FLAAR
MESOAMÉRICA

WETLANDS #9

CACAO SILVESTRE
COCOA SUBSTITUTE

Amphitecna latifolia

Wild Calabash of Caribbean Coast
Livingston, Guatemala

NICHOLAS **HELLMUTH**

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Amphitecna latifolia

Potentially Edible Wild Plant Native to the Municipio de Livingston, Izabal, Guatemala.

FEBRUARY **2021**

CREDITS

The helpful individuals listed below are all part of the FLAAR Mesoamerica research and field work team. The office research team, webmaster, and web designers are additional individuals in the main office in Guatemala City. Since each report is a different plant or animal, the individuals who assist in preparing the bibliography, species identification and botanical information category are not the same for each report.

Author
Nicholas Hellmuth

Botanical Information Compiler
Nicholas Hellmuth
Diana Sandoval

Genus Species Identification Team
Nicholas Hellmuth
Victor Mendoza
Senaida Ba

Bibliography Team
Nicholas Hellmuth
Vivian Hurtado

Editor
Vivian Díaz

Photographers
Nicholas Hellmuth
María Alejandra Gutierrez
David Arrivillaga

Photography Aassistants
Senaida Ba Mucu

Manager of Design and Layout
Andrea Sánchez Díaz

Layout of this English Edition
Heidy Galindo

APPRECIATION

Assistance for local Access, Municipio de Livingston
Daniel Esaú Pinto Peña, Alcalde of Livingston (Izabal, Guatemala).

Assistance for Knowledge of plants at Tapon Creek and Taponcito Creek FUNDAECO
Lucas Cuz

Lanchero and Guide in Tapon creek, Lagunita Creek
Carlos Cuevas

Field Work Project Manager (Planning and Preparatin)
María Alejandra Gutiérrez, FLAAR Mesoamerica

FRONT COVER PHOTOGRAPH
Amphitecna latifolia.

Photo by: David Arrivillaga, FLAAR Mesoamerica, Dec. 20, 2020, 4:08 p.m. Lagunita Creek reserve, Municipio de Livingston.

Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/4,000 sec; f/10; ISO 1,600.

TITLE PAGE PHOTOGRAPH
Amphitecna latifolia.

Photo by: Nicholas Hellmuth, FLAAR Mesoamerica, Dec. 20, 2020, 4:10 p.m. Lagunita Creek reserve, Municipio de Livingston, Izabal, Guatemala.

Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/1,000 sec; f/13; ISO 3,200.

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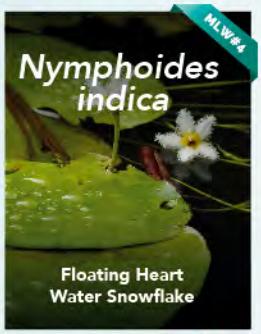

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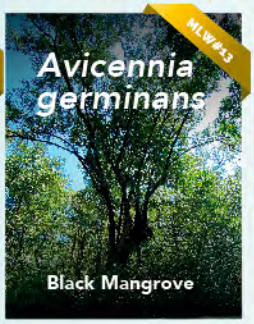

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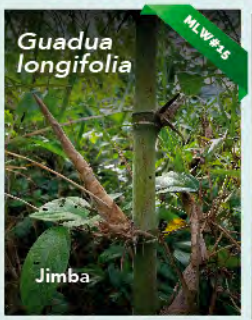

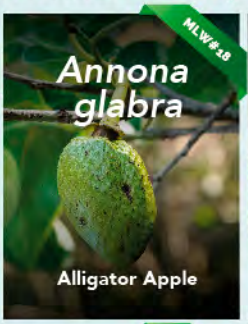

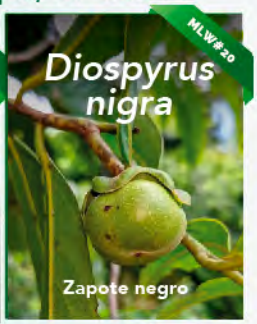

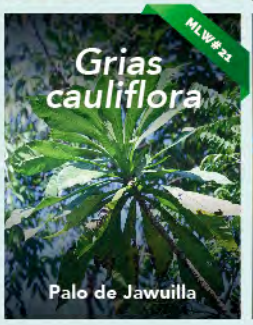

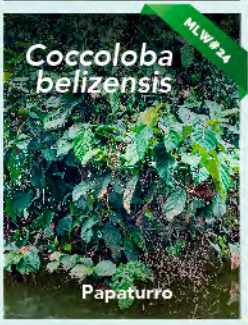

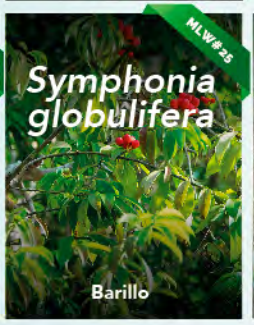

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GLOSSARY

Cacao: usually refers to the seeds of *Theobroma cacao* and the beverage made from toasted and processed seeds. In Guatemala you can also find *Theobroma bicolor*. It is debated whether *Theobroma angustifolium* was brought to Guatemala from Costa Rica by the Spanish quickly after the conquest; or was present before the arrival of the Spanish. Almost no one today in Guatemala grows or uses *Theobroma angustifolium* other than as a curiosity. The linguistic origin of the word cacao and the Mayan hieroglyph for this concept can keep you busy reading linguistic, ethnobotanical, epigraphy, and archaeological reports for months.

Chocolate: is normally considered the post-Hispanic spelling of what was originally a Nahuatl word (Aztec). But you could easily spend several years doing library research on the origin of this word and its variations.

Cocoa: I always consider a botched English mis-understanding of the word cacao. Or cocoa can be considered the more processed cacao (ready to mix to drink). Multiple articles, reports, and endless books have been written on cacao, cocoa, and chocolate. Several of them (such as all three editions by Sophie and Michael Coe) include photographs by Hellmuth and team at FLAAR (USA) and FLAAR Mesoamerica (Guatemala).

Wild cacao, wild cocoa (cacao silvestre, cocoa silvestre): in reality does not exist. All species of cacao originated to the south of Guatemala and arrived thousands of years ago. I have every once and a while heard of a potential wild cacao which is a vine that grows in the Selva Lacandon area of Chiapas, bordering on the Rio Usumacinta (with Peten, Guatemala on the other side). But the words cacao silvestre or cocoa silvestre usually mean a totally unrelated plant whose seeds can be used to make or adulterate a cacao/cocoa/chocolate drink. For example, the seeds of *Pachira aquatica* can be prepared into a cacao substitute. But for the present report, the words cacao silvestre or cocoa silvestre means the seeds of *Amphitecna latifolia*. These words are used more in lower Central America and are no longer used or known for most of Guatemala. Our goal is to reintroduce this concept with the library research for *Amphitecna latifolia* for the present FLAAR report.

Life on land is the Sustainable Development Goal 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

Calabash: is a gourd, in this case a bottle gourd, *Lagenaria siceraria*.

Calabash tree: is *Crescentia cujete*, a tree that, in the wild, grows primarily in seasonally inundated savannas or tasistal areas. We have found wild *Crescentia cujete* in all the savannas of Parque Nacional Yaxha, Nakum and Naranjo (PNYNN), especially in the Savana East of Nakum. And if I remember correctly, we found *Crescentia cujete* in the seasonally inundated tasistal areas of Arroyo Petexbatun and Arroyo El Faisan, Municipio de Sayaxche, Peten, Guatemala (four reports are available; two on each of the tasistal areas). The calabash tree is featured in the Popol Vuh.

Jicaro: should be the word used for *Crescentia alata*. This tree grows wild along dry areas of CA9 (Zacapa and nearby) and grows wild in dry aeas along the highway to Auto Safari Chapin and then Monterrico (using the ferry). *Crescentia alata* is not native to wet areas but can be planted anywhere.

Morro: should be the word used for *Crescentia cujete*. But the words jicaro and morro are mish-mashed and both used for both species (*Crescentia cujete* and *Crescentia alata*). The dry fruits of *Crescentia cujete* are cut in half and dried. Then they are used as a bowl/cup to serve native Maya cacao beverage. When we are in remote areas, and the local Q'eqchi' Mayan people invite us to stop to visit them, they serve us cacao in calabash bowls of *Crescentia cujete*.

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.

Sandy shore habitat: is a challenge to define since when you hike along the beach of Amatique Bay, Municipio de Livingston (Caribbean area of Guatemala) you get a different habitat every kilometer. Where the waves break and where there is relatively pure sand, is the "beach." But a few meters inland you get swampy areas, or more sand, or sand but lots of soil. Often the shore is the edge of a hill (so no beach to walk on). We found *Amphitecna latifolia* in several of these variants of coastal shore.

Amphitecna latifolia

Photo by: Alejandra Gutiérrez, FLAAR Mesoamerica, Dec. 17, 2020, 11:24 a.m. Río Sarstún, Izabal.
Camera: Canon EOS-1D X Mark II. Lens: Canon EF 100MM Macro USM. Settings: 1/1250 sec; f/7.1; ISO 2,000.

INTRODUCTION TO *AMPHITECNA LATIFOLIA* **OF GUATEMALA AND MESOAMERICA**

Amphitecna latifolia is a close relative of *Crescentia cujete* and *Crescentia alata*. Morro and jicara are known to a majority of Mayanists (who have been in Mesoamerica in-person). *Amphitecna latifolia* is not known: I never heard of it before I stood in front of this tree in late 2020.

Amphitecna latifolia is common along the sandy beaches facing the Amatique Bay, from Río Quequehache (southeast edge of town of Livingston) all the way up the coast to Rio Sarstun (border area of Izabal and Belize). *Amphitecna latifolia* grows several meters inland from high-tide line (so not "on the beach" but in the soil+sand at the end of the high-tide area). So, like for me, if most of your botanical field work is in Peten and Alta Verapaz, you will not know of this seashore tree.

As a result, *Amphitecna latifolia* is missing from almost all books, articles, reports and awareness of us Mayanists (my unawareness previous to finding this plant is typical). Our goal of this FLAAR report is to put *Amphitecna latifolia* on the Maya map, back into the Maya menu, and to document that many plants of wetlands areas have been overlooked as most of us focus on hillsides and hilltops of Peten, Belize, adjacent in-land Campeche, Yucatan etc.

The archaeological focus on wetlands has been "raised field agriculture" and many other helpful research concepts by capable scholars since the 1990's or before. My goal is to put wild native plants into our knowledge base; so more than agriculture and a whole lot more than forest gardens: we need to also focus on swamp gardens, marsh gardens, and riverside/lakeside/seaside plants that are edible (and require no agriculture). This does not mean the Classic Maya did no agriculture in wetlands, it means that the earliest inhabitations, who did not yet have the experience; and the latest inhabitations after the Classic culture collapsed, they still had food available from the wetlands without the need of "farming."

MY PERSONAL EXPERIENCE WITH ***AMPHITECNA LATIFOLIA***

In the 50+ years that I have been in the Mayan areas of Mesoamerica (at age 16 at Palenque in 1961, at age 17 as student intern flown to Bonampak by the INAH archaeologists in 1962, and at age 19 as student intern at Tikal for all twelve months of 1965), I have never seen or heard of *Amphitecna latifolia* until I saw this tree behind our base camp while doing field work in the Aldea Buena Vista area of Tapon Creek in winter 2020. I thank the parents of Ericka Garcia for making their house available for our base camp for several field trips. There are several of these trees behind the house (about 30 meters from the shore; sort of at high-tide edge (where waves will hit in a storm; but not "on the beach"). Although they grow "in sand" they don't grow on the beach (the several meters from the sea where the waves roll up the beach).

Amphitecna latifolia is not listed in my over a decade of library research and field work on edible and usable plants of the Mayan areas (Hellmuth 2014). I enjoy finding edible and useable plants that I have never previously seen or heard about.

Amphitecna latifolia.

Photo by: David Arrivillaga, FLAAR Mesoamerica, Dec. 17, 2020, 11:19 a.m. Playa Quehueche, Livingston.
Camera: iPhone 11 Pro Max

Amphitecna latifolia.

Photo by: Victor Mendoza, FLAAR Mesoamerica, Dec. 17, 2020, 10:41 a.m. Lagunita Creek reserve, Municipio de Livingston, Izabal, Guatemala. Camera: Canon EOS-1D X Mark II. Lens: Canon EF 100MM Macro USM. Settings: 1/150 sec; f/7; ISO 200.

FULL BOTANICAL **NAME**

Plant family name is Bignoniacea.
Amphitecna latifolia (Mill.) A.H.Gentry is the accepted name.

HERE ARE SYNONYMS FOR ***AMPHITECNA LATIFOLIA***

- *Amphitecna obovata* (Benth.) L.O.Williams
- *Crescentia coriacea* Miers
- *Crescentia cucurbitifera* Houtt.
- *Crescentia cucurbitina* L. [Illegitimate]
- *Crescentia cucurbitina* var. *heterophylla* Kuntze
- *Crescentia cuspidata* Miers
- *Crescentia elongata* Miers
- *Crescentia latifolia* Mill.
- *Crescentia lethifera* Tussac
- *Crescentia obovata* Benth.
- *Crescentia ovata* Burm.f. [Invalid]
- *Crescentia palustris* Forsyth ex Seem. [Invalid]
- *Crescentia toxicaria* Tussac [Illegitimate]
- *Dendrosicus latifolius* (Mill.) A.H.Gentry
- *Dendrosicus saxatilis* Raf.
- *Enallagma cucurbitina* (L.) Baill. ex K.Schum.
- *Enallagma latifolia* (Mill.) Small
- *Enallagma obovata* (Benth.) Baill. ex

www.theplantlist.org/tpl1.1/record/kew-319480

Amphitecna latifolia.

Photo by: David Arrivillaga, FLAAR Mesoamerica, Dec. 20, 2020, 4:07 p.m. Lagunita Creek reserve, Municipio de Livingston, Izabal, Guatemala. Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/250 sec; f/10; ISO 1,600..

HOW MANY OTHER PLANTS OFGUATEMALA **HAVE THE SAME SPANISH NAME?**

The word and concept calabash and tree calabash is used for many fruits (seed pods) such as actual gourds but especially for *Crescentia cujete*. In a future edition we will consider presenting a tabulation of everything in the Mayan areas named calabash, tree calabash, morro or jicaro. But the goal of this first edition is to show the tree, the flowers and the fruits; to mention the related species, and to open the door so that botanists, ethnobotanists, and Mayanists can have all our unexpected findings available for their own use.

LOCAL NAMES FOR ***AMPHITECNA LATIFOLIA***

Known in British Honduras as "calabash," "morrito del rio," "river calabash," or "wild calabash";"huiro de montana" (Tabasco);"jicarillo" (Veracruz).

(Standley and Williams 1974: 169)

MAYAN NAMES FOR ***AMPHITECNA LATIFOLIA***

Not found, güiro is a name of Taino origin.

Cabeza de güiro, Cuchara, Guiro de los petenes, Jicarilla, Jicarillo, Totumuelo

www.theplantlist.org/tpl1.1/record/kew-319480

HABIT FOR ***AMPHITECNA LATIFOLIA***

Shrub or tree (Balick, Nee and Atha 2000). Size would depend on soil or sand and amount of nearby water. I estimate at least 90% of the *Amphitecna latifolia* were trees, with limbs and branchs spreading widely out from the trunk. One, growing on above the beach (so not on beach sand), was potentially a (rather woody) shrub.

Amphitecna latifolia.

Photo by: Roxana Leal, FLAAR Mesoamerica, Dec. 17, 2020, 10:37 p.m. Lagunita Creek reserve, Municipio de Livingston, Izabal, Guatemala. Camera: Google Pixel 4a

HABITAT FOR ***AMPHITECNA LATIFOLIA***

66% of the local names for this plant in Belize use the word river and not the word beach or ocean or bay or inlet (Balick, Nee and Atha 2000):

- Morito de rio.
- River calabash.

In the Palenque park area of Chiapas, *Amphitecna apiculate* and *Amphitecna latifolia* are both listed (Gomez et al. 2015: 567, Apendice 1). If the ID for *Amphitecna latifolia* is correct, this means it does not need salt water on a beach or even brackish water.

Amphitecna cf. *latifolia*, close to accepted name *Amphitecna latifolia* is listed for Rio Bravo Conservation and Management Area, Belize (Brokaw, Schulze, Mallory, Taylor and Alcorn 1998). This protected conservation area is far inland: not even brackish water here. So if the real true *Amphitecna latifolia* trees are here, this is proof they can be a "river calabash" and not just a beach calabash. But so far 90% of the *Amphitecna latifolia* that we have found in the Municipio de Livingston are facing Amatique Bay; but the team found *Amphitecna latifolia* growing alongside a river a bit inland this week (February 2021).

> The jícaro de playa is a native tree from Mexico to South America It grows near mangroves and in humid forests that border the beaches…In Costa Rica…under 20 m. altitude. It likes to grow under the sun, although it tolerates shade well, as well as in any type of soil.
>
> *[original text in spanish].*

www.elmundoforestal.com/portfolio/jicaro-de-playa/

> A common tree of seashores, mangrove fringes, and brackish water swamps along both coasts.
>
> (Gentry 1973b: 847).

HOW DO THE SEEDS **GET DISPERSED?**

The fruit can float so the seeds get dispersed via water (Flores 2016: 8). No wonder it is called tree of the beach and tree of rivers.

D. latifolius is a synonym of *Amphitecna latifolia*:

> Fruits of *D. latifolius* are commonly found washed up on beaches with still fertile seeds which germinate only when the fruit is broken open. Evidently seed dispersal is a combination of water-dispersed fruit with mammal-dispersed seeds, either vector being sufficient to disseminate the species.
>
> (Gentry 1973b: 847).

> Comparable statement by Garguillo et al. "dispersed by mammals and water".
>
> (2008: 164).

Amphitecna latifolia.

Photo by: Victor Mendoza, FLAAR Mesoamerica, Dec. 17, 2020, 10:41 a.m. Lagunita Creek reserve, Municipio de Livingston. Camera: NIKON D810, Lens: 200.0 mm, Speed 1/80; opening f 10; ISO 1,600.

Amphitecna latifolia.

Photo by: David Arrivillaga, FLAAR Mesoamerica, Dec. 17, 2020, 10:55 a.m. Río Quehueche, Izabal.
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/125 sec; f/10; ISO 1,600.

Amphitecna latifolia.

Photo by: Alejandra Gutiérrez, FLAAR Mesoamerica, Dec. 17, 2020, 10:56 a.m. Río Quehueche, Izabal.
Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/125 sec; f/10; ISO 1,600.

BOTANICAL DESCRIPTION OF *AMPHITECNA LATIFOLIA* IN STANDLEY **AND CO-AUTHORS CHICAGO BOTANICAL MONOGRAPHS**

Amphitecna obovata is the name used half a century ago; *Amphitecna latifolia* is the accepted name today.

> **Amphitecna obovata**
>
> (Benth.) L. Wms. Fieldiana, Bot. 36: 25. 1973. *Crescentia obovata* Benth. Bot. Voy. Sulph. 130. t. 46. 1845. *Enallagma obovata* Schumann in Engler & Prantl, Pflanzenf. IV. 3b: 247. 1895. Morrito del rio; wild calabash. Usually in forests along rivers or in mangrove swamps near sea level or but little above. Southern Mexico; British Honduras to Panama and the West Indies to northern South America; southern Florida. Large shrubs or trees, sometimes 15 m. high but usually lower, the Trunk often crooked, the crown widely spreading, the bark thin; branchlets angulate, becoming subterete and shallowly fissured, the nodes enlarged; leaves sessile or nearly so, coriaceous, oblong-elliptic to obovate or oblan-ceolate, 7-25 cm. long, 2-9 cm. broad, abruptly acute, cuneate to rounded at the base; flowers long-pedunculate, the calyx 2-4 cm. long, bilabiate, cleft almost to the base, with a few scattered impressed plate-shaped glands on the upper half; corolla green or tinged with purple, 4-6 cm. long, glandular-lepidote; ovary glandular-lepidote; fruit subglobose, 6-8 cm. in diameter. Known in British Honduras as "calabash," "morrito del rio," "river calabash," or "wild calabash"; "huiro de montana" (Tabasco); "jicarillo" (Veracruz). This plant has gone under the name of *Enallagma latifolia* (Miller) Small in most of the recent floras. However, Miller's description of *Crescentia latifolia* does not fit the plant to which the name commonly has been applied. Since no authentic material exists, the name may be considered to be an ambiguous one.

(Standley and Williams 1974: 167-169)

BOTANICAL DESCRIPTION OF RELATIVES OF *AMPHITECNA LATIFOLIA*

Amphitecna donnell-smithii is accepted name; main synonym is *Amphitecna oblanceolate*. If *Amphitecna donnell-smithii* is listed for Peten and Belize, should also be in Izabal.

Amphitecna donnell-smithii

(Sprague) L. Wms. Fieldiana:Bot. 36: 22. 1973. *Crescentia donnell-smithii* Sprague, Bull. Herb.Boiss. ser. 2. 6: 376. 1906. *Enallagma donnell-smithii Standl.* Field Mus. Bot. 1224:361. 1936. Wet mixed forests, 300 m. or less; Alta Verapaz (type, Tuerckheim7P53); Peten. British Honduras. Shrubs or small trees with slender branches, the nodes not enlarged, About 9 m. tall; leaves papyraceous, oblanceolate, attenuate-acuminate, attenuate to the base, 7-16 cm. long, 1.5-4 cm. broad, sparsely glandular-lepidote; flowers solitary, usually axillary; calyx cleft almost to the base, narrow, bilabiate, one lobe minutely tridentate, the other bidentate, 12-17 mm. long, glabrous; corolla 2.5-3 cm. long, the tube very narrow, the limb spreading, sparsely glandular-lepidote; ovary densely glandular-lepidote. The smallest-flowered of all the species of this group to be found in our area. It is uncommon and several of the specimens seen and presumed to belong here are sterile.

(Standley and Williams 1974: 164)

Amphitecna macrophylla is an accepted name. This we would not expect in the Lowlands of Izabal because *Amphitecna macrophylla* grows in the Highlands. There are also hills (Cerro San Gil) and mountains (Sierra Santa Cruz) in Izabal. We have not yet ourselves located this plant because in Municipio de Livingston our first five months of field trips have been focused on wetlands and riverine areas.

Amphitecna macrophylla

(Seem.) Miers ex Baill. Rev. Hort.465. 1882. *Crescentia macrophylla* Seem, in Hook. Journ. Bot. Kew Misc. 6: 274. 1854. *Neotuerckheimia megalophylla* Donn.-Sm. Bot. Gaz. 47: 258, /. 1. 1909 (type from Coban, Alta Verapaz, Tuerckheim II 2278. *Enallagma macrophylla* Lundell, Wrightia 4: 170. 1971.Moist or wet forest, usually growing on limestone at the edges of streams, 1,300 meters or less; Alta Verapaz; Izabal. Mexico (Veracruz and Tabasco; type from Teapa, Tabasco). Shrubs or trees 4.5-12 m. high, simple or with few branches; leaves very large, clustered near the top of the trunk, almost sessile, oblanceolate or oblong-oblanceolate, 40-80 cm. long and 6-16 cm. broad or probably even larger, obtuse to acuminate, long-attenuate to the base, papyraceous, blackening when dried, glabrous; flowers borne on the thick trunk usually near its base; calyx 1.5-2.5 cm. long, pale green, splitting bilabiately half-way to the base, somewhat glandular-lepidote; corolla 2-5 cm. long, pale green, the lobes pale lilac-pinkish, glabrous; ovary oblong, punctate-glandular; anthers dull purplish brown; fruit pendent, ellipsoid, 26 cm. long or probably even larger, short-acuminate at the apex, narrowed at the base, with 8 unevenly spaced longitudinal ridges, filled with white, spongy or finally soft pulp. Called "guiro de montafia" in Tabasco and "morro cimarron" in Oaxaca. This plant is striking in appearance. It is plentiful along the Rio Carcha between Coban and Carcha, probably the type locality of Neotuerckheimia, where it forms thick stands on the jagged limestone rocks, the trunks often leaning out across the water. Pittier compares the mature fruits to those of cacao criollo (*Theobroma cacao*), but the younger ones suggest a small wild papaya (*Carica*). When cut, they show a solid spongy white mass in which the seeds, although large, are scarcely distinguishable from the pulp. In the locality mentioned, at the end of March the trees bore young flower buds and almost ripe fruits. The huge leaves form a single cluster at the end of the trunk or its branches or are arranged in several whorls at the top of the plant

(Standley and Williams 1974: 164-166)

.

Amphitecna oblanceolata is synonym for *Amphitecna donnell-smithii*. This is found in Peten, Alta Verapaz, Izabal; and in Mexico, in Chiapas and Tabasco (Villaseñor 2016: 669)/ Chiapas and Tabasco, Mexico, are the left and northwest edge of Peten, Guatemala.

> **Amphitecna oblanceolata**
>
> L. Wms. Fieldiana, Bot. 36: 23. 1973. Wet lowland forests of the Atlantic coastal plain; Peten (type, Tun 14.59); Alta Verapaz; Izabal. Endemic. Shrubs or small trees to 10 m. tall; branches slender, terete or angulate, whitish, glabrous; leaves oblanceolate or elliptic-oblanceolate, acuminate, cuneate to the base, glabrous, secondary nerves 10-15 pairs at nearly a right angle to mid-nerves, the tips anastomosing, the blades often with small plate-shaped glands, 9-25 cm. long and 2-7 cm. broad, petiole very short, 2-8 mm. long; inflorescence terminal on young branches, mostly a single pedicellate flower, the pedicel 2-3 cm. long; calyx bilabiate at anthesis, 1.5-2 cm. long and 0.5-0.8 cm. broad at the base, the lobes broadly oblong-ovate to narrowly obovate, obtuse; corolla campanulate-funnelform, zygomorphic, 5-lobate, 2.5-4.5 cm. long; fruit narrowly ovate-cylindric, probably more than 15 cm. long and about 3.5-5 cm. in diameter; seeds (nearly mature) immersed in the whitish pulp, subreniform in outline with the embryo at the center and with lateral wings thin and obtuse.The long narrowly ovate-cylindric fruit is distinctive.
>
> (Standley and Williams 1974: 167)

Amphitecna latifolia.

Photo by: David Arrivillaga, FLAAR Mesoamerica, Dec. 17, 2020, 11:20 a.m. Reserva Natural Tapón Creek, Livingston.
Camera: iPhone 11 Pro Max

TIKAL	YAXHA	ALTA VERAPAZ	IZABAL
Amphitecna Apiculata	Additional field work is needed to find which species of are native to Parque Nacional Yaxha, Nakum, and Naranjo.	*Amphitecna obovate*, Onoch, synonym for *Amphitecna latifolia* **(Coy 2008: 97, Cuardo 39A)**	*Amphitecna latifolia*
Amphitecna donnell-smithii		*Amphitecna oblanceolata* is synonym for *Amphitecna donnell-smithi* **(Standley and Williams 1974: 167)**	*Amphitecna oblanceolata* is synonym for *Amphitecna donnell-smithii*
			Amphitecna macrophylla
CALAKMUL	**TABASCO**	**PALENQUE CHIAPAS**	**YAXCHILAN,CHIAPAS LACALDON AREA, CHIAPAS**
Amphitecna apiculate Programa de Manejo de la Reserva de la Biosfera Calakmul (INE 1999)	*Amphitecna apiculate*	*Amphitecna apiculate*	*Amphitecna apiculata* **(Meave et al. 2008: 60)** *Amphitecna apiculate* **(Levy et al: 2006: 83)**
Amphitecna latifolia **(Villabobos and Vega 2010: 211)**	*Amphitecna* aff. *latifolia* definitely sounds close to *Amphitecna latifolia*	*Amphitecna latifolia*	
	Amphitecna macrophylla		
	Amphitecna obovata is synonym of *Amphitecna latifolia*		*Amphitecna donnell-smithii* **(S.A.S. et al. 2016: 253)**
	(Bueno et al. 2005: 86)	**(Gomez et al.: 2015: 567)**	

Amphitecna latifolia.

Photo by: Alejandra Gutiérrez, FLAAR Mesoamerica, Dec. 17, 2020, 10:56 a.m. Río Quehueche, Izabal. Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/125 sec; f/10; ISO 1,600.

AMPHITECNA LATIFOLIA TREES IN BELIZE: **STANDLEY AND RECORD**

Not one single solitary *Amphitecna* species is listed by Standley and Record (in part because Record was focused on lumber trees that could be commercialized).

> **Amphitecna latifolia**
> (Mill.) A.H. Gentry — **Syn:** *Amphitecna obovata* (Benth.) L.O. Williams. — **Reg Use:** CNST, MED, FORG. — **Nv:** morito de río, river calabash, wild calabash. — Habit: Shrub or tree.
>
> (Balick, Nee and Atha 2000: 138)

> **Amphitecna breedlovei**
> A.H. Gentry — **Ref:** FG 10: 164. 1974. Gentry, 1980: 57, fig. 7C-D. — **Nv:** calabash, wild calabash. — **Habit:** Shrub or tree. — **Note:** *Amphitecna donnell-smithii* (Sprague) L.O. Williams, misapplied.
>
> (Balick, Nee and Atha 2000: 138)

Amphitecna breedlovei is the species that is potentially most commonly listed for Belize.

> **Amphitecna breedlovei**
> A.H. Gentry **Ref:** Standley et al. (1974: 164). **Note:** Balick et al. (2000: 138) suggest that the name *Amphitecna donnell-smithii* (Sprague) L.O. Williams has been misapplied to this species in Belize. Local Name: Calabash, Wild Calabash. **Habit:** Tree. **Vegetation Type:** Savanna/Forest. **Vouchers:** STANN CREEK: All Pines Schipp, W.A. 734 (BRH, MO); Melinda Pine Ridge *Gentle, P.H. 1864* (MO); Silk Grass Reserve *Gentle, P.H. 3093*(MO).
>
> (Goodwin et al. 2013: 31)

WHERE IN MEXICO CAN *AMPHITECNA LATIFOLIA* **BE FOUND (VILLASEÑOR 2016)**

Amphitecna latifolia (Mill.) A.H. Gentry CAM, CHIS, OAX, TAB, VER, YUC Villaseñor 2016

Note: surprisingly not listed for Quintana Roo, the Caribbean coastal area of Mexico, above Belize (where *Amphitecna latifolia* has been found) and above Izabal (where we have found lots of *Amphitecna latifolia*).

Four species of *Amphitecna* are in Tabasco (Bueno et al. 2005: 86):

- *Amphitecna apiculata.*
- *Amphitecna* aff. *latifolia* definitely sounds close to *Amphitecna latifolia*.
- *Amphitecna macrophylla.*
- *Amphitecna obovata* is synonym of *Amphitecna latifolia*.

Unfortunately no information plant-by-plant as to in what habitat they were found, so we do not know for Tabasco where *Amphitecna latifolia* is able to grow away from sandy beach areas. *Amphitecna donnell-smithii* (Sprague) L., morro, is in the Parque Nacional Sierra Lacandon (CONAP: 134, 8.6 ANEXO 6. Listado de Vegetación del Parque Nacional Sierra Del Lacandón).

Amphitecna latifolia.

Photo by: David Arrivillaga, FLAAR Mesoamerica, Dec. 20, 2020, 4:10 p.m. Lagunita Creek reserve, Municipio de Livingston. Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/250 sec; f/7.1; ISO 2,000..

CLOSE RELATIVE(S) OF ***AMPHITECNA LATIFOLIA***

In the Calakmul biosfera, *Amphitecna apiculata* A. Gentry is listed (INE 1999: 134).

In the Yaxchilan park area of the Rio Usumacinta, Chiapas, *Amphitecna apiculate* is listed (Meave et al. 2008: 60). Plus *Amphitecna steyermarkii* (page 69). We have shown these previously in a tabulation.

In the Palenque park area of Chiapas, *Amphitecna apiculate* and *Amphitecna latifolia* are both listed. If the ID for *Amphitecna latifolia* is correct, this means it does not need salt water on a beach or even brackish water.

Amphitecna macrophylla

(Seem.) Miers ex Baill. Rev. Hort. 465. 1882. *Crescentia macrophylla* Seem, in Hook. Journ. Bot. Kew Misc. 6: 274. 1854. *Neotuerckheimia megalophylla* Donn.-Sm. Bot. Gaz. 47: 258, /. 1. 1909 (type from Coban, Alta Verapaz, Tuerckheim II 2278. *Enallagma macrophylla* Lundell, Wrightia 4: 170. 1971. Moist or wet forest, usually growing on limestone at the edges of streams, 1,300 meters or less; Alta Verapaz; Izabal. Mexico (Veracruz and Tabaco; type from Teapa, Tabasco). Shrubs or trees 4.5-12 m. high, simple or with few branches; leaves very large, clustered near the top of the trunk, almost sessile,oblanceolate or oblong-oblanceolate, 40-80 cm. long and 6-16 cm. broad or probably even larger, obtuse to acuminate, long-attenuate to the base, papyraceous, blackening when dried, glabrous; flowers borne on the thick trunk usually near its base; calyx 1.5-2.5 cm. long, pale green, splitting bilabiately half-way to the base, somewhat glandularlepidote; corolla 2-5 cm. long, pale green, the lobes pale lilac-pinkish, glabrous; ovary oblong, punctate-glandular; anthers dull purplish brown; fruit pendent, ellipsoid, 26 cm. long or probably even larger, short-acuminate at the apex, narrowed at the base, with 8 unevenly spaced longitudinal ridges, filled with white, spongy or finally soft pulp. Called "guiro de montafia" in Tabasco and "morro cimarron" in Oaxaca. Pittier compares the mature fruits to those of cacao criollo (*Theobroma cacao*), but the younger ones suggest a small wild papaya (*Carica*). When cut, they show a solid spongy white mass in which the seeds, although large, are scarcely distinguishable from the pulp. In the locality mentioned, at the end of March the trees bore young flower buds and almost ripe fruits. The huge leaves form a single cluster at the end of the trunk or its branches or are arranged in several whorls at the top of the plant.

(Standley and Williams 1974: 164-166)

Amphitecna oblanceolata L.O.Williams is a synonym of *Amphitecna donnell-smithii* (Sprague) L.O.Williams

Amphitecna oblanceolata

L. Wms. Fieldiana, Bot. 36: 23. 1973. Wet lowland forests of the Atlantic coastal plain; Peten (type, Tun 14.59); Alta Verapaz; Izabal. Endemic. Shrubs or small trees to 10 m. tall; branches slender, terete or angulate, whitish, glabrous; leaves oblanceolate or elliptic-oblanceolate, acuminate, cuneate to the base, glabrous, secondary nerves 10-15 pairs at nearly a right angle to mid-nerves, the tips anastomosing, the blades often with small plate-shaped glands, 9-25 cm. long and 2-7 cm. broad, petiole very short, 2-8 mm.long; inflorescence terminal on young branches, mostly a single pedicellate flower, the pedicel 2-3 cm. long; calyx bilabiate at anthesis, 1.5-2 cm. long and 0.5-0.8 cm. broad at the base, the lobes broadly oblong-ovate to narrowly obovate, obtuse; corolla campanulate-funnelform, zygomorphic, 5-lobate, 2.5-4.5 cm. long; fruit narrowly ovate-cylindric, probably more than 15 cm. long and about 3.5-5 cm. in diameter; seeds (nearly mature) immersed in the whitish pulp, subreniform in outline with the embryo at the center and with lateral wings thin and obtuse. The long narrowly ovate-cylindric fruit is distinctive.

(Standley and Williams 1974: 167)

Amphitecna latifolia.

Photo by: Roxana Leal, FLAAR Mesoamerica, Dec. 17, 2020, 10:37 p.m. Lagunita Creek reserve, Municipio de Livingston. Camera: Google Pixel 4a

WHERE HAS *AMPHITECNA LATIFOLIA* BEEN **FOUND IN THE MUNICIPIO OF LIVINGSTON?**

> Is *Amphitecna latifolia* listed for Biotopo Protegido Chocón Machacas, CECON/USAC?
Not mentioned

> Is *Amphitecna latifolia* listed for Tapon Creek Nature Reserve (including Taponcito Creek), FUNDAECO?
Not mentioned

> Is *Amphitecna latifolia* listed for Buena Vista Tapon Creek Nature Reserve?
Not mentioned

> Is *Amphitecna latifolia* listed for Cerro San Gil (south side of Rio Dulce)?

94. *Amphitecna macrophyla* hüiro de motaña, morro cimarrón
95. *Amphitecna oblanceolata*, is a synonym of *Amphitecna donnell-smithii*

> Is *Amphitecna latifolia* listed for Ecoalbergue Lagunita Creek (Área de Usos Múltiples Río Sarstún)?
Not mentioned

> Is *Amphitecna latifolia* listed for Sarstoon-Temash National Park (northern side of Río Sarstún)?
Yes (Meerman, Herrera and Howe 2003).

> Is *Amphitecna latifolia* listed for El Refugio de Vida Silvestre Punta de Manabique?
Amphitecna macrophyla is on the list of Vegetation found in the Izabal area in the Cerro San Gil and Punta de Manabique sector (AMBIENS S.A 2013)

> Is *Amphitecna latifolia* listed for Bocas de Polochic?
Not mentioned

> Is *Amphitecna latifolia* from the Highlands or from the Lowlands (or both)?
Lowlands, close to sea level (GENTRY 1980).

WORLD RANGE FOR ***AMPHITECNA LATIFOLIA***

The West Indies (Lesser Antilles, Greater Antilles), South Florida, southern Mexico, Central America and northern South America. According to the Institute for Regional Conservation.

www.regionalconservation.org/ircs/database/plants/PlantPagePR.asp?TXCODE=Amphlati

USES OF ***AMPHITECNA LATIFOLIA***

In Panama: "El fruto se emplea para fabricar instrumentos musicales como las guiras o famosas churucas"

https://stricollections.org/portal/taxa/index.php?taxon=61646&clid=59

> *Amphitecna apiculate*. Utensilios domésticos.
>
> (Levy et al. 2006: 80)
>
> Usos tradicionales de la especie: Como árboles aislados en potreros, cercas vivas, delimitación de linderos y huertos caseros, estabilización de dunas, protección de ecosistemas estuarinos y recuperación de yermos costeros. Se cree que su madera es dura y resistente a la pudrición.
>
> (Garcia n.d.: 48).
>
> So as a living fence (so you don't have to chop down other tree species to make fence posts). And super-helpful, to avoid erosion of shore areas.
>
> Listed as edible in lower Central America; here is a documentation for Costa Rica
>
> (Garguillo et al. 2008: 164).

DOES *AMPHITECNA LATIFOLIA* ALSO **GROW IN HOME GARDENS?**

If you have a house facing the beach of Amatique Bay, Municipio de Livingston, you may have *Amphitecna latifolia* in back of your house (about a meter above low water level at low-tide).

IS THERE POTENTIAL MEDICINAL USAGE OF ***AMPHITECNA LATIFOLIA*** **BY LOCAL PEOPLE?**

If you Google. *Amphitecna latifolia*, medicinal you will get enough to keep you busy on the medicinal uses of this plant.

ARE ANY PARTS OF *AMPHITECNA LATIFOLIA* **EATEN BY ANIMALS?**

Yes, "…also eaten by Agoutis…" (Garguillo et al. 2008: 164).

Amphitecna latifolia.

Photo by: David Arrivillaga, FLAAR Mesoamerica, Dec. 20, 2020, 4:12 p.m. Lagunita Creek reserve, Municipio de Livingston. Camera: Sony A7R (ILCE-7RM4). Lens: Sony FE 90mm Macro G OSS. Settings: 1/4,000 sec; f/10; ISO 1,600.

CONCLUDING DISCUSSION AND SUMMARY ON ***AMPHITECNA LATIFOLIA TREES***

https://enciclovida.mx/especies/163222-amphitecna-latifolia Yet on the other side of the border not one single solitary specimen is shown for Izabal, in an area where we have found (I estimate) almost 10 of these trees: 9 along the coast and 1 inland a few kilometers away from the Amatique Bay). Yet another herbaria data base shows only 1 for Belize and 0 for Guatemala (and 0 for Campeche or Quintana Roo).
https://herbanwmex.net/portal/taxa/index.php?tid=71902&taxauthid=1&clid=5169

It would be helpful if one single database should show 100% of specimens; but this is so far no viable; you have to jump from database to database. In the meantime, our photographs can document the presence of this tree up and down the sandy coast of Amatique Bay. Our goal is to assist botanists with a photographic resource to suggest that high-resolution photographs, together with traditional herbaria specimens, can be "the new way" to document plants.

CONCLUDING DISCUSSION AND SUMMARY ON ***AMPHITECNA LATIFOLIA* TREES**

Amphitecna apiculata is the only species listed for Calakmul, Campeche (INE 1999). This is an accepted name; not a synonym. *Amphitecna apiculate* is also found in Chiapas, Tabasco, Yucatan, and Quintana Roo (Villaseñor 2016: 669).

Amphitecna breedlovei is the species that is potentially most commonly listed for ecosystem reports on Belize. Balick, Nee and Atha 2000 list also *Amphitecna latifolia* for Belize. Considering that *Amphitecna latifolia* trees are "all up and down the Caribbean coast of Amatique Bay" and considering that our FLAAR Mesoamerica team found *Amphitena latifolia* this week (last week of February 2021) in the Rio Sarstun area of Izabal (a few kilometers south of the border of Belize), surely there should be even more A*mphitecna latifolia* on the northern coast. *Amphitecna breedlovei* is an accepted name; not a synonym. In Mexico is listed only for Chiapas (Villaseñor 2016: 669).; rather unlikely that it would not be in Quintana Roo if it is all over Belize? In Guatemala has been found "near base of Cerro San Gil….Rio Frio.." However "most collections are from pine or pine/oak forest" (Gentry 1980: 58)

CONCLUDING DISCUSSION AND SUMMARY ON ***AMPHITECNA LATIFOLIA* TREES**

This is one of the most forgotten, ignored, yet edible, medicinal, and useful plants in Guatemala, probably because it grows pretty much primarily along the sandy salty beach facing Amatique Bay (Caribbean area, Izabal, Guatemala). So unless you are doing botanical and ethnobotanical field work in the Municipio de Livingston you will not see, notice, or be aware of this plant.

This plant has edible, medicinal, and utilitarian uses but was missing from my 14 editions of library and fieldtrip research on edible, medicinal, and utilitarian plants, since I focus on Peten and Alta Verapaz. This low shrubby tree is very frequent about 3 to 15 meters from the edge of Amatique Bay (Caribbean inlet). Yet the specimen database for MOBOT shows only two specimens for *Amphitecna latifolia* (https://serv.biokic.asu.edu/neotrop/plantae/collections/list.php). We have seen about 10 of these trees from the town of Livingston up the beach as far as you can hike and then when the beach is walkable again up to Aldea Buena Vista Tapon Creek. *Amphitecna latifolia* is also documented for Chiapas, Tabasco, Campeche, and Yucatan.

> As I predicted despite being absent in several books on Belize ecosystems, *Amphitecna latifolia* does occur in Belize (because it occurs everywhere on the coast of Izabal immediately south of Belize):

Belize, Toledo District, Temash River, ca 11 km W of Caribbean Sea and ca 3.5 km N of Belize/Guatemala border, 15.9495361 -89.0334081, 1 - 1m NYBG

https://serv.biokic.asu.edu/neotrop/plantae/collections/list.php

Monkey River, Belize also lists *Amphitecna latifolia*, low swamp and also littoral forest (Belize 1995: Vegetation Sheet 2, Monkey River SDA).

And, literally the last website I looked at named this tree what I want to focus on: its presence on beaches: Jícaro de playa.

www.riomoros.com/2005/01/amphitecna-latifolia-jicaro-de-playa.html

TOTAL CACAO, COCOA SURPRISE FOR **CONCLUSIONS ON *AMPHITECNA LATIFOLIA***

> The green fruits, about 10 cm long, are characterized by their globose shape, for its hard and smooth shell, that reminds of jícaros or guacals (*Crescentia*), which inside have an edible whitish pulp although apparently its taste is a bit bland. For growing near the sea, due to their shape and the characteristics of their shell, these fruits are easily carried by the tides, which has allowed the species to settle in many coastal sites. The seeds can be roasted and ground to make a chocolate-like drink.
>
> *[Original text in sapnish]*

In Costa Rica the fruit of *Amphitecna latifolia* is also called cocoa (Cocoa, Higüerillo, Higüerita / Black calabash)

www.regionalconservation.org/ircs/database/plants/PlantPagePR.asp?TXCODE=Amphlati

In Costa Rica it is even called cacao silvestre (Grandtner 2005: 53 and Garguillo et al. 2008). Indeed they even give the recipe: "Las semillas son gruesas, Negras y corchosas de 1,5 cm de largo las cuales se pueden tostar y moler para hacer una bebida similar al chocolate."

(www.elmundoforestal.com/portfolio/jicaro-de-playa/).

Palo de Cocoa, for Nicaragua (http://papo-vives.blogspot.com/2012/02/).

I found these mentions of *Amphitecna latifolia* as cacao, cocoa substitute about 9:42 pm, on the last night of research assigned to this plant (since we have dozens of trees and scores of plants of the Municipio de Livingston to research and write reports about I have to finish each plant so I can move to write about other plants). So the night that I learned about cacao, cocoa substitute I had a happy night's sleep cogitating that probably none of us Mayanists knew about the potential of this Caribbean shore and river bank tree whatsoever.

Amphitecna latifolia.

Photography by: Victor Mendoza, FLAAR Mesoamerica, Dec. 17, 2020, 10:41 a.m. Lagunita Creek reserve, Municipio de Livingston. Camera: NIKON D810, Lens: 200.0 mm, Speed 1/80; opening f 10; ISO 1,600.

Appendix A

Occurrence Records for *Amphitecna donnell-smithii* in Neotropical Plant Portal

Keep in mind: this is only one database; there are many other databases that have other locations.

MO:Tropicos
Amphitecna donnell-smithii
(Sprague) L.O. Williams
1284222H. von Türckheim 7953
Guatemala, Alta Verapaz,
Cubilgüitz, 15.68 -90.42, 350m

MO:Tropicos
Amphitecna donnell-smithii
(Sprague) L.O. Williams
1284643C.L. Lundell & Elias
Contreras 190151975-02-20
Guatemala, Izabal, Cadenas, on
old brecha to Río Chocón Arriba,
in high forest, about 6 km S of the
village, in zapotal, 15.85 -89.21

MO:Tropicos
Amphitecna donnell-smithii
(Sprague) L.O. Williams
1284653 Elias Contreras
69721967-05-14
Guatemala, Petén, La Cumbre,
[west of] Km 146 on Cadenas
Road. In high forest, 16.08 -89.35

MO:Tropicos
Amphitecna donnell-smithii
(Sprague) L.O. Williams
1488353 H. von Türckheim
II 221Guatemala

MO:Tropicos
Amphitecna donnell-smithii
(Sprague) L.O. Williams
1488362 Rolando Tún Ortíz
14591970-12-03
Guatemala, Petén, San Luis, en
orillando el camino para en el
camino para Poctún, a km 118,
aprox. 20 m del camino, lado
saliente. En foresta alta, 16.2
-89.44, 20 - 300m

MO:Tropicos
Amphitecna donnell-smithii
(Sprague) L.O. Williams
2598901 H. von Türckheim 221
Guatemala, Alta Verapaz,
Cubilgüitz, 15.68 -90.42, 350m

Amphitecna latifolia.

Photo by: David Arrivillaga, FLAAR Mesoamerica, Dec. 20, 2020, 4:10 p.m. Playa Quehueche, Livingston, Camera: Google Pixel 4a

Amphitecna latifolia.

Photography by: Victor Mendoza, FLAAR Mesoamerica, Dec. 17, 2020, 10:41 a.m. Lagunita Creek reserve, Municipio de Livingston. Camera: NIKON D810, Lens: 200.0 mm, Speed 1/80; opening f 10; ISO 1,600.

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2006 *Amphitecna latifolia*: Black Calabash. IFAS Extension, University of Florida. 2 pages.

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

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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.

Available as a download.

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

Available as a download.

INE (Instituto Nacional de Ecología)
1999 Programa de Manejo Reserva de la Biosfera Calakmul, México. Instituto Nacional de Ecología. Mexico. 273 pages.

Available as a download.

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.

Available as a download.

LUNDELL, Cyrus L.
1937 The Vegetation of Peten. Carnegie Institution of Washington, Publ. 478. Washington. 244 pages.

We have scanned and turned the entire monograph into a searchable PDF. We are hoping to have time in the future to release this to colleagues and students.

LUNDELL, Cyrus L.
1938 Plants Probably Utilized by the Old Empire Maya of Peten 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/

MAE, FAO and IT
2014 Árboles y Arbustos de los Manglares del Ecuador. MAE (Ministerio del Ambiente del Ecuador); FAO (Organización de las Naciones Unidas para la Alimentación y la Agricultura, IT). Quito. 48 pages.

Available as a download:
https://biblio.flacsoandes.edu.ec/catalog/resGet.php?resId=55818

MEAVE, Jorge A., ROMERO-Romero, Marco A.; VALLE-Doménech, Andrés; RINCÓN Gutiérrez, Armando; MARTÍNEZ, Esteban and **Clara H. RAMOS**
2008 Plant diversity assessment in the Yaxchilán Natural Monument, Chiapas, México Boletín de la Sociedad Botánica de México, núm. 83, 2008, pp. 53-76. Sociedad Botánica de México, Distrito Federal, México.

Available as a download.

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.

Available as a download.

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 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. Also would help to have more than one page per photo. Louteridium is too often considered a shrub, so would not be expected in monographs on "TREES."

http://aleph.ecosur.mx:8991/exlibris/aleph/a22_1apachemedia/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 the Parker book is year 2008, it has additional information for some trees, but not

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." 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, would help if there were more photos, larger photos, and not so much blank space at the bottom of each page. Plus 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 principals especies. 3rd edition. UNAM, Fondo de Cultura Economica. 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 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. And, 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), Fundacion Para el Ecodesarrollo y la Conservacion (FUNDAECO), The Nature Conservancy (TNC).

Available as a download.

S.A.S. et al.
2016 Lacandón – Forest for Life, REDD+ Project. South Pole Carbon S.A.S., Fundación Defensores de la Naturaleza, OroVerde - Die Tropenwaldstiftung, Tropical Forest Foundation.

Available as a download.

SCHULZE, Mark D. and **David F. WHITACRE**
1999 A Classification and Ordination of the Tree Community of Tikal National Park, Peten, Guatemala. Bulletin of the Florida Museum of Natural History. Vol. 41, No. 3, pp. 169-297.

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).

No *Amphitecna* whatsoever found by Schulze and Whitacre.

Available as a download.

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.

Available as a download.

STANDLEY, Paul C.
1926 Trees and Shrubs of Mexico. Contributions from the United States National Herbarium, Volume 23, Part 5. 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 **Louis O. WILLIAMS**
1974 Flora of Guatemala. Fieldiana: Botany, Volume 24, Part X, Numbers 3 and 4, Chicago Natural History Museum.

Available as a download.

VILLALOBOS-Zapata, G. J. and **J. MENDOZA Vega (Coordinators)**
2010 La Biodiversidad en Campeche: Estudio de Estado. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO), Gobierno del Estado de Campeche, Universidad Autónoma de Campeche, El Colegio de la Frontera Sur. México. 730 pages.

Available as a download.

VILLASEÑOR, José Luis
2016 Checklist of the native vascular plants of MexicoCatálogo 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

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://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. 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.

WEB PAGES SPECIFICALLY ON ***AMPHITECNA LATIFOLIA* TREES**

www.cicy.mx/sitios/flora%20digital/ficha_virtual.php?especie=1030
Flora de la Península de Yucatán. Listed as native only for Campeche. Fruits and flowers much of the year (as we have observed each month for several months in Municipio de Livingston).

https://www.discoverlife.org/mp/20m?r=0.2&la=33&lo=-66&kind=Amphitecna+latifolia&guide=Neotropical_flora
One of the most useless and unhelpful maps that I have seen anywhere on the web.

www.elmundoforestal.com/portfolio/jicaro-de-playa/)
Documents that it prefers the coastal areas. Documents that you can make a drink similar to chocolate from the seeds.

http://plantillustrations.org/species.php?id_species=55174
Ten helpful illustrations but not all are of *Amphitecna latifolia*.

www.regionalconservation.org/ircs/database/plants/PlantPagePR.asp?TXCODE=Amphlati
Plants of Puerto Rico. Nice photo of the peeling bark of *Amphitecna latifolia*.

https://stricollections.org/portal/taxa/index.php?taxon=61646&clid=59
Only for Panama; nice photos.

www.theplantlist.org/tpl1.1/record/kew-319480
Gives the accepted name and all the synonyms.

http://tropical.theferns.info/viewtropical.php?id=Amphitecna+latifolia
Gives all uses and cites each source. Plus has a few photographs: flowers, leaves, fruits, etc.

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 he supported us with the preparation of bibliographies on different topics. From now on, he 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 She has been our photo assistant for several years. Now prepare 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 He 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

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

Izabal

1. Reserva Protectora de Manantiales Cerro San Gil
2. Biotopo Protegido Chocón Machacas
3. Área sin protección
4. Parque Nacional Río Dulce
5. Área de Usos Múltiples Río Sarstún
Acceso terrestre
Acceso de tierra

FLAAR MESOAMÉRICA

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

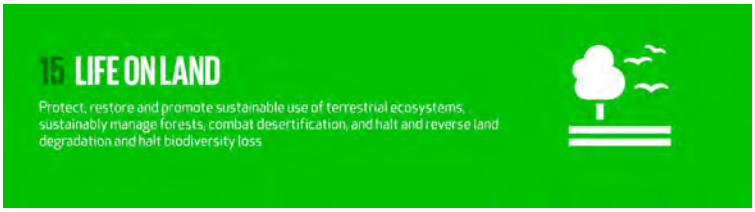
Wetland Series 2: plants that grow along the beach shore of Amatique Bay

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

Guadua longifolia Jimba 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	***Lacmellea standleyi*** Lechemiel MLW#26

FLAAR



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 associated 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

This report may be cited with this information:

HELLMUTH, Nicholas
2021 Cacao silvestre, Cocoa Substitute (Wild Calabash of Caribbean Coast) *Amphitecna latifolia*, Municipio de Livingston, Izabal, Guatemala. Wetland Series MLW2: Edible Plants of Municipio de Livingston that grow along the beach shore of Amatique Bay, Wetlands Report #9, Sub-Series Municipio de Livingston W2 Number 1.

BACK COVER PHOTO
Amphitecna latifolia.

Photo by: Nichollas Helmuth, FLAAR Mesoamerica, Dec. 17, 2020, 10:26 a.m. Reserva Natural Tapón Creek, Livingston.

Camera: NIKON D810, Lens: Sigma 50mm Dg. Settings: 1/200 sec: f/40: ISO 1,250.

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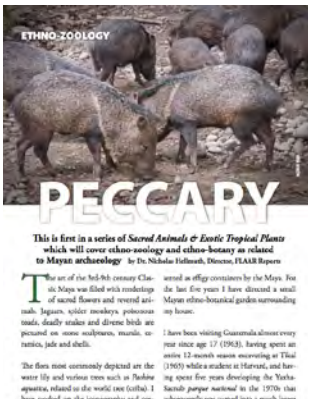

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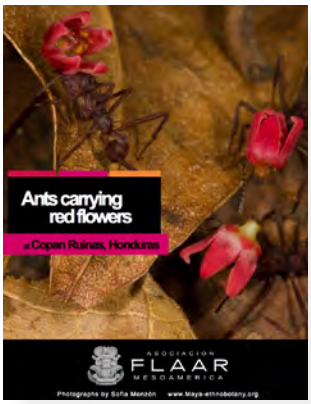

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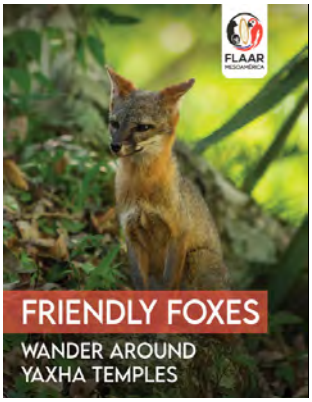

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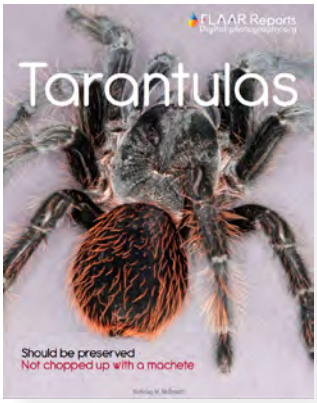

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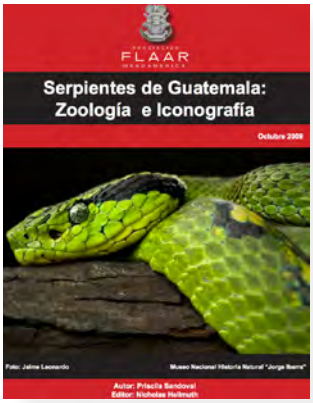

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www.maya-ethnozoology.org.

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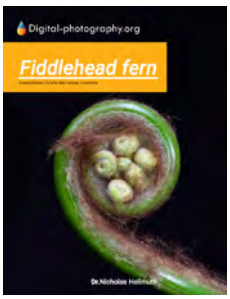

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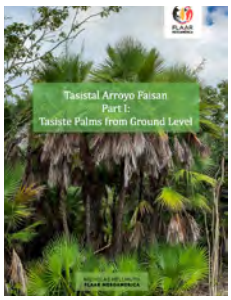

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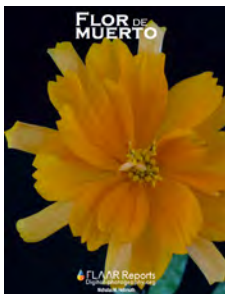

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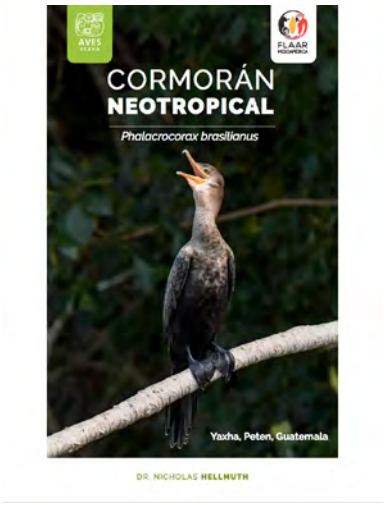

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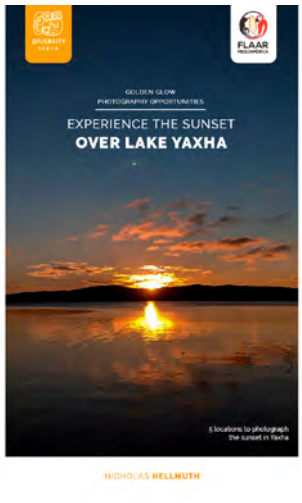

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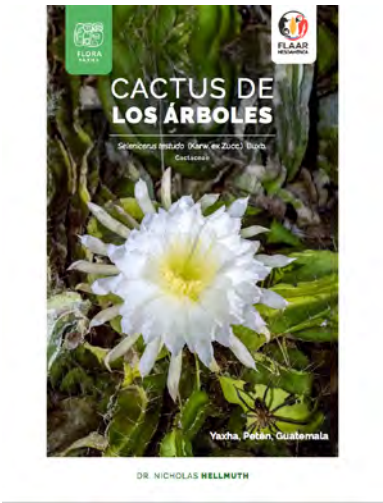

Cactus de Los Arboles
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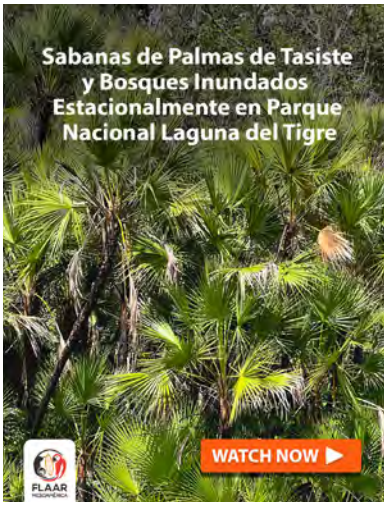

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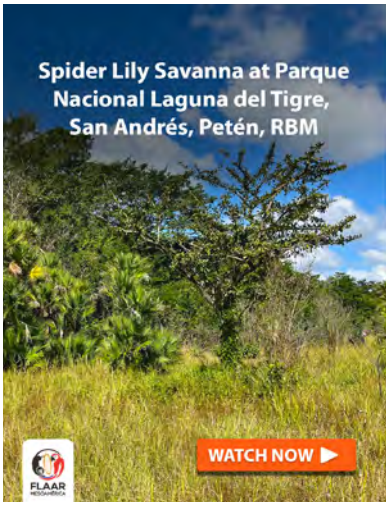

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