



FLAAR
MESOAMÉRICA

WETLANDS #24

PAPATURRO

THE LARGEST LEAF OF ANY TREE IN GUATEMALA

— *Coccoloba belizensis* —

Municipio de Livingston,
Izabal, Guatemala

DIANA SANDOVAL & NICHOLAS HELLMUTH

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— *Coccoloba belizensis* —

Municipio de Livingston,
Izabal, Guatemala

DECEMBER 2022



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Photo by: Victor Mendoza, FLAAR Mesoamerica,
Jul. 3, 2021.

Camera: Sony RX10 IV. Settings: 1/1,000; sec; f/4;
ISO 800.



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Edible Wetlands Plants of Municipio de Livingston, Izabal

Wetland Series 1: from Swamps, Marshes and Seasonally Inundated Flatlands of Izabal



Wetland Series 2: plants that grow along the beach shore of Amatique Bay



Wetland Series 3: plants that grow alongside water: rivers, lagoons, swamps, or ocean





GLOSSARY

Bajo: is a low forest over totally flat land. Bajos often have a few centimeters of standing water in the wet season. In the dry season they are dry to the point that the ground has the typical surface fissures of completely dried mud. So a bajo is a seasonally inundated wetland. If the bajo has palo de tinto it is called a tintal. But there are lots of bajos with few and often no logwood whatsoever. Bajos occupy a lot of the land of Petén (the rest are hills that have different vegetation, usually with taller trees). That said, some bajos do have occasional tall trees.

Ciénaga: area swampy, soft mud, wet, and often a bog or swamp or marsh.

Ferns: (class Polypodiopsida), are a class of nonflowering yet vascular plants that possess true roots, stems, and complex leaves (but they have no flowers or seeds). Ferns reproduce by spores.

Manglar: is Spanish for mangrove swamp. Each area of each coast has slightly different mangrove species. In the Municipio de Livingston the most common mangrove is the mangle rojo. Black mangrove is also present in Izabal coastal areas. Rio San Pedro (Petén) is an inland area that surprises us all with its mangrove trees.

Marsh: usually has water all year but has no total tree cover. Grasses, reeds and low plants are more common; plus, underwater plants and floating plants. If there are trees everywhere, then I consider it a swamp.

Pantano: could be considered a Spanish translation of marsh, so lots of reeds and grasses (but not many trees). If the area is a forest with water at the foot of every tree, then it is a swamp. The definition of each of these words depends a bit whether you are in the wetlands of Tabasco, or Rio San Pedro, or near Monterrico (inland from Pacific Ocean coast of Guatemala) or in the Municipio de Livingston or in Petén.

15 LIFE ON LAND



Life on land is the Sustainable Development Goal (number 15 of the United Nations proposal) which claims to ensure the conservation of terrestrial and freshwater ecosystems. Municipio de Livingston has multiple natural protected areas that includes tropical rain forests and species associated to rivers.



GLOSSARY

Plants: any of a kingdom Plantae of multicellular eukaryotic, mostly photosynthetic organisms typically lacking locomotive movement or obvious nervous or sensory organs and possessing cellulose cell walls.

Riperian: the bank of a river or stream. In a location such as the Municipio de Livingston, it would help to have a single word for the bank of a river, stream, and lagoon. I will use shoreline or comparable.

Swamp: usually has water all year but has lots of trees. During the rainy season the water simply gets deeper. Petén has more marshes than swamps; Izabal has both. You get mangrove swamps all around the Caribbean coast and parallel to the Pacific Ocean coast (several impressive mangrove swamp areas inland from the Pacific coast of Guatemala).

Swampo: is the way this is pronounced in the Caribbean area of Guatemala.

Wetlands or Wetland: to me is a generic word to cover swamps, marshes, rivers, lakes, lagoons and seasonally inundated areas (including bajos, savannas, cibles, etc.). Each ecologist geographer and botanist use their own academic terms. But, Holdridge (initiator of life zone systems concept) never hiked through the Savanna of 3 Fern Species nor the Savanna East of Nakum (PNYNN) nor took a boat up all the rivers entering into El Golfete. And if he cruised up Arroyo Petexbatún, he (and Lundell and all other capable scholars who accomplished fieldwork in Petén) did not get out of their seats on the lancha to hike through the tinal swamps to see what was 100 to 200 meters inland (namely the two tasistal areas that FLAAR has documented).

15 LIFE ON LAND



Life on land is the Sustainable Development Goal (number 15 of the United Nations proposal) which claims to ensure the conservation of terrestrial and freshwater ecosystems. Municipio de Livingston has multiple natural protected areas that includes tropical rain forests and species associated to rivers.



Cocoloba belizensis

Photo by: Roxana Leal, FLAAR Mesoamérica. Río Taponcito, Livingston. Jul 3, 2021.

Camera: Google Pixel 3xl.

INTRODUCTION TO *COCCOLOBA BELIZENSIS*

There are many plants with edible potential that are unknown within the different ecosystems of Guatemala. In the genus *Coccoloba* there are several species that can be edible. In our series of edible plants of the Livingston wetlands we will address the species *C. uvifera* and *C. belizensis* that are known as beach grapes and wild grapes respectively. Both these species can be found in the Municipio de Livingston, Departamento de Izabal.

Despite bearing the name grape, these species are not related to the vine. They are given that name because of their globular fruits that grow in clusters and resemble the clusters of grapes that we all know. Plus all *Coccoloba* plants are shrubs or trees; not vines or lianas.

Coccoloba belizensis is a plant that belongs to the Polygonaceae family and has become a species of interest to us because it is an edible plant that can be found on the beaches of the municipality of Livingston and can become an alternative food for the people from local communities.

The goal is to bring *Coccoloba uvifera* and *Coccoloba belizensis* back from obscurity. Both these trees grow in water-associated habitats in the Municipality of Livingston (and elsewhere in Mesoamerica). We are presenting a separate report on each of these two species. The one you are reading now covers *Coccoloba belizensis*, a beachside grape “tree” (not a vine or liana).



Coccoloba belizensis on swamp

MY PERSONAL EXPERIENCE WITH ***COCCOLOBA BELIZENSIS* (BY NICHOLAS HELLMUTH)**

I first saw a *Coccoloba belizensis* tree while hiking through the area of natural vegetation preserved around the Hotel Ecologico Posada Caribe in the Arroyo Petexbatun area of Peten. The leaves were so large it was amazing. We have a FLAAR Report on the trees there (Hellmuth 2019). Then we began seeing the same large leaves in the eastern half of the Municipio de Livingston, Departamento de Izabal, Guatemala. So the present report is a "Part II" of our locating, photographing, and making information available on this tree. Appendix A shows where we photographed this tree in the eastern part of the Municipio de Livingston, Izabal, Guatemala during our 17 weeks (one week each month) of field work there in 2019-2020.



Coccoloba uvifera

Photo by: Victor Mendoza, FLAAR Mesoamérica. Oct. 4, 2021.

Camera: Sony RX10 IV. Settings: 1/200; sec; f/4; ISO 400.

FULL BOTANICAL NAME

Coccoloba belizensis Standl.

[Click here to read more](#)

HERE ARE SYNONYMS FOR ***COCCOLOBA BELIZENSIS***

Coccoloba hirsuta Standl.

[Click here to read more](#)

MAYAN NAMES FOR ***COCCOLOBA BELIZENSIS***

Niiché (Mayan, Yuc.) is a name that it shares with its relative *C. uvifera*.

LOCAL NAMES ***COCCOLOBA BELIZENSIS***

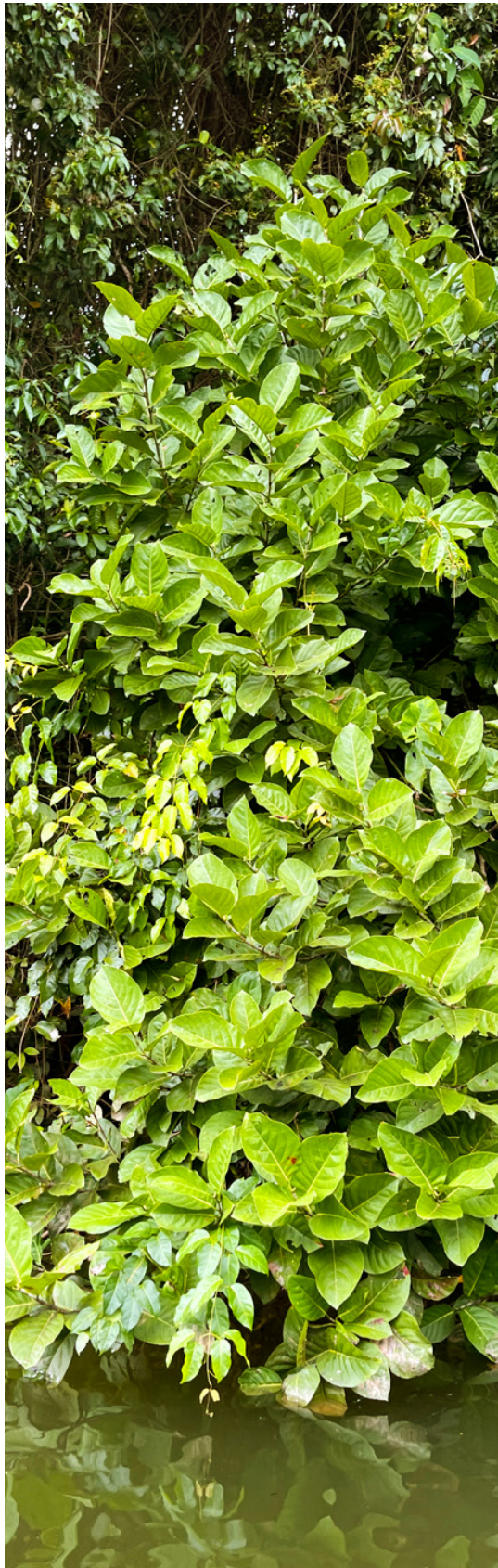
Papaturro, uva silvestre

Coccoloba belizensis

Photo by: Nicholas Hellmuth, FLAAR Mesoamérica.
Rio Bonito, El Golfete. Mar. 25, 2021.

Camera: Nikon D810. Settings: 1/500; sec; f/14; ISO 1,250.





HOW MANY OTHER PLANTS OF GUATEMALA HAVE THE **SAME SPANISH NAME?**

Other species of *Coccoloba* are also called by the name Papaturo.

HABIT FOR ***COCCOLOBA BELIZENSIS***

Tree

HABITAT, IN WHAT ECOSYSTEM(S) CAN YOU FIND NATIVE ***COCCOLOBA BELIZENSIS***?

Humid forests of the Atlantic zone (for Guatemala means the Caribbean area).

[Click here to read more](#)

WHAT OTHER TREES OR PLANTS ARE OFTEN FOUND **IN THE SAME HABITAT?**

Nesheim, Halvorsen, and Nordal in 2010, studied the floristic composition and stand structure of lowland forests of the Maya Biosphere Reserve (MBR) of El Petén, Guatemala. Among the most abundant forest species in the 5 reserves are *Coccoloba belizensis*, *Sabal mauritiiformis* and *Sebastiania tuerckheimiana*.

Coccoloba belizensis

Photo by: Nicholas Hellmuth, FLAAR Mesoamérica.
Rio Chocon Machacas, Livingston. Mar. 21, 2021.
Camera: iPhone 12 Pro Max.

BOTANICAL DESCRIPTION OF THE *COCCOLOBA BELIZENSIS* BY STANDLEY AND STEYERMARK (1946)

***Coccoloba belizensis* Standl.** Trop. Woods 16: 38. 1928. Uva de monte (Peten).

Wet forest or thickets, 900 meters or less; Peten; Alta Verapaz. Izabal. British Honduras; Atlantic coast of Honduras. A small or large tree, sometimes 25 meters high with a trunk 45 cm. in diameter, the thick branchlets densely puberulent; ocreae large and conspicuous, ferruginous-puberulent or tomentulose; leaves large, thick-coriaceous, short-petiolate, the blades broadly oval to broadly oblong or obovate, often 30 cm. long and 24 cm. wide, but many of the leaves smaller, usually very obtuse or rounded at the apex and abruptly pointed, sometimes acute, shallowly cordate at the base or merely obtuse, puberulent or glabrate beneath, the lateral nerves coarse and prominent, glabrous on the upper surface; flower spikes few or numerous, paniculate, 20 cm. long or less, usually very dense, the stout rachis densely hirtellous or puberulent, the flowers sessile or nearly so, whitish, slightly odorous; fruits subglobose, 5 mm. in diameter when dry. Called "uva" and "bul" (an Indian name) in Honduras, and "wild grape" in British Honduras.

(Standley and Steyermark 1946: 110-111).

Since *Coccoloba hirsuta* is a synonym, you also need to have information on that species:

***Coccoloba hirsuta* Standl.** Field Mus. Bot. 4: 303. 1929. Wet forest, at or near sea level; Izabal. Atlantic coast of Honduras, the type collected in Lancetilla Valley, near Tela.

A shrub or small tree, the branchlets very thick, densely hirsute with fulvous hairs; ocreae 1-1.5 cm. long, hirsute; petioles stout, 4-8 cm. long, fulvous-hirsute; leaf blades oblong-oval or elliptic-obovate, about 40-50 cm. long and 17-28 cm. wide, short-acuminate, rounded or shallowly cordate at the base, thin, green above and hirsute, somewhat paler beneath and fulvous-hirsute, the lateral nerves about 11 pairs, conspicuous.

The species is known only from sterile material but is easily recognized by the abundant pubescence of long spreading hairs. It seems rather probable that it will be found to have paniced racemes, and to be closely related to *C. Tuerckheimii*. In Honduras the tree is called "uva" and "uva de monte."

(Standley and Steyermark 1946: 114)

BRIEF LIST OF *COCCOLOBA BELIZENSIS* TREES FOR BELIZE BY STANDLEY AND RECORD (1936)

***Coccoloba belizensis* Standl.** Trop. Woods 16: 38. 1928. Wild Grape. Uva (Honduras). Type from Tipperary Road to Silk Grass, N. S. Stevenson 7 (Yale 10689); All Pines, broken forest, open pine flats, Schipp 794; Honey Camp; Tower Hill Estate; Honduras. A small or rather large tree, often 9 meters high, with a trunk 15 cm in diameter, leaves large, oval, or elliptic, finely pubescent beneath on the costa or almost glabrous; flowers white; fruit reddish green.

(Standley and Record 1936: 127).

COCCOLOBA BELIZENSIS IN BELIZE (BALICK, NEE AND ATHA 2000: 63)

***Coccoloba belizensis* Standl.** — **Syn:** *Coccoloba hirsuta* Standl. — **Loc Use:** FOOD, FORG, CNST. — **Nv:** berry tree, bob, niiche, papaturo, papa turro, uva montes, uva silvestre, wild grape. — **Habit:** Tree.

WHERE IN MEXICAN CAN *COCCOLOBA BELIZENSIS* BE FOUND (VILLASEÑOR 2016: 860)

Coccoloba belizensis Standl. CAM, CHIS, QROO, VER

Curious that this plant is not listed for Tabasco. Yucatan may be too dry though I would expect the plant on Caribbean beach. *Coccoloba belizensis* is not included in Flora of Yucatan back in 1930 (Standley 1930: 252-253).



Cocoloba belizensis

Photo by: Roxana Leal, FLAAR Mesoamérica. Río Taponcito, Livingston. Jul. 3, 2021.
Camera: Google Pixel 3XL.

WHERE HAS *COCCOLOBA BELIZENSIS* BEEN FOUND IN THE MUNICIPIO OF LIVINGSTON?

- > Is *Coccoloba belizensis* listed for Biotopo Protegido Chocón Machacas, CECON/USAC?
The genus *Coccoloba* is mentioned in the list of flora species (PEREZ-Consuegra 2001: 92).
- > Is *Coccoloba belizensis* listed for Tapón Creek Nature Reserve (including Taponcito Creek), FUNDAECO?
Not mentioned.
- > Is *Coccoloba belizensis* listed for Buena Vista Nature Reserve?
Not mentioned.
- > Is *Coccoloba belizensis* listed for Cerro San Gil (south side of Río Dulce)?
The genus *Coccoloba* is mentioned in the list of timber species of the Cerro San Gil Springs Protective Reserve Master Plan, 2008-2012 (Ruíz 2006).
- > Is *Coccoloba belizensis* listed for Ecoalbergue Lagunita Creek (Área de Usos Múltiples Río Sarstún)?
Yes, *Coccoloba belizensis* is in the list (CONAP 2003: 82).
- > Is *Coccoloba belizensis* listed for Sarstoon-Temash National Park (northern side of Río Sarstún)?
Yes, *Coccoloba belizensis* is in the list (Meerman, Herrera, and Howe 2003: 8).
- > Is *Coccoloba belizensis* listed for El Refugio de Vida Silvestre Punta de Manabique?
No, *Coccoloba uvifera* is mentioned as one of those that interacts with *Chrysobalanus icaco* (FUNDARY 2007 Sheet 22).
- > Is *Coccoloba belizensis* listed for Bocas de Polochic?
No, the species that appears in the list is *Coccoloba schiedeana* (FUNDAECO 2007: 45)



Cocoloba belizensis

Photo by: Nicholas Hellmuth, FLAAR Mesoamérica, Río Bonito, El Golfete. Mar. 25, 2021.

Camera: Sony Alpha Ag II. Settings: 1/320; sec; f/9; ISO 400.

ARE *COCCOLOBA BELIZENSIS* TREES REGISTERED FOR PARQUE NACIONAL TIKAL?

No record of *C. belizensis* was found in Tikal, only the following species:

- *Coccoloba acapulcensis* Standl.
- *Coccoloba cozumelensis* Hemsl.
- *Coccoloba spicata* Lundell

(Aguilar and Aguilar 1992) (Schulze & Whitacre 1999)

SAME FOR YAXHA NAKUM NARANJO IS *COCCOLOBA BELIZENSIS* PRESENT OR MISSING FROM EARLIER LISTS?

Only record of *Coccoloba swartzii* was found in Lake Yaxha.

[Click here to read more](#)

IS *COCCOLOBA BELIZENSIS* REGISTERED BY CYRUS LUNDELL IN PETÉN?

C. belizensis is mentioned on pages 136, 167, 194 and 198 of his books "The Vegetation of Peten". (Lundell, 1937)

IS *COCCOLOBA BELIZENSIS* FROM THE HIGHLANDS OR FROM THE LOWLANDS (OR BOTH)?

Lowlands, 0–800 meters above sea level.

[Click here to read more](#)

DOES *COCCOLOBA BELIZENSIS* **ALSO GROW IN HOME GARDENS?**

No information found about it.

USES OF *COCCOLOBA BELIZENSIS*

Food; animal forage; construction. (Duncan 2019: 582)

Uses: honey (nectar) and timber (Arellano, Flores, Tun and Cruz 20031: 494)

The ripe fruit is sweet and is eaten by humans and birds. Wood is used for the construction of frames and poles. (Balick and Arvigo 2015: 431)



IS THERE POTENTIAL MEDICINAL USAGE **OF COCCOLOBA BELIZENSIS BY LOCAL PEOPLE**

No information was found that *C. belizensis* has medicinal properties.

ARE ANY PARTS OF **COCCOLOBA BELIZENSIS EATEN BY MAMMALS?**

Animal fodder (young stem and leaves)

(Duncan 2019: 582)

WHAT ARE THE PRIMARY POLLINATORS **OF COCCOLOBA BELIZENSIS FLOWERS?**

No information was found about it, but it is very likely that it is caused by bees, as well as *C. uvifera* and other species of this genus.



Coccoloba belizensis

Photo by: Víctor Mendoza, FLAAR Mesoamérica. Taponcito Creek, Livingston. Jul. 3, 2021.

Camera: Sony RX10 IV. Settings: 1/1,000; sec; f/4; ISO 800.

CLOSE RELATIVE(S) OF ***COCOLOBA BELIZENSIS***

There are a dozen other species of *Coccoloba* in the Mayan areas; the other four (that are comestible) are the species that interest us the most:

Coccoloba uvifera (L.) L. — **Loc Use:** FOOD, BEV, MED, FUEL, FORG — **Reg Use:** FOOD, PRD, MED, FUEL, CNST, BEV, TAN. — **Nv:** grape, niiche, sea - **Habit:** Tree

Coccoloba barbadensis Jacq. — **Syn:** *Coccoloba mayana* Lundell; *Coccoloba schiedeana* Lindau; *Coccoloba petenensis* Lundell — **Loc Use:** FORG, MED. — **Nv:** freshwater grape, wild grape. — **Habit:** Tree.

Coccoloba diversifolia Jacq. — **Syn:** *Coccoloba lancifolia* Lundell; *Coccoloba laurifolia* Jacq.; *Coccoloba oligocarpa* Lundell — **Reg Use:** BEV, CNST, FOOD, MED. — **Habit:** Tree.

Coccoloba spicata Lundell — **Reg Use:** FOOD. — **Nv:** wild grape. — **Habit:** Tree.



Coccoloba uvifera

Photo by: Victor Mendoza, FLAAR Mesoamérica. Oct. 4, 2021.

Camera: Sony RX10 IV. Settings: 1/200; sec; f/4; ISO 400.

CONCLUDING DISCUSSION **AND SUMMARY ON COCCOLOBA BELIZENSIS**

Ethnobotanist Cyrus Lundell lists two edible *Coccoloba* species (1938):

- *Coccoloba x lundellii* Standl. Grape
- *Coccoloba uvifera* (L.) Jacq. Grape

We have not yet researched *Coccoloba x lundellii* but it is not listed as FOOD for Belize (Balick, Nee and Atha 2000). This is an accepted name (usually without the x in the middle). *Coccoloba x lundellii* is not in the Mexican plant list of Villaseñor (2016: 861).

We worked on the two best known edible species:

- *Coccoloba belizensis* (common in wet areas of Peten and Muni Livingston)
- *Coccoloba uvifera* (common in Muni Livingston)

Coccoloba diversifolia is also FOOD but we have not yet found this in situ. *Coccoloba spicata* is also FOOD but we have not yet found this in situ.

Coccoloba laurifolia and *C. lancifolia* are both synonyms of the accepted name *Coccoloba diversifolia* Jacq. This should be findable in Izabal.

Coccoloba laurifolia Jacq., *C. lancifolia* Lundell, (type from Jacinto Hills, Toledo District, British Honduras, W. A. Schipp 1200). Wet forest or thickets, 500 meters or less; Upper Verapaz; Izabal. British Honduras; southern Florida; West Indies; Venezuela.

Coccoloba spicata Lundell. Dry upland forest, or about lake borders, 300 meters or less. Peten; High Verapaz. British Honduras; Yucatan; Quintana Roo; Campeche. (Standley and Steyermark 1946: 117). Vol. 24, part IV

What is notable, is the unexpected number of uses listed by Balick, Nee and Atha for *Coccoloba* in Belize (2000: 63):

Loc Use: FOOD, FORG, CNST.

Then the uses are gathered in edible, mellifera and timber for construction. The most extensive information is found in documents from Belize for obvious reasons.



Cocoloba uvifera

Photo by: Nicholas Hellmuth, FLAAR Mesoamérica. Playa Quehueche, Livingston. Jul. 29, 2021.
Camera: iPhone 12 Pro Max.

APPENDIX A

WHERE WE SAW AND PHOTOGRAPHED *COCCOLOBA BELIZENSIS* IN THE EASTERN PART OF IZABAL, GUATEMALA
(Fuente: Victor Mendoza – Investigador, Fototeca Digital de FLAAR Mesoamérica)

Coccoloba belizensis records by FLAAR Mesoamérica

PLACE	DATE	PHOTOGRAPHER
Río Chocón Machacas	Jan 24 2021	Nicholas Hellmuth
Reserva Mirador del Cañón	Mar 23 2021	Nicholas Hellmuth
Río Bonito	Mar 25 2021	Nicholas Hellmuth
Black Creek	Mar 24 2021	Nicholas Hellmuth
Río Chocón Machacas	Mar 21 2021	Alejandra Gutiérrez
Taponcito Creek	Apr 29 2021	Nicholas Hellmuth
Tapón Creek	Apr 28 2021	Nicholas Hellmuth
Aldea Buena Vista	Apr 26 2021	Nicholas Hellmuth
Taponcito Creek	Jul 3 2021	Roxana Leal
Taponcito Creek	Jul 3 2021	Victor Mendoza

Tabulation prepared by Victor Mendoza, researcher and digital photo library manager of FLAAR Mesoamérica.



Coccoloba belizensis

Photo by: Nicholas Hellmuth, FLAAR Mesoamérica. El Golfete, Black Creek, Livingston. Mar. 24, 2021.
Camera: iPhone 12 Pro Max.

REFERENCES CITED AND SUGGESTED READING **ON COCCOLOBA BELIZENSIS**

AGUILAR, María and **Marco Antonio AGUILAR**

- 1992 Arboles de la Biosfera Maya, Peten. Guia para las especies del Parque Nacional Tikal Centro de Estudios Conservacionistas (CECON) Escuela de Biología. Facultad de Ciencias Químicas y Farmacia. Universidad de San Carlos de Guatemala con la colaboración de: Conservation International washington, DC Field Museum of Natural History Chicago, IL. 257pages

ARELLANO, J. Alberto, FLORES, José, TUN, Juan and **María CRUZ**

- 2003 Nomenclatura, forma de vida, uso, manejo y distribución de las especies vegetales de la Península de Yucatán. Universidad Autónoma de Yucatán. 815 pages.

Available online: books.google.com.gt/

Note: Information of *Coccoloba belizensis* in page 494

BALICK, Michael J., NEE, Michael H. and **Daniel E. ATHA**

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BALICK, Michael J. and **Rosita ARVIGO**

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CONAP

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FUNDARY-ONCA

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Even though 20 years ago, it's the best list of trees of Tikal that I have found. There is a web site with plants of Tikal but they are not separated into trees, vines, shrubs, etc., so harder to use. The new monograph on Arboles de Calakmul is better than anything available so far on Tikal (and the nice albeit short book by Felipe Lanza of decades back on trees of Tikal is neither available as a scanned PDF nor as a book on Amazon or ebay).

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Note: Information of *Coccoloba belizensis* in page 860

HELPFUL WEB SITES FOR **ANY AND ALL PLANTS**

There are several web sites that are helpful even though not of a university or botanical garden or government institute.

However most popular web sites are copy-and-paste (a polite way of saying that their authors do not work out in the field, or even in a botanical garden). Many of these web sites are click bait (they make money when you buy stuff in the advertisements that are all along the sides and in wide banners also. So we prefer to focus on web sites that have reliable information.

https://www.cicy.mx/sitios/flora%20digital/ficha_virtual.php?especie=1977

FLORA DE LA PENÍNSULA DE YUCATÁN

No information on uses; no info on common name (so clearly they do not know this plant in person, probably because it is mainly in Campeche and Quintana Roo, so not in the state of Yucatan). Nonetheless, this website is very helpful for many other plants.

<https://serv.biokic.asu.edu/neotrop/plantae/>

Neotropical Flora data base. To start your search click on this page:

<https://serv.biokic.asu.edu/neotrop/plantae/collections/harvestparams.php>

<http://legacy.tropicos.org/NameSearch.aspx?projectid=3>

This is the main SEARCH page.

<https://plantidtools.fieldmuseum.org/pt/rrc/5582>

SEARCH page, but only for collection of the Field Museum herbarium, Chicago.

<https://fieldguides.fieldmuseum.org/guides?category=37>

These field guides are very helpful. Put in the Country (Guatemala) and you get eight photo albums.

<http://enciclovida.mx>

CONABIO. The video they show on their home page shows a wide range of flowers pollinators, a snake and animals. The videos of the insects are great.

www.kew.org/science/tropamerica/imagetdatabase/index.html

Kew gardens in the UK is one of several botanical gardens that I have visited (also New York Botanical Gardens and Missouri Botanical Gardens (MOBOT), in St Louis. Also the botanical garden in Singapore and El Jardín Botánico, the open forest botanical garden in Guatemala City).

www.ThePlantList.org

This is the most reliable botanical web site to find synonyms. In the recent year, only one plant had more synonyms on another botanical web site.

WEBSITES SPECIFICALLY ON ***COCCOLOBA BELIZENSIS***

www.gbif.org/species/4033827

Photos, distribution map and taxonomy

bdi.conabio.gob.mx/fotoweb/archives/5023-Plantas/Plantas/JRBBBK031-124%20Coccoloba%20belizensis.jpg.info

Information and photography

legacy.tropicos.org/ame/26000217?projectid=7

Information and photos

www.plantsoftheworldonline.org/taxon/urn:lsid:ipni.org:names:62001-2

Distribution map

www.discoverlife.org/p/20m?kind=Coccoloba+belizensis&m_i=t&m_order=0

Distribution map

www.cicy.mx/sitios/flora%20digital/ficha_virtual.php?especie=1977

General information

www.worldfloraonline.org/taxon/wfo-0000613014

General information and taxonomy

ACKNOWLEDGEMENTS TO FLAAR MESOAMÉRICA

Flor de María Setina is the office manager, overseeing all the diverse projects around the world. We also utilize the inkjet prints to produce educational banners to donate to schools.

Vivian Hurtado is the actual project manager for FLAAR's divisions: Flora & Fauna and MayanToons. She is also environmental engineer and passionate researcher

Victor Mendoza environmental engineer, is in charge of the photographic database of FLAAR Mesoamerica and its taxonomic identification. He also supports as a research assistant.

Sergio Jerez He is involved with plant identification, bibliographic research and map design for the trails explored on each expedition.

Belén Chacón her work includes ordering, tabulating, and updating our ethnobotanical list.

Diana Sandoval her work consists of the recompilation of scientific information, which later is transformed into the FLAAR reports that are published on our websites.

María José Toralla she gathers information and bibliographies that are added to our Flora & Fauna electronic library and also make part of the information found in research, reports and websites.

Samuel Herrera is in charge of processing maps of our field trips and helping with species identification and research.

Pedro Pablo Marroquín he is part of the editing team, reviews and adds information to our photographic reports

Alejandra Valenzuela biology student is now part of Flora y Fauna's photographic report and educational material editing team since September 2020.

Maria José Rabanales she is part of the photographic report editing team.

Senaida Ba has been our photography assistant for several years. Now, she puts together PowerPoint presentations for students and teachers to learn about several subjects like Flora, Fauna and Mayan Iconography.

Byron Pacay he is our assistant during field trips.

Norma Cho is our assistant during field trips.

Roxana Leal major in Communication who manages all our social media and digital community.

Isabel Rodriguez Paiz is in charge of the fundraising.

Edwin Solares environmental engineering. He is a photographer and videographer during our expeditions and later edits this content to be able to use it in the materials we generate.

Pedro Pablo Ranero is in charge of editing videos of flora and fauna to create content on our sites

Andrea de la Paz designer who helps prepare the master-plan for aspects of our publications. She is our editorial art director.

Jaqueline González designer who puts together the text and photographs to create the actual report.

Heidy Alejandra Galindo Setina designer who puts together the text and photographs to create the actual report.

Alexander Gudiel designer who puts together the text and photographs to create the actual report.

Cristina Ríos designer who puts together the text and photographs to create the actual report.

David Arrivillaga experienced photographer and graphic designer. Sometimes he is a photographer during our expeditions, but he is also a designer of our flora and fauna reports.

María Alejandra Gutiérrez is an experienced photographer who now prepares all the Photography Catalogs for the project we're currently working on the RBM.

Juan Carlos Hernández takes the material that we write and places it into the pertinent modern Internet software to produce our web pages.

Paulo Núñez is a webmaster, overlooking the multitude of web sites. Internet SEO changes every year, so we work together to evolve the format of our web sites.

María José García is part of the web team. Receive the material we produce to place on our sites.

Andrés Fernández is in charge of keeping our websites updated and making them more efficient for the user.

Valeria Áviles graphic designer and illustrator. She is in charge of coordinating the activities of MayanToons, as well as making illustrations for the different materials that we prepare.

Laura Morales digital content engineer He is in charge of directing the animation area of our MayanToons project.

Paula García is part of our MayanToons Animation team. His job is to bring our favorite characters to life.

Niza Franco is part of our MayanToons Animation team. His job is to bring our favorite characters to life.

Isabel Trejo graphic designer and illustrator for MayanToons.

Rosa Sequén is an illustrator for MayanToons

Josefina Sequén is an illustrator for MayanToons

620000

650000

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1780000
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Áreas naturales protegidas de Livingston



- Izabal**
- 1. Área sin protección
 - 2. Parque Nacional Río Dulce
 - 3. El Higuerito
 - 4. Área de Usos Múltiples Río Sarstún
 - 5. Sierra de Santa Cruz
 - 6. Biotopo Protegido Chocón Machacas
 - 7. Reserva Protectora de Manantiales Cerro San Gil

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674000

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1754000
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1750000
1748000



Reserva Natural Tapón Creek, Livingston

Bahía de Amatique

Área de Usos Múltiples
Río Sarstún

Punta
Cocolí

Aldea Buena
Vista Tapon Creek

San Juan

Reserva Natural Tapón Creek
Municipio de Livingston

Siete
Altares

Finca
Gangadiwali

Sarstún Creek

Taponcito
Creek

El Rosario

San
Martin

La Desmembración

Plan Grande
Tatín

Área de Usos Múltiples
Río Sarstún

Biotopo
Chocón Machacas

El Golfete

Parque Nacional
Río Dulce



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Izabal

Edible Wetlands Plants of Municipio de Livingston, Izabal

Wetland Series 1: from Swamps, Marshes and Seasonally Inundated Flatlands of Izabal

<p>Cyperus esculentus</p> <p>Chufa, Yellow Nutsedge, Earth Almond</p> <p>MLW#1</p>	<p>Eleocharis geniculata Eleocharis caribaea</p> <p>Caribbean Spike-Rush</p> <p>MLW#2</p>	<p>Montrichardia arborescens</p> <p>Camotillo Water Chestnut</p> <p>MLW#3</p>	<p>Nymphoides indica</p> <p>Floating Heart Water Snowflake</p> <p>MLW#4</p>
<p>Pachira aquatica</p> <p>Zapoton</p> <p>MLW#5</p>	<p>Pontederia cordata</p> <p>Pickereel Weed</p> <p>MLW#6</p>	<p>Sagittaria latifolia</p> <p>Water Potatoes</p> <p>MLW#7</p>	<p>Typha domingensis</p> <p>Cattail</p> <p>MLW#8</p>

Wetland Series 2: plants that grow along the beach shore of Amatique Bay

<p>Amphitecna latifolia</p> <p>Black calabash</p> <p>MLW#9</p>	<p>Coccoloba uvifera</p> <p>Uva del mar</p> <p>MLW#10</p>	<p>Manicaria saccifera</p> <p>Confra, Manaca</p> <p>MLW#11</p>	<p>Chrysobalanus icaco</p> <p>Coco Plum</p> <p>MLW#12</p>	<p>Avicennia germinans</p> <p>Black Mangrove</p> <p>MLW#13</p>	<p>Rhizophora mangle</p> <p>Red Mangrove</p> <p>MLW#14</p>
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Wetland Series 3: plants that grow alongside water: rivers, lagoons, swamps, or ocean

<p>Guadua longifolia</p> <p>Jimba</p> <p>MLW#15</p>	<p>Acoelorrhaphe wrightii</p> <p>Pimientillo, Tasiste, Palmetto Palm</p> <p>MLW#16</p>	<p>Acrostichum aureum</p> <p>Mangrove Fern</p> <p>MLW#17</p>	<p>Annona glabra</p> <p>Alligator Apple</p> <p>MLW#18</p>	<p>Bactris major</p> <p>Huiscoyol Palm</p> <p>MLW#19</p>	<p>Diospyros nigra</p> <p>Zapote negro</p> <p>MLW#20</p>
<p>Grias cauliflora</p> <p>Palo de Jawuilla</p> <p>MLW#21</p>	<p>Inga vera Inga multijuga Inga thibaudiana</p> <p>River Koko</p> <p>MLW#22</p>	<p>Pithecellobium lanceolatum</p> <p>Bastard Bully Tree Chucum Red Fowl</p> <p>MLW#23</p>	<p>Coccoloba belizensis</p> <p>Papaturro</p> <p>MLW#24</p>	<p>Symphonia globulifera</p> <p>Barillo</p> <p>MLW#25</p>	<p>Lacmellea standleyi</p> <p>Lechemiel</p> <p>MLW#26</p>

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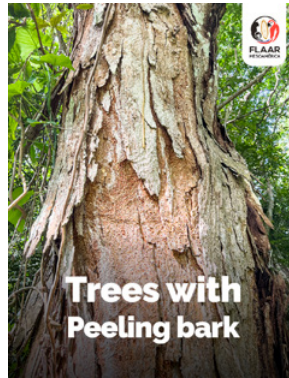
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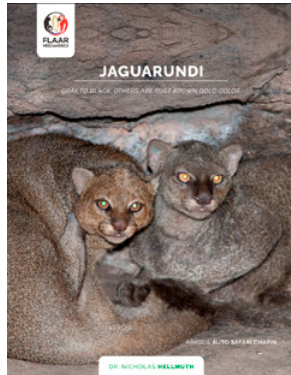
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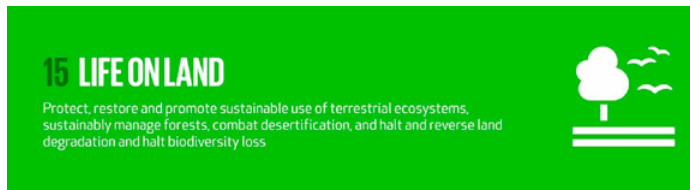


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The current Alcalde of Livingston, Mr. Daniel Pinto, together with his team on the Division of International Cooperation, has set the goal of achieving the municipality development in the years 2020-2024 based on the goals and indicators proposed by the 2030 Agenda for Sustainable Development. In this regard, bot FLAAR (USA) and FLAAR Mesoamerica (Guatemala) will collaborate whit this Municipality achieve the Sustainable Development Goal (SDG), number 15 "Life on Land".

Throughout this cooperation project, different materials will be and publishes prepared, as this Photo Essay. These will help to collect information on species, different ecosystems (terrestrial, wetlands and fresh water asociated) and biodiversity. This information will also be useful as it is considered in various conservation estrategies to protect threatened species and prevent their extinction. Moreover, the municipality goals also look forward to promote the sustainable use, conservation and research of the flora and animal species of all terrestrial, wetlands, aquatic shore and coastal asociated ecosystems of the Guatemalan Caribbean region. You can learn more about this project and the SDG indicators wich are being pursued at:

<https://flaar-mesoamerica.org/rain-forests-rivers-lakes-bays-ocean-caves-canyons-livingston-the-caribbean-biodiversity-wonderland-of-guatemala/>

SERIES OF MUNICIPIO OF LIVINGSTON



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SANDOVAL, D. and Nicholas HELLMUTH (2022) Edible Plants of Wetlands, Papaturre, *Coccoloba belizensis*. Largest Leaf of any Tree in Guatemala Livingston, Izabal, Guatemala. FLAAR Reports, Series for the Municipalidad de Livingston. FLAAR (USA) and FLAAR Mesoamérica (Guatemala). Wetlands series 3: rivers, lagoons, swamps, or ocean, Wetlands #25

BACK COVER PHOTO

Photo by: Nicholas Hellmuth, FLAAR Mesoamerica.
Mirador del Cañon, Río Dulce. Mar. 23, 2021.
Camera: Nikon D810. Settings: 1/160; sec; f/14; ISO 640.

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