

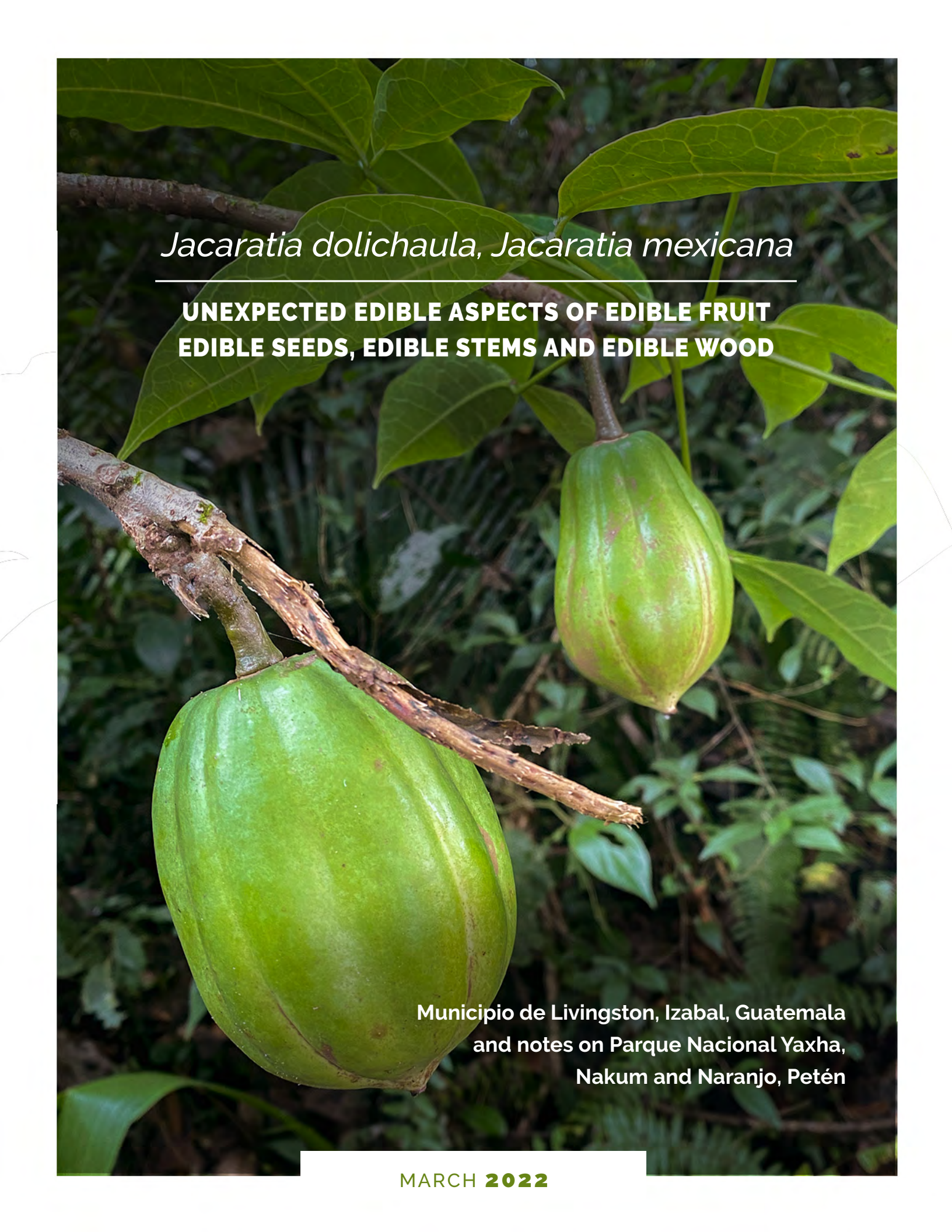


Jacaratia dolichaula, Jacaratia mexicana

**UNEXPECTED EDIBLE ASPECTS OF EDIBLE FRUIT
EDIBLE SEEDS, EDIBLE STEMS AND EDIBLE WOOD**

**Municipio de Livingston, Izabal, Guatemala
and notes on Parque Nacional Yaxha,
Nakum and Naranjo, Petén**

NICHOLAS HELLMUTH



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Municipio de Livingston, Izabal, Guatemala
and notes on Parque Nacional Yaxha,
Nakum and Naranjo, Petén

MARCH 2022



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Jacaratia dolichaula.

Photo by: David Arrivillaga, FLAAR Mesoamérica, Jun. 7, 2022, 3:11 p.m. Cueva del Tigre, Livingston, Izabal. Camera: Sony Ag (ILCE-9M2). Settings: 1/320; sec; f/6.3; ISO 2,000.

TITLE PAGE PHOTOGRAPH

Jacaratia dolichaula.

Photo by: Victor Mendoza, FLAAR Mesoamérica, Jun. 7, 2022, 3:18 p.m. Cueva del Tigre, Livingston, Izabal. Camera: iPhone 11.



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INTRODUCTION TO *JACARATIA MEXICANA* **AND *JACARATIA DOLICHAULA***

Jacaratia mexicana and *Jacaratia dolichaula* are seldom studied trees with an edible fruit and another edible part we will mention further into this present FLAAR report. These wild trees are native to several areas of Guatemala, Mexico, etc. It is known to capable botanists and ethnobotanists that *Jacaratia dolichaula* is food (Balick, Nee and Atha 2000: 74), so was available for the Mayan people past and present. But there is no attention focused on this edible fruit and it is missing from lots of discussions of edible fruits of the New World. So the research team at FLAAR (USA) and FLAAR Mesoamerica (Guatemala) is studying *Jacaratia mexicana* and *Jacaratia dolichaula*, since we are interested in finding at Parque Nacional Yaxha Nakum Naranjo any and all wild relatives of edible domesticated plants. These trees are wild relatives of domesticated papaya.



***Jacaratia dolichaula*.**

Photo by: David Arivillaga, FLAAR Mesoamérica, Jun. 7, 2022, 3:18 p.m.
Cueva del Tigre, Livingston, Izabal. Camera: iPhone 11.

“WILD PAPAYA” IS A SEPARATE SHRUB OR SHORT TREE; THIS REPORT IS ON *JACARATIA MEXICANA*

Wild papaya is a totally different tree than *Jacaratia mexicana*. We have found wild papaya near lagoons or other wet areas in several locations within the Parque Nacional Yaxha, Nakum and Naranjo. Plus, between the town of Livingston and Cueva del Tigre (especially the moist areas before and after the Q’eqchi’ community of Plan Grande Tatin). I am familiar with the golf-ball sized green fruits of this wild papaya for many decades.

The wild papaya is a totally different size and shape (like a golf ball) than the large domesticated papaya. But wild papaya does not always get a different species name whatsoever. And some authors use the word papaya “criolla” (creole) as a plant distinct from papaya “silvestre” (wild) (Carvalho and Renner).

Ethnobotanist Cesar Azurdia says there are “two species in wild status *Carica papaya* and *C. cauliflora*...” (origila text in spanish, Azurdia 2004 :72). Azurdia is an experienced and respected botanist, especially for underutilized plants of Guatemala.

We are writing separate FLAAR reports on this commonly found wild papaya. The present report is on *Jacaratia mexicana*. This species is totally different in every visible aspect. It does not flower from the trunk and the fruit is nothing similar to in any way, shape or form to “papaya silvestre” (wild papaya), which is spherical, smooth surfaced, and which indeed looks like a spherical, tiny wild relative of a modern oblong papaya.

You can find what local people call papaya silvestre in many parts of Guatemala. In July 2017 we found it flowering in Chipemech area (between Senahu and Cahabon). Senahu is high in the mountains of Alta Verapaz. Chipemech is also at high elevation. Cahabon is at a lower elevation. This entire area gets lots of rainfall plus mist in the morning. We have done dozens of field trips to all these areas between 2014 and 2018, but in 2018 the series of projects in Peten and Izabal were initiated.

Senaida Ba, of Chipemech, says that she and her Q’eqchi’ Mayan family do indeed harvest and eat wild *Carica* (but in the wild; they do not plant or raise papaya silvestre).



Jacaratia dolichaula.

Photo by: Alexander Cuz, FLAAR Mesoamérica, Jun. 7, 2022, 3:18 p.m.
Plan Grande Tatin, Livingston, Izabal. Camera: Google Pixel.



Jacaratia dolichaula.

Photo by: David Arrivillaga, FLAAR Mesoamérica, Jun. 7, 2022, 1:10 p.m. Cueva del Tigre, Livingston, Izabal.
Camera: Sony Ag (ILCE-gM2). Settings: 1/50; sec; f/4.0; ISO 800.

MY PERSONAL EXPERIENCE WITH **JACARATIA TREES AND FRUITS**

I first learned about Jacaratia species while doing research on wild relatives of papaya. In Parque Nacional Yaxha, Nakum and Naranjo we found other wild papaya growing in humid areas along the shores of lagoons. In the Municipio de Livingston we found lots of wild papaya growing along the wet areas between Plan Grande Tatin and Cueva del Tigre. Plus, this golf-ball sized wild papaya fruit shrub is found in other humid areas of Guatemala and neighboring countries. While doing research on what other wild relatives had cauliflorous flowers and fruits, I began to see the cacao-sized fruits of Jacaratia. Even though they are neither cauliflorous nor ramiflorous, the Jacaratia trees are well worth studying.

Gradually, our plant scout in PNYNN found one fruiting tree. And we found a fruiting tree in the Municipio de Livingston. So now we feel this tree should be published and become better known.

LOCAL NAMES FOR **JACARATIA SPECIES**

Jacaratia mexicana: Papaya de monte in Yucatan (Casteñeda et al. 1994: 382).

In a publication from Puebla, Mexico, they list both “bonete” and “cuahuayote” (Secretaría de Desarrollo Rural del Gobierno del Estado de Puebla 2007). Ayote is a common local word for squash. Other words used by botanists or in reports on *Jacaratia mexicana* include: papaya criolla, papaya de monte, papaya orejona (Villalobos and Mendoza 2010: 489).

Jacaratia dolichaula: papaya cimarrona, wild papaw (in Belize, Balic, Nee and Atha 2000: 74). Papaya montana, sapota, palo de barril, and papaillo (Horticultural Reviews, Volume 47. Via Google Books). Hour by hour you can find more names; obviously some are shared with its close relative, *Jacaratia mexicana*. Many plants have a different name in each country.

HERE ARE SYNONYMS FOR

JACARATIA DOLICHAULA AND JACARATIA MEXICANA

<i>Jacaratia dolichaula</i> (Donn.Sm.) Woodson	<i>Jacaratia Mexicana</i> A.DC. Synonyms by Kew Gardens	<i>Jacaratia mexicana</i> A.DC. Synonyms by ThePlantList (no longer accessible since February 2022; all data from this and other sites on taxonomy is being transferred to Tropicos.org).
<i>Carica dolichaula</i> Donn.Sm.	<i>Carica mexicana</i> (A.DC.) L.O.Williams	<i>Carica heptaphylla</i> Sessé & Moc.
	<i>Leucopremna mexicana</i> (A.DC.) Standl.	<i>Carica mexicana</i> (A. DC.) L. O. Williams
	<i>Pileus mexicanum</i> (A.DC.) I.M.Johnst	<i>Jacaratia conica</i> Kerber
		<i>Ficus jaliscana</i>
		<i>Leucopremna mexicana</i> (A. DC.) Standl
		<i>Pileus mexicanus</i> (A. DC.) I.M. Johnst.
	<i>Pileus pentaphyllus</i> Becerra, M. E.	

[Continues on the next page]

I do not understand why two different elite botanical websites have totally different lists of synonyms for the same one accepted name *Jacaratia mexicana*.

[Click here to read more](#)

[Click here to read more](#)

www.theplantlist.org/tpl1.1/record/kew-2870235 was the page I used three years ago when www.ThePlantList.org was still functional. Currently, the data from this and other sites is being transferred to <https://tropicos.org/home>. So it is probably that soon ThePlanList no longer exist and you will have to check the synonyms at Tropicos.org.

In addition to the species synonyms, *Jatropha gaumeri* Greenm. is an accepted name, so not a synonym of *Jacaratia mexicana* www.theplantlist.org/tpl1.1/record/kew-104607. It is worth mentioning that *Jatropha* is a different genus (part of the family Caricaceae).

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

The literally wild papaya, fruit size and shape of a golf ball, on a plant the size of a small normal papaya tree, has same or similar name as *Jacaratia* species. The leaves of the wild papaya plant are similar to commercial papaya but wild papaya of Peten and Izabal wet areas is, usually, about 1.5 to 2 meters high and has fruits not even as large as a tennis ball. Papaya raised for its fruit has fruits the size of a football. The fruit of *Jacaratia mexicana* is the size of a cacao pod.



Jacaratia dolichaula.

Photo by: Victor Mendoza, FLAAR Mesoamérica, Jul. 31, 2021, 2:22 p.m. Cueva del Tigre, Livingston, Izabal.
Camera: iPhone 11.

FULL BOTANICAL NAME FOR EACH **JACARATIA SPECIES OF MESOAMERICA**

- *Jacaratia dolichaula* (Donn.Sm.) Woodson
- *Jacaratia mexicana* A.DC.

MAYAN NAMES FOR **JACARATIA**

The Maya name for this plant in Yucatan is reported to be “cunche” or “cumche.” In other regions of Mexico it is called “Bonete”, “orejona” or “papaya orejona.”

(Standley and Williams 1961: 147-148).

Chich puut in Yucatec Maya (Castañeda et al. 1994: 382).

Yucatec Maya, Ch'iich'puut (Jim Conrad, Backyard Nature)

K'uunche, kuumche (Heindorf 2011: 119). Che = tree in many Mayan languages. Kuun, Kuum, etc can be translated as squash.

In Maya, k'uumche, 'squash' + 'tree' (*Jacaratia mexicana*) (Joyce 1982: 265).

Since there is literal confusion over which species is present in Peten and adjacent Chiapas, Tabasco, Campeche, Quintana Roo and Belize you don't always really know which species of *Jacaratia* is being named locally.

NAMES FOR *JACARATIA MEXICANA* IN NAHUATL (AZTEC LANGUAGE)

In Nahuatl, *cuauh ayotli*, 'tree' + 'squash' (*Jacaratia mexicana*) (Marcus 1982: 265).

Standley says that a *Jacaratia* "is treated by Hernandez under the name "quaiuhayoth." (Standley 1924: 850). The spelling quaiuhayoth has zero returns from a Google search (it shows only Standley 1924!). Tree gourd is a more likely translation into English, with a spelling cuaguayote.

OTHER *JACARATIA* SPECIES IN BELIZE, MEXICO, AND GUATEMALA

Levy mentions *Jacaratia dolichaula* for a Lacandon area of Chiapas, Mexico (Levy 1999: 24).

Jacaratia dolichaula (Donn. Sm.) Woodson is listed in Diversidad de Frutas Mexico (Ibarra and Cornejo: 2010: 74).

Jacaratia dolichaula (Donn. Sm.) Woodson is listed by Castillo for Chiapas (2009: 8). *Jacaratia spinosa* is primarily in South America. I would not expect this in Mexico, Guatemala, etc.

WHERE HAS *JACARATIA DOLICHAULA* BEEN FOUND IN THE MUNICIPIO OF LIVINGSTON?

On July 31, 2021 we found *Jacaratia dolichaula* fruit on the trail parallel to Cueva del Tigre, so while walking from Plan Grande Tatín past the cave. You can then descend steeply to the River Tatín. The next year, our plantscout Alexander Cuz was asked to make visits to the Cueva del Tigre area to monitor this plant. In the month of June 2022 he again found fruits of *Jacaratia dolichaula*. An express expedition was immediately made to the area to photograph it in a better way.

You can check in these reports the record of *J. Dolichaula*.



CATALOGO DE HOJAS DE CONTACTO
[Download now](#)



PROYECTO DE DOCUMENTACIÓN DE LA BIODIVERSIDAD DEL MUNICIPIO DE LIVINGSTON, IZABAL
[Download now](#)



BIODIVERSITY DOCUMENTATION PROJECT OF THE MUNICIPALITY OF LIVINGSTON, IZABAL
[Download now](#)

- > Is *Jacaratia* sp. listed for Biotopo Protegido Chocón Machacas, CECON/USAC?
 No mentioned.
- > Is *Jacaratia* sp. listed for Tapon Creek Nature Reserve (including Taponcito Creek), FUNDAECO?
 Not mentioned.
- > Is *Jacaratia* sp. listed for Cerro San Gil (south side of Río Dulce)?
 Not mentioned.
- > Is *Jacaratia* sp. listed for Buena Vista Nature Reserve?
 Not mentioned.
- > Is *Jacaratia* sp. listed for Ecoalbergue Lagunita Creek (Área de Usos Múltiples Río Sarstún)?
 Not mentioned.
- > Is *Jacaratia* sp. listed for Sarstoon-Temash National Park (northern side of Río Sarstún)?
 Not mentioned.

IS *JACARATIA MEXICANA* LISTED FOR PARQUE NACIONAL TIKAL BY SCHULZE AND WHITACRE?

Schulze and Whitacre do not include *Jacaratia* or any papaya in their list of trees of Tikal (1999). Perhaps they do not consider papaya a tree? But in the monograph of *Árboles de El Salvador*, *Carica papaya* is listed (in other words, that author considered it a tree).

For elsewhere in Guatemala *Jacaratia mexicana* is listed for Peten, La Cumbre, about 3 km on Pusila Village road. In zapotal, high forest, MOBOT, collected by Cyrus Lundell and Elias Contreras (but a quarter century after he published his book on plants of Peten in 1937).

[Click here to read more](#)

Jacaratia dolichaula is listed as for Izabal, near Quirigua (90% of that original forest has been chopped down for commercial banana plantations).

[Click here to read more](#)

FOR PARQUE NACIONAL YAXHA, NAKUM AND NARANJO, IS *JACARATIA MEXICANA* PRESENT OR MISSING FROM TREE LIST BY DIX AND DIX 1992?

Not even wild papaya is listed by Dix and Dix. No *Jacaratia* is listed. We found dozens of wild papaya during the August 2018-July 2019 field trips and during the first year of the current 5-year project with CONAP. Park ranger Teco (Moises Daniel Perez Diaz), who assists our projects in PNYNN as a plant scout, found *Jacaratia* (we need to document in which area).



Jacaratia dolichaula.

Photo by: David Arrivillaga, FLAAR Mesoamérica, Jul. 31, 2021, 3:18 p.m. Cueva del Tigre, Livingston, Izabal.
Camera: iPhone 11.



Jacaratia dolichaula.

Photo by: David Arrivillaga, FLAAR Mesoamérica, Jul. 31, 2021, 3:04 p.m. Cueva del Tigre, Livingston, Izabal.
Camera: Sony Ag (ILCE-gM2). Settings: 1/200; sec; f/6.3; ISO 3,200.

MENTION OF *JACARATIA* SPP IN HERBARIUM COLLECTIONS

Records of Plants in Mexican Collections (CONABIO: Plants)

Catalog #: 480749

Instance ID: urn:

Catalog: IBUNAM: MEXU: 480749: fc5e16e2593bf358e135cd6c463efd2b

Taxon: *Jacaratia dolichaula* (J. D. Smith) R. E. Woodson

Family: *Caricaceae*

Determiner: Fernanda Antunes Carvalho

Collector: Elias Contreras

Date: 1969-07-29

Literal Date: 1969-07-29T00:00:00

Location: Guatemala, Peten, La Cumbre, Cdenas Road, 3 km west of Km 137, in high forest [locationID: 457829]

Preparations: Herbalized

Notes: University of Texas Herbarium (TEX-LL). Flora of Guatemala. Lundell Herbarium.

United States National Herbarium- Smithsonian(US:Botany)

Catalog #: US 1150299

Instance ID: <http://n2t.net/ark:/65665/363d306a3-4726-4019-bb4f-ffb30a62fe2e>

Taxon: *Jacaratia dolichaula* (Donn. Sm.) Woodson

Family: *Caricaceae*

Collector: P.C. Standley

Number: 29680

Date: 1922-03-31

Literal Date: 15 May 1922 to 31 Mar 1922

Location: Guatemala, Izabal, Vicinity of Quiriguá

Elevation: 75-225 meters (246-738ft)

United States National Herbarium- Smithsonian(US:Botany)

Catalog #: US 1360055

Instance ID: <http://n2t.net/ark:/65665/3a7f535c8-17d5-4098-858b-4692c6c07455>

Taxon: *Jacaratia dolichaula* (Donn. Sm.) Woodson

Family: *Caricaceae*

Collector: H. von Türckheim

Number: 8548

Date: 1904-03-00 - 1904-03-31

Literal Date: 1904-3

Location: Guatemala, Alta Verapaz, Cubilquitz, Depart. Alta Verapaz.

Elevation: 350 meters (1148ft)

United States National Herbarium- Smithsonian(US:Botany)

Catalog #: US 1922805

Instance ID: <http://n2t.net/ark:/65665/3b32f86be-f507-457c-b872-a82dc0f5a38a>

Taxon: *Jacaratia dolichaula* (Donn. Sm.) Woodson

Family: *Caricaceae*

Collector: J.A. Steyermark

Number: 49243

Date: 1942-07-23

Literal Date: 1942-7-23

Location: Guatemala, Huehuetenango, Dept. Huehuetenango: between Ixcan and Río Ixcan, Sierra de los Cuchumatanes.

Elevation: 150-200 meters (492-656ft)

United States National Herbarium- Smithsonian(US:Botany)

Catalog #: US 576662

Instance ID: <http://n2t.net/ark:/65665/3f11167be-d7e8-4691-852d-4c424c839d93>

Taxon: *Jacaratia dolichaula* (Donn. Sm.) Woodson

Family: *Caricaceae*

Collector: H. von Türckheim

Number: 8548/II932

Date: 1904-03-00 - 1904-03-31

Literal Date: 1904-3

Location: Guatemala, Alta Verapaz, Cubilquitz, Depart. High Verapaz.

Elevation: 350 meters (1148ft)

Missouri Botanical Garden(MO:Tropics)

Catalog #: 2552679

Instance ID: urn:catalog:MO:Tropicos:2552679

Taxon: *Carica mexicana* (A. DC.) L.O. Williams - *Jacaratia mexicana* A. DC.

Family: *Caricaceae*

Determiner: C. Todzia (1988)

Collector: Elias Contreras

Number: Contreras 8776

Date: 1969-07-29

Literal Date: 1969-7-29

Location: Guatemala, Petén, La Cumbre, 3-5 km west of Km 137 on Cadenas Road 16.08111 -89.35083

Missouri Botanical Garden(MO:Tropics)

Catalog #: 1431392

Occurrence ID: urn: catalog: MO: Tropicos: 1431392

Taxon: *Jacaratia mexicana* A. DC.

Family: *Caricaceae*

Determiner: J.F. Morales, 1994 (GNI)

Collector: Cyrus L. Lundell | Elias Contreras

Number: Lundell 20677

Date: 1977-03-25

Literal Date: 1977-3-25

Location: Guatemala, Petén, La Cumbre, about 3 km on Pusila Village Road. In zapotal, in high forest 16.08111 -89.35083

Missouri Botanical Garden(MO:Tropics)

Catalog #: 100398025

Instance ID: urn: catalog: MO: Tropicos: 100398025

Taxon: *Jacaratia mexicana* A. DC.

Family: *Caricaceae*

Determiner: F.R. Barrie (2013)

Collector: Miguel Flores | José Linares | J. Morales Can | Cecilia Sigal

Number: Flowers 3271

Date: 2005-12-13

Literal Date: 2005-12-13

Location: Guatemala, Chiquimula, Km 167, highway to Ipala. Chiquimula.
Elevation: 822 meters (2696ft)

United States National Herbarium- Smithsonian

(US: Botany)

Catalog #: US 1975194

Instance ID: <http://n2t.net/ark:/65665/32a3dca7a-aebb-44a1-a45f-bdae6472f49a>

Taxon: *Jacaratia dodecaphylla* (Vell.) A. DC. – (*Jacaratia spinosa* (Aubl.) A. DC.)

Family: *Caricaceae*

Collector: J.A. Steyermark

Number: 46591

Date: 1942-05-19

Literal Date: 1942-5-19

Location: Guatemala, Suchitepéquez, Dept. Suchitepéquez: Finca Panamá, San Agustín.

Elevation: 900 meters (2952ft)

[Click here to read more](#)

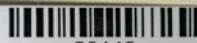
On November 9 of 2022, with the researcher Diana Sandoval, we visited the Herbarium of the Botanical Garden of Guatemala, to collect information on *Jacaratia* spp. (Caricaceae family)

When searching for samples of *Jacaratia mexicana*, we only found one record in Petén Department, Guatemala; where the fruits were collected. After months visiting other herbariums collections and searching for a sample of *Jacaratia* spp., we came to the conclusion that there are no more records of these plants in the physical collections of herbariums in Guatemala.

FLAAR Mesoamérica has the desire to contribute to these records bringing samples to the herbarium collections, as we did it before with a sample of *Jacaratia dolichaula*, collected in Livingston. The sample was donated to UVAL, the Herbarium collection of University of the Valley of Guatemala (Universidad del Valle de Guatemala).

Written by researcher Victor Mendoza




 29146
 FLORA DE GUATEMALA
 CARICACEAE
Carica mexicana (A. DC.) L., Wms. dup.=1
 Det. J. Linares, 2005
 Camino a Finca El Platanar, Asunción Mita, Jutiapa.
 14°12'53" N -89°36'24" W 538 m.s.n.m.
 J. Morales 3379
 08 Diciembre 2005 - 10 Diciembre 2005
 Herbario Universidad de San Carlos de Guatemala (USCG)

Jacaratia mexicana.

Credits: *Jacaratia mexicana* in the Herbarium of CECON USAC, Botanical Garden of Guatemala. Collection No. 29146. Scanned by Victor Mendoza

WHAT SPECIES OF JACARATIA OR WILD PAPAYA RELATIVES DID CYRUS LUNDELL FIND IN PETEN?

Lundell, neither in his 1937 monograph nor 1938 article, was not very focused on the differences between edible papaya of kitchen gardens and golf-ball sized wild papaya of abandoned milpas (milpas left to fallow).

WHERE HAVE OTHER BOTANISTS FOUND SPECIES OF *JACARATIA* IN PETEN?

Need to visit all the herbaria in Guatemala City to see where each species *Jacaratia* spp. has been collected, and what species name was assigned. Roche notes one example in El Caoba, which is not far south of Tikal; El Caoba is west of Nakum. Roche notes another specimen from El Pesquero in Municipio de La Libertad, Peten Roche (2010: 40). Still using synonym, *Carica mexicana*.



***Jacaratia dolichaula*.**

Photo by: David Arrivillaga, FLAAR Mesoamérica, Jun. 7, 2022, 1:10 p.m. Cueva del Tigre, Livingston, Izabal.
Camera: Sony Ag (ILCE-9M2). Settings: 1/50; sec; f/4.0; ISO 800.

BOTANICAL DESCRIPTION OF *JACARATIA MEXICANA* BY STANDLEY AND WILLIAMS (1961)

Jacaratia dolichaula is not included in Flora of Guatemala. The accepted name today, *Jacaratia mexicana*, is listed by Flora of Guatemala under its name of the past century, *Carica mexicana*. In Trees and Shrubs of Mexico, *Jacaratia mexicana* is listed under *Leucopremna mexicana*. But first let's look at *Flora of Guatemala*:

Carica mexicana (A. DC.) L. Wms. Fieldiana, Bot. 29: 368. 1961. *Jacaratia mexicana* A. DC. Prodr. 15, pt. 1: 420. 1864. *Carica dolichaula* Donn.-Sm. Bot. Gaz. 23: 247. 1897. *Leucopremna mexicana* Standl. Contr. U. S. Nat. Herb. 23: 850. 1924. *Pileus mexicanus* Johnston, Contr. Gray Herb. n.s. 70: 79. 1924. *Jacaratia dolichaula* Woodson, Ann. Mo. Bot. Gard. 37: 404. 1950; 45: 23, / . 1958. Chaya silvestre (perhaps an erroneous name).

Moist or dry lowland forest or scrub, 800 meters or less; Peten; Alta Verapaz; Izabal. Mexico; British Honduras through Central America to Panama. A tree 5-12 m. tall or more, sometimes blooming when a shrub 3 m. tall, the trunk slender or thick, the bark pale brown, almost smooth, glabrous throughout; leaves long-petiolate, the leaflets 3-7, oblong or obovate-oblong, sometimes obovate-elliptic, mostly 9-18 cm. long, cuspidate-acuminate to almost obtuse, acute at the base, petiolulate or sessile, entire or lobate, glaucescent beneath; peduncles axillary, few-many-flowered, the flowers fragrant, greenish to cream-colored; calyx 1-2 mm long, the sepals oblong-ovate or subtriangular, obtuse; corolla of the pistillate flowers 3-7 cm. long, the segments linear or linear-lanceolate; corolla of the staminate flowers 5-6 cm. long, tubular below, the free lobes 1-2 cm. long and oblong-elliptic; fruit obovoid, 4-15 cm. long or perhaps even larger, sometimes 5-angled and produced at the base into cone-like protuberances or wings; seeds many and large, often filling the single-celled or falsely 5-celled cavity.

The Maya name for this plant in Yucatan is reported to be "cunche" or "cumche." In other regions of Mexico it is called "bonete orejona" or "papaya orejona." In Mexico it is said that the fruits are sometimes eaten raw, especially in salads, or that they are made into sweetmeats of various kinds. When maize is scarce the Mayas of Yucatan are said to pulverize the pith of the plant and mix it with maize in making tortillas, although this seems unlikely.

(Standley and Williams 1961: 147-148).

IS *JACARATIA MEXICANA* FROM THE HIGHLANDS OR FROM THE LOWLANDS (OR BOTH)?

At least one native species, *J. dolichaula* can grow in the Highlands up to 1000 meters in Guerrero (Cortes and Alvarado 2017: 14); more research on this would be helpful. *J. mexicana* can grow up to 1520 meters (Ibid: 19). But this depends on the soil, climate (rainfall), etc. That is for the Mexican state of Guerrero (that height). For Guatemala: Moist or dry lowland forest or scrub, 800 meters or less; Petén; Alta Verapaz; Huehuetenango; Izabal. Mexico; British Honduras. (Standley and Williams 1961: 147). Petén is all Maya Lowlands, Alta Verapaz has both low and high elevations; Huehuetenango has extremely high elevations but also parts that are in the lowlands. I estimate more than 50% of Izabal is near sea level but there are several chains of literal mountains also in Izabal.



Jacaratia dolichaula.

Photo by: David Arivillaga, FLAAR Mesoamérica, Jun. 7, 2022, 3:18 p.m.
Cueva del Tigre, Livingston, Izabal. Camera: iPhone 11.



LEARNING MORE ABOUT THE TREE YOU **WISH TO STUDY IN GUATEMALA**

As a suggestion, if you want to learn about any tree in Guatemala:
learn about it also in all areas surrounding Guatemala

- Chiapas
- Tabasco
- Campeche,
- Yucatan
- Quintana Roo
- Belize,
- Honduras

These are the ecosystems that surround Guatemala and many species
(and some uses) are shared.

To find where a species is found, use all the herbaria database web sites.
I am sure there are other databases that I have not yet learned to use.

Be sure to visit the herbaria of Guatemala in-person (since these are not on-line).

And, very crucial: cooperate with local people. Share what you have learned
with them. You have spent days or weeks on-line and in your library:
summarize this for the local people.

JACARATIA MEXICANA TREES IN CHIAPAS

Uses for the Lacandón area listed as “nd” (Levy et al. 2006: 84) which I estimate could be considered “no data.” Levy et al. list *Jacaratia dolichaula* (Donn. Sm.) Woodson for the area of Chiapas where they worked. (ibid.). If you spend additional days during research on each Mexican state, you will find lots more mention of *Jacaratia* species. But we primarily want to double-check that *Jacaratia* is present in all areas surrounding Petén (since Petén + surrounding areas (Chiapas, Tabasco, Campeche, Quintana Roo, Belize, Izabal, and Alta Verapaz are the headland of the Lowland portion of Maya civilization).

JACARATIA TREES IN BELIZE

Jacaratia dolichaula (Donn. Sm.) Woodson —**Reg Use:** FOOD, PRD, MED. — Nv: papaya cimmaron, wild papaw. — **Habit:** Tree. — **Note:** *Carica mexicana* (DC) L.O. Williams, misapplied.

(Balick, Nee and Atha 2000: 74).

Quite a surprise to find that the correct name for Belize is *Jacaratia dolichaula* (Donn. Sm.) Woodson and that *Carica mexicana* (DC) L.O. Williams has been misapplied. If I can read through the words, it seems that *Jacaratia mexicana* is simply an incorrect “identification” by Standley and Williams. This raises the question of whether *Jacaratia mexicana* has been misapplied by everyone else? What about the list of Villasenor? He lists *Jacaratia mexicana* for all parts of Mexico adjacent to Petén (Chiapas, Tabasco, Campeche) and the part of Mexico adjacent to northern Belize (Quintana Roo).

JACARATIA TREES IN **MEXICO BY VILLASEÑOR**

JACARATIA DOLICHAULA	JACARATIA MEXICANA
	CAM
CHIS	CHIS
	COL
GRO	GRO
	JAL
	MEX
	MICH
	MOR
	NAY
OAX	OAX
	PUE
	QTROO
	SIN
TAB	TAB
VER	VER
YUC	YUC
	ZAC

ARE *JACARATIA* TREES MAINTAINED IN **KITCHEN GARDENS**

Having a garden of edible plants around your home is typical for most parts of Mesoamerica, until the Spaniards chopped down the trees and burnt down the indigenous houses to force people to live in towns with streets and avenues all focused on the church in the town square. The Spaniards wanted to have everyone available to tax and as labor. But even in these colonial towns, the local people did the best they could to maintain edible plants around their homes, in addition to favored decorative plants.

IS THERE POTENTIAL MEDICINAL USAGE OF **JACARATIA MEXICANA BY LOCAL PEOPLE?**

Yes, simply dedicate lots of hours and days and you can find mention of medicinal uses of *Jacaratia* plants. For instance, Zulueta et al. (2015) mentions that this species has pharmaceutical uses (among other uses such as human food, foraging and firewood).

Ruiz et al. (2008) include *J. mexicana*, among other twenty-two plants that are used in traditional medicine. The fruit and the latex of this species are used against mouth ulcers and digestive disorders. The latex of this plant contains cysteine proteases, which are enzymes that are present in the Caricaceae family, and have therapeutic properties. These can be found in *Carica candamarcensis*, *C. papaya*, and *J. mexicana* (Oliver et al., 2013).



Jacaratia dolichaula.

Photo by: Alexander Cuz, FLAAR Mesoamérica, Jun. 7, 2022, 3:22 p.m.
Plan Grande Tatin, Livingston, Izabal. Camera: Google Pixel.

WHAT PARTS OF **JACARATIA MEXICANA** ARE EDIBLE?

It is apparent that *J. mexicana* is the species with the most demand for its flowers and fruits, since it can be consumed as a snack, and it can be found in markets (Martínez et al. 2016). Another species, *Jacaratia spinosa*, is considered an unconventional, but edible fruit, rich in latex consumed by some Brazilian communities, and its toxicity has been tested recently in a study carried out by Groth et al. (2021).

In Mexico it is said that the fruits are sometimes eaten raw, especially in salads, or that they are made into sweetmeats of various kinds. When maize is scarce the Mayas of Yucatan are said to pulverize the pith of the plant and mix it with maize in making tortillas, although this seems unlikely.

(Standley and Williams 1961: 147-148).

Uses: the fruits and the stem are consumed fresh, in stews or preserved (Lomelí-Sención, 1998), the bark is used in the manufacture of barrels to store food and drinks.

(Original text in spanish, Cortés and Alvarado 2017: 18).

In a publication from Puebla, Mexico, they indicate that the seeds are eaten (Secretaría de Desarrollo Rural del Gobierno del Estado de Puebla 2007).

Even the Larousse cookbook for Mexico gives local recipes:

The fruit is yellow when ripe and is approximately 15 cm long and 3 to 10 cm thick. Irregularly shaped, it can be wide, elongated, round, thin or twisted; Its pulp is fleshy, with a sweet flavor and a reddish yellow color. It belongs to the papaya family, which is why it is sometimes used like the common papaya. It is eaten cooked, in salad, sweet and in its juice. The Nahuas of central Guerrero cut them green and let them ripen for consumption. In Colima, a starch is extracted from the trunk of the tree to make a kind of tortilla. In Jalisco it is used as a vegetable in broths and stews; when it is ripe it is consumed as a seasonal fruit, although its use has currently declined.

(Original text in spanish, Muñoz 2012)

WHAT ANIMALS EAT THE FRUITS OF **JACARATIA TREES?**

Do monkeys, birds, or other fauna of the rain forest eat the fruits? This needs to be studied. I estimate that many mammals that climb trees and many birds will enjoy eating the fruits of *Jacaratia* trees.

J. spinosa is a widespread tree distributed throughout the Neotropical region from Guatemala to northeast Argentina and through its distribution, it has been reported that its fruits are attractive and nutritious in the diet of the lowland tapir (*Tapirus terrestris*), opossums (*Didelphis aurita*), tortoises (*Chelonoidis denticulate*), the black and white tegu (*Tupinambis merrianae*), peccaries, monkeys, and birds (Salas and Villalobos, 2021). In one investigation from Costa Rica, it is reported the first interaction of a rodent, the Sumichrast's Vesper Rat (*Nyctomys sumichrasti*), with the fruits and seeds of *J. spinosa*. According to a study conducted by Eusebio in 2019, the fruit of *J. mexicana*, and of *Spondias purpurea*, is consumed by bats.

WHAT ARE THE PRIMARY POLLINATORS OF **FLOWERS OF JACARATIA MEXICANA?**

It has been reported that *Jacaratia mexicana* is a dioecious species, with biotic pollination that depends on visual and scent mimicry. Female flowers lack reward for pollinators, but their scent is similar to that produced by the male flowers, which do produce nectar. Zoogamy predominates in arboreal species like *J. mexicana* and *J. spinosa*, with insects being the main dioecious pollinators (Piratelli et al., 1998). Nocturnal moths (Sphingidae) have been observed visiting both male and female flowers of these species (Arias et al., 2012). Some studies on the pollination biology of Caricaceae report sphingid moths as the main pollinators not only of species of *Jacaratia* but also of *Carica papaya* (Cerino et al., 2015). It is important to note that the concentration of flowers could attract opportunistic pollinators, which visit plants with an intense supply of flowers, as may be the case with *J. spinosa* (Piratelli et al., 1998).

CONCLUDING DISCUSSION AND SUMMARY ON *JACARATIA MEXICANA* TREES

The FIVE-HUNDRED page book on “Fruits of Warm Climates” has nothing on any *Jacaratia* of Guatemala or anywhere in Mesoamerica. Only a buried mention of a *Jacaratia* species of South America. This is surprising since this book by Julia F. Morton is extremely useful for dozens of other fruits of the Mayan areas. But *Jacaratia* misses out.

Unexpected that a SEVEN-HUNDRED page book on edible plants of the world would not have any species of *Jacaratia* whatsoever (Cornucopia II: A Source Book of Edible Plants, 2nd edition).

Stephen Facciola. Frutas de America, Tropical y subtropical, historia y usos obviously includes commercial papaya but not wild *Jacaratia* whatsoever (Olaya 1991).

Exotic Fruits and Nuts of the New World has zilch on *Jacaratia* fruits. I mean, *Jacaratia* is in the New World and is about as exotic as I can imagine. So book after book on “Fruits...” lack discussion of *Jacaratia* fruits (also zero photographs).

So now you can see why we at FLAAR (USA) and FLAAR Mesoamerica (in Guatemala) hike through the rain forests to find edible fruits of the Neotropics. We have an in-house team to handle library research (university students who work on research their entire time). We have over 5,000 downloaded PDFs of books, articles, web pages if they are reliable. Plus, we have a hard-copy library of books on botany and ethnobotany collected over the last half century.

Neither species of *Jacaratia* is mentioned in the comprehensive Plants of the Peten Itza’ Maya (Atran, Lois and Ucan 2004). Neither species is listed in several other ethnobotanical studies of the Maya Lowlands. Yet we are learning that the two potential species should be in Peten for sure; in Izabal we already found one.

Standley and Williams consider lots of ethnobotanical aspects unlikely if they themselves did not see it in-person. But “Kerber reports that in Colima a kind of tortilla is made from the starch of the trunk.” (Standley 1924: 850). Notable that Standley already in 1924 was aware of using the pith of the tree in Colima and yet does not accept that the Maya of Yucatan “pulverize the pith of the plant and mix it with maize in making tortillas” (Standley and Williams 1961: 148). Also notable that one of the *Jacaratia* species is called “árbol de pan” or “palo de pan” (tree of bread)! I see this potentially as “tree that produces an ingredient for making tortillas.”

[Continues on the next page]

Every additional hour and day that I devoted to library research, I found additional documentation to the use of *Jacaratia mexicana* to make tortillas (or to add to maize if you did not have enough maize):

The analysis of the ethnohistorical sources makes it sufficiently clear, on the one hand, that maize was the most important food but not the only one, and on the other, that tubers and ramón, together with other species, played a strategic role of the first order. to withstand the critical years when corn was scarce. Makal, yucca, papaya root, ramón, cocoyol (*Aerocomia mexicana*, Karw. et Waert.) and bonete (*Jacaratia mexicana* A. DC.), have the virtue of being mixed with nixtamal and thus increase the basic corn dough, to make tortillas and atole.

(Original text in Spanish, Teran and Rasmussen 2009: 110).

Every additional hour and day that I devoted to library research, I found additional documentation to the use of *Jacaratia mexicana* to make tortillas (or to add to maize if you did not have enough maize):

The unresolved concept of which species exist in Guatemala and Belize needs further work. Would help if a dedicated Caricaceae family specialist discusses this with the experienced botanical authors that suggest *J. mexicana* has been misapplied botanists (Balick, Nee and Atha 2000: 74). The FLAAR teams will be working to do our best to obtain macro photographs of the flowers of the *Jacaratia* in Peten and Izabal. Botanically, it is important to learn why several recognized and experienced prefer the plant name *Jacaratia dolichaula*. Yet almost every other botanical book does not use that plant name whatsoever, or considers that *J. dolichaula* and *J. mexicana* are simply two different species. All the more reason for our team to work to find when these trees are flowering in Izabal and in Petén. Close-up macro photos of all different angles of the flower and all its parts (and leaves, front and back) will help, especially because all these flowers and leaves will be alive, fresh, fully developed. A dry pressed specimen in a drawer of a herbaria has been helpful for centuries, but I sincerely believe that high-resolution digital photographs are a contribution towards improving botanical data bases.

[Continues on the next page]

I also see the results, every day of my research into what wild plants native to Guatemala are edible if you take the time to find what plants of all the rest of the Neotropical and Tropical areas of the Americas are edible. Standley and Steyermark in 1961 a tad understandably did not believe that the pith of a tree was used to make tortillas. But the team of FLAAR work often around the clock to learn about every single species of plant in Guatemala and whether it is, was, could be edible. So, can the pith of *Jacaratia* be eaten? Remember, there are two places where it really is (or was in past century: Yucatan and Colima areas of Mexico). I just about had a heart attack when I Googled "pan", "jacaratia" (because at least one species is called árbol de pan or palo de pan. I then find complete web sites on EDIBLE WOOD.

<https://bichosdecampo.com/sabores-y-saberes-mitos-y-verdades-sobre-el-yacaratia-la-unica-madera-comestible-del-mundo/>, "la única madera comestible del mundo" (the only edible wood in the world) turns out to be *Jacaratia spinosa* (in South America). WOW, now I can understand why other species of *Jacaratia* tree are called arbol de pan or palo de pan: My "translation" as tree to make a tortilla out of" was my estimate before I saw the web sites on EDIBLE WOOD of *Jacaratia spinosa*. All the more reason to have students go to Yucatan and go to Colima to document the edible *Jacaratia* trees there! Dennis Puleston brought ramón nuts to the attention of the world (I eat ramón nut flour together with amaranth (seeds, pocorn, and flour) as my health-food breakfast cereal every morning all year). Ramon nuts had been mentioned by Lundell and Puleston dedicated years to documenting their presence and use. Today Mayan women's associations in Petén earn their livelihood harvesting and processing ramón (that's where I get my ramón for breakfast cereal).

Rather obviously you don't have to chop down a ramón tree to harvest the nuts. But papaya trees grow like weeds; what if *Jacaratia* trees grow fast? Google "arbol del queso" and guess what: *Jacaratia spinosa* from Argentina. Palo de pan is also used for *Jacaratia dolichaula* in Veracruz (<http://148.226.12.161:8080/egvadmin/bin/view/enciclopedia/palo+de+pan>). But in another botanical report, where the local names are only list as: Bonete, coalsuayote, cuaguayote, kunchó, orejona, papaya de montafta (Moreno 1980: 16), Moreno says the edible interior part is of *Jacaratia mexicana*: Fruto comestible: tallo rayado comestible, mezclado al maiz para consumo por los antiguos mayas. Moreno (1980: 17). So, at least here, *Jacaratia mexicana* is not called palo de pan but is nonetheless the species whose tree interior is eaten as bread! But since *Jacaratia spinosa* in South America is eaten as "bread" then I estimate that all three species have an edible pith: *J. dolichaula*, *J. mexicana*, and *J. spinosa*.

[Continues on the next page]

Standley and Steyermark did not accept that the Yucatec Maya ate the inside of the trunk of *Jacaratia* trees: very simple in today's era of research via the Internet: you even get a recipe. The video is no longer (easily) available but the recipe from the video is available on another website:

You can follow the recipe here:

[Click here to read more](#)

It's not complicated.

- 1) Cut a branch of the tree. Not too old, or it will be too fibrous.
- 2) Remove the bark and the fibrous outer layer of the kernel. Keep only the soft white kernel.
- 3) Grate the kernel and wash it several times in running water.
- 3) Cook the grated jacaratia in water for around 2 hours.
- 4) Dry it and then cook again, adding the same weight of sugar and some water (no mention of the quantity in the video)
- 5) Add cloves for flavor.
- 6) It should be ready when the grated pulp becomes translucent and you can see the bottom of the pan, when you stir pulp it with a spoon.

[Click here to read more](#)

This is "the most edible tree I have yet found in the forests of the Maya Lowlands." Even if the recipe is for South America, we know that in Colima and Yucatan local people were still eating the inside of the trunk. Thus I would suggest that *Jacaratia* be added to "The Maya Forest Garden" of updated editions. *Jacaratia* may be "the Ramon revolution" of year 2022.



Jacarattia dolichaula.

Photo by: Alexander Cuz, FLAAR Mesoamérica, Jun. 7, 2022, 3:15 p.m.
Plan Grande Tatin, Livingston, Izabal. Camera: Google Pixel.

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2005 Biodiversidad del Estado de Tabasco. CONABIO, UNAM, Mexico. 370 pages.

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CONABIO

n.d Listado de algas y plantas presentes en Ría Lagartos (Las Coloradas), Yucatán. (CONABIO, Anexo 3).

This is just Anexo 3; the rest of the report is splattered in a dozen other PDFs. But this Anexo 3 had six species of Croton listed.

Download online: www.conabio.gob.mx/conocimiento/manglares/doctos/anexos/PY71_Anexo_3.pdf

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Download online:

https://www.researchgate.net/profile/Melanie-Congretel/publication/321998040_La_parota_y_el_bonete_en_el_valle_de_Autlan_de_Navarro_Jalisco_Mexico_Ejemplos_de_aprovechamiento_de_dos_productos_forestales_no_maderables_semilla_de_Enterolobium_cyclocarpum_y_fruto_de_Jacaratia_mex/links/5a3ce45f458515f7ea5416fb/La-parota-y-el-bonete-en-el-valle-de-Autlan-de-Navarro-Jalisco-Mexico-Ejemplos-de-aprovechamiento-de-dos-productos-forestales-no-maderables-semilla-de-Enterolobium-cyclocarpum-y-fruto-de-Jacaratia.pdf

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This is one of the best discussions which covers both species of *Jacaratia* that are native to Mesoamerica, *J. dolichaula* and *J. mexicana*.

Download online: <http://biologia.fciencias.unam.mx/plantasvasculares/PDF%20FLORAS/076%20Caricaceae-Theophrastaceae.pdf>

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Download online: <https://es.scribd.com/document/558291691/De-la-Garza-Mercedes-et-al-eds-Relaciones-historico-geograficas-de-la-gobernacion-de-Yucatan-Merida-Valladolid-y-Tabasco-vol-II-ocr-1983>

DIX, Margaret A., and M. W. DIX

1922 Recursos biológicos de Yaxhá-Nakúm-Yaloch. 54pp.

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

GUTIÉRREZ Vázquez, Ernestina, HERNÁNDEZ Maldonado, Gloria Ibeth and Ana Celestina JUÁREZ Gutiérrez

2018 *Jacaratia mexicana* A. DC. Pp. 72-75 in: Recursos arbóreos y arbustivos tropicales para una ganadería bovina sustentable. José Manuel Palma García and Carlos González-Rebeles Islas, compilers. Universidad de Colima.

This is the best short article on *Jacaratia mexicana*. Surprisingly in a book on cattle food.

Available online: http://ww.ucol.mx/content/publicacionesenlinea/adjuntos/Recursos-arboreos-y-arbustivos-tropicales_462.pdf

H. Ayuntamiento de Othon P. Blanco

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1996 La vegetación de la Reserva El Ocote a lo largo del Cañón del Río La Venta. ECOSUR, CONABIO.

Download online:

<https://ecosur.repositorioinstitucional.mx/jspui/handle/1017/1133>

OCHOA-Gaona, Susana, RUÍZ González, Hugo, ÁLVAREZ Montejó, 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.

Download online:

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

OLAYA, Clara Inés

1991 Frutas de America, Tropical y subtropical, historia y usos. Grupo Editorial Norma, Colombia. 179 pages.

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.

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2011 Plantas medicinales y comestibles de la Reserva Natural de Usos Múltiples Monterrico-RNUMM-, Taxisco, Santa Rosa. Programa Universitario de Investigación en Recursos Naturales y Ambiente- PUIRNA-. Universidad de San Carlos de Guatemala. Guatemala.

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2012 La vegetación leñosa del sitio Arqueológico de Oxpemul, Municipio de Calakmul, Campeche, México. Polibotánica, Num 33, pp. 131-150

Download online: www.scielo.org.mx/pdf/polib/n33/n33a9.pdf

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 SITES SPECIFICALLY ON *JACARATIA* TREES

www.backyardnature.net/yucatan/jacarati.htm
Backyard Nature web site of Jim Conrad

VIDEOS ON EDIBLE ASPECTS OF *JACARATIA*

Google *Jacaratia* comestible and you get everything including recipes.



Jacaratia dolichaula.

Photo by: Victor Mendoza, FLAAR Mesoamérica, Jul. 31, 2021, 2:22 p.m. Cueva del Tigre, Livingston, Izabal.
Camera: iPhone 11.

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Sergio Jerez is involved in the identification of plants and support in research issues.

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Diana Sandoval collects scientific information that is added to the reports that are published on our pages.

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Byron Pacay he is our assistant during field trips.

Norma Cho she is our assistant during field trips.

Roxana Leal degree in communication. Manage all our social networks and digital community.

Isabel Rodríguez Paiz is in charge of fundraising and alliance building.

Edwin Solares He is a photographer and videographer during our expeditions. Later edit this content to be used in our different materials.

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

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Heidy Galindo graphic designer who diagrams text and photographs to create our reports.

Alexander Gudiel graphic designer who diagrams text and photography to create our reports.

Cristina Ríos graphic designer who diagrams text and photographs to create our reports.

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Paulo Núñez web admin. He is the person in charge of the maintenance and programming of the entire network of FLAAR websites.

Juan Carlos Hernández is part of the web team. Receive the material we produce to place on our sites.

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

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

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

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

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

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

Isabel Trejo graphic designer and illustrator for MayanToons. Josefina Sequén is an illustrator for MayanToons.

Rosa Sequén is an illustrator for MayanToons.

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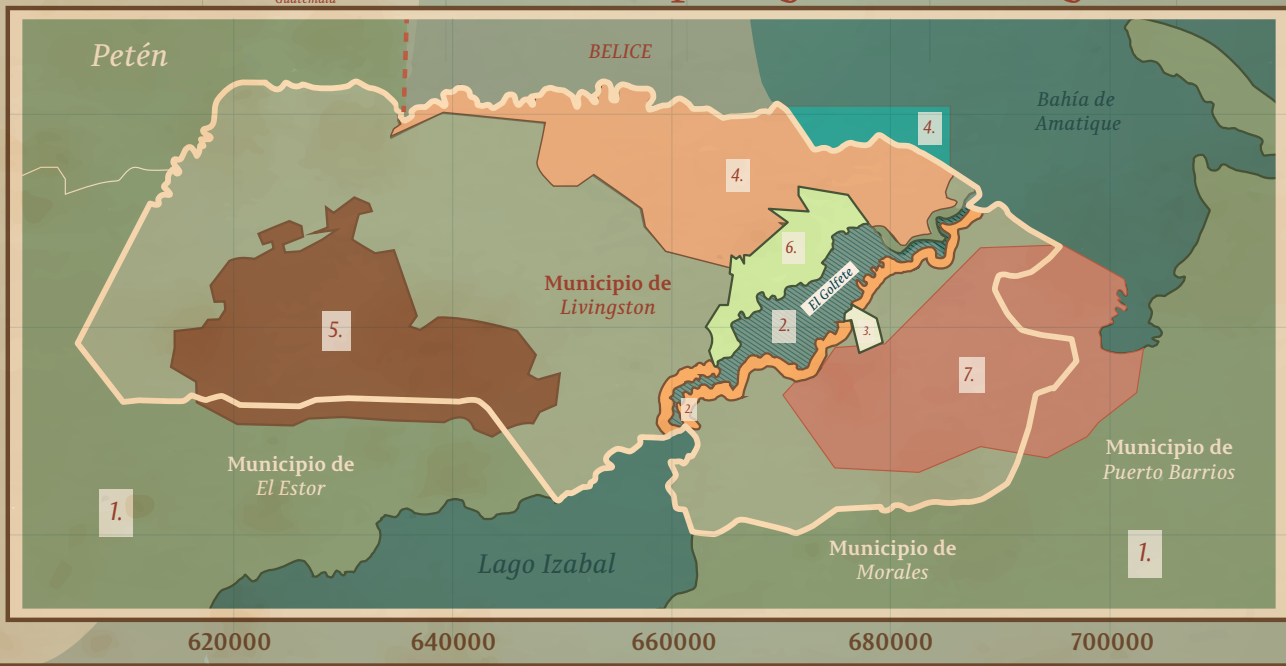
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Áreas naturales protegidas de Livingston



Izabal

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

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1754000
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1750000
1748000



Reserva Natural Tapón Creek, Livingston

Bahía de Amatique

Área de Usos Múltiples
Río Sarstún

Punta
Cocolí

Aldea Buena
Vista Tapon Creek

San Juan

Reserva Natural Tapón Creek
Municipio de Livingston

Siete
Altares

Finca
Gangadiwali

Sarstún Creek

Taponcito
Creek

El Rosario

San
Martin

La Desmembración

Plan Grande
Tatín

Área de Usos Múltiples
Río Sarstún

Biotopo
Chocón Machacas

El Golfete

Parque Nacional
Río Dulce

Cálix Creek

Laguna
Salvador

Laguna
Cálix

Laguna
Negra

Cerro Grande
(Cerro de Payara)

Canón Río Dulce



Izabal

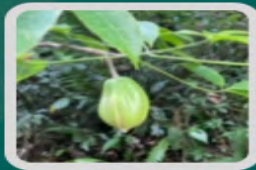


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- Cuerpos de agua. Ministerio de Agricultura Ganadería y Alimentación (MAGA)
- Dirección de Análisis Geoespacial del (CONAP), Marzo/2017.

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

Livingston



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Jacaratia dolichaula located in Plan Grande Tatín, Livingston, Coordinates by Victor Mendoza using iPhone 11: N 15.793, W -88.809

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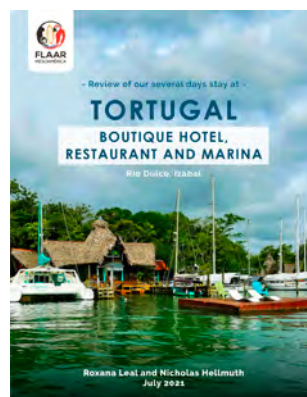
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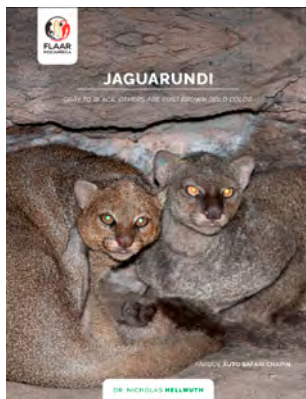


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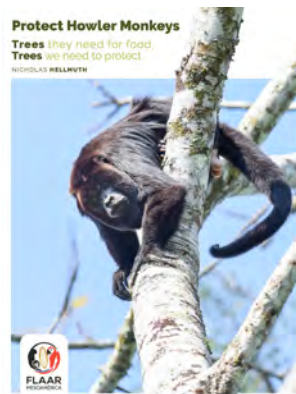
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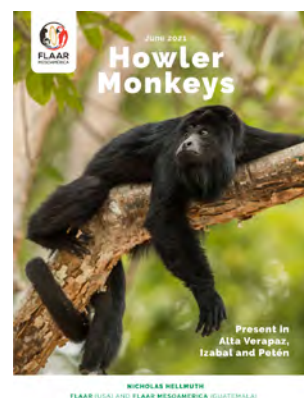
Protect Howler Monkeys
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Souther house spider
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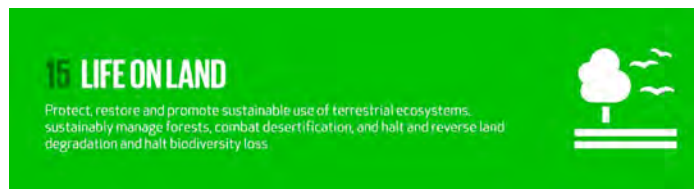


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The current Alcalde of Livingston, Mr. Daniel Pinto, together with his team on the Division of International Cooperation, has set the goal of achieving the municipality development in the years 2020-2024 based on the goals and indicators proposed by the 2030 Agenda for Sustainable Development. In this regard, both FLAAR (USA) and FLAAR Mesoamerica (Guatemala) will collaborate with this Municipality to 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 associated) and biodiversity. This information will also be useful as it is considered in various conservation strategies 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 which are being pursued at:

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

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This report can be cited with the following information:

HELLMUTH, Nicholas

2022 Edible Fruit, Edible Seeds, Edible Stems AND Edible WOOD Unexpected Edible Aspects of *Jacaratia dolichaula*, *Jacaratia mexicana*, Parque Nacional Yaxha, Nakum and Naranjo, Peten and Municipio de Livingston, Isabal, Guatemala. FLAAR Reports, FLAAR (USA) and FLAAR Mesoamerica (Guatemala).

BACK COVER PHOTO *Jacaratia dolichaula*.

Photo by: Alexander Cuz, FLAAR Mesoamérica, Jun. 7, 2022,
 3:18 p.m. Plan Grande Tatin, Livingston, Izabal.
 Camera: Google Pixel.

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