



# Wild Grape Vine Relatives of Mayan Rain Forests

## *Cissus gossypiifolia*

Parque Nacional Yaxha, Naum and Naranjo (PNYNN)  
Reserva de la Biosfera Maya RBM, Petén, Guatemala

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## APPRECIATION FOR ENCOURAGING THE RESEARCH PROJECT



### FOR COOPERATION, HOSPITALITY, AND ASSISTANCE AT PARQUE NACIONAL YAXHA, NAKUM AND NARANJO

(AUGUST 2018 THROUGH JULY 2019)

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- Biolg. Lorena Lobos - CONAP

### ASSISTANCE FOR KNOWLEDGE OF PLANTS AND ANIMALS OF PNYNN

- Teco, Moisés Daniel Pérez Díaz, park ranger, PNYNN

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2021-2025

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- Plus, all the helpful and knowledgeable park rangers of IDAEH CONAP at PNYNN who accompanied us each day. It is essential to have either an IDAEH and/or CONAP “guardabosque” or comparable when doing flora and fauna research in a national park. We appreciate the assistance of park ranger Teco (Moisés Daniel Pérez Díaz), Ricardo Herrera and every park ranger that accompanied us on other field trips.

I thank Gabriella Moretti, owner of Ecolodge El Sombrero, for providing hotel room and meals while we have been doing field work at Parque Nacional Yaxha, Nakum and Naranjo. We also appreciate the hospitality of her sons Sebastián de la Hoz and Juan Carlo de la Hoz. Equally crucial is having a place to charge the batteries of the computers, plus all the cameras and cell phones. Solar power is great, but it lasts only about an hour, or less if you plug in multiple computers and cameras and flash batteries to charge. Therefore, a place with enough electricity to charge the entire mass of essential field work equipment is essential and thus very much appreciated. We also sincerely

appreciate the storage space for our camping equipment: tents, camping mattresses, cooking equipment, etc. There is no way to drive this volume of equipment back-and-forth from Guatemala City to where we may be camping in a remote area of the Reserva de la Biosfera Maya during a following month.

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Photo by: Nicholas Hellmuth, FLAAR Mesoamérica. Oct, 31. 2018. Camera: Nikon D810. Settings: 1/250; sec; f/13; ISO 5000.

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## Introduction to Vines of the Genus *Cissus*, Lake Yaxha and Río Ixtinto, PNYNN

*Cissus* is the vine flower most commonly visible when taking a boat trip along the west end and north shore of Lake Yaxha. You notice this vine because of the deep red color of its bracketed-shaped inflorescence. You never really notice a “flower.” What attracts your eye is the wide size and almost flat layout of the inflorescence (the leafy but bright-colored structure that holds the tiny flowers).

One day per month, every month, we use a boat to explore the waterbirds, shorebirds, wading birds, aquatic plants, shore plants, and the awesome rain forest that lives all along the west and north shores of Lake Yaxha (portions of the south shore vegetation were destroyed decades ago when the forest was chopped down for cattle ranches; however much of this south shore has regrown). We accomplished an average of one-week-per-month field trips at PNYNN during our August 2018-July 2019 project of cooperation and coordination with the park co-administrators.

The last day of October 2018 I noticed a lot of clusters of tiny red flowers. Normally, I would get out of the boat and set up a tripod to photograph such a gorgeous floral display of Mother Nature, but the shore is a tad muddy, and you can take better photos from several meters away from the shore (although this means the boat is swaying back and forth so the flowers wander out of focus and out of view in the viewfinder also). But I was able to capture a few nice snapshots. On subsequent field trips we took lots more photos.

Then, in October 2022, we noticed a few *Cissus* vines with their red inflorescences. We had a meeting with CONAP co-administrator of PNYNN the day before and he indicated that documenting and publishing these vines would be of interest. So now we are working on this FLAAR Report on vines of the genus *Cissus*.





***Cissus gossypiifolia.***

At different angles of view, you gradually notice how the flowers are held out on a horizontal "platform".  
Photograph by Nicholas Hellmuth. Camera: Nikon D810. Settings: 1/320; sec; f/14; ISO 5000.

**Credits for photo on page 5.**

Photograph by Nicholas Hellmuth. Camera: Nikon D5. Settings: 1/320; sec; f/14; ISO 4000.



***Cissus gossypiifolia.***

It was a challenge to identify this plant to begin with, since each vine has leaves of two totally different shape: young leaves are alternate and bi partite while older leaves are tri-partite. Later we realized that the two different leaf shapes were a feature of this species (at first, I assumed that one was the leaf of the host tree and another was the leaf of the vine itself). I have not previously noticed a plant with two such totally different shapes of leaves on the same plant. Photograph by Nicholas Hellmuth. Camera: Nikon D810. Settings: 1/320; sec; f/14; ISO 5000.



***Cissus gossypifolia*.**

This is a closer view (not a crop; this is a separate photograph).

Photograph by Nicholas Hellmuth. Camera: Nikon D810. Settings: 1/320; sec; f/14; ISO 5000.



## Botanical Name

As we show below, there are many species of the genus *Cissus* in Petén. Therefore, figuring out the species is a challenge. But, until a *Cissus* expert can correct us, we estimate the vine around the shores of the Lake and Río Ixtinto is *Cissus gossypiifolia* Standley.

Synonyms: *Cissus formosa* Standley. On many websites, even botanical websites, the name is spelled *gossypiifolia*.

The family is Vitaceae, Grape (or grapevine) Family, but the berry of this genus, *Cissus*, is said to be not edible by Standley and Steyermark (1949: 295).

## Local Common Name(s)

In Chiquimula and other areas this vine is called "tabardillo" (Ardon 2008: 85).

Aguilar & Diez-Martínez (1989: 78) list the Mayan common name of "Ixtacani" and the local common name "Juan mecate" for *C. gossypiifolia* on their report of the "Most representative flora of eastern Yucatán". Also, the Mayan name "Xtab ka'an" is mentioned on an informative file of wetlands of Quintana Roo (Merediz 2003: 21).

We do not yet have a local name for *Cissus* specifically for Petén. The common names used in Belize are listed in the section below.



### ***Cissus gossypiifolia*.**

Photo by: Roxana Leal, FLAAR Mesoamerica.  
Jul, 04, 2021. Camera: Google Pixel 3XL



## *Cissus gossypiifolia* described for Belize

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**Cissus gossypiifolia** Standl. — **Ref:** FG 6: 297. 1949. — **Loc Use:** MED. — **Nv:** bee rut, behuco parilla, cresta de gallo, rooster's crest. — **Habit:** Liana. (Balick, Nee and Atha 2000: 111).

## Distribution of *Cissus gossypiifolia*

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*Cissus gossypiifolia* is Native to:  
Belize, Colombia, Costa Rica, Cuba, Guatemala, Honduras, Mexico Gulf, Southeast and Southwest Mexico, Nicaragua

[Click here to read more](#)

***Cissus gossypiifolia*.**

Photo by: Nicholas Hellmuth, FLAAR Mesoamerica. Dec. 19. 2018.

Camera: Nikon D810. Settings: 1/250; sec, f/13; ISO 1600.

## Lots of other different species of *Cissus* vines in Guatemala and nearby

Standley and Steyermark list eight species for the diverse eco-systems of Guatemala (1949: 295-299), but of course in subsequent decades other botanists changed the old names.

- *Cissus biformifolia*
- *Cissus erosa*
- *Cissus gossypiifolia*
- *Cissus microcarpa*
- *Cissus rhombifolia*
- *Cissus salutaris*
- *Cissus sicyoides* (modern botanists consider this same as *C. verticillata*).
- *Cissus verticillata*

Additionally, Lombardi (1997:7) mentions a *Cissus pallidiflora* specimen (an archaic synonym for *Cissus tiliacea* Kunth) registered by Lundell for the Tikal National Park in 1969.

Standley and Record list four species for Belize (1936: 239). Keep in mind that names used in the 1930's may today be just synonyms.

- *Cissus biformifolia* Standl.
- *Cissus gossypiifolia* Standl.
- *Cissus rhombifolia* Vahl.
- *Cissus sicyoides* L. (now a synonym for *Cissus verticillata*)

Balick and Arvigo discuss four species for Belize (2015):

- *Cissus cacuminis* Standl. medicinal
- *Cissus gossypiifolia* Standl. Medicinal
- *Cissus microcarpa* Vahl, medicinal
- *Cissus verticillata* (L.) Nicolson & C.E. Jarvis, medicinal (Duke and Vasquez 1994 list as edible)



***Cissus gossypifolia.***

Photo by: Nicholas Hellmuth, FLAAR Mesoamerica.  
Oct, 12, 2021. Camera: iPhone 12 Pro Max.

Lundell (1937) lists only three (for the La Libertad area of Petén):

- *Cissus rhombifolia*
- *Cissus salutaris*
- *Cissus sicyoides* L. (now a synonym for *Cissus verticillata*)

Also, the Portal de Biodiversidad de Guatemala lists one extra species, *Cissus biformifolia*, for the La Libertad area, near La Joyanca archaeological site

[Click here to read more](#)

Suzanne Cook lists one for the Lacandon area of Chiapas, Mexico:

- *Cissus biformifolia* Standl., medicinal.

So, if you combine all the lists, you have a possible total of nine species:

- *Cissus biformifolia*
- *Cissus cacuminis*
- *Cissus erosa*
- *Cissus gossypifolia*
- *Cissus microcarpa*
- *Cissus rhombifolia*
- *Cissus salutaris*
- *Cissus verticillata*
- *Cissus tiliacea*

I estimate that specialists in this genus can add or subtract one or two, but our initial goal is to show the photographs and let the world know that they can find *Cissus gossypiifolia* at Parque Nacional Yaxha, Nakum and Naranjo. Plus, I estimate that additional species could be found if a botany or ethnobotany student had *Cissus* at this park area as a thesis or dissertation topic.

As usual, the botanical names vary and change, but botanist Jim Conrad uses the name *Cissus gossypiifolia*. However, there are many other species of *Cissus* that look very similar, so I am not yet positive that the *Cissus* at Yaxha is *Cissus gossypiifolia*. Note that he does NOT list this species for Petén. And mentions no uses.

***Cissus gossypiifolia*** Standl. Field Mus. Bot. 8: 23. 1930 (type from Honey Camp, Orange Walk, British Honduras, C. L. Lundell 25). *C. formosa* Standl. loc. cit. (type from Suitun, Yucatan, Gaumer 23389). Moist or wet forest or thickets, 1,300 meters or lower; Huehuetenango (Paso del Boqueron, below La Libertad, Steyermark 51208). British Honduras; Campeche; Tabasco; Yucatan. A small or large, woody vine, the young branches glabrous or nearly so; leaves long-petiolate, very variable in shape, the larger and lower ones 9-15 cm. long and often fully as wide, truncate or shallowly cordate at the base, shallowly 3-5-lobate, the lobes acute or abruptly acute, entire or serrate, the upper and smaller leaves ovate to broadly elliptic, not lobate, acute or short-acuminate, entire or serrulate, glabrous or nearly so; cymes pedunculate, dense or lax and many-flowered, the flowers bright red; calyx truncate; petal red

(Standley and Steyermark 1949: 296).

## Is there more than one species of *Cissus* at Yaxha?

There are two collections of *Cissus biformifolia* listed for the Yaxha area in the Portal de Biodiversidad de Guatemala.

[Click here to read more](#)

One of them was found near the park entrance and the other near an archaeological site in Yaxha, both collected in 1999 by Guatemalan biologist Mario Véliz. Since there are six species listed for Belize, I would not be surprised if there was more than one species at Yaxha.

## When do *C. gossypiifolia* bloom at Parque Nacional Yaxha?

We have found this species in flower in October, November and through late December. We estimate it may be found flowering in September.

Already in November a lot of the vines had grapes instead of flowers.

Jim Conrad's photos are of the vine flowering in mid-September.

**Credits for photo on page 15.**  
***Cissus gossypiifolia*.**

Photo by: Nicholas Hellmuth, FLAAR Mesoamerica. Dec. 23. 2021.  
Camera: Nikon D810. Settings: 1/250; sec; f/9; ISO 1000.

## Diverse Insects are Pollinators of *Cissus* flowers at Yaxha

Even if the flowers are so tiny you can hardly notice them, and even when all the flowers have lost their miniature petals, there are still several species of pollinators who are able to land on the inflorescence and suck juicy nectar out of each tiny individual flower. Although we are not completely sure of which insects are *Cissus* pollinators in the Yaxha area specifically, we have gathered some information to give us a clue. Our FLAAR field team had the luck to photograph a butterfly landing on

*Cissus'* inflorescences, which our research team possibly identified as *Cissus gossypifolia*. It is amazing how, even when the flowers on top of the inflorescences are tiny and not visible for us humans from afar, you can see the bright red and orangish colors of the plant attracting these insects that feed on their nectar. The way the red contrasts with the subtle brownish colors of the butterfly is just another work of art from Mother Nature that our team has been able to photograph.



Plus, Pozo et al. (2011:15) reported that the main pollinators of several *Cissus* species in Quintana Roo were diurnal butterflies, followed by bees from the *Apis* genus. Given that Quintana Roo borders with Petén, I wouldn't be surprised if these were the pollinators for the species that we found at Yaxha. Also, several species from this genus around the world are known to be pollinized by bees (for example *C. verticillate* pollinated by *Apis mellifera*, Mexico), flies (pollinating *C. erosa*, Southeast Brazil) or wasps (*C. vitiginea* and *C. quadrangularis* pollinated by *Sphex* sp., Northern Brazil).

## How many *Cissus* species are in Petén?

To estimate how many *Cissus* species we should be looking for at Parque Nacional Yaxha, Nakum and Naranjo, it helps to know how many are listed for Petén and how many for adjacent Belize, keeping in mind that the Yaxha park has no pine forests as does adjacent Belize and much of central Petén (especially in Poptún but also in many other areas of Petén, including just outside the Tikal Park). So not every species for “Petén” or for Belize will be in the PNYNN park. Nonetheless, if there are six *Cissus* species for Petén and six for Belize (and if you put the two together you get about seven species), this encourages me to expect several species in the diverse eco-systems around Parque Nacional Yaxha, Nakum and Naranjo. For example, I estimate the pendant red aerial roots that I often see at eye level may be of *Cissus verticillata*. I will double-check the next time we see these remarkable pendant hanging roots. Plus, there is the one species of *Cissus* vine with sloping into horizontal structure of bright deep red inflorescence all along the west and north shore area of Lake Yaxha. This is also found along the edge of Río Ixtinto and the adjacent shore of Topoxté Island.

BALICK, NEE & ATHA (BELIZE) PAGE 111	STANDLEY & STEYERMARK (FOR PETÉN)	COMMENTS
<i>Cissus biformifolia</i>		Red inflorescence, just like all the ones at Yaxha
<i>Cissus cacuminis</i>		No good photos on Internet
<i>Cissus erosa</i>	<i>Cissus erosa</i>	Red inflorescence, just like all the ones at Yaxha
<i>Cissus gossypifolia</i>	<i>Cissus gossypifolia</i>	Red inflorescence, just like all the ones at Yaxha
<i>Cissus microcarpa</i>	<i>Cissus microcarpa</i>	Red inflorescence, just like all the ones at Yaxha
	<i>Cissus rhombifolia</i>	No red inflorescence; may be synonym for <i>Cissus alata</i>
	<i>Cissus salutaris</i>	Now considered a synonym of <i>Cissus erosa</i>
<i>Cissus verticillata</i>	<i>Cissus sicyoides</i>	Thin red roots (but not red flowers)



## Is *Cissus verticillata* present between Yaxha and Nakum?

*Cissus sicyoides* is now a synonym for *Cissus verticillata* (L.) Nicolson & C.E.Jarvis. This is a significant medicinal plant. But the inflorescence is not red, nor are the flowers (so this is not the common *Cissus* all around the shores of all of Lake Yaxha, especially the north side). However, the roots of *Cissus verticillata* are red! We have found hanging red roots driving from Yaxha to Nakum. The red roots are as thin as really thin spaghetti, to the point that twice I stopped to photograph them.



I have never seen (or perhaps best to say, I had never noticed such a thin deep red fiber hanging from nowhere, at eye level, as I was driving from Nakum back to Yaxha. Photograph by Nicholas Hellmuth. Camera: Nikon D810. Settings: 1/320; sec; f/14; ISO 5000.



*Cissus gossypifolia.*

Photo by: Nicholas Hellmuth, FLAAR Mesoamerica. Oct. 31. 2018.  
Camera: Nikon D5. Settings: 1/320; sec; f/13; ISO 8000.

# *Cissus* species in the Maya Lowlands of Mexico

I list only the *Cissus* species that are in the Maya Lowlands (Chiapas, Tabasco, Campeche, Quintana Roo or Yucatan). I put the Maya Lowlands states in bold:

*Cissus alata* Jacq. **CAM, CHIS**, COL, GRO, HGO, JAL, MEX, MICH, MOR, NAY, OAX, PUE, QRO, **QROO**, SLP, SIN, **TAB**, TAMS, VER, **YUC**

*Cissus biformifolia* Standl. **CAM, CHIS**, COL, GRO, MICH, MOR, OAX, PUE, **QROO**, **TAB**, VER

*Cissus cacuminis* Standl. **CAM, CHIS**, GRO, OAX, PUE, **QROO**, SLP, **TAB**, VER

*Cissus erosa* Rich. **CAM, CHIS**, GRO, MICH, MOR, NAY, OAX, **QROO**, SIN, **TAB**, VER, **YUC**

*Cissus gossypifolia* Standl. **CAM, CHIS**, GRO, OAX, **QROO**, **TAB**, VER, **YUC**

*Cissus microcarpa* Vahl AGS, **CAM, CHIS**, COL, GRO, JAL, MEX, MICH, MOR, NAY, OAX, PUE, QRO, **QROO**, SLP, SIN, **TAB**, TAMS, VER, **YUC**

\**Cissus subtruncata* Rose GRO, MEX, MOR, OAX, PUE, **TAB**

*Cissus tiliacea* Kunth **CAM, CHIS**, CDMX, DGO, GTO, GRO, HGO, JAL, MEX, MICH, MOR, NAY, OAX, PUE, QRO, **QROO**, SIN, SON, TAMS, VER

*Cissus trifoliata* (L.) L. BCN, BCS, **CAM**, CHIH, COAH, COL, DGO, GTO, GRO, HGO, JAL, MEX, MICH, MOR, NLE, OAX, PUE, QRO, **QROO**, SLP, SIN, SON, TAMS, VER, **YUC**, ZAC

*Cissus verticillata* (L.) Nicolson & C.E. Jarvis AGS, **CAM, CHIS**, CHIH, COL, CDMX, DGO, GTO, GRO, HGO, JAL, MEX, MICH, MOR, NAY, OAX, PUE, QRO, **QROO**, SLP, SIN, SON, **TAB**, TAMS, TLAX, VER, **YUC**, ZAC

(Villasenor 2016: 900)

\* *Cissus subtruncata* is now a synonym for *Cissus tiliacea* Kunth.



## Medicinal Uses of *Cissus* Vines

Most scientific articles list *Cissus* vines with providing medicinal uses. Ardon is one example (2008: 71, 77, 85), as he mentions that the infusion of the leaves of *C. verticillata* can be used as a remedy for dengue symptoms and fever. Diez-Martinez & Aguilar (1989: 85) list that *Cissus gossypifolia* leaves are used a remedy for rheumatism, ulcers and fever. Sundaran et al. (2020:581) list dozens of medicinal uses for the species *Cissus quadrangularis*, including: anti-obesity activity, cholesterol regulation, as a treatment for allergies, stomach and muscle pain, diabetes, etc. The infused leaves can be used for osteoarthritis and osteoporosis since studies have revealed bone healing activity. On the other hand, when the leaves are macerated and turned into

powder, they can be used to treat hemorrhoids and some intestinal infections. The stems and roots are boiled to treat bone fractures, and if boiled with limewater it is given to treat asthma. In turn, if the stems are blended to make juice, they can be used to alleviate menstrual pain. Beltrame et al. (2002: 215) mention that *Cissus sicyoides*' extract has shown several health benefits, like helping to treat epilepsy, diabetes, rheumatism and strokes. They also conclude that several species from this genus share at least four beneficial and antioxidant compounds. This would explain why species like *C. quadrangularis*, *C. sicyoides*, *C. gossypifolia* are reported to treat similar illnesses like diabetes and rheumatism.

Photo by: Nicholas Hellmuth, FLAAR Mesoamerica. Dec, 19, 2018.  
Camera: Nikon D810. Settings: 1/250; sec; f/13; ISO 1600.



## Practical Uses of *Cissus vines*

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*Cissus verticillata* can be used to make rope: “The tough flexible stems are used as a substitute for twine and rope.” (Standley and Record 1936: 239). Kakudidi also mentions *Cissus rotundifolia* as a source of fiber that makes highly resistant, durable and flexible rope that is used for fencing in some regions of Uganda (2007: 25).

*Cissus verticillata* is a remarkable vine, forming entire “curtains” (which you can see in Google images, when you Google *Cissus verticillata*). There is a 50-50 chance that we can find *Cissus verticillata* at Yaxha (it’s not easy to find flowers on vines that grow high up in tall trees).

*Cissus rhombifolia* is listed under “domestic uses” on the report of Most representative fauna of eastern Yucatán. These species are used to make different household items (Diez-Martinez & Aguilar 1989: 53). *Cissus sycioides*’ stems are used to make the fibers for rough cloths and rope, and its leaves and stems are used to feed cattle and domestic animals in some regions of Yucatán.

### ***Cissus gossypifolia.***

Photo by: Nicholas Hellmuth, FLAAR Mesoamerica.  
Oct. 9, 2018. Camera: Nikon D810. Settings: 1/320;  
sec; f/10; ISO 1250.

## Additional research

*Cissus verticillata* (L.) Nicolson & C.E. Jarvis is frankly the most interesting species due to its many uses:

**Cissus verticillata** (L.) Nicolson & C.E. Jarvis— **Syn:** *Cissus sicyoides* L. —**Loc Use:** MED. — **Reg Use:** MED, PRD, POIS. — **Nv:** coronilla, prenatal segunda, ta-kan. — **Habit:** Liana.

PRD means products, such as baskets, from stems and roots (Standley and Steyermark 1949). This vine is probably very common in Petén: we need to find it. There are many articles on uses of this plant (but it's not edible). A good introduction is by Standley and Steyermark (in 1949 it was *Cissus sicyoides* L.:

*Cissus sicyoides* L. Syst. Nat, ed, 10, 2: 897, 1759. *Vitis sicyoides* Morales in Poey, Repert. 1: 206. 1866. Comemano; Sanaltodo; Bejuco de gallina. Common or abundant in dry to wet thickets and forest, 1,200 meters or less; Petén; Alta Verapaz; Izabal; Zacapa; El Progreso; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Suchitepequez; Retalhuleu; San Marcos. Mexico; British Honduras to Salvador and Panama; West Indies; South America. Often a very large, woody vine, frequently climbing over tall trees, the stems thick and tough, very flexible; leaves simple, on long or short petioles, oblong-ovate to rounded-ovate, often very asymmetric, 4-16 cm. long, obtuse to acuminate, rounded to cordate at the base, coarsely or finely serrate, usually densely pubescent but sometimes almost glabrous; cymes small or large, pedunculate, usually dense and shorter than the opposing leaves, sometimes lax and open, pubescent; flowers green or yellowish green; fruit globose-obovoid, black at maturity, 1-seeded, about 6 mm. long in the dry state. Called "picamano" in Honduras and "bejuco loco" in Tabasco. This is one of the most common and widely distributed of tropical American plants. It exhibits a great deal of variation in pubescence and leaf form, as a result of which numerous varieties have been named. Perhaps someone may find a basis for separating satisfactorily some of these forms, but with present material the lines of division are vague. The stems and roots are tough and often are used as cordage, and in Costa Rica baskets are made from them. In Guatemala the sap is applied as a remedy for gangrene. In Salvador a decoction of the crushed stems and wood ashes is applied to wounds of cattle. It is said to change the color of their hair, which later resumes its natural color. The inflorescences frequently are greatly deformed by a smut, *Myeosyrinx Cissi* (DC) Beck, so much so that it resembles a strange parasitic plant. This diseased form was made the type of a new genus of flowering plants, *Spondylantka*, by Presl.

(Standley and Steyermark 1949: 298-299).



*Cissus gossypiifolia.*

Photo by: Nicholas Hellmuth, FLAAR Mesoamerica. Oct, 31. 2018.

Camera: Nikon D5. Settings: 1/320; sec; f/7.1; ISO 3200.



***Cissus gossypiifolia.***

Photo by: Nicholas Hellmuth, FLAAR Mesoamerica. Oct, 31. 2018.  
Camera: Nikon D5. Settings: 1/320; sec; f/10; ISO 5000.



# Cited References and additional Bibliography

This bibliography was initiated by the author and then improved and expanded by the FLAAR Mesoamerica bibliography research-editor Marcella Sarti. This was then updated in 2022 by Majo Toralla and Alejandra Valenzuela, FLAAR Mesoamerica. This bibliography is only an introduction to help people who visit Yaxha and wish to learn a bit more about the plants they can experience if they stay overnight so that they have time for a boat ride in addition to the tour of the ruins.

## **ANGELES, G.** and **C. LEÓN-Gómez**

1997 Bark anatomy of four tropical Vitaceae from Veracruz, Mexico. IAWA Journal. Vol. 18, No. 3. Pages 215-228.

Sold online: [https://brill.com/abstract/journals/iawa/18/3/article-p215\\_3.xml](https://brill.com/abstract/journals/iawa/18/3/article-p215_3.xml)

## **ARDON Manchame, Carlos Enrique**

2008 Descripción y Uso de Especies con Propiedades Medicinales en las Comunidades de San Francisco Chancó, Salitrón Y Corral de Piedra, de La Microcuenca del Río Chancó, del Municipio de San Juan Ermita, Departamento de Chiquimula. Thesis, Licenciatura, USAC.

[http://cunori.edu.gt/descargas/DESCRIPCIN\\_Y\\_USO\\_DE\\_ESPECIES\\_CON\\_PROPIEDADES\\_MEDICINALES\\_\\_EN\\_LAS\\_COMUNIDADES\\_DE\\_SAN\\_\\_FRANCISCO\\_CHANC\\_\\_SALIT.pdf](http://cunori.edu.gt/descargas/DESCRIPCIN_Y_USO_DE_ESPECIES_CON_PROPIEDADES_MEDICINALES__EN_LAS_COMUNIDADES_DE_SAN__FRANCISCO_CHANC__SALIT.pdf)

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

1995 Plants of the Petén Itza' Maya. Museum of Anthropology, Memoirs, Number 38, University of Michigan. 248 pages.

Very helpful book, based on years of their dedicated field work. But the index is awkward to the point that finding a single plant is a journal requiring patience. Suzanne Cook's 2016 book on ethnobotany of the Lacandon has a nice Genus species index which would be recommended as an essential part of any scholarly work on medicinal plants or ethnobotany in general.

Turns out not a single *Cissus* is mentioned; perhaps because the once forested areas around Lake Petén Itza have been obliterated for cattle ranches and other disruptive practices. Multiple species of *Cissus* are present in Petén and around Lake Yaxha the flowers are "everywhere." But perhaps if you are at Lake Petén Itza in other months, you just see endless vines (with no flowers to allow you to identify them). *Cissus* around Lake Yaxha was in full flower in September and October with lots still flowering in November and a few in the week before Christmas in December 2018.

Not easily available as a download but is available

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

2000 Checklist of the Vascular Plants of Belize: With Common Names and Uses. *Memoirs of the New York Botanical Garden* Vol. 85. 246 pages.

Has an outstanding bibliography, such as listing more references for Lundell than any other botanical monograph that I have ever read.

**BALICK, Michael and Rosita ARVIGO**

2015 *Messages from the Gods: a guide to the useful plants of Belize*. Oxford University Press.

**BELTRAME, F. L., FERREIRA, A. G., and CORTEZ, D. A.**

1989 *La flora más representativa del oriente de Yucatán; sus usos e importancia*. Secretaría De Agricultura Y Recursos Hidráulicos, Comisión Nacional Del Agua, México. 155 pages.

Available online: [http://repositorio.imta.mx/bitstream/handle/20.500.12013/822/IMTA\\_010.pdf?sequence=1&isAllowed=y](http://repositorio.imta.mx/bitstream/handle/20.500.12013/822/IMTA_010.pdf?sequence=1&isAllowed=y)

**DUKE, James A. and Rodolfo VÁSQUEZ**

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**KAKUDIDI, Esezah K.**

2017 A study of plant materials used for house construction around Kibale National Park western Uganda. *African Journal of Ecology*. Pages 22–27.

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1997 Types of Names in *Ampelocissus* and *Cissus* (Vitaceae) referring to taxa in the Caribbean, Central and N. America. *Taxon*. Vol. 46, No. 3. Pages 423-432.

Sold online: [www.jstor.org/stable/1224385?seq=1#page\\_scan\\_tab\\_contents](http://www.jstor.org/stable/1224385?seq=1#page_scan_tab_contents)

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Available online:

[www.botanicalsciences.com.mx/index.php/botanicalSciences/article/viewFile/1477/1131](http://www.botanicalsciences.com.mx/index.php/botanicalSciences/article/viewFile/1477/1131)

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2015 The antibacterial and antifungal activity of essential oils extracted from Guatemalan medicinal plants, *Pharmaceutical Biology*, 53:4, 548-554.

[www.tandfonline.com/doi/full/10.3109/13880209.2014.932391](http://www.tandfonline.com/doi/full/10.3109/13880209.2014.932391) or

[www.tandfonline.com/doi/pdf/10.3109/13880209.2014.932391?needAccess=true](http://www.tandfonline.com/doi/pdf/10.3109/13880209.2014.932391?needAccess=true)

**MORALES, J. F**

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Available online: [www.researchgate.net/publication/279445958\\_Morales\\_J\\_F\\_2015\\_Vitaceae\\_In\\_Manual\\_de\\_Plantas\\_de\\_Costa\\_Rica\\_Vol\\_VIII\\_BE\\_Hammel\\_MH\\_Grayum\\_C\\_Herrera\\_N\\_Zamora\\_Monogr\\_Syst\\_Bot\\_Missouri\\_Bot\\_Gard\\_131\\_612-624](http://www.researchgate.net/publication/279445958_Morales_J_F_2015_Vitaceae_In_Manual_de_Plantas_de_Costa_Rica_Vol_VIII_BE_Hammel_MH_Grayum_C_Herrera_N_Zamora_Monogr_Syst_Bot_Missouri_Bot_Gard_131_612-624)

**PÉREZ, José**

2014 Las uvas y sus parientes en la península de Yucatán. Herbario CICY. Vol. 6. Pages 59-61.

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

1936 Forest and Flora of British Honduras. Field Mus. Nat. Hist., Bot. Series 12, 432 pages.

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

1949 Flora of Guatemala. Fieldiana: Botany Vol. 24, Part VI. Chicago Natural History Museum. *Cissus* species which are listed for Peten are on pp. 294-299

Again we note, Standley and Steyermark clearly did not hike the back trails of Peten whatsoever. They get their listings mostly from earlier botanists (as do we all). They list six *Cissus* species for Petén

**SUNDARAN, J., BEGUM, R., VASANTHI, M., KAMALAPATHY, M., BUPESH, G., and SAHOO, U.**  
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2016 Checklist of the native vascular plants of Mexico Catálogo de las plantas vasculares nativas de México. Revista Mexicana de Biodiversidad 87 (2016) 559–902.

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

## Web sites

<http://www.backyardnature.net/mexnat/cissgoss.htm>

Jim Conrad provides several nice photos.

[http://chalk.richmond.edu/flora-kaxil-kiuic/c/cissus\\_gossypifolia.html](http://chalk.richmond.edu/flora-kaxil-kiuic/c/cissus_gossypifolia.html)

Several photos

[www.cicy.mx/sitios/flora%20digital/ficha\\_virtual.php?especie=2284](http://www.cicy.mx/sitios/flora%20digital/ficha_virtual.php?especie=2284)

Information.

<https://colombia.inaturalist.org/taxa/287410-Cissus-gossypifolia>

Photo and map location.

[www.gbif.org/species/4053753](http://www.gbif.org/species/4053753)

Map location.

<https://naturalhistory.si.edu/research/botany/research/lianas-and-climbing-plants-neotropics>

Says there are 10,000 species of climbing plants in the Neotropics but does not show a photograph of even a single sample.

[www.tropicos.org/name/34000413?projectid=7](http://www.tropicos.org/name/34000413?projectid=7)

Information.

## Helpful web sites for any and all plants

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

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

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

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

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

This is the main SEARCH page.

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

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

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

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

<http://enciclovida.mx>

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

[www.kew.org/science/tropamerica/imagedatabase/index.html](http://www.kew.org/science/tropamerica/imagedatabase/index.html)

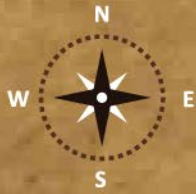
Kew gardens in the UK is one of several botanical gardens that I have visited (also New York Botanical Gardens and Missouri Botanical Gardens (MOBOT), in St Louis, the botanical garden in Singapore, and El Jardín Botánico, the open forest botanical garden in Guatemala City).

[www.worldfloraonline.org](http://www.worldfloraonline.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.

# RESERVA DE LA BIÓSFERA MAYA - RBM - DEPARTAMENTO DE PETÉN, GUATEMALA

- Límite Municipal
-  Ruta
-  Aeropuertos
- Terracería
- Carretera



MÉXICO

BELICE



## CATEGORÍAS DE MANEJO

-  BIOTOPO
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-  ZONA DE USO MÚLTIPLE
-  CONCESIÓN INDUSTRIAL
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-  MONUMENTO CULTURAL
-  ÁREAS PROTEGIDAS DEL SUR DE PETÉN



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---

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**Victor Mendoza** environmental engineer in charge of the photographic database and its taxonomic identification. He also helps with the coordination of research activities.

**Sergio Jerez** agronomy engineering student involved in the identification of plants and support in research topics.

**Flor Morales** is a biologist that collects information and bibliographic references to feed our electronic library of flora and fauna and support research for reports and websites.

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**Edwin Solares** is a photographer and videographer during our expeditions. Later, he edits this content to be used in our different materials.

**Haniel López** is a drone pilot and photographer during our expeditions.

**Pedro Pablo Ranero** with a degree in communication is responsible for editing videos of flora and fauna to create content on our sites.

**Andrea Sánchez** graphic designer who helps prepare the graphic line of our publications. She is our editorial art director.

**Jaqueline González** graphic designer who combines text layout and photo editing to create our reports.

**Heidy Galindo** graphic designer who combines text layout and photo editing to create our reports.

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

**María Alejandra Gutiérrez** is an experienced photographer who is now in charge of the preparation of photographic catalogs.

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**Juan Carlos Hernández** is a graphic designer and part of the web team. Receive the material we produce to place on our sites.

**María José García** is a graphic designer and part of the web team. Receive the material we produce to place on our sites.

**Andrés Fernández** is a graphic designer and in charge of keeping our websites updated and more efficient for the user.

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**Gabriela Cabnals** helping scanning archaeology files of the FLAAR archive and assist in the office

**Luis Molina** is a professional illustrator specialized in line drawings of Maya vases, bowls, and plates.

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

**Laura Morales** is a digital content engineer, She is in charge of directing the animation area of our MayanToons project.

**Paula García** is part of our MayanToons animation team. Her job is to bring our favorite characters to life.

**Niza Franco** is part of our MayanToons animation team. Her job is to bring our favorite characters to life.

**Isabel Trejo** is a graphic designer and illustrator for MayanToons and for social media posts.

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**Josefina Sequén** is an illustrator for MayanToons.

**Rosa Sequén** is an illustrator for MayanToons.

# Other publications on RBM Project



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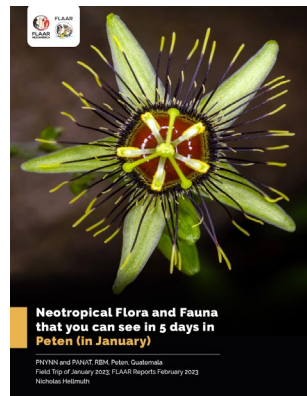
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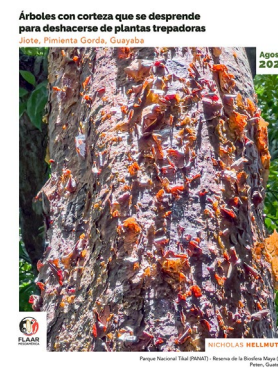
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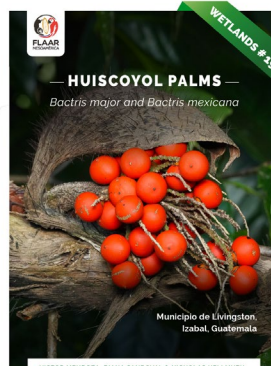
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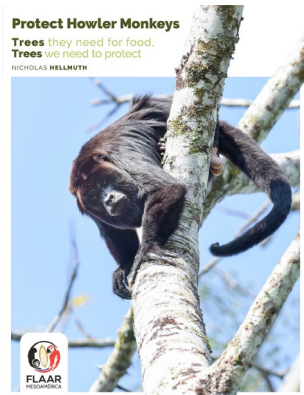
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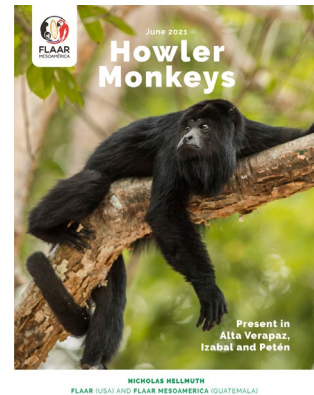
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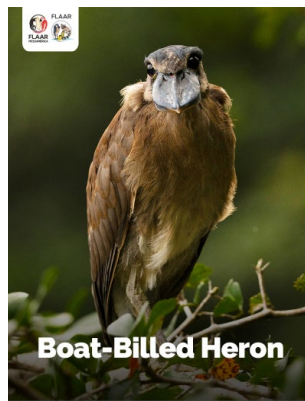
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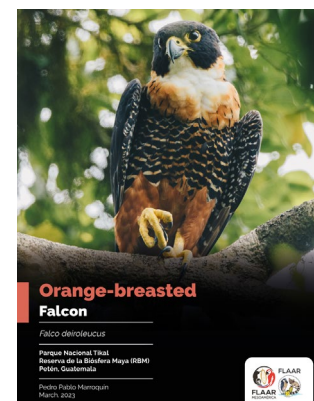
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