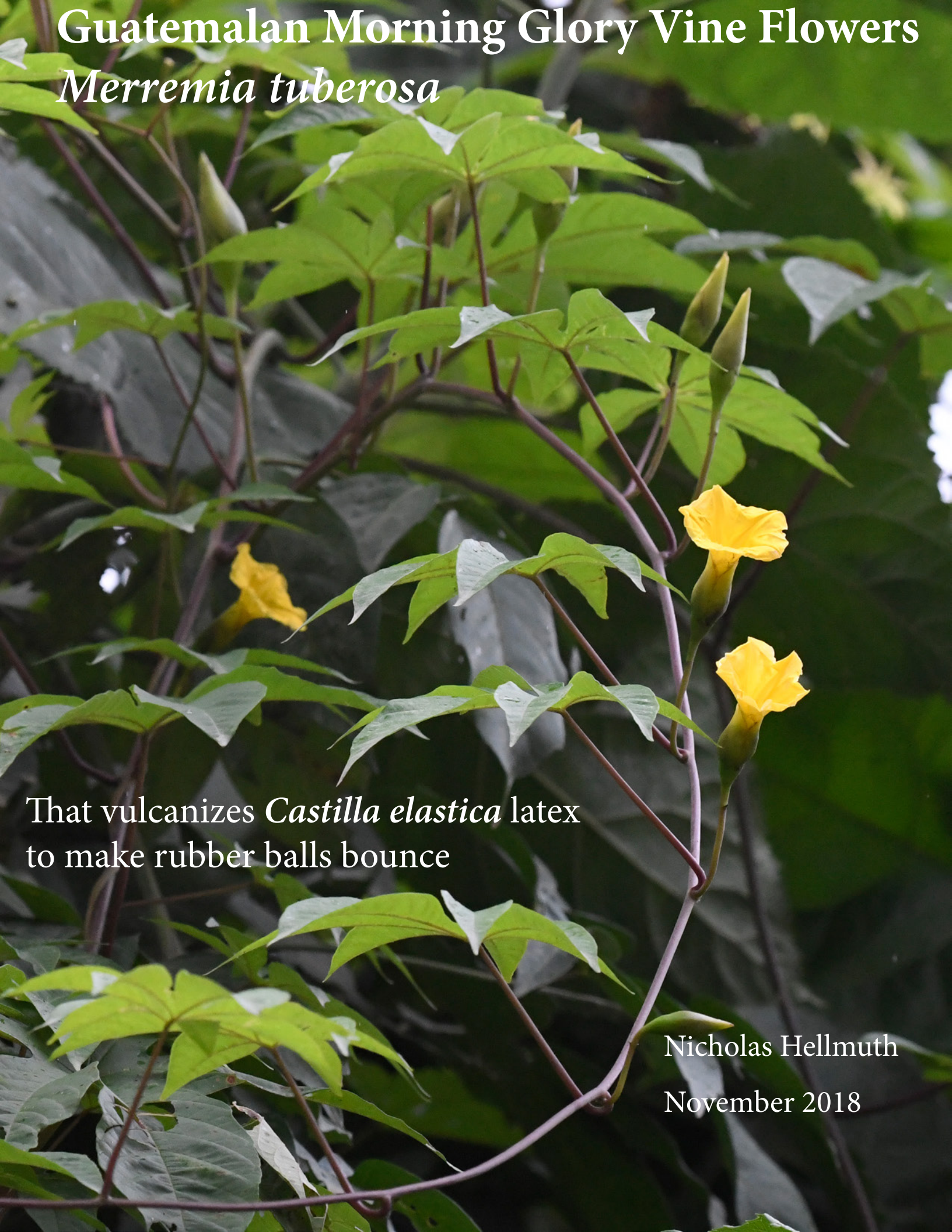
Guatemalan Morning Glory Vine Flowers

Merremia tuberosa



That vulcanizes *Castilla elastica* latex
to make rubber balls bounce

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FOTOGRAFÍA DE PORTADA: **Guatemalan Morning Glory Vine Flowers *Merremia tuberosa***, Nikon D5, Nikon AF-S 200mm f/4 AF-D Macro, f/10.0, 1/800 Seg. ISO 10000, Guatemala. Fotografía por: Nicholas Hellmuth, FLAAR Mesoamérica.

FOTOGRAFÍA DE ÍNDICE: Nikon D5, Zeiss Makro-Planar T* 2/100 ZF.2, f/9.0, 1/500 Seg. ISO 6400, Guatemala. Fotografía por: Nicholas Hellmuth, FLAAR Mesoamérica.

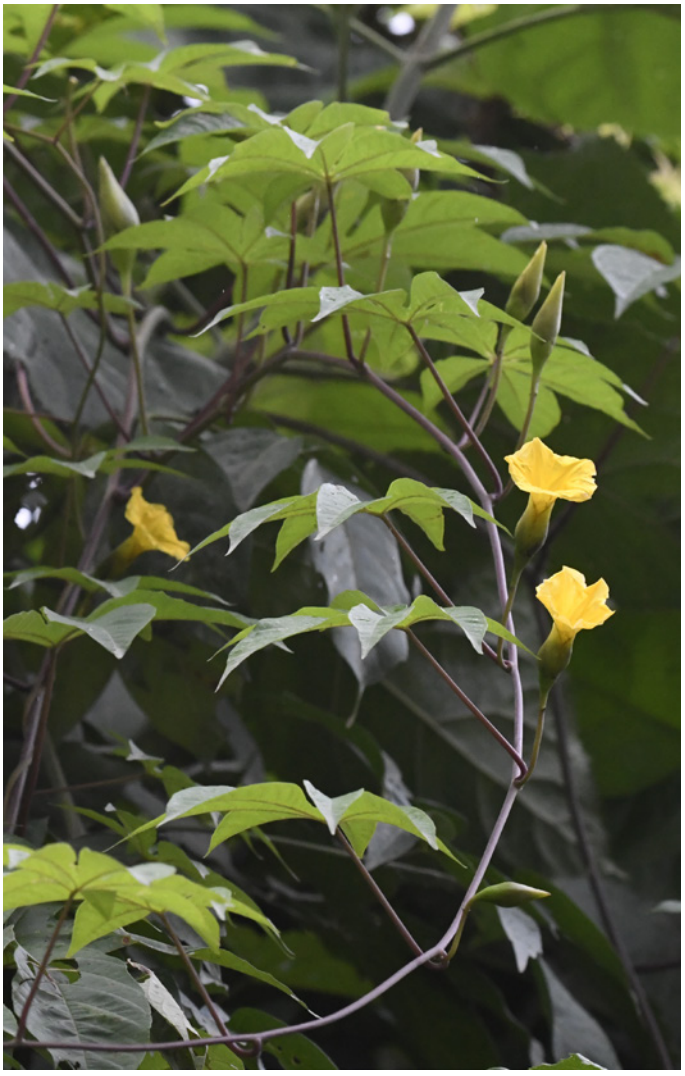
Rubber tree latex sap has to be vulcanized before it can bounce

If you collect sap from the Olmec and Maya native rubber tree (of Mexico, Guatemala, Belize, Honduras, etc), the latex from ***Castilla elastica*** is not yet rubber-like. To make latex sap become rubbery you have to add a chemical, boil it, and then the tree sap is "vulcanized."

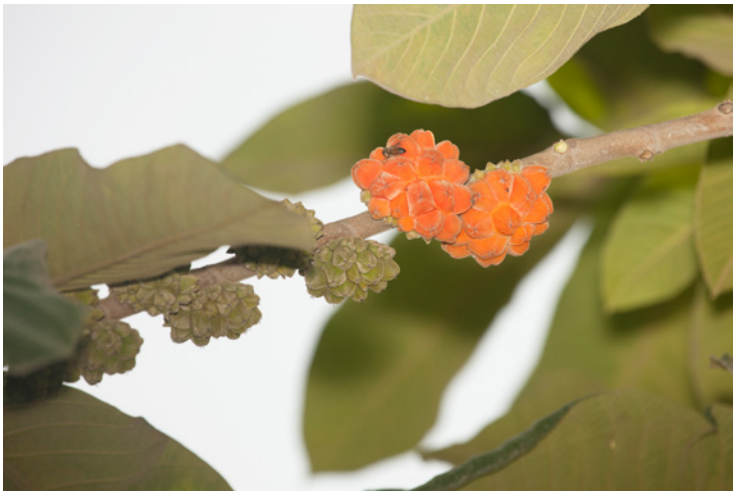
People in the USA are taught that Thomas Goodyear invented vulcanization. But the Olmecs of Mexico discovered how to vulcanize rubber about 3000 years before any Gringo figured it out.

The Maya, Teotihuacan, Classic Veracruz (of El Tajin), the Zapotecs (of Monte Alban), the Toltecs, Mixtecs (of Oaxaca), Aztecs: they all knew how to vulcanize rubber centuries before either Thomas Goodyear or Thomas Hancock (UK) claimed patents in the mid-1800's.

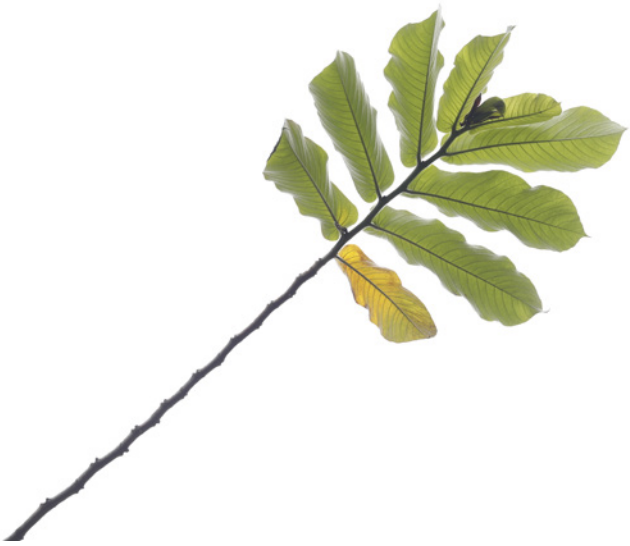
Castilla elastica



Merremia tuberosa




Rubber tree photo Alta Verapaz

Rubber tree photo El Caoba to Nakum road, Parque Nacional Yaxha -nakum-naranjo

So far the most Castilla elastic trees that we have found are in Alta Verapaz. Both ***Ipomoea alba*** and ***Merremia tuberosa*** are also in Alta Verapaz. However the rubber tree and Ipomoea alba have been found in Parque Nacional Yaxha Nakum Naranjo. We estimate that we can also find at least one species of Merremia morning glory vine as well.

If local people plant the tree and both vines around their homes, they can form a village cooperative to make rubber balls to sell to tourists. “Mayan Rubber Balls from authentic Mayan Rubber Trees” will become popular with visitors. FLAAR has two decades of experience in generating marketing, so

Ipomoea alba is featured in every single publication by Tarkanian

Professor Michael. J. Tarkanian is familiar with diverse options for the Olmec and Maya to have added juice from vines to turn latex of ***Castilla elastica*** into bounceable rubber. However ***Ipomoea alba*** is the plant selected to be extensively tested by Tarkanian to turn latex into functional rubber (because this is the vine used in Chiapas where he worked). I would like to propose to test ***Merremia tuberosa*** since both these vines are present in Guatemala.

Suzanne Cook clearly documents the use of both ***Ipomoea alba*** and also ***Merremia tuberosa***.

Ts'ak k'ik', literally 'rubber venom'. This is used for killing k'ik' (***Castilla elastica***). It's the same as hut'kih (***Ipomoea sp.***, ***I. alba).*** Uts'ak k'ik' looks almost the same as hut'kih. The two are used for killig k'ik'…. They contain a lot of resin, the same as hut'kih….The resin from the vine is extracted and mixed with the latex of the k'ik' tree (***Castilla elastica***) to produce rubber. (Cook 2016: 260).

Nahuatl name (Aztec) is xixicamátic (Sahagun).

How many other "Morning Glory" vines can we find which also can turn latex into functional rubber?

So, if there are two plants whose chemicals can "vulcanize" rubber, surely other ***Merremia species*** and other ***Ipomoea species*** should be looked at. So, after doing more research I found that ***Merremia umbellata*** (L.) H. Hallier is called cuajo de hule (Conabio, Mexican government agency web page). In Mexico this vine is found in: Campeche, Chiapas, Colima, Guanajuato, Guerrero, Jalisco, Estado de México, Michoacán, Morelos, Nayarit, Oaxaca, Puebla, Querétaro, Quintana Roo, San Luís Potosí, Sinaloa, Tabasco, Tamaulipas, Veracruz y Yucatán.

So rather likely that ***Merremia umbellata*** is in Peten, which touches Chiapas, Tabasco, Campeche, and Quintana Roo. I estimate that even more species of Merremia and more species of Ipomoea can be found which could have been utilized 2000 years ago to make rubber from ***Castilla elastica*** latex. As soon as funding is available we can find these interesting plants.

Botanical information on *Merremia tuberosa*

Scientific name is ***Merremia tuberosa*** (L.) Rendle. Common name is woodrose; also spelled wood rose. This is because after the flower dries then additional petal-shaped forms grow out around the bulbous seed pod: so it looks like a "wooden rose."

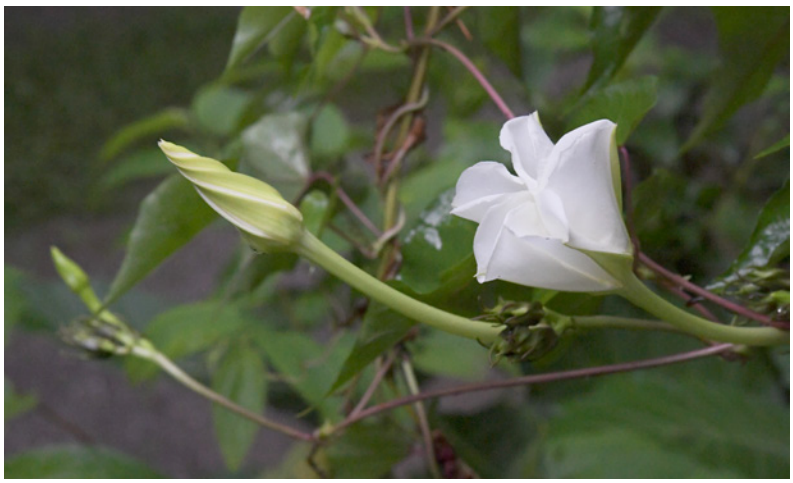
Botanical scientific Family: Convolvulaceae. So this is same family as I***pomoea alba*** (they both look like morning glory vine flowers). ***Ipomoea alba*** also provides chemicals to vulcanize rubber. ***Ipomoea alba*** looks like all other morning glories, but blooms at night! So is called Moon Flower. We raise both ***Ipomoea alba*** and also ***Merremia tuberosa*** in the FLAAR Mayan Ethnobotanical Research Garden, 1500 meters above sea level, in Guatemala City. The original location for these plants is in various diverse eco-systems of Alta Verapaz, Peten, and other parts of Guatemala.

Merremia tuberosa

Photo by Nicholas Hellmuth, Camera Nikon D5, Zeiss Makro-Planar 2/100 ZF.2, ISO 6400, f/9.0, speed 1/320 seg. FLAAR Photo Archive of Flora and Fauna.
21 de diciembre de 2016, 12:23:58 PM
Tucurú to La Tinta

Ipomoea alba

Photo by Nicholas Hellmuth, Camera Nikon D5, Nikon AF-S Micro 60mm F2.8 G, ISO 10000, f/10.0, speed 1/400 seg. FLAAR Photo Archive of Flora and Fauna.
01 de Agosto de 2018, 06:07 PM
Garden Flaar Mesoamerica



To me it looks like a cardboard flower (in a complimentary sense in being sculpted and hard). Of course the petals are so dry they are fragile, but to see a tall vine with "solid brown" "flowers" all over it, is an impressive sight.

These were photographed along the highway from Tucuru to La Tinta. All this has now been totally bulldozed away in recent months as the highway has been paved this year (2018). So the photos of FLAAR are the among the only records of the presence of this plant parallel to the river.

As typical, there are lots of synonyms (older names used by earlier scholars, names which are no longer accepted). Best to find these in a botanical book if you wish to know the endless obsolete earlier names.

The local names given for Guatemala include Quiebra-machete (Suchitepequez; probably an erroneous rendering of quiebra-cajete); rosa de barranco; foco de luz; bejuco de golondrina; quinamacal (Peten)… Called "seven-fingers" in British Honduras. In Honduras the vine is called "mala hierba," it being claimed that the huge tuberous roots are poisonous to pigs and horses.

It is one of the more showy of Central American morning-glories and under favorable conditions attains a great size and is covered with the large blossoms. In Guatemala the dry capsules with their enveloping sepals are much used as decorations in houses or on alters, either in their natural brown color or embellished with silver or gold paint.

Moist or wet thickets, 1,200 m. or lower; Peten; Alta Verapaz; Baja Verapaz; Izabal; Escuintla; Suchitepe"quez; Retalhuleu; Quiche"; Quezaltenango; San Marcos. Mexico; British Honduras to Panama; West Indies; South America. (Standley and Williams 1970: 74 and 75).

Merremia tuberosa, Photo by Nicholas Hellmuth, Camera Nikon D810, Sigma 50mm F/1.4 Dg, ISO 80, f/11.0, speed 1/3 seg.
FLAAR Photo Archive of Flora and Fauna.
03 de MArzo de 2018, Photographic studio FLAAR Mesoamerica

***Merremia tuberosa* is native to Mexico, Guatemala and other countries**

Merremia tuberosa is invasive as an unwanted weed in many parts of the world. However I am totally content to have it taking over my entire garden and, literally, covering my entire house.

Merremia tuberosa is the most rapidly growing and spreading vine we have introduced to our garden. It grows up over a 3-story house with ease. It grows up into trees and spreads throughout their branches. I am totally happy to have this plant wandering around my garden.

It took well over a year before it decided to bloom, but finally, in October and November, it is blooming. Flowers open after 10 am, so barely a "morning glory."

We have watched the flower open; it opens so fast that unless we have our fingers on the camera cable release we miss its opening sequence.

In Guatemala this plant is common growing both near and also physically adjacent to ***Castilla elastica*** rubber trees. Literally: the two are happy in the same eco-system.

Ipomoea alba Moonflower vines grow a few kilometers away. So it would be great to start a project to see to what degree ***Merremia tuberosa*** can vulcanize rubber the same efficiency as already well documented for ***Ipomoea alba***. Suzanne Cook's thorough study of plants of the Lacandon Maya area of Chiapas clearly documents that the Lacandon Maya use ***Merremia tuberosa*** to vulcanize latex (2016: 216) from ***Castilla elastica*** tree.

Merremia tuberosa

Photo by Nicholas Hellmuth, Camera Nikon D5, AF-S VR Micro-Nikkor 105mm f/2.8G IF-ED, ISO 1000, f/4.0, speed 1/500 seg. FLAAR Photo Archive of Flora and Fauna.
11 de Noviembre de 2018, 09:58 a.m
Garden Flaar Mesoamerica

Merremia tuberosa

Photo by Nicholas Hellmuth, Camera Nikon D5, AF-S VR Micro-Nikkor 105mm f/2.8G IF-ED, ISO 1000, f/4.0, speed 1/500 seg. FLAAR Photo Archive of Flora and Fauna.
11 de Noviembre de 2018, 10:04 a.m
Garden Flaar Mesoamerica

Can *Merremia tuberosa* be found in Parque Nacional Yaxha Nakum Naranjo?

Both ***Ipomoea alba*** and ***Merremia tuberosa*** are listed for Calakmul area (a few kilometers north of the Campeche (Mexico) Peten (Guatemala border (so not far from El Mirador, a bit south of the border (CONANP 2013: 8-9).

Park ranger Teco (Moises Daniel Pérez Díaz) found ***Castilla elastica*** between Yaxha and Nakum and now is tracking down whether ***Merremia tuberosa*** is also present.

Our FLAAR team has found *Ipomoea alba* at Lake Yaxha area

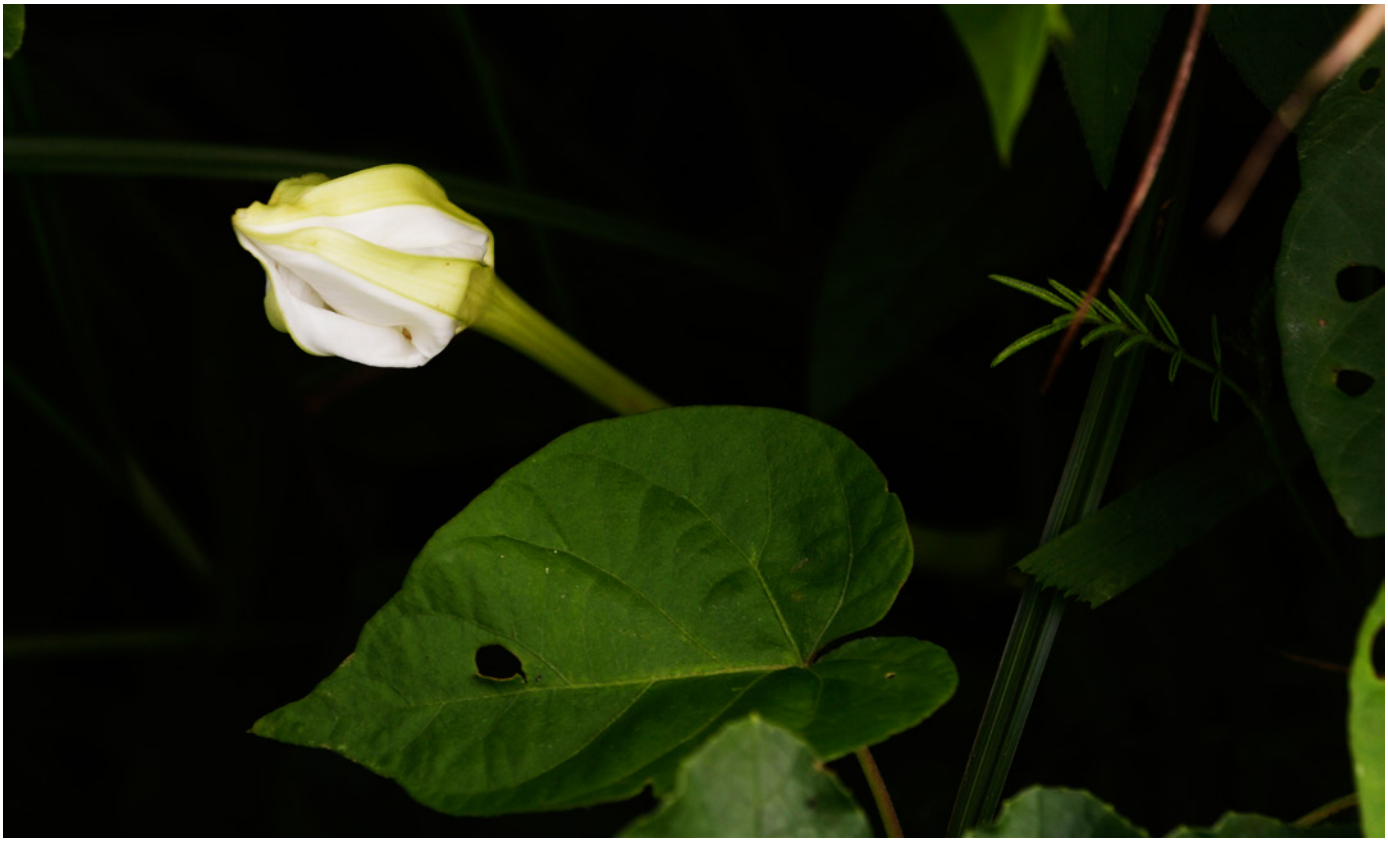
Photograph at 05:01 a. m. in the morning by Nicholas Hellmuth, Camera Nikon D810, Nikon AF-S 200mm f/4 AF-D Macro, ISO-2500, f/10.0, speed 1/200 seg.

Photograph at 07:55:28 a. m. in the morning by Nicholas Hellmuth, Camera Nikon D810, Nikon AF-S 200mm f/4 AF-D Macro, ISO-1000, f/9.0, speed 1/250 seg.

Between Yaxha and Sacnab, *Ipomoea alba,* parque nacional yaxha-nakum-naranjo

Since there is no electricity anywhere near, in order to photograph these flowers opening at night

Senaida Ba, one of our plant scout team, found Ipomoea alba in two locations at Parque Nacional Yaxha: between the two lakes.



Here is ***Ipomoea alba*** along the shore of Rio Ixtinto (on the shore of Topoxte Island). Since the flowers bloom at night, by the time we arrive in the morning they are wilted.

***Merremia tuberosa* is not considered to be hallucinogenic**

Even though ***Merremia tuberosa*** is not considered to be psychoactive, we recommend NOT taste testing or eating it.

Merremia tuberosa is considered a potential medicinal plant

Lots more to learn about the medicinal potential of ***Merremia tuberosa***.

Useful plants of the Mayan people

In other words, our discoveries suggest that Yaxha may have been an ancient Maya producer of rubber for all the many uses of this practical substance. Same with Nakum and Naranjo, and the many Mayan sites in between.

Rubber is useful for many more products than just game balls: rubber soles for sandals is a potential use. Would be worth doing research to make list of what other items the Classic Maya could have used rubber for.

Suggested reading on *Merremia tuberosa*

PDF, Articles, Books on *Merremia tuberosa*

AUSTIN, D. F.

1998 Xixicamátic or wood rose (***Merremia tuberosa***, Convolvulaceae): origins and dispersal. Economic Botany. Vol. 52, No. 4. Pages 412-422.

AUSTIN, D. F.

2013 Moon–Flower (***Ipomoea alba***, Convolvulaceae)—Medicine, Rubber Enabler, and Ornamental: A Review. Economic Botany Vol. 67 No.3 Pages 244-262.

HAMMEL, B. E.

2010 Convolvulaceae. Monographs in Systematic Botany from the Missouri Botanical Garden. Vol. 119 Pages 72-126.

CAMPOS, Álvaro, VILLANUEVA, M., KELLY, LAWRENCE and **Alfonso DELGADO**

2004 Bejucos y otras trepadoras de la estación de Biología Tropical los Tuxtlas, Veracruz, México. UNAM. 155 pages.

CONANP

2013 Nomination of Ancient Maya City and Protected Tropical Forests of Calakmul, Campeche By the Government of Mexico for Inscription on the World Heritage List. CONACULTA, Mexico.

Totally unclear who is the author(s) and which is the "publisher" CONACULTA or CONANP. However the list of plants is impressive.

Available online: https://whc.unesco.org/uploads/nominations/1061bis.pdf

COOK, Suzanne

2016 The forest of the Lacandon Maya: an ethnobotanical guide. Springer. 334 Pages.

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

O'DONELL, C. A.

1941 Revision de las especies americanas de Merremia (Convolvulaceae) (Lilloa). Vol. 6. Pages 514-516.

QUATTROCCHI, Umberto
2016 CRC World dictionary of medicinal and poisonous plants: common names, scientific names, eponyms, synonyms, and etymology. CRC Press. 3960 Pages.

STANDLEY, Paul C.
1938 Convolvulaceae, in Flora of Costa Rica. Field Museum of Natural History, Botany Series. Vol. 18. Pages 960-974.

STANDLEY, Paul C. and Louis O. WILLIAMS
1970 Convolvulaceae. In P. C. Standley, L. O. Williams and D. N. Gibson, eds. Flora of Guatemala, Fieldiana: Botany, Volume 24, Part IX, Number 1. Pages 4-85.

Suggested web pages with photos and information on *Merremia tuberosa*

http://www.theplantlist.org/tpl/record/tro-8500796
Synonyms.

https://www.cabi.org/isc/datasheet/115577
Photos.

https://www.cicy.mx/sitios/flora%20digital/ficha_virtual.php?especie=1245
Information.

http://keys.trin.org.au/key-server/data/0e0f0504-0103-430d-8004-060d07080d04/media/Html/taxon/Merremia_tuberosa.htm
Information and photos.

Written Resources on other Merremia species

AUSTIN D. F., McDonald J.A. and **D. Murguía-Sánchez**
2012 Convolvulaceae. In: Flora Mesoamericana. Missouri Botanical Garden. Tropicos.org.

www.tropicos.org/Name/8500797?projectid=3&langid=66

CARRANZZA, E.
2008 Convolvulaceae (II). En: Rzedowski, G. C. de y J. Rzedowski (eds.). Flora del Bajío y de regiones adyacentes. Fascículo 155. Instituto de Ecología-Centro Regional del Bajío. Consejo Nacional de Ciencia y Tecnología y Comisión Nacional para el Conocimiento y Uso de la Biodiversidad. Pátzcuaro, Michoacán, México.

McDonald, A.
1993 Convolvulaceae I. En: Sosa, V. (ed.). Flora de Veracruz. Fascículo 73. Instituto de Ecología. Xalapa, Veracruz, México.

STEVENS W. D., C. ULLOA U., A. POOL and **O. M. MONTIEL** (eds.)
2001 Flora de Nicaragua. Vol. 85, tomos I, II y III. Missouri Botanical Garden Press. St. Louis, Missouri.

VILLASEÑOR R., J. L. and **F. J. ESPINOSA G.**
1998 Catálogo de malezas de México. Universidad Nacional Autónoma de México. Consejo Nacional Consultivo Fitosanitario. Fondo de Cultura Económica. México, D.F.

Web sites on Merremia species other than tuberosa

www.conabio.gob.mx/malezasdemexico/convolvulaceae/merremia-umbellata/fichas/ficha.htm