FLAAR
MESOAMÉRICA

WETLANDS #10

UVA DEL MAR

SEASIDE GRAPE TREE

Coccoloba uvifera

Municipio de Livingston,
Izabal, Guatemala

NICHOLAS **HELLMUTH**

WETLANDS #10

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MAY **2021**

CREDITS

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FRONT COVER PHOTOGRAPH
Coccoloba uvifera.

Photography by: David Arrivillaga,
FLAAR Mesoamerica, Apr. 27, 2021, 1:30 p.m.
Playa Aldea Buena Vista, Tapón Creek,
Livingston, Izabal, Guatemala.
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/250 sec; f/8; ISO 640.

TITLE PAGE PHOTOGRAPH
Coccoloba uvifera.

Photography by: Nichollas Hellmuth,
FLAAR Mesoamerica, Dec. 17, 2020, 11:07 a.m.
Playa Quehueche, Municipio de
Livingston, Izabal, Guatemala
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/200 sec; f/8; ISO 1,250.

We appreciate the donation of Dr John D. Dwyer´s family (Chicago) in his honor and memory. Dr Dwyer was a botanist who worked in many areas of Mesoamerica, including the Yaxha area while the site was being mapped by FLAAR in the 1970´s. The donation, provided in November 2021, has supported FLAAR research projects: the current FLAAR project of flora and fauna in Reserva de la Biosfera Maya (RBM) and the research in Municipio de Livingston, Departamento de Izabal, carried out by FLAAR (USA) and FLAAR Mesoamerica (Guatemala).

This donation is also in recognition of the urgency and need for the conservation of both wildlife and rare plants within the biodiverse ecosystems of RBM in Guatemala, which includes Parque Nacional Yaxha, Nakum and Naranjo (PNYNN).

Coccoloba uvifera.
Photography by: David Arrivillaga, FLAAR Mesoamerica, Apr. 27, 2021, 1:29 p.m.
Playa Aldea Buena Vista, Tapón Creek, Livingston, Izabal, Guatemala
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/250 sec; f/8; ISO 640.

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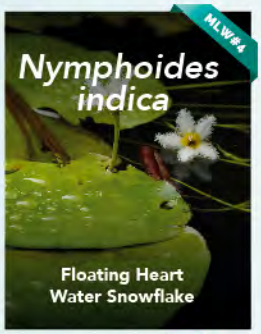
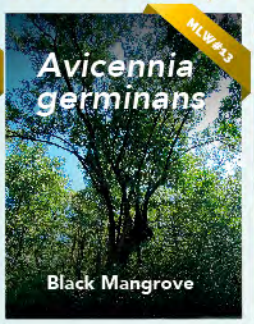
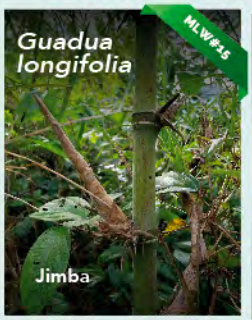
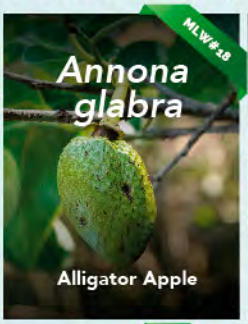


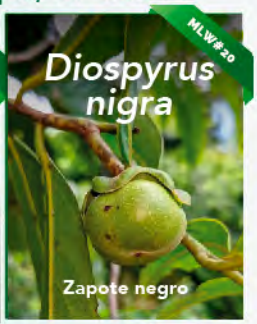
Wetland Series 2: plants that grow along the beach shore of Amatique Bay

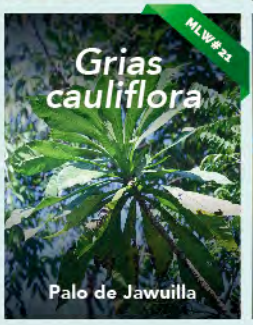


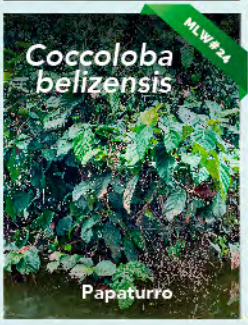
Wetland Series 3: plants that grow alongside water: rivers, lagoons, swamps, or ocean

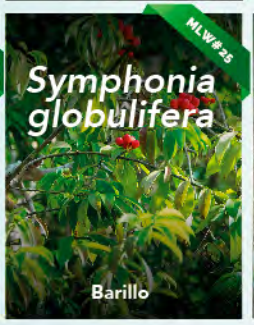












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Coccoloba uvifera.

Photography by: Victor Mendoza, FLAAR Mesoamerica, Apr. 07, 2021, 11:15 a.m.
Playa Aldea Buena Vista, Tapón Creek, Livingston, Izabal Guatemala
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/400 sec; f/4.0; ISO 800.

MY PERSONAL EXPERIENCE WITH ***COCCOLOBA UVIFERA***

I have *Coccoloba uvifera* listed in many years of many editions of my Mayan Ethnobotany research reports (Hellmuth 2013, Hellmuth 2014, and many earlier editions). But I did not see this plant in-person until year 2020, when we began working in the Municipio de Livingston. I had learned about other *Coccoloba* species in the Municipio de Sayaxché in 2019 and early 2020:

- *Coccoloba barbadensis*
- *Coccoloba belizensis*

These two species can be found in many parts of Guatemala, but *Coccoloba uvifera* is primarily on or near coastal areas.

Coccoloba uvifera.

Photography by: David Arrivillaga, FLAAR Mesoamerica, Apr. 27, 2021, 1:37 p.m.
Playa Aldea Buena Vista, Tapón Creek, Livingston, Izabal, Guatemala.
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/250 sec; f/10; ISO 800.

FULL BOTANICAL **NAME**

Coccoloba uvifera (L.) L. is the accepted name.

Buckwheat Family Polygonaceae.

HERE ARE SYNONYMS FOR ***COCCOLOBA UVIFERA***

Only two synonyms:

Coccolobis uvifera (L.) Crantz
Polygonum uviferum L.

MAYAN NAMES FOR ***COCCOLOBA UVIFERA***

Kiiche, Niiché (maya, Yuc.)

http://www.conabio.gob.mx/conocimiento/info_especies/arboles/doctos/57-polyg2m.pdf

Coccoloba uvifera.

Photography by: David Arrivillaga, FLAAR Mesoamerica, Sep. 21, 2021, 4:36 p.m.
Aldea el Pumpo, Monterrico, Santa Rosa Guatemala
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/250 sec; f/10; ISO 800.

LOCAL NAMES FOR ***COCCOLOBA UVIFERA***

> "Uva de la playa" (Tamaulipas, Veracruz, Venezuela); "uva de la mar" (Tamaulipas, Yucatán, Oaxaca, Porto Rico); "uvero" (Tamaulipas, Cuba); "uva" (Yucatán, Veracruz, Santo Domingo); "manzano" (Sinaloa); "uva caleta" (Cuba); "papaturro" (Costa Rica); "uvero de playa" (Panama, Costa Rica); "uvilla" (Santo Domingo). In Florida and the British West Indies the plant is known as "sea-grape." "pigeon-wood," "horsewood," and "hopwood.
>
> (Standley 1922: 245).

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

Any name with the word grape will be used for several different plants.

Papaturro is also used for *Coccolobo belizensis.*

Coccoloba uvifera.

Photography by: Victor Mendoza, FLAAR Mesoamerica, Jul. 03, 2021, 4:42 p.m.
Playa Aldea Buena Vista, Tapón Creek, Livingston, Izabal, Guatemala.
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/400 sec; f/9; ISO 2,500.

Coccoloba uvifera.

Photography by: David Arrivillaga, FLAAR Mesoamerica, Apr. 27, 2021, 1:29 p.m.
Playa Aldea Buena Vista, Tapón Creek, Livingston, Izabal, Guatemala.
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/250 sec; f/8; ISO 640.

HABIT FOR ***COCCOLOBA UVIFERA***

Tree, although not gigantic.

HABITAT FOR ***COCCOLOBA UVIFERA***

I put this into the series for plants that grow on the upland edge of the beach facing Amatique Bay. But Standley and Steyermark list it also for Petén (in areas with no brackish water and no ocean beaches).

> Hábitat: Zonas muy húmedas en la costa del Caribe, en dunas arenosas o rocosas y vegetación costera.
>
> (Chizmar 2009: 260).

Coccoloba uvifera.

Photography by: Roxana Leal, FLAAR Mesoamerica, Apr. 7, 2021, 11:27 a.m. Playa Aldea Buena Vista, Tapón Creek, Livingston, Izabal, Guatemala. Camera: Google pixel 3.

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

> 2) Paisaje de acahual: formado por vegetación secundaria, con árboles de menos de 5 m de altura y un crecimiento cerrado de las especies. Las especies representantes son: *Diohysa* sp. (quiebra hacha), *Pachira aquatica* (zapote de agua), *Bucida buceras* (puckté), *Metopium brownei* (chechen), *Salix humboldtiana* (sauce), *T. rosea* (macuilís), *H. campechianum* (tinto), *Guazuma ulmifolia* (guácimo) y *Coccoloba uvifera* (uvero) (Fig. 2).
>
> (Estrada 2011: 18 and 106).

I now put these into a list of uses:

- *Bucida buceras* (puckté), very common in seasonally inundated areas
- *Coccoloba uvifera* (uvero), edible
- *Diphysa* sp. (quiebra hacha), three to five trees in Guatemala have this name; name; none are Diphysa; only a new species, *Diohysa Yucatánensis* medicinal, construction (Mexico)
- *Guazuma ulmifolia* (guácimo) FUEL, MED, PRD, FOOD, BEV, FORG, FIBR, SPC, CNST, POIS.
- *Haematoxylon campechianum* (tinto), MED, PRD, DYE
- *Metopium brownei* (chechen), irritant, medicinal, construction
- *Pachira aquatica* (zapote de agua), food
- *Salix humboldtiana* (sauce), FUEL, PRD, ORN, CNST, FORG, MED, POIS
- *Tabebuia rosea* (macuilís), medicinal, construction

Every part of Mexico, Belize, or Guatemala that has *Coccoloba uvifera* will have other slightly different plants nearby since some areas will be facing the sea; others will be facing a stream with brackish water; in Petén there will be no brackish water and for sure no sea.

BOTANICAL DESCRIPTION OF THE *COCCOLOBA* ***UVIFERA*** **BY STANDLEY AND STEYERMARK (1949)**

Coccoloba belizensis Standl. Trop. Woods 16: 38. 1928. Uva de monte (Petén).
Wet forest or thickets, 900 meters or less; Petén; 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).

COCCOLOBA UVIFERA TREES IN BELIZE: **STANDLEY AND RECORD**

Coccoloba uvifera (L.) Jacq. Grape. Uva (Honduras). Niiche (Yucatán, Maya). Sea beaches; widely distributed on the beaches of tropical America. A dense, rounded shrub or small tree; leaves almost sessile, stiff and thick; fruit white or purple, as much as 2 cm. long, very juicy. The bark, when cut, yields an astringent red sap, the source of West Indian kino, which formerly was an article of commerce. The usual English name for the plant is Sea Grape. Wood reddish, hard, heavy, strong, fine-textured, fairly durable; little used except for fuel. (For description see T. of T. A., pp. 151-153).

(Standley and Record 1936: 127).

COCCOLOBA UVIFERA MENTIONED IN TREES AND SHRUBS OF MEXICO, STANDLEY

2. **Coccoloba uvifera** (L.) Jacq. Enum. Pl. Carib. 19. 1760. *Polygonum uvifera* L. Sp. Pl. 365. 1753. In coastal thickets, Tamaulipas to Yucatán and Sinaloa. Florida, West Indies, Central America, and northern South America. Shrub or tree, sometimes as much as 15 meters high, with a trunk a Meter in diameter, but usually much smaller, densely branched; bark thin, smooth, brown; leaves about 20 cm. wide, very thick, the veins often red; Flowers white; fruit purple, 1 to 2 cm. in diameter, in long dense heavy racemes; wood hard, dark brown, taking a good polish, its specific gravity about 0.96. "Uva de la playa" (Tamaulipas, Veracruz, Venezuela); "uva de la mar" (Tamaulipas, Yucatán, Oaxaca, Porto Rico); "uvero" (Tamaulipas, Cuba); "uva" (Yucatán, Veracruz, Santo Domingo); "manzano" (Sinaloa); "uva caleta" (Cuba); "papaturro" (Costa Rica); "uvero de playa" (Panama, Costa Rica); "uvilla" (Santo Domingo). In Florida and the British West Indies the plant is known as " sea-grape." "pigeon-wood," " horsewood," and "hopwood." The wood is highly esteemed in tropical America for cabinet work, and is used also for fuel. It is said to yield a red dye. The roots are astringent and have been employed as a remedy for dysentery. The fruit is edible, with an acidulous, somewhat astringent flavor, and in the West Indies it has been fermented, with sugar, to produce an alcoholic drink. Febrifuge properties are attributed to the bark. The shrub is often planted (as in Florida) for ornamental purposes, for the large thick leaves are of striking and handsome appearance. It grows readily from cuttings. The first account of the plant, probably, is that given by Oviedo (Lib. VIII, Cap. XIII), who says: "The Christians give the name uvero to the tree the Indians call quiabara. This is a fine tree, with good wood, especially for making charcoal for blacksmiths and silversmiths; as they are trees with spreading tops, and not straight, although the branches are thick and the weed strong, they are useless for construction of houses, but may be employed for butchers' blocks and shoe lasts. The wood resembles that of madrono, for it is red, but it is stronger. The fruit consists of thin racemes of grapes, separated from each other, rose or purple in color, and good to eat, although the stone is very large in proportion to the size of the fruit and the amount of flesh ; the largest are the size of a filbert. The leaves are like those illustrated; they are so different from other leaves that I have shown them here.

(Standley 1922: 245).

BOTANICAL DESCRIPTION OF THE *COCCOLOBA* ***UVIFERA*** **BY STANDLEY FOR YUCATÁN**

> **Coccoloba uvifera** (L.) Jacq. Niiche. Sp. Uva del mar, Uva. Common along seashores. Seagrape. A shrub or small tree, the handsome thick rounded leaves often red when young. The wood, when of sufficient dimensions, is useful for cabinetwork. The calyx is accrescent and at maturity large, fleshy, juicy, and edible. The plant is astringent, and tonic properties are ascribed to it. It is employed locally as a remedy for chronic diarrhea and dysentery, and for venereal diseases.
>
> (Standley 1922: 245).

The current series of reports is on edible plants of wetlands ecosystems. But in the future we will also be writing reports on the other edible species, so I show all five species here.

Coccoloba barbadensis	*Coccoloba belizensis*	*Coccoloba diversifolia*	*Coccoloba spicata*	*Coccoloba uvifera*
CAM	CAM		CAM	CAM
CHIS	CHIS		CHIS	CHIS
GRO				
JAL				
MICH				
OAX		OAX		OAX
PUE			PUE	
QRO	QRO	QRO	QRO	QRO
				SIN
				SLP
TAB			TAB	TAB
				TAM
	VER	VER	VER	VER
YUC		YUC	YUC	YUC

Coccoloba ***uvifera***

Coccoloba uvifera.

Photography by: David Arrivillaga, FLAAR Mesoamerica, Apr. 30, 2021, 7:50 a.m.
Playa Aldea Buena Vista, Tapón Creek, Livingston, Izabal, Guatemala.
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/2,000 sec; f/6.3; ISO 2,000.

CLOSE RELATIVE(S) OF ***COCCOLOBA UVIFERA***

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

> ***Coccoloba barbadensis*** Jacq. — **Syn**: *Coccoloba mayana* Lundell; *Coccoloba schiedeana* Lindau; *Coccoloba Peténensis* Lundell —**Loc Use**: FORG, MED.— Nv: fresh water grape, wild grape. — **Habit**: Tree.

> ***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.

> ***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.

CREDITS FOR PHOTO ON PAGE 18.
Coccoloba uvifera.

Photography by: David Arrivillaga, FLAAR Mesoamerica, Dec. 17, 2020, 11:07 a.m.
Playa Quehueche, Livingston, Izabal, Guatemala.
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/200 sec; f/8; ISO 1,250.

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

> Is *Coccoloba uvifera* 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 uvifera* listed for Tapón Creek Nature Reserve (including Taponcito Creek), FUNDAECO?

Not Mentioned.

> Is *Coccoloba uvifera* listed for Buena Vista Tapón Creek Nature Reserve?

Not mentioned.

> Is *Coccoloba uvifera* 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 uvifera* listed for El Refugio de Vida Silvestre Punta de Manabique? FODECYT 2008: Anexo 3

Yes, *Coccoloba uvifera* is mentioned as one of those that interacts with *Chrysobalanus icaco* (FUNDARY 2007 Sheet 22).

> Is *Coccoloba uvifera* listed for Ecoalbergue Lagunita Creek (Área de Usos Múltiples Río Sarstún)?

No, the species that appears in the list is *Coccoloba belizensis* (CONAP 2003: 82).

> Is *Coccoloba uvifera* listed for Sarstoon-Temash National Park (northern side of Río Sarstún)?

No, the species that appears in the list is *Coccoloba belizensis* (Meerman, Herrera and Howe 2003: 8).

> Is *Coccoloba uvifera* listed for Bocas de Polochic?

No, the species that appears in the list is *Coccoloba schiedeana* (FUNDAECO 2007: 45).

> Is *Coccoloba uvifera* from the Highlands or from the Lowlands (or both)?

Lowlands under 500 meters above the sea level.

http://www.conabio.gob.mx/conocimiento/info_especies/arboles/doctos/57-polyg2m.pdf

WORLD RANGE FOR ***COCCOLOBA UVIFERA***

Native to tropical America. It is found to the south of Florida, Bermuda, Bahamas, West Indies and coast northeastern Mexico. It extends the entire length of the Atlantic coast of Central America, meeting also on both coasts of South America up to Peru and Brazil.

http://www.conabio.gob.mx/conocimiento/info_especies/arboles/doctos/57-polyg2m.pdf

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

If you live on the Caribbean shore, you may have *Coccoloba uvifera* behind your house. But I doubt people would plant this tree in their garden if they live elsewhere.

IS THERE POTENTIAL MEDICINAL USAGE OF ***COCCOLOBA UVIFERA* BY LOCAL PEOPLE?**

Yes, the medicinal uses of *Coccoloba* plants would be a separate research project.

Coccoloba uvifera.

Photography by: David Arrivillaga, FLAAR Mesoamerica, Apr. 27, 2021, 1:37 p.m.
Playa Aldea Buena Vista, Tapón Creek, Livingston, Izabal, Guatemala.
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/400 sec; f/9; ISO 2,500.

Coccoloba uvifera.

Photography by: David Arrivillaga, FLAAR Mesoamerica,
Apr. 27, 2021, 1:29 p.m. Playa Aldea Buena Vista,
Tapón Creek, Livingston, Izabal, Guatemala.
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G
OSS. Settings: 1/250 sec; f/8; ISO 640.

Coccoloba uvifera.

Photography by: Victor Mendoza, FLAAR Mesoamerica,
Apr. 07, 2021, 11:15 a.m. Playa Aldea Buena Vista,
Tapón Creek, Livingston, Izabal, Guatemala.
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G
OSS. Settings: 1/400 sec; f/4.0; ISO 800.

Coccoloba uvifera.

Photography by: Roxana Leal, FLAAR Mesoamerica, Apr. 7, 2021, 11:27 a.m. Playa Aldea Buena Vista, Tapón Creek, Livingston, Izabal, Guatemala. Camera: Google pixel 3.

USES OF ***COCCOLOBA UVIFERA***

> The wood is highly esteemed in tropical America for cabinet work, and is used also for fuel. It is said to yield a red dye. The roots are astringent and have been employed as a remedy for dysentery. The fruit is edible, with an acidulous, somewhat astringent flavor, and in the West Indies it has been fermented, with sugar, to produce an alcoholic drink. Febrifuge properties are attributed to the bark.
>
> (Standley 1922: 245).

> **Coccoloba uvifera** (L.) L. — **Ref**: FG 4: 118. 1946; Howard, 1959b: 217. — **Loc Use**: FOOD, BEV, MED, FUEL, FORG — Reg Use: FOOD, PRD, MED, FUEL, CNST, BEV, TAN. — **Nv**: grape, niiche, sea
>
> (Balick, Nee and Atha 2000: 63).

WOW, Food, products, medicine, fuel, construction, beverage, and tannin. It sounds like a useful plant that has been blissfully neglected in focus on root crops, Ramón, and the need for agricultural engineering to produce food.

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

> Bats are the main consumers of the fruit of this species and fulfill the function of dispersing the seeds.
>
> (Madriz and Ramirez 1997: 111).

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

> Pollination is done by small insects, mainly hymenopterans. The pollination system is generalist according to insect visitation, frequency, pollen load and site of pollen transportation.
>
> (Madriz and Ramirez 1997: 107).

> Seven species of social insects belonging to the order Hymenoptera were found visiting the flowers of *C. uvifera, Nannotrigona testaceicornis, Trigona* sp. and *Apis mellifera* have high frequency of visits.
>
> (Madriz and Ramirez 1997: 107).

CONCLUDING DISCUSSION AND SUMMARY ON *COCCOLOBA UVIFERA* TREES

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

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

> *Coccoloba* x *lundellii* Standl. Uva
> *Coccoloba uvifera* (L.) Jacq. Uva

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 are working on the two best known edible species:

- *Coccoloba belizensis (*common in wet areas of Petén 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 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; Alta Verapaz; Izabal. British Honduras; southern Florida; West Indies; Venezuela.

> **Coccoloba spicata** Lundell Dry upland forest, or about lake borders, 300 meters or less; Petén; Alta Verapaz. British Honduras; Yucatán; Quintana Roo; Campeche.

(Standley and Steyermark 1946: 117). Vol. 24, part IV

The present report on *Coccoloba uvifera* is to introduce the edible aspect of many species of the genus *Coccoloba*. We start with the sea grape, since this species is not known to all of us who work in Petén, Alta Verapaz, etc. I never paid much attention to *Coccoloba uvifera* until I was hiking along the sandy shore facing Amatique Bay. And although included *Coccoloba uvifera* in my multiple editions of edible and usable plants already a decade ago, it was not until the present months (February and March 2021) that I began to study it.

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

> *Loc Use: FOOD, BEV, MED, FUEL, FORG —*
> *Reg Use: FOOD, PRD, MED, FUEL, CNST, BEV, TAN.*

This shows that this is a beverage in addition to also being food, medicinal, and useful as a tannin for curing leather. Now you can see why accomplishing field work an entire week every month in the multitude of different biodiverse ecosystems of the Municipio of Livingston is providing fresh factual documentation of the wild native edible and useful plants available to the Classic Maya for thousands of years.


Coccoloba ***uvifera***

Coccoloba uvifera.

Photography by: Nicholas Hellmuth, FLAAR Mesoamerica, Apr. 27, 2021, 1:28 p.m. Playa Aldea Buena Vista, Tapón Creek, Livingston, Izabal, Guatemala. Camera: IPhone 12 Pro Max.

Coccoloba uvifera.

Photography by: David Arrivillaga, FLAAR Mesoamerica, Apr. 27, 2021, 1:32 p.m.
Playa Aldea Buena Vista, Tapón Creek, Livingston, Izabal, Guatemala.
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/1,000 sec; f/7.5; ISO 800.

REFERENCES CITED ON SUGGEST **READING *COCCOLOBA UVIFERA***

ATRAN, Scott, LOIS, Mimena and **Edilberto UCAN Ek'**

2004 Plants of the Petén Itza' Maya. Museum of Anthropology, Memoirs, Number 38, University of Michigan. 248 pages.

Very helpful and nice collaboration with local Itza' Maya people. It would help in the future to have a single index that has all Latin, Spanish, and English plan names so that you can find plants more easily. Suzanne Cook's Lacandón ethnobotany index is significantly easier to use.

Not available as a download.

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

2015 Messages from the Gods: A Guide to the Useful Plants of Belize. The New York Botanical Garden, Oxford University Press.

CONAP

2003 Plan Maestro 2003-2007 Refugio de Vida Silvestre Bocas de Polochic CONAP. Fundación Defensores de la Naturaleza. Guatemala.

COOK, Suzanne

2016 The forest of the Lacandón Maya: an ethnobotanical guide. Springer. 334 pages.

Sold online: www.springer.com/la/book/9781461491101

DIX, Margaret A. and **M. W. DIX**
1992 Recursos biológicos de Yaxhá-Nakum-Yaloch. 54 pages.

This is one of the sources for the tree list portion of CONAP Plan Maestro reports on Yaxha in the past decade. Unfortunately, the Dix and Dix list is rather limited. The 1999 Schulze and Whitacre list for Tikal is more complete (but all these lists need more field work to improve).

We have asked several times for a copy of the original Dix and Dix report, but have never received one.

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2010 Indicadores ecológicos de la zona riparia del Río San Pedro, Tabasco, México. MS Thesis, El Colegio de la Frontera Sur. 131 pages.

Downloadable: https://ecosur.repositorioinstitucional.mx/jspui/bitstream/1017/1656/1/100000050585_documento.pdf

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1989 United States Department of Agriculture. USA.

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2007 Plan Maestro 2008-2011 Área De Protección Especial Punta De Manabique. Consejo Nacional De Áreas Protegidas Fundación Mario Dary Rivera.

FUNDAECO
2007 Propuesta de Incorporación a la Convención Ramsar del Área Protegida "Reserva de Usos Múltiples Río Sarstún", Fundación para el Desarrollo y la Conservación (FUNDAECO). 62 pages.

FUNDAECO
2007 Propuesta de Incorporación a la Convención Ramsar del Área Protegida "Reserva de Usos Múltiples Río Sarstún", Fundación para el Desarrollo y la Conservación (FUNDAECO). 62 pages.

GOODWIN, Z. A., LÓPEZ, G. N., STUART, N., BRIDGEWATER, G. M., HANSTON, E. M., CAMERON, I. D., MICHELAKIS, D., RATTER, J. A., FURLEY, P. A., KAY, E., WHITEFOORD, C., SOLOMON, J. LLOYD, A. J. and **D. J. HARRIS**
2013 A checklist of the vascular plants of the lowland savannas of Belize, Central America. Phytotaxa 101 (1): 1–119.

Download: www.eeo.ed.ac.uk/sea-belize/outputs/Papers/goodwin.pdf

GRANDTNER, Miroslav M.
2005 Elsevier's Dictionary of Trees: Volume 1: North America. ELSEVIER. 1493 pages.

HIDALGO, Hugo and **Cristofer LOPEZ**
2007 Propuesta de Incorporación a la Convención Ramsar del Área Protegida "Reserva de Usos Múltiples Río Sarstún". FUNDAECO.

HELLMUTH, Nicholas M.
2013 Maya Ethnobotany, Complete Inventory, Fruits, nuts, root crops, grains, con struction materials, utilitarian uses, sacred plants, sacred flowers 12th edition. FLAAR Reports, FLAAR (USA) and FLAAR Mesoamerica (Guatemala). 106 pages.

The 13th edition that followed is an update, but the 12th edition has tons of material to get you started.

HELLMUTH, Nicholas M.
2014 Maya Ethnobotany, Complete Inventory, Fruits, nuts, root crops, grains, construction materials, utilitarian uses, sacred plants, sacred flowers 13th edition. FLAAR Reports, FLAAR (USA) and FLAAR Mesoamerica (Guatemala). 111 pages.

HITZIGER, Martin
2016 Mayan phytotherapy in Guatemala: A transdisciplinary study for ethnographic documentation and local empowerment. PhD dissertation, ETH, Zurich.

KANTÚN-Balam, Jesús, SALVADOR-Flores, José, TUN-Garrido, Juan, NAVARRO-Alberto, Jorge, ARIAS-Reyes, Luis and **Jaime MARTÍNEZ-Castillo**

2013 Diversidad y Origen Geográfico del Recurso Vegetal en los Huertos Familiares de Quintana Roo, México. POLIBOTÁNICA, Núm. 36, pp. 163-196, México, 2013.

LESUR, Luis

2011 Árboles de México. Editorial Trillas. 368 pages.

Louteridium is too often considered a shrub, so would not be expected in monographs on "TREES

LEVY Tacher, Samuel I., AGUIRRE Rivera, J. Rogelio, GARCÍA Perez, José D. and **María Magdalena MARTÍNEZ Romero**

2006 Aspectos florísticos de Lacanhá Chansayab, Selva Lacandona,Chiapas. Acta Botánica Mexicana, núm. 77, octubre, 2006, pp. 69-98. Instituto de Ecología, A.C., Pátzcuaro, México.

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1937 The Vegetation of Petén. Carnegie Institution of Washington, Publ. 478. Washington. 244 pages.

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1938 Plants Probably Utilized by the Old Empire Maya of Petén and Adjacent Lowlands. Papers of the Michigan Academy of Sciences, Arts and Letters 24, Part I:37-59.

www.botanicalsciences.com.mx/index.php/botanicalSciences/article/download/1660/1309/

MADRIZ, R. and **N. RAMIREZ**

1997 Biología Reproductiva de *Coccoloba uvifera* (Polygonaceae) una especie poligamo-dioica. Centro de Botánica Tropical. Universidad Central de Venezuela, Facultad de Ciencias, Los Chaguaramos. Revista de Biología Tropical. Pages 106-115.

MEERMAN, J. C., HERRERA, P. and **A. HOWE**

2003 Rapid Ecological Assessment Sarstoon Temash National Park Toledo District, Belize. Volume II: Appendices (Species lists and raw data). Temash Institute for Indigenous Management (SATIIM). 92 pages.

OCHOA-Gaona, Susana, RUÍZ González, Hugo, ÁLVAREZ Montejo, Demetrio, CHAN Coba, Gabriel and **Bernardus H. J. DE JONG**

2018 Árboles de Calakmul. ECCOSUR, Chiapas. 245 pages.

It is amazing that there is no such book for Parque Nacional Tikal, nor El Mirador. Even though it includes only half the estimated number of "trees", it has more tree species than Schulze and Whitacre for Tikal (they estimated about 200 but list only about 156 (their lists of species and list by plant family are not identical)).

The entire book is a totally free download. However, you can't copy and paste so is difficult to add to your discussion.

In the future it would be helpful to have a photographer with high-resolution equipment available and a book producer that can put these photos at a resolution that allows you to see the details. The photos of the overall tree have almost no visible detail. Nonetheless, the authors all have botanical experience, and this book is a good start. A second edition would be helpful. It would also help to have more than one page per photo.

Louteridium is too often considered a shrub, so it would not be expected in monographs on "TREES".

http://aleph.ecosur.mx:8991/exlibris/aleph/a22_1/apache_media/74R92GMRSJSEPFDEE5NJY4SJI2I8AK.pdf

PARKER, Tracey

2008 Trees of Guatemala. The Tree Press. 1033 pages.

Even though copy-and-paste, it helps to have 99% of the trees of Guatemala in one single volume. Although more than half the book is copy-and-paste from Flora of Guatemala, since this Parker book is year 2008, it has additional information for some trees.

PEREZ-Consuegra, Sergio, et al.

2001 Caracterización Ecológica de los Biotopos Chocón Machacas, Izabal y Cerro Cahuí, Petén, Universidad de San Carlos de Guatemala (USAC).

PEÑA-Chocarro, María and **Sandra KNAPP**

2011 Árboles del Mundo Maya. Natural History Museum Publications. 263 pages.

Helpful book; contributing authors are experienced botanists. They cover 220 species of trees, more than virtually all other "Books on Trees of the Maya". They even include tasiste (which is missing from all other books on "Trees of the Maya", except for the recent book on Árboles de Calakmul).

But if all this effort is going into a book, it would be helpful if there were more photos, larger photos, and not so much blank space at the bottom of each page. Plus, it would help if the text could include personal first-hand experience with these trees out in the Mundo Maya. But even as is, it is a helpful book.

If you are doing field work you need this, plus Árboles de Calakmul, plus Árboles tropicales de México. Parker's book you need back in your office, since out in the field it's not much help due to lack of photographs. Back in your office the books by Regina Aguirre de Riojas are also helpful.

PENNINGTON, Terence D. and **José SARUKHAN**

2005 Árboles tropicales de México. Manual para la identificación de las principales especies. 3rd edition. UNAM, Fondo de Cultura Económica. 523 pages.

This book is a serious botanical monograph. 1968 was the first edition (I still have this), 1998 was second edition. The 3rd edition is a "must have" book. Each tree has an excellent line drawing of leaves and often flowers and fruits (though to understand flowers you need them in photographs, in full color). Each tree has a map showing where they are found in Mexico (such maps are lacking in most books on Trees of Guatemala or plants of Belize). But trying to fit a description of a tree on one single page means that a lot of potential information on flowering time is not present. Plus, this is definitely not a book on ethnobotany: for that you need Suzanne Cook.

RUIZ, CLAUDIA, et al.

2006 Plan Maestro de la Reserva Protectora de Manantiales Cerro San Gil, 2008-2012. Consejo Nacional de Áreas Protegidas (CONAP), Fundación Para el Ecodesarrollo y la Conservación (FUNDAECO), The Nature Conservancy (TNC).

SCHULZE, Mark D. and **David F. WHITACRE**

1999 A Classification and Ordination of the Tree Community of Tikal National Park, Petén, Guatemala. Bulletin of the Florida Museum of Natural History. Vol. 41, No. 3, pp. 169-297.

Even though it was written 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 it's harder to use. The new monograph on Árboles de Calakmul is better than anything available so far on Tikal (and the nice albeit short book by Felipe Lanza from decades back on trees of Tikal is neither available as a scanned PDF nor as a book on Amazon or ebay).

Download on the Internet.

STANDLEY, Paul C. and **Samuel J. RECORD**

1936 The Forests and Flora of British Honduras. Field Museum of Natural History. Publication 350, Botanical Series Volume XII. 432 pages plus photographs.

STANDLEY, Paul C.

1922 Trees and Shrubs of Mexico. Contributions from the United States National Herbarium, Volume 23, Part 2. Smithsonian Institution.

In this one monograph the species are not listed in alphabetical order, so it's a mental adventure finding the species you are looking for.

All monographs by Standley and co-authors can be easily found and downloaded. I would recommend finding the .pdf versions as they are easier to store, easier to copy, and easier to share with students and colleagues.

STANDLEY, Paul C. and **Julian A. STEYERMARK**

1946 Flora of Guatemala. Fieldiana: Botany, Volume 24, Part IV. Chicago Natural History Museum.

TREJO-Torres, J. C. and **J. RODRÍGUEZ**

2014 Listas para Usarse: Lista de árboles del Mayab, (Campeche, Quintana Roo y Yucatán), v. 1. The Institute for Regional Conservation – Programa para la Península de Yucatán. 40 pages.

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2004 Plan de Proyecto Parque Nacional Tikal. Parque Nacional Tikal, Petén, Guatemala.

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2016 Checklist of the native vascular plants of Mexico. Catálogo de las plantas vasculares nativas de México. Revista Mexicana de Biodiversidad 87 (2016) 559–902.

http://revista.ib.unam.mx/index.php/bio/article/view/1638/1296

WILLIAMS, Louis O.

1981 Foods for Early Man. CEIBA, Vol. 24 Núm. 1-2, Escuela Agrícola Panamericana, Zamorano.

CREDITS FOR PAGE 29.
Coccoloba uvifera.
Photography by: David Arrivillaga, FLAAR Mesoamerica, Apr. 30, 2021, 7:44 a.m.
Playa Aldea Buena Vista, Livingston, Izabal, Guatemala.
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/1000 sec; f/7.5; ISO 800.

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). Therefore, we prefer to focus on web sites that have reliable information.

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/imagedatabase/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, 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.

ACKNOWLEDGEMENTS TO FLAAR MESOAMÉRICA

Flor de María Setina is the administrator of the office, she is in charge of several projects around the world (since FLAAR-REPORTS has been researching large format printers around the world for over 20 years.)

Vivian Díaz coordinator of the Flora & Fauna and MayanToons projects (publications, results, reports for all audiences and experts on each topic). She is an environmental engineer and for more than six years she has supported us with the organization of each team and the Yaxha and RBM project from 2018 to 2022.

Victor Mendoza Identifies species of flora, fauna and fungi. Participates as a researcher in the office and sometimes on field trips

Vivian Hurtado At first she supported us with the preparation of bibliographies on different topics. From now on, she coordinates the field trips of the MBR 2022 project and supports the management of other Flora & Fauna activities.

Andrea de la Paz is a graphic designer who helps propose art for the overall template and for aspects of our posts.

Senaida Ba Has been our photo assistant for several years. Now she prepares PowerPoint presentations for teachers and students on various topics of Flora, Fauna and Mayan Iconography

Jaqueline González is a designer who diagrams text and photos to create the current reports.

Roxana Leal Bachelor of Communication is the one who manages all our social networks and the digital community. He sometimes accompanies us on field trips because he likes the adventure and nature of Guatemala.

María Alejandra Gutiérrez She is an experienced photographer who today prepares the Photograph Catalogs for the current RBM project. He supported us with the coordination of the trips for the Livingston, Izabal project.

David Arrivillaga is an experienced photographer and can handle both Nikon and the latest Sony digital cameras. Their work during and after a field trip also includes sorting, naming, and processing.

Juan Carlos Hernández receives the material we write and puts it into Internet software to produce our web pages.

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

Valeria Áviles is an illustrator for MayanToons, a division in charge of educational material for schools, especially the Mayan Q'eqchi' schools in Alta Verapaz, Q'eqchi' and Peten Itza Maya in Peten, and the Mayan and Garífuna Q'eqchi' schools in the Municipality of Livingston, Izabal.

Josefina Sequén is an illustrator for MayanToons and also helps prepare illustrations for social media posts and animated videos.

Rosa Sequén is an illustrator for MayanToons and also helps to prepare illustrations for social media posts and animated videos.

Heidy Alejandra Galindo Setina is a designer who diagrams text and photos to create the actual reports.

Laura Morales is preparing animated videos in the style of MayanToons, as animated videos are the best way to help schoolchildren protect ecosystems
fragile and endangered species.

Maria José Rabanales She has been part of the Flora y Fauna photographic reportage and educational material editing team since September 2020. He works together with others in the team to prepare the finished pdf editions of the Yaxhá Nakum Naranjo Project material.

Alejandra Valenzuela She is a biology student and is part of of the editing team of photographic reports and educational material of Flora and Fauna since September 2020.

Alexander Gudiel designer who will join the editorial design team in December 2020. He will combine the text, images and maps in the FLAAR Mesoamerica editorial criteria.

Cristina Ríos is a design student who joins the editorial design team in December 2020. She will combine the text, images and maps in the editorial criteria of FLAAR Mesoamerica.

Carlos Marroquín is a graphic design student at USAC who volunteered to do his internship with the Editorial Design Team. We are very grateful to people like him who join our team and contribute their knowledge and work.

Sergio Jerez supports us with the identification of plants, bibliographic research and the generation of maps of the routes carried out in the expeditions

Edwin Solares is an environmental engineering student with a strong interest in ecology. 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.

Belén Chacón Her work includes the ordering and tabulation of the useful and edible flora listed in the FLAAR bibliography and many other references, to make a complete list of useful plant species with updated taxonomic information

Diana Sandoval Her work is based on the collection of scientific information that shapes the reports that are published on our pages.

Paula García is part of our MayanToons Animation team. With his work he gives life and sounds to our favorite characters from the jungles, wetlands and savannahs of the region.

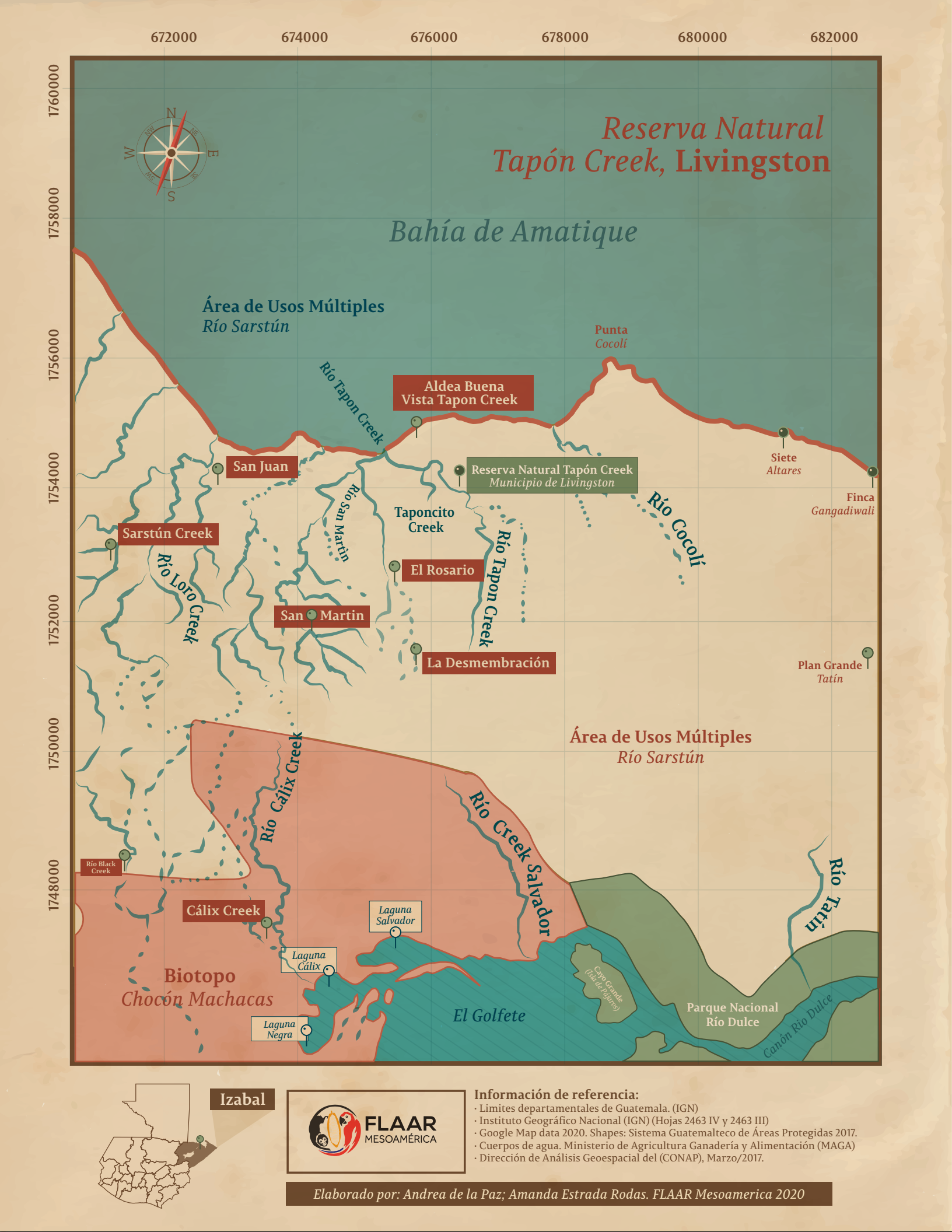
Niza Franco is part of our MayanToons Animation team. With his work he gives life and sounds to our favorite characters from the jungles, wetlands and savannahs of the region.

María José Toralla Collects information and bibliographic references to feed our electronic library of Flora & Fauna and support research for reports and websites

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

Elaborado por: Andrea de la Paz; Amanda Estrada Rodas. FLAAR Mesoamerica 2020



Información de referencia:

- Limites departamentales de Guatemala. (IGN)
- Instituto Geográfico Nacional (IGN) (Hojas 2463 IV y 2463 III)
- Google Map data 2020. Shapes: Sistema Guatemalteco de Áreas Protegidas 2017.
- Cuerpos de agua. Ministerio de Agricultura Ganadería y Alimentación (MAGA)
- Dirección de Análisis Geoespacial del (CONAP), Marzo/2017.

Elaborado por: Andrea de la Paz; Amanda Estrada Rodas. FLAAR Mesoamerica 2020

FLAAR MESOAMÉRICA

WETLANDS

Edible Wetlands Plants of Municipio de Livingston, Izabal

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

Cyperus esculentus
Chufa, Yellow Nutsedge, Earth Almond
MLW#1

Eleocharis geniculata
Eleocharis caribaea
Caribbean Spike-Rush
MLW#2

Montrichardia arborescens
Camotillo
Water Chestnut
MLW#3

Nymphoides indica
Floating Heart
Water Snowflake
MLW#4

Pachira aquatica
Zapoton
MLW#5

Pontederia cordata
Pickerel Weed
MLW#6

Sagittaria latifolia
Water Potatoes
MLW#7

Typha dominguensis
Cattail
MLW#8

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

Amphitecna latifolia
Black calabash
MLW#9

Coccoloba uvifera
Uva del mar
MLW#10

Manicaria saccifera
Confra, Manaca
MLW#11

Chrysobalanus icaco
Coco Plum
MLW#12

Avicennia germinans
Black Mangrove
MLW#13

Rhizophora mangle
Red Mangrove
MLW#14

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

Glossary
of Wetland Terms
Bibliography of Wetlands Habitat Names
MLW#15

Acoelorrhaphe wrightii
Pimientillo, Tasiste, Palmetto Palm
MLW#16

Acrostichum aureum
Mangrove Fern
MLW#17

Annona glabra
Alligator Apple
MLW#18

Bactris major
Huiscoyol Palm
MLW#19

Diospyros nigra
Zapote negro
MLW#20

Grias cauliflora
Palo de Jawuilla
MLW#21

Inga vera
Inga multijuga
Inga thibaudiana
River Koko
MLW#22

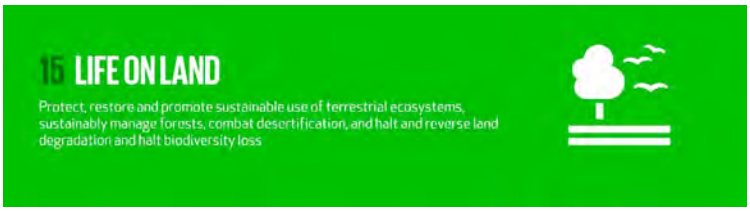
Pithecellobium lanceolatum
Bastard Bully Tree Chucum Red Fowl
MLW#23

Coccoloba belizensis
Papaturro
MLW#24

Symphonia globulifera
Barillo
MLW#25

Crataeva tapia
Matasanillo, Granadillo, Tortugo
MLW#26

FLAAR



The current Alcalde of Livingston, Mr. Daniel Pinto, together with his team of International Cooperation division, have 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. From this agenda, FLAAR (USA) and FLAAR Mesoamerica (Guatemala) will collaborate to achieve Sustainable Development Goal (SDG) number 15 "Life on Land".

Throughout this cooperation project, different materials have been prepared, like this Photo Essay, that helps to collect information on species, different ecosystems: terrestrial, wetlands and fresh water biodiversity. This information would also be useful as part of a strategy to protect threatened species and prevent their extinction. The municipality's goals include to promote the sustainable use, conservation and research of the species of flora and fauna of the terrestrial, wetlands and aquatic shore and coastal ecosystems of the Guatemalan Caribbean. Learn more about this project and the SDG indicators 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

Any school, college, university, botanical garden, zoological garden, botanical or zoological association (or club) may post this report on their web sites, (at no cost) as long as they link back to one of our web sites:

www.maya-ethnobotany.org
www.maya-ethnozoology.org
www.maya-archaeology.org
www.digital-photography.org
www.FLAAR-Mesoamerica.org

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Uva del mar, Seaside Grape Tree, *Coccoloba uvifera*, Wetlands of Municipio de Livingston, Izabal, Guatemala. Wetlands Report #10, Edible Plants of Municipio de Livingston that grow along the beach shore of Amatique Bay MLW2, Number 1. FLAAR Mesoamerica.

BACK COVER PHOTO
Coccoloba uvifera.

Photo by: Victor Mendoza, FLAAR Mesoamerica, Apr. 26, 2021, 09:04 a.m. Playa Quehueche, Livingston, Izabal, Guatemala. Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/800 sec; f/4.0; ISO 800.

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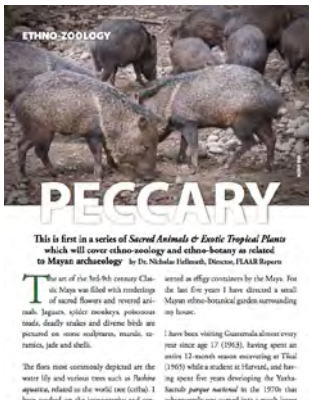

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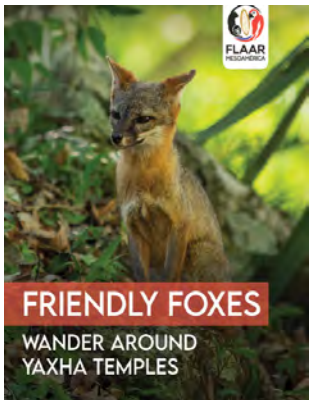

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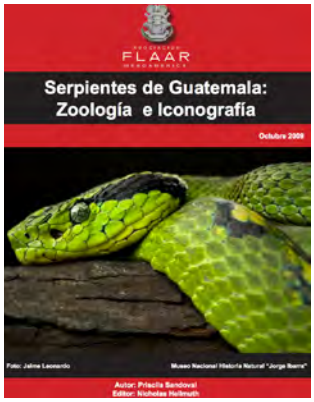

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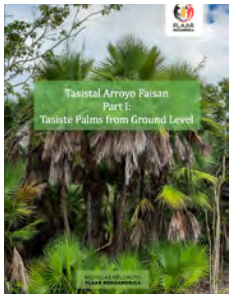

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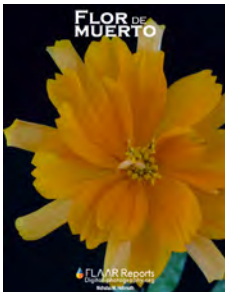

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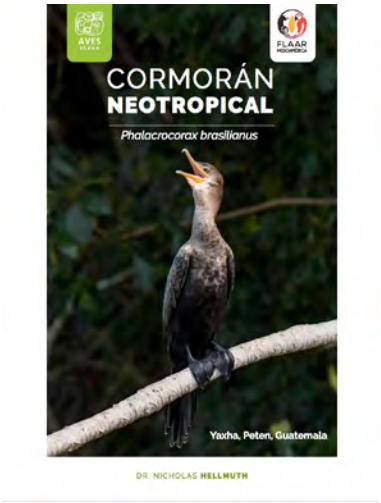

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