plain (OCP), also Young Coastal Plain (YCP)
Soils	Soils
- Very poorly drained soil - clays, silty loams - Peat layer to 2.5 m deep (fallen leaves in stagnant, acidic water) - 'Kawfutu' or 'Hogwallow' structure absent (Page 3)	- Poorly drained soils – clays, silty loams - Peat layer absent (fallen leaves decomposing normally as 'leaf litter') - 'Kawfutu' or 'Hogwallow' structure present (Page 3)
Water	Water
- Flooded during rainy season - Soil water-logged during normal dry season	- Alternating flooded/non-flooded during rainy season - Soil moist, not water-logged during normal dry season
Biodiversity	Biodiversity
- Maripa palm absent; Pinapalm present - Species diversity greater than Mangrove Forest	- Maripa palm present; Pinapalm present - Species diversity greater than Swamp and Savanna Forest
Landscape Zones	Landscape Zones
- Common in both Young Coastal Plain and Old Coastal Plain	- Occurs primarily in Old Coastal Plain, extending into Young Coastal Plain, transition between swamp (hydrophytic) and dry land forests (mesophytic, xerophytic). South of the Coastal Plain, wetlands and creeks are considered part of "Riparian" ecosystems (Manuals 6-10).

Table 2. Ecosystem Diversity & Dominant Species

Swamp Forest (Manual 2)

Young Coastal Plain (YCP) and Old Coastal Plain (OCP)

1) Herbaceous Open Swamps

- Young Coastal Plain dominant species:
Langagrasi (*Typha domingensis*),
Prasorograsi (*Cyperus giganteus*),
Mokomoko (*Montrichardia arborescens*)
- Old Coastal Plain dominant species:
Large Sedges –prapragrasi (*Eleocharis spp.*),
twatwagrasi (*Lagenocarpus guianensis*, *Rhynchospora gigantea*)

2) Low Swamp Forest (incl. swamp scrub or wood)

- One Canopy Layer, 10-25 m, YCP, OCP
- Types:
 - a) Watrabebe (*Pterocarpus officinalis*) - Swampupanta (*Tabebuia insignis*)
 - b) Morisi dominant (*Mauritia flexuosa*);
 - c) Mira-udu dominant (*Triplaris weigeltiana*)
 - d) Zwamppruim (*Chrysobalanus icaco*) - Zwampzuurzak (*Annona glabra*)

3) High Swamp Forest

- Two Canopy Layers 25-35 m
- Types:
 - a) Shallow water swamp mix (mostly YCP)
(Babun – *Virola surinamensis*, Matak – *Symphonia globulifera*
Pinapalm – *Euterpe oleracea*)
 - b) Deep water swamp (mostly OCP) – low diversity
(Watrabiri – *Macrolobium bifolium*)
 - c) Low sand ridges (YCP/OCP)
(Ridge forest, Ritsbos, mixed species including marsh,
savanna, and dryland forest species)

Marsh Forest (Manual 3)

Mostly Old Coastal Plain (OCP), also Young Coastal Plain (YCP)

1) Marsh Forest

- Two Canopy Layers, 15-40 m
- Types:
 - a) Riverbanks, Creeksides (YCP and OCP)
 - b) Low clay flats (mostly OCP)
 - c) Low sand ridges (YCP and OCP)
(Ridge forest: mixed species from marsh forest, savanna forest,
and high, dryland forest.

2) Some Common Marsh Forest Tree and Palm Species

Trees

Barklak (*Eschweilera spp.*, *Lecythis spp.*)
Diya Ficus (*Ficus maxima*)
Groenhart (*Tabebuia spp.*)
Kankantri (*Ceiba pentandra*)
Krapa, redi (*Carapa guianensis*)
Krapa, weti (*Carapa procera*)
Mope (*Spondias mombin*)
Neku udu (*Alexa spp.*)
Possentri (*Hura crepitans*)
Sorosali (*Trichilia guianensis*)
Zwart Riemhout (*Micropholis guyanensis*)

Palms

Maripa (*Attalea maripa*)
Morisi (*Mauritia flexuosa*)
Pinapalm (*Euterpe oleracea*)

What are Marshforests?

Forest ecosystems adapted to conditions of seasonal fresh water inundation and drying

Marsh forests are common on river and creek banks, low ridges and low, flat areas often where tributaries join larger rivers. Marsh forests typically have poorly-drained clay or loam soils and are distinguished by a 'kawfoe-toe' microstructure – with many small hummocks and channels running inbetween them (p. 3). These forests have dry to wet soils in the dry season and wet to flooded soils in the rainy season. If standing water is present, it drains away much more rapidly than is seen in swamp forests.

High marsh forest stands in-between high swamp forest and high dryland forest in terms of structure, species richness and species composition. Different marsh (or riparian) ecosystems can be recognized based upon the dominance of tree species, seasonal change in water levels, and location

in Suriname. Moving southwards, the marsh forests generally become taller and richer in species. In western Suriname, marsh forests dominated by Krupa trees (*Carapa* spp.) or Mora (*Mora excelsa*) are more common. To the east, the older ridges with marsh forest are often dominated by rode fungu (*Pirani campestris*).

South of the Old Coastal Plain, creekside and riverbank forests are considered 'riparian' and are treated separately from the marsh forest wetlands covered in this manual.



Ecology

Flora and Fauna Diversity.

The status of marsh forest as an ecological intermediary supports high plant and animal diversity. Fauna with a ecological preference

for swamp or dryland forest habitat can establish themselves permanently in marsh forest or migrate back and forth depending upon seasonal conditions.

The physical proximity of marsh forest as a transition zone between swamp and dryland forest is also a factor causing higher species diversity.



Some Key Species of Freshwater Marsh Forests



Medium to Large Trees

- Diya Ficus - *Ficus maxima*

- Kankantri - *Ceiba pentandra*

- Laagland Tafrabon - *Cordia tetrandra*

- Mope - *Spondias mombin*

- Possentri - *Hura crepitans*

- Weti Krapa - *Carapa procera*

Palms

- Maripa - *Attalea maripa*

Smaller Trees, Shrubs

- Laagland Watramamabobi - *Gustavia augusta*

- Kapuwa-tiki - *Tabernaemontana siphilitica*

- Slabriki - *Senna alata*

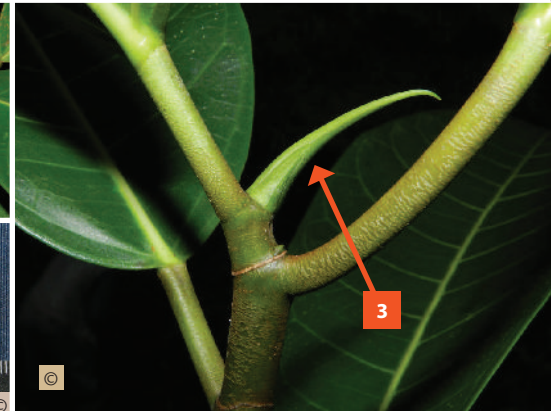
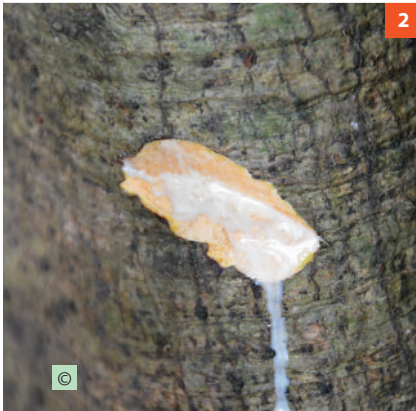
Understory

- Tassi - *Geonoma baculifera*

- Warimbo - *Ischnosiphon spp.*

Diya-Ficus *Ficus maxima* Moraceae

Tree 20-30 m tall, 50 cm diam. Common in swamp, marsh and ridge forests. Leaves alternate, simple, fleshy. Fig fruits 1-2 cm diam., green or yellow.



- 1 Thick, low support-roots (buttresses)
- 2 Abundant white milky sap present
- 3 Pointed cap (stipule) covering bud at twig tip - leaving a circular scar when it falls.

- 4a Fig 'fruit'.
- 4b. Fig cut open - tiny flowers and seeds within.
(important food for many forest animals)

Kankantri
Ceiba
pentandra
Malvaceae

Tree up to 45 m tall,
2.5. m diam., trunk
straight. Buttresses tall,
few, thin. Branches few,
thick, horizontal. Leaves
alternate, palmate-com-
pound, with 5-9 leaflets.



All © Pieter & Siela Teunissen

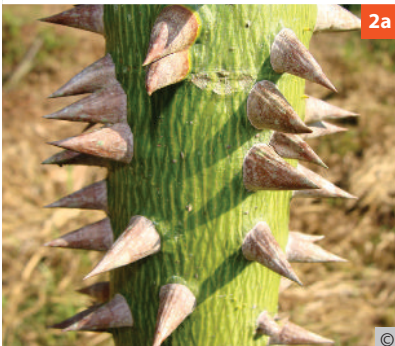


Kankantri

Ceiba pentandra

Malvaceae

- 1 In the dry season - leaves fall, flowers and fruits produced.
- 2 Large, thick thorns on
a) young and b) old stems.
- 3 Flowers in clusters.
- 4 Fruit capsules producing cotton-like hairs around seeds (wind-dispersal).



2a



2b



3



4

Mope

Spondias mombin

Anacardiaceae

20-30 m tall.
Common in marsh, ridge,
swamp and creek forests.
Bark thick, fissured, sap
colorless.

- 1 Leaves alternate,
pinnate-compound,
leaflets 7-15.
Flowers in large
clusters at branch
ends.
- 2 Fruits ripening bright
yellow, to 4 x 2.5 cm,
pulp edible, with
sweet-sour taste,
1-seeded.



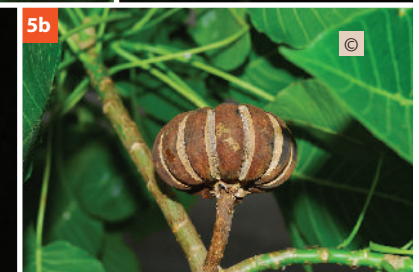
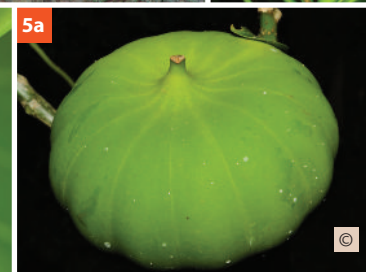
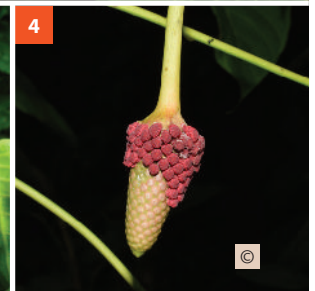
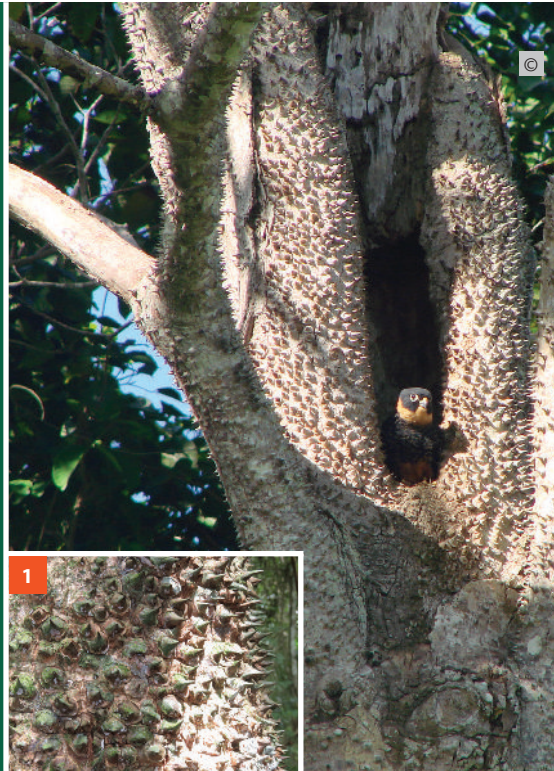
Possentri

Hura crepitans

Euphorbiaceae

Tree to 40 meters with large buttresses, spiny, and brownish-white, poisonous white sap in all parts. Common in marshes, swamps, and sand ridges. Leaves alternate, simple, heart-shaped, with long leaf-stalks.

- 1 Close-up of thorny bark
- 2 Paired-glands - leaf stalk apex
- 3 Female flower
- 4 Male flower spike
- 5 Fruit capsule: a) green fruit, b) dry, explosive fruit



Laagland Tafrabon *Cordia tetrandra* Boraginaceae

Tree to 18 m tall,
with pagoda-like whorls
of horizontal branches.
Common in swamp, marsh
forests of coast and ripari-
an forests of interior. Bark
grey-fissured, sap colorless.
Leaves alternate, simple,
hairy.

- 1 Flowering stalk 10-30
cm wide, hairy, flowers
small.
- 2 Fruits pale yellow,
round, 1 x 0.8 cm,
pulp sticky and edible.



Weti Krapa *Carapa procera* Meliaceae

Tree 20-30 m tall, 30-50 cm diameter. Trunk straight, round, buttresses absent. Bark brown, light-colored, slash with a little brown-orange sap, tasting bitter. Leaves alternate, pinnate-compound (w/o terminal leaflet).

- 1 Youngest leaves pale red.
- 2 Flowering stalks pointing upwards, with tiny flowers.
- 3 a) Fruit capsule 5-parted (Redi Krapa 4-parted).
b) Seeds



Maripa

Attalea maripa

Arecaceae

Large, spineless palm, single trunk to 20 m tall, 20 cm diameter. Occurs in marsh forest and not in swamp forest (except on sand ridges), abundant in secondary forest. Leaf scars present but inconspicuous.

- 1 Large, conspicuous, woody spathe (protection for flowering stalk) with female stalk and flowers.
- 2 Male flowering stalk
- 3 Edible fruits, spread by agoutis and people



Laagland
Watramamabobi
Gustavia augusta
Lecythidaceae

Small tree to 8 m tall,
common along creeks.
Leaves alternate or
whorled, simple, long.
Bark fibrous. Flowers
large and showy
(> 10 cm across)

All © Pieter & Siela Teunissen



Opening flower



20

Mature flower



Fruit capsules



Seeds



Kapuwatiki
Tabernaemontana
siphilitica
Apocynaceae

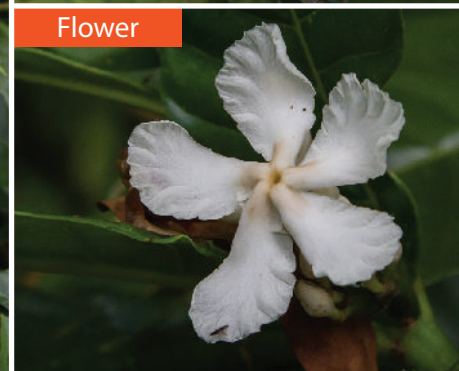
Shrub or tree to 6 m, common. White sap present in all cut parts. Twigs 4-sided. Leaves opposite, simple. Flowers white. Fruits (mericarps) paired, to 4 x 2.3 cm, 3-ridged, turning orange or brown at maturity.



Flower cluster



Flower



Fruit



Slabriki
Senna alata
Fabaceae

Shrub or treelet to 4 meters; often with strong unpleasant odor. Leaves alternate, pinnate-compound (w/o terminal leaflet), lacking nectar cups or glands in-between leaflets. Flowers large, bright yellow. Fruit pods 10-15 x 1.5 cm.



Legume pod



Tassi
*Geonoma
baculifera*
Arecaceae

© B. Hoffman

Tassi
Geonoma baculifera
Arecaceae

Small palm to 4 m tall, with creeping 'cane' roots connecting many stems (clonal). Common in marsh, swamp and creek forest. Fruits maturing black, ovoid, 1 x 0.8 cm. Leaves commonly used by local communities as roof thatch.



Leaves cut and stacked for hauling



Warimbo
Ischnosiphon spp.
Marantaceae

Common, bamboo-like herbs
in understory, stems stripped
and used in basketry





Threats to Marsh Forests

Marsh forests face the same threats as other Coastal Plain forest types regarding degradation from timber extraction, sand- or mineral-mining, organic (black) soil mining, over-hunting and over-fishing, and land conversion for roads, industry, agriculture, and housing projects. Marsh forests are especially sensitive to these threats because:

- they are a refuge for animals from both dryland and swamp habitats (concentrated biodiversity),

- they occur in a dryland-wetland transition zone that is more accessible than swamp for much of the year
- Close proximity to the urban zone

Climate change threatens marsh forests through extreme weather events, rising sea level and increased vulnerability to human disturbances.

“Kibri a drasbusi lek
a drasbusi kibri yu”





European Union

dwb ecology

CARING
FOR NATURE. FOR LIFE
SURINAME CONSERVATION FOUNDATION

 **AMAZONIA**
2.0 Connected
for our
forests



the Amazon Conservation Team
Suriname

