



ASOCIACION  
**FLAAR**  
MESOAMERICA

Fifth edition, November 2011

# Maya Ethnobotany

**Complete Inventory:  
fruits, nuts,  
root crops,  
grains, construction  
materials, utilitarian  
uses, sacred plants,  
sacred flowers**

**Guatemala, Mexico, Belize, Honduras**

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## Introduction

This opus is a progress report on over thirty years of studying plants and agriculture of the present-day Maya with the goal of understanding plant usage by the Classic Maya. As a progress report it still has a long way to go before being finished. But even in its unfinished state, this report provides abundant listings of plants in a useful thematic arrangement. The only other publication that I am familiar with which lists even close to most of the plants utilized by the Maya is in an article by Cyrus Lundell (1938).

- Obviously books on Mayan agriculture should have informative lists of all Maya agricultural crops, but these do not tend to include plants used for house construction.
- There are monumental monographs, such as all the trees of Guatemala (Parker 2008) but they are botanical works, not ethnobotanical, and there is no cross-reference by kind of use. You have to go through over one thousand pages and several thousand tree species to find what you are looking for.
- There are even important monographs on Maya ethnobotany, but they are usually limited to one country, or one theme, often medicinal plants.
- There are even nice monographs on edible plants of Central America (Chízmar 2009), but these do not include every local edible plant, and their focus is not utilitarian plants at all, nor sacred plants. *La flora silvestre de Guatemala*, by Luis Villar Anleu (2008), is another helpful publication, but our goal was to list every category: wild and domesticated, edible and utilitarian, and sacred (even if not eaten or used for construction).

There are plenty of other lists of all Maya whatever else, but for one single resource, which lists all plants: food, construction, sacred flowers, etc; such a list is not widely available (or if available is kept well hidden). The most inspirational list I have found is over seventy years ago, namely that already mentioned, of Cyrus Lundell.

I wrote this entire opus without access to Brücher's 1989. *Useful Plants of Neotropical Origin and Their Wild Relatives*. I found another list after I had finished my work: that of Legner, "*American Plants of Economic Importance*" where he cites Brücher and others. Another list that I found after I finished mine was a "*Crop List of Latin America*." I did not cross-check my list with that of *Plantas Comestibles Centro America* (Chízmar 2009) until I had finished my first and second editions. I found the list plants of the Maya Mountain Research Farm only after I had finished the present second edition. FLAAR is open to cooperation with these other entities and their lists. Just as we credit their work, we appreciate when other lists credit our several decades of work that has produced this second edition update and improvement on our first edition of last month (which was in turn the work of several decades).



After I finished the first two editions I continued to do more research and kept finding more complications of plants. A good example would be the article by Rico-Gray et al. 1991 for Yucatan.. Even though it was only “forest species” it lists about 250 plants. In almost every such list I find one or two plants that was not in my original list. Nonetheless, even my first edition had more useful and edible plants than most of these articles and monographs. But even after I had found severa hundred edible or otherwise utilitarian plants, I still find one or two when I read the work of an experienced specialist. For example, I found at least three plants in the University of Texas course material of Brian Stross that I had not seen listed elsewhere.

But as a work-in-progress I am constantly adding obscure edible or utilitarian plants to my list. But to keep the list within reason, I focus exclusively on the plants related to Maya culture: southern Mexico, Belize, Guatemala, and portions of Honduras and El Salvador.

This present version by FLAAR Reports has only a few illustrations ironically in part because the FLAAR Photo Archive has so many thousands of photos of ethnobotany and ethnozoology that it is time-consuming and expensive for a small research institute to go into this large an archive and pull out photos of each species. In a single 8-day period in early June 2011 we took over 42 GB of photographs (and these are compressed files; the actual total once in TIF format would be more than 80 GB).

Yes, obviously of course the archive should be coded and cataloged: but it has cost thousands of dollars to do the field work to bring in the photographs. It would cost even more to catalog them.

So we have a simple decision: spend money on field work: resulting in a larger and more informative archive; or spend money on cataloging what we have photographed in past years (result is no money for any more field work). Sorry, but I prefer field work, since a capable student or scholar can catalog the archive in the future. But travel in Latin America gets progressively more dangerous. In other words, in the next decade not many people will wish to venture into rural areas to do the needed photography. Plus many of the species will have been bulldozed by commercial companies or burnt by milpa agriculture or for cattle pastures. So the time to do photography of plants out in the field is now, not later.

The list you see below is the work of many years, including my research in the Archivo General de Indias (Sevilla) in 1971, and my ethnohistory work in the Archivo General de Central America (Guatemala City) before then (Hellmuth 1971; 1977). In other words my current publications on Maya ethnobotany are based on research initiated 40 years ago.



The thematic categories that I have selected are based on common sense and are categories that I have found easy to understand as a general practitioner (I rather obviously do not have a university background in biology or botany). My interest in botany comes from living 12 months in Tikal at age 19 (1965); and five seasons at Yaxha, Peten at age 35+ (1970-1975), plus twenty years of field trips through Campeche, Chiapas, Yucatan, Quintana Roo, Tabasco, Belize, and Honduras (1970's-1990's).

I am entirely self-taught in botany, and I appreciate the help of the more experienced Guatemalan biologists who have worked for FLAAR: Eduardo Sacayon for many years; Mirtha Cano for about two years; and presently Priscila Sandoval. It is also helpful to have the publications of the many capable Guatemalan botanists at the universities and government institutes. The publications of Ana Lucrecia MacVean and Elfriede Pöll are good examples.

It would be helpful to compare my themes with how the Maya themselves organize their plant world. This is a job of a linguist. I would expect the Maya to organize things very differently. But in order to do all my research, and to present the findings to an audience worldwide in a manner we can understand, it is more effective to keep the present listings in basic thematic groups. A linguist can in the future do a thesis on how a Mayan language group would classify their plant universe.

## Thesis, dissertation research planning

One of many reasons I work on these Maya ethnobotanical listings is to assist and encourage students to do thesis and dissertation work on the plants of the Maya area (before these plants are burned out or bulldozed to extinction). But if you do intend to do a thesis, consider limiting yourself to one topic: fruits and nuts, or basketry, rope, and thread materials, or perhaps construction materials, vegetables, sacred flowers, etc. My mania to list everything is a constant stumbling block to getting things finished.

There are thousands of plants and to cover all this in a single thesis is not realistic. I am crazy for even attempting to list them all. But again, the list that follows are only notes; a progress report. But even in rough form, even unfinished, this PDF represents endless hours at my desk, and out in the Peten rain forests and savannas, as well as field trips throughout other areas of Guatemala, Belize, Mexico, and Honduras.

I first came to Mexico when I was 16; and was first in Guatemala when I was 17 years old. I am now precisely half a century in Mesoamerica and still working with plants and animals. I intend to continue research for several more decades!





I apologize in advance to botanists that I do not list all the botanist's names at the end of a species name. I want to get this work finished in a realistic time framework, and whether I list Lundell or Linnaeus or Standley or Morelet will not make or break the benefit of my thematic concept of listing. Standley's scholarly work of listing all antiquated names is great, but that is not my goal. I seek to provide practical assistance to students, scholars, and interested lay people in today's world of 2011. But I do follow botanical tradition in capitalization and italics. And I do my best to keep track of which books I have used or referenced by others in the bibliography.

If you know of a plant in any category which I should include, please let me know at [ReaderService@FLAAR.org](mailto:ReaderService@FLAAR.org).



Flor de Mayo by Nicholas Hellmuth with a Canon EOS-1Ds Mark III.

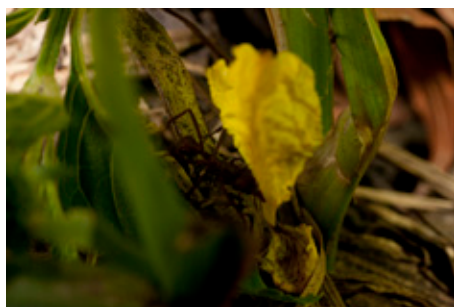


This report is an Annual Report for 2010-2011

This report is intended to be a form of “Annual Report” for 2010. Actually you could consider it an annual report for the decade from 2000 through 2010. Normally we are so full-time occupied doing research that we don’t stop research to write lists of what we have done previously. We are eager to do more research rather than cogitate on what we already did. But every once in a while we do need to stop long enough to get out reports on what we have amassed so far.

Three years ago Mirtha Cano was working with FLAAR and she put together in PDF format our initial lists in a nice tabulated format. This was issued as a FLAAR Report with basic illustrations. Compared with our list today, and in thematic groupings, you can see how much labor and library time and hours (and weeks and months) on the Internet has been dedicated and invested in this long range project even since 2008. As a note, we still cooperate with Mirtha Cano though she now works for the Parque Nacional Tikal, appropriately as a biologist.

I hope the thematic groupings can assist scholars who are interested in one specific theme.



zompopo and a yellow flower



Nicholas Hellmuth photographing leaf-cutting ant with a Canon EOS-1Ds Mark III with macro flash system. Near Sayaxche, Peten, late 2010 or early 2011.





### This report can be considered a Chapter Outline for further research

Rather obviously our long-range goal is to have a “chapter” on each plant or flower. We already have “chapters” on some of the species, such as cacao, ceiba, etc. These are PDFs on our [www.maya-archaeology.org](http://www.maya-archaeology.org) web site. But the long range first step is to list all the plants.

Second step is to receive feedback from botanists, ethnographers, iconographers, epigraphers, and archaeologists on what species we should add (or comments from botanists on what species we should place in a different theme group).

Third step is to create a digital photographic reference archive of top quality photographs. We have been testing camera equipment the entire decade from 2000-2010 and recently we received another \$5000 in Canon camera equipment from a benefactor, Parrot Digigraphic (close-up lenses, close-up accessories, flash, and tilt-shift lens for wide-angle).

### The urgent need for better photographs to aid scholarly research

There are several botanical photo archives with really nice photographs. The photographs in the Plant Guides of The Field Museum (Chicago) web site would be a good example. Photographs on the web sites of Jim Conrad are also of recommended quality. But too many photographs in older books are not professional quality or have other inadequacies:

- Over-exposed so the whites are burned out;
- darks too dark to see details;
- images out of focus;
- too much clutter distracting you from the flower or fruit.

And on the Internet today, and even in recent publications on plants, gardening, and botany, too many of the photographs are not of professional quality.

Ours are not always perfect, but we definitely get them better-than-average, and in many cases the photos we will be providing are a significant asset to scholarly research. Plus the photographs in the FLAAR Photo Archive are often of higher resolution than available elsewhere. The Canon EOS-1Ds Mark III is 21 megapixels as is our Hasselblad with a Phase One P25+ digital back.

As soon as donations or funding allow it, we hope to improve our photographic equipment even more, up to 60 megapixels minimum. The 80 megapixel option is a price we can't even dream of (unless a financial angel would assist). And yes, these cameras do exist: Phase One even invited me to the pre-



launch of the 80 megapixel in Dubai earlier in 2011 (I was asked to be the head of the Dubai committee for printing and graphic design excellence so was flown to the United Arab Emirates by the committee). By coincidence the Phase One camera had its pre-launch event the same days in Dubai.

### **This list is a work-in-progress**

It is ironic that after working for so many years, just a few weeks ago I was in Antigua Guatemala, in the local market. I found two food plants in this market that I had not noticed elsewhere previously. Probably they are listed in crop lists and probably listed by Lundell as well, but I had not noticed them. Yet the Guatemala assistants who were working with me, especially Sofia Monzon, knew the Spanish names and said they eat these plants regularly.

And every time I read a book or visit a web site I find another plant or flower that needs to be studied. For example, the informative book by MacVean on useful plants of Peten is long ago sold out, so I do not have any copy in my library. I did all my years of listing plants without referencing her three monographs (Peten plus two on the Highlands). I wanted to learn to find the plants by myself. But now that my list is comprehensive, I and research assistants are going to all "listing sources" and comparing their lists with our list. Any utilitarian plant that I missed we cite with the author's name of the monograph where we found the plant that we are adding. So I expect that other scholars and hopefully botanists and ethnographers will let me know what other edible or useful or sacred plants that I have not yet noticed.

Now, several months after our third edition, I have found so many more edible or useful plants that we are issuing a fourth edition.

For medicinal plants, however, there are so many hundreds that we do not yet realistically have funding to handle them. Our primarily goal is to list edible, utilitarian and sacred plants.

### **This list is the fifth edition.**

The eventual umteenth edition will include tabulations by scientific species name, alphabetical tabulation by English name, and alphabetical tabulation by Spanish name. In the meantime we are still working at getting "all" the useful plants included. Where we are missing many would be in wood used for house construction, since local people use about everything.

But I also find edible plants every month. . Every time we add ten more things we have read and every time we add five more plants, we reissue this as a new edition. So now we are issuing this fifth edition. It also has another dozen monographs.





The full bibliography is still out into the future, as the world financial crunch puts some realistic limits on the number of staff we can assign to this project. We have no outside grants, donations, or funding specifically for this project; funding could really be a help. Nonetheless, the bibliography even at its present stage is pretty good

### Be aware that some “edible plants” are toxic

The list of “edible plants” is not a suggestion to actually eat these plants. Some are toxic unless cooked or heated: cashew nuts are a good example (my favorite nut). Others have one part of the plant that is toxic, but another part that can be eaten. A few plants are seriously toxic in all aspects.

For the list of medicinal plants, these are intended to be an inventory of plants but not a medical treatise. Do not attempt to use these plants to cure yourself.

Citations for each plant are in the plant-by-plant descriptions, which are separate PDFs in preparation.



Cashew, Peten June 2011 by Nicholas Hellmuth.



### Edible plants

#### Grains

##### Maize

Teosinte, *Zea luxurians*,



**Grain amaranth**, *Amaranthus cruentus*, is primarily known for non-Maya Mexico but in fact is used by Highland Maya also.

#### Vegetables

We discuss the botanical distinctions between what is a vegetable and what is a fruit in the upcoming detailed “chapters” on each theme.



Black

##### Beans

**Chaya**, *Cnidocolus aconitifolius*, toxic unless cooked.

**Chayote**, dark green güisquil, *Sechium edule*;  
*Sechium compositum*



Beans

**Chile peppers, sweet**

**Chile peppers, picante**

**Perulero**, smaller, smoother surface, another kind of güisquil. Also name of a town in Guatemala.

**Squash** of dozens of species

- Ayote
- Calabaza
- Calabazita
- Chilacayote, *Cucurbita ficifolia*
- calabaza melón (Mexico), melo-cotón (Guatemala), *Sicana odorifera*

However this is from South America and not yet convincingly documented to be prehispanic in the Maya area (but it is cultivated as food and as an ornamental today).



Sometimes it is only the seed of a squash that is eaten (pepitorio) other times the flesh; other species both.

**Maracuya Chino** (the name in Panama, Chízmar 2009:153-154), *Cionosicyos macranthus*. Some botanical web sites list this for only lower Central America; others say “Mexico south to...” Is not a passion flower but a member of the Cucurbitaceae plant family.

**Bitter melon**, condiamor, *Momordica charantia* (Chízmar 2009:155-157). Read warnings in botanical web sites before eating this fruit.

*Rytidostylis carthagenensis* (Chízmar 2009:158-160). Bizarre super-fine “hairy” type vegetable with remarkable flower (nothing like any wiskil).

**Tomato**, *Lycopersicum lycopersicum*

**Tomatillo**, tomate verde, *Physalis ixocarpa*

**Tree tomato** *Cyphomandra betacea* (Stross, course outline), tamarillo.

However this plant is not (yet) documented as pre-Columbian in Mesoamerica, so should not be in the list of preHispanic Maya foods.



Tomato & Miltomate

## Edible leaves

Often it is easier to have a plant included in several theme-sections if different parts of the plant have different uses. Edible leaves is a category in a brief discussion of ethnobotany by Ana Lucrecia de MacVean and Elfriede Pöll (Chapter 8, Table 2). Many leaves are primarily for seasoning, rather than eating per se.

**Allspice**, pimenta gorda, leaves are used for tea

**Bledo**, amaranth greens, *Amaranthus cruentus* and/or *Amaranthus hypochondriacus*

**Calabash**, *Cucurbita moschata*

**Canak**, arbol de las manitas, *Chiranthodendron pentadactylon*

Calabash







*Cestrum racemosum* (Chízmar 2009:302-303).

**Chaya**, *Cnidosculus aconitifolius*

**Chayote**, *Sechium edule* (root, flowers, and leaves are edible).

**Chile pepper**, *Capsicum frutescens* (Elevitch 1998:3)

**Chipilin**, *Crotalaria longirostrata*

**Macuy**, *Solanum americanum*

**Manioc**, *Manihot esculenta* (Elevitch 1998:3)

*Sinclairia sublobata* (Chízmar 2009:113-116).

**Sweet potato** *Ipomoea batatas* (Elevitch 1998:3)



Chayote leaves

### Edible seeds

**Jicara**, morro (two different plants, but not many people use only one name)  
*Crescentia alata*.

**Pepitoria**, Pumpkin seeds, squash seeds, various species are grown more for their seeds than for the vegetable portion.



Pepitoria seeds

### Edible Seed pulp

I added this category after learning how many species and relatives there are of Inga that are edible. But it is the pulp around the seed that you eat: not the seed itself.

**Bri Bri**, *Inga edulis*, (when it is mainly the seed pulp that is eaten, we have separate section on seeds).

Xelex, *Inga thibaudiana*, (Chízmar 2009:191-192)

*Inga vera*, (Chízmar 2009:193-194)

**Paterna**, *Inga paterna*, seed pods; common in Guatemala





Plus there are other fruits whose pulp (and in some cases also seeds) are edible.

**Cacao**, *Theobroma cacao*; seed pulp is also eaten (has no chocolate taste whatsoever, but is delicious). However does not survive shipping, so you can taste it only if you pick the fruit from the tree in the orchard and eat it on the spot. Yummy. I have not tried pulp of pataxte because these pods are so high in the tree you can't harvest them yourself.

Provision Tree, **Zapoton**, zapote bobo, *Pachira aquatica*. The flower of this tree is similar to flowers favored in scenes on Maya pottery (Zidar 2009).

### Berries

**Acai berry**, acai palm tree, *Euterpe oleracea* (don't blame me; it's called a berry, but you can also consider it as a nut).

**Allspice berry**, *Pimenta racemosa*, I list this also under seasoning.

*Vaccinium confertum*, Tlo'Chaj

**White Maya Tree**, *Miconia argentea*

There are hundreds of secondary web sites that quote each other, thus spreading slight misinformation. These sites all say that the Maya diet included "fruits and berries"; or whatever. Yes, dozens of fruits: but actually not many berries are pre-Columbian in the core lowland Maya area. I have never heard of berries being a common food of the Maya, past or present.



### Fruits (primarily trees, lots of annona first)

**Anona**, cherimoya, guanabana, *Annona cherimola*, *Annona glabra*.

**Custard apple**, *Annona reticulata*

**Ilama**, *Annona diversifolia*

**Soncoya**, matacuy, *Annona purpurea*. Covered with conical spines.

**Sugar apple**, *Annona squamosa*

**Cherimoya**, *Annona cherimola*

**Guanábana**, custard apple, soursop *Annona muricata*

Plus others; each area shares some species but several areas of Mesoamerica have another species that is not as common elsewhere. We will track them all down sooner or later.



Guanabana Fruit

### Other Fruits (primarily fruits from trees)

**Aceituno**, wild pigeon plum *Hirtella racemosa*, *H. americana*, *H. triandra*

**Anay**, *Hufelandia anay* (Popenoe)

**Arbol de manzana**, *Bellucia grossularioides*, (Chízmar 2009:235-236)

*Ardisia revolute*, (Chízmar 2009:247-248).

**Avocado**, *Persea americana*

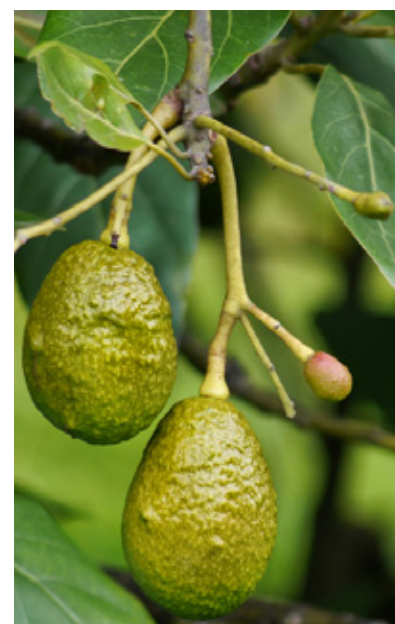
wild avocado, aguacatillo, *Persea donnell-smithii*,

**Baboon Cap**, *Couepia dodecandra*

*Couepia polyandra* (Chízmar 2009:144-145; E. N. Anderson for Yucatan)

**Breadnut, ramon**, *Brosimum alicastrum*

**Bri Bri**, *Inga edulis*, (when it is mainly the seed that is eaten, we have separate section on seeds).



*Persea americana*



**Cacao**, *Theobroma cacao*

**(monkey) cacao**, *Theobroma angustifolium*

**Capulin**, *Muntingia calabura* L. (Chízmar 2009:244-246)

*Celtis iguanaea*

Chilindron, Huevo de Gato, *Thevetia ahouai*, (Chízmar 2009:55-57).

**Ciricote**, *Cordia dodecandra*

**Coyo**, *Persea schiedeana* (Popenoe)

**Craboo**, *Byrsonima crassifolia*

**Cuajilote**, see Wild Cucumber Tree

**Estococa**, *Carludovica palmate* (Chízmar 2009:169-171).

**Guano**, *Sabal mexicana*; thatch palm, also used for weaving baskets.

**Guarumo**, trumpet tree, *Cecropia peltata*

**Guarumo de montana**, *Pourouma bicolor*, *Pourouma aspera*

**Guava**, **Guayaba**, Guayava, *Psidium guajaa*,

*Guaya*, *Talisia olivaeformis* (MacVean 2003:122)

*Guazuma ulmifolia*, also used to flavor chocolate (Chízmar 2009:307-311).

**Guapinol** or huapinol, *Hymenaea courbaril* (Jim Conrad, backyardnature.net)

**Güiligüiste**, Huilihuiste, *Karwinskia calderonii* (Chízmar 2009:263-265).

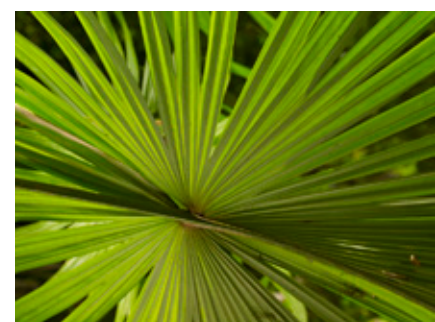
*Psidium guineense* (Chízmar 2009:249-251).



Guayaba



Palmera thatch roof



Palmera tree



**Hog Plum**, ciruela cochino, jocote jobo, *Spondias mombin* or *S. purpura*

**Jilotillo**, Salsoco, Raisoco, *Asplundia utilis* (Chízmar 2009:167-168).

**Jocote**, *Spondias purpurea*; a suburb of Antigua Guatemala is named after this fruit.

**Lagartillo**, *Alibertia edulis*. Flower potentially sacred (my estimate)

**Leucaena leucocephala**

**licaco**, *Chrysobalanus icaco*

**Jagua**, *Genipa americana* (Chízmar 2009: 271-275).

**Mamey Amarillo**, *Mammea americana*

**Lemon drop mangosteen**, *Garcinia intermedia*; edible fruit, handsome flowers; wood used for construction and utilitarian uses. [www.montosogardens.com/garcinia\\_intermedia.htm](http://www.montosogardens.com/garcinia_intermedia.htm)

*Malvaviscus arboreus*, (Chízmar 2009:230-232).

**manax**: wild cherry *Pseudolmedia spuria*

manzanilla, tropical hawthorn, *Crataegus pubescens var. stipulata* (Popenoe 1921)

Maxbal, moco, *Saurauia kegeliana* (Chízmar 2009:18-19).

**mora**, *Rubus glauca*, *Rubus adenotrichus*

**nance**, *Byrsonima crassifolia*, favorite food of mythical deity 7 Macaw

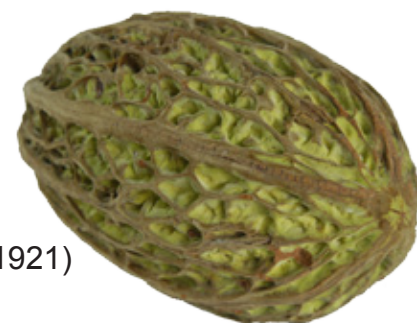
**shaving brush tree**, *Pachira aquatica* (also listed under sapoton in zapote list)

**papaya**, *Carica papaya*.

**Pataxte**, *Theobroma bicolor*. See also two other cacao, listed under "c".



Nance



Pataxte



Pataxte





*Posoqueria latifolia* (Chízmar 2009:278-280)

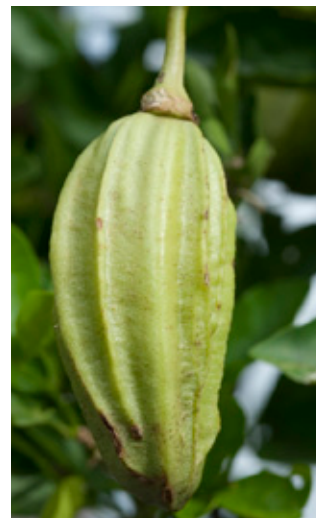
Sauco, *Sambucus mexicana*

Sea grape, *Coccoloba uvifera*

Tamarind, *Dialium guianense* (Chízmar 2009:179-181).

Wild Cucumber Tree, Candle Tree, Cuajilote, Caiba,  
Pepino de Arbol Silvestre, *Parmentiera aculeata*.

This is a close relative of calabash trees.



Cuajilote, *Parmentiera aculeata*

Zapatero (Peten), Negrito (Belize), *Simarouba glauca*,

### Fruits (typical misnomer mishmash of Spanish language)

Sapote or Zapote is not really a word for one tree or fruit, it is a generic word. It is typical in Spanish nomenclature for pre-Columbian things to use a similar word for things which in the scientific designation are not related (other than superficially). Spanish can be a very imprecise language for tagging plants and animals!

Black zapote, *Diospyros digyna*

Chico Zapote, sapodilla, sap produces chicle, *Manilkara zapota*

Green zapote, *Pouteria viridis*, called *Achradelpha viridis* by Pope noe

Mamey sapote, *Pouteria sapota*

Canistel, *Pouteria campechiana*, a yellow-looking sapote

sansapote, sonzapote, monkey apple *Licania platypus*

red zapote, *Mammea americana*, zapote mamey

white zapote, matasano, *Casimiroa edulis*

Zapote bobo, sapoton, *Pachira aquatica*



Zapote



Zapote



### Fruits on vines

**Granada** (pomegranate), *Punica granatum*, is totally different than granadilla.

**Granadilla**, fruit of passion flower vine, *Passiflora ligularis*.

**Maracuya**, another passion flower vine fruit, *Passiflora edulis*

*Passiflora seemannii* (Chízmar 2009:254-256)

Corky Stem Passionvine, *Passiflora suberosa*

*Passiflora adenopoda*, (Chízmar 2009:252-254)



Granadilla

**Split leaf philodendron**, ceriman, Piña anona, *Monstera deliciosa*. Not a fruit but is on a vine.

### Edible fruits from cactus or cactus-like vines

nopal and tuna, cactus, *Opuntia ficus*

Pitaya, Pitahaya, *Hylocereus undatus*.



Pitaya

Arias (2010) lists nine cacti from Mexico that have edible fruits. Most if not all of these are outside the Mayan area. However there are plenty of cactus species in the upstream valley of Rio Motagua, Guatemala. So hopefully this list of Mexican cacti will encourage Guatemalan botanists to make comparable lists of edible cactus and cactus-like vines for Guatemala (they may exist already).

Pochas, *Ferocactus latispinus*

Chilitos de biznaga, *Mammillaria* spp.

Junco espinoso, *Aporocactus flagelliformis*

Limón de biznaga, *Ferocactus pilosus*

Tuna de biznaga, *Echinocereus* spp.

Alicoche, *Echinocereus* spp.

Garambullos, *Myrtillocactus geometrizans*

Pitayo, pitayo de mayo, *Stenocereus pruinosus*

Pitayo xoconostle, *Stenocereus stellatus*

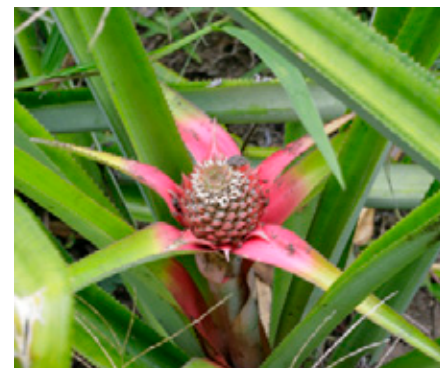


### Other fruits (not in trees)

**Pineapple**, a terrestrial bromeliad, *Ananas comosus*.

**Piñuela**, *Bromelia pinguin*, motate

**Piñuela**, *Bromelia alsodes*, (Chízmar 2009: 130-132)



Pineapple field

### Nuts, Palm trees

**coconut** (potentially arrived before Spaniards)

**corozo palm**: plentiful and still eaten in Peten today

**coyol**, *Acrocomia aculeata*

*Brahea aculeata*, palmilla

*Brahea dulcis*, capulin

*Ractrisbarronis major*



Coconut

Rosengarten, in his excellent book on nuts of the world, does not mention corozo palm nuts.

### Palm trees with edible parts

Capuca, *Calyptrogyne ghiesbreghtiana* (Chízmar 2009:87-88)

*Chamaedorea pinnatifrons* (Chízmar 2009:89-91)

**Chocho** palm, *Astrocaryum mexicanum*, shoots, heart, and flowers edible (Haynes and McLaughlin 2000).

**Cohune** palm, oil palm, *Astrocaryum cohune*, in addition to the edible nut, the heart is also edible.

*Gonolobus taylorianus*, some parts toxic (Chízmar 2009:107-109)



Huiscoyol, *Bactris major* (Chízmar 2009:84-86)

**Manaco**, *Manicaria saccifera* (Chízmar 2009:103-104)

**Palmito**, ternera, *Euterpe precatoria* (Chízmar 2009:100-102)

Piva, peach palm, *Guilielma utilis*, edible fruits

Mexican Sabal palm,

### Nuts and food that is considered a “nut”

Acorns (present in Highlands but not often eaten by local people)

Breadnut, ramon nut, *Brosimum alicastrum*

cashew (marañon), *Anacardium occidentale* L.

cashew, marañon Silvestre, *Anacardium excelsum*, (Chízmar 2009:23).

ramon nuts (see breadnut)

Peanut, *Arachis hypogaea*; first in Peru but got to Mesoamerica also.

Coconut is a rather substantial “nut” but we discuss palm products in a section on palms. There are many palm oil nuts that are edible.



Cashew or marañon

### Cooking oil

*Acrocomia aculeate*

Corozo (cohune) palm oil

*Chamadorea elegans*

*Gonolobus taylorianus* (Chízmar 2009:107-110)



Gonolobus





*Jatropha curcas*, physic nut, oil for soap and other uses. Toxic as food.

Zapatero, *Simaruba glauca*, Paradise tree, oil, medicine, and fruit.

Several other palm tree parts can be used to produce oil.

You could also make a list of “oil” used as a lotion (we would consider that “medicinal”). I would assume that the ancient Maya could obtain cooking oil from wild boar and other animals. It is also logical to look for vegetable oils too.

### Other plants which have edible parts

**Mangrove fern**, *Acrostichum aureum* (from pollen at Copan; Fedick 2010)

Fern, *Microgramma lycopodioides* (from pollen at Copan; Fedick 2010)

Cattail, **reed**, *Typha latifolia* [www.rook.org/earl/bwca/nature/aquatics/typhalat.html](http://www.rook.org/earl/bwca/nature/aquatics/typhalat.html)

#### Sorosi Vine

**white milkwood**, lechoso, *Tabernaemontana alba*; chewing gum substitute

*Spathiphyllum friedrichsthali*

*Spathiphyllum phryniifolium* (Chízmar 2009:60-62)

**Yuc**, *Spathiphyllum blandum* (Chízmar 2009:58-59)

### Root crops

**Sweet potato**, camote *Ipomoea batatas*



**Jicama**, yam bean, *Pachyrhizus erosus*. Flower is distinctive shape and beautiful lavender colors.

**Cassava**, sweet manioc, yuca, *Manihot esculenta*

**Malanga**, *Xanthosoma* species (these four featured by Bronson 1966:63-65)

Kaqiox, Marac, Quequescamote, *Xanthosoma sagittifolium*



**Chayote**, *Sechium edule* (root, flowers, and leaves are edible).

Iron cross plant, *Oxalis deppei* (Stross, UTexas course outline)

*Maranta arundinacea*, (Chízmar 2009:233-234)

**Mexican Shell flower**, *Tigridia pavonia*  
(Stross ethnobotany course outline)

*Smilax spinosa* (Chízmar 2009:295-296)



Chayote root

### Water plants: rivers and lakes

Since I have been studying the water lily for years, I am always curious why, out of all the many other plants that grow in the rivers and lakes, why only the water lily is so important to the Classic Maya. I have discovered several aspects of why the Maya selected the water lily (more than just the fact that the water lily seed pod could potentially have been the cheapest and most readily available source of tasty chemicals for Maya rituals).

*Brasenia schreberi*

**Waterlily**, *Nymphaea ampla*, is edible, and parts are eaten in many other parts of the world.

Surely there must be other water plants that were harvested and eaten. Tule is primarily for making baskets and mats.

### Flavoring, herbs, and spices

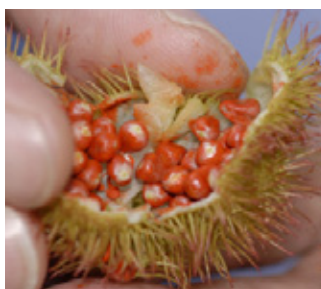
See also all the flavorings (in the next section) for cacao drinks.

**Allspice**, *Pimenta gorda*, *Pimenta racemosa*

**Achiote**, Annatto, *Bixa orellana*

**bay-leaves** *Litsea glaucescens*

**boldo**, *Peumus boldo*



Achiote



Pimienta gorda



**Chia**, *Salvia hispanica*; seeds used; in juice; sprouts, etc

**Chipilin**, *Crotalaria longirostrata*.

Unique flower; Parts edible, part toxic (Morton 1994)

**Chili pepper**, *Capsicum* species



Chili pepper

*Dipteryx panamensis* seed is listed in a Tico ethnobotanical dictionary as flavoring tobacco (on-line).

*Dorstenia contrajerva*, roots flavor tobacco Tico ethnobotanical dictionary as flavoring tobacco (on-line)

*Myroxylon balsamum*, powder added to tobacco (Nations 2006:96)

**Guarumo**, leaves also used for tobacco

**Coriander**, *Porophyllum ruderale*

Culantro, cilantro, samat *Eryngium foetidum* (Chízar 2009:40-41).

**Guanacaste**, *Enterolobium cyclocarpon*

**hierba de conejo**, *Tridax coronpifolia*, *Castilleja lanata*

**Hoja Santa**, *Piper auritum*



Marigold

**Marigold**, *Tagetes minuta* and *Tagetes elliptica*

“oregano” or “marjoram” in the cookbooks, but I suspect that local herbs are meant in the first place. At least two different herbs are known as “**Mexican oregano**”: *Poliomintha longiflora* (Lamiaceae) and *Lippia graveolens* (Gernot Katzer, Geographic Spice Index)

*Porophyllum tagetoides*

Pumpkin seed (*Cucurbita* spp)

*Renealmia aromatica*, MacVean gives local words as tzi or chucho (Alta Verapaz), nabay (Peten), and rat plantain for Belize. She says pulp of the fruit is used to flavor tea. (MacVean 2003:136).



Sapoton, *Pachira aquatica* (Gomez 2008:84)

*Talauma mexicana* (Gomez 2008:84)

**Wormseed**, Epazote, *Chenopodium ambrosioides*

Probably another dozen spices could easily be added, though most modern spices come from India, Asia, Africa, or Europe. For example, *Coriandrum sativum*, is not indigenous.

### Flavoring for cacao drinks

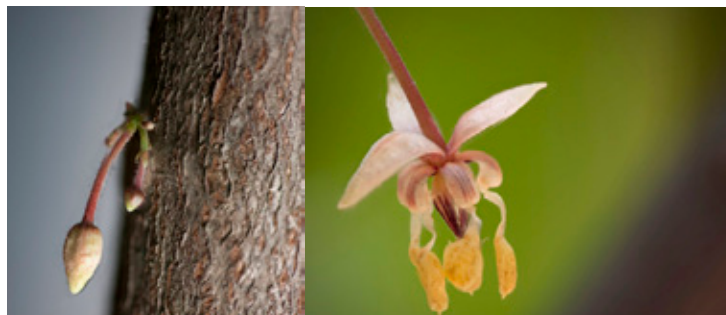
Flavorings for cacao are nicely listed by Sophie Coe (1994) and then also by Sophie and Michael Coe (2007) but you can find additional spices for cacao drinks listed elsewhere. In upcoming FLAAR Reports on cacao flavoring I will cite all the flavoring that Sophie Coe and Michael Coe carefully include and compare with ingredients that I have found during the past three years of ethnobotanical research. Below is just the basic list of the most commonly known ingredients, which are included in most of the better discussions of cacao and chocolate.

As a side comment I raise cacao in and around my house (literally) and the seeds I planted about four years ago have grown enough they have their first flowers this year. As the first rains of the rainy season hit, the tree trunks burst into producing actual cacao pods (through self-pollination I assume, as at 1500 meters above sea level, in the middle of Guatemala City, I doubt I have any or many of the appropriate species of midges to pollinate the flowers).

I also raise pataxte, though this grows much more slowly. To be an archaeologist, and iconographer, and with a personal interest in plants and animals, to actually live surrounded by cacao trees and a host of other Maya-related plants gives me an experience that I was not able to achieve associated with a university campus with snow surrounding my apartment. However there are definite advantages of a university campus as well: best is to have both: access to a campus and access to an ethnobotany garden.

Flowers & seeds (mostly to flavor cacao)

- Achiote, *Bixa orellana*
- allspice, pimenta gorda, *Pimenta racemosa*
- *Quararibea funebris*, Rosita de cacao
- Marigold (*Tagetes lucida*) flor de muerto
- *Cymbopetalum penduliflorum*, Guanacaste, uei nacaztli in Nahuatl, ear flower
- mecaxochitl (*Piper amalago*) mecasuchiles, Higuillo de limón
- teonacaztli (*Chirantodendron pentadactylon*) String flower (black pepper family)



Cacao





- *Magnolia mexicana* flowers, yolloxochitl
- Popcorn flower, *Bourreria huanita*
- piztle (the seeds of *Calocarpum mammosum*, mamey sapote)
- Chile
  - *Chilchote*, *Capsicum frutescens*
  - *Chiltipiquin*,
  - *Tonalchiles*
  - *Chilpaelagua*
- Chile that is sold in Guatemalan markets and called “chile chocolate”



Achiote, *Bixa orellana*

### Flowers, sacred

Flower of **zapote bobo**, *Pachira aquatica*

Flower of **ceiba** tree, various species

**Waterlily**, *Nymphaea ampla*

**Plumeria** species, flor de Mayo, bak nikte’

flores del nardo, *Polianthes tuberosa*. (Schoenhals 1988:206).

Also an additive to balche drink of Lacandon.

flowers that attract hummingbirds

flowers on Maya bowls, vases, plates (that have not yet been identified)

Aak’ alyoom “night flower from which Kisin was born” <http://home.planet.nl/~roeli049/gloseng.pdf>

Chipilin flowers: white petaled, red petaled, yellow petaled, *Crotalaria longirostrata*, *Crotalaria guatemalensis*.

**Squash** flower(s), related to ballgame

Probably another ten species, plus or minus

Although the *Pachira aquatica* has been singled out as a natural model for flowers in Maya art (Zidar and other scholars) I would also like to point out the following flower species as worth comparing with Mayan art:

**Amapola**, *Pseudobombax ellipticum* (shares some features with *Pachira aquatica*)

### Flowers, edible

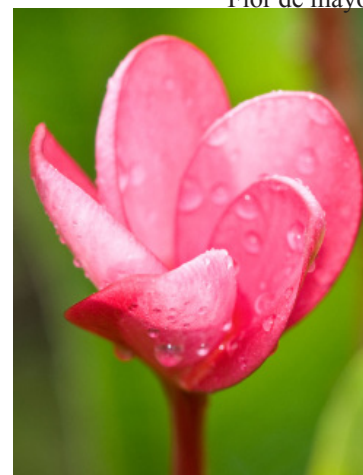
**Biznaga colorada**, Cactus flowers, *Ferocactus pilosus*, (Arias 2010)

**Chayote**, *Sechium edule* (root, flowers, and leaves are edible).

**Dahlia, Tzoloj**, *Dahlia imperialis* (Chízmar 2009:111-112)

**Isote** tree (also spelled izote), spineless yucca, *Yucca elephantipes*

Flor de mayo



Flor de Izote



**Loroco**, *Fernaldia pandurata*

**Pacaya**, palm, *Chamaedorea pacaya*

Many parts of the waterlily, *Nymphaea ampla*, are edible.

This list will grow.



Loroco flowers

### Plant substances for cosmetics

See also separate section on medicinal plants, and on colorants.

**Charcoal**, for black

**Cochneal**, for red colorant. These are insects but their host is a plant, *Opuntia* species.

### Flowers as models and inspiration for earring jewelry design

The recognition that Mayan earrings are flower shaped is all over the Internet. One web site even sells “5-petal bloodwood Mayan Flower Plugs.” Although the tree is South America the earrings look just like those of the Maya. That earrings were flowers was also noticed by Mary Butler, Piedras Negras Pottery, Pottery Vessels (1935:128).

Botanist Charles Zidar has also recognized the flower origin of Mayan earrings (personal communication 2009). The advantage of his contributions are double: first, he is an experienced botanist. Second, he is familiar with Mayan culture.

If you peruse books of flowers of Mesoamerica you quickly find flowers that should be checked to see if they are similar to earrings. One is Ciricote, *Cordia dodecandra*.

Lundell lists flowers which are “strung as necklaces and bracelets.” I would guess these are in Yucatan, Campeche, and Quintana Roo.

- black seed of *Canna edulis* Ker. (chankala, platanillo),
- the scarlet and black seed of *Abrus precatorius* L. (xocoak)
- *Rhynchosia pyramidalis* (Lam.) Urban,
- and the fruits of *Acrocomia mexicana* Karw. (cocoyol)



### Additional Flowers to check out

This is a list of flowers that attract my attention when I see them. Thus it is worth checking to see if any of these was edible, was a sacred flower, or was a model for an earring or other aspect of jewelry.

*Alamanda* species

Annatto flower is quite showy, *Bixa orellana*

*Acnistus arborescens* (Chízmar 2009:297-298)

**Balsa flower**, *Ochroma pyramidale*

**Bucut**, *Cassia grandis* (OFI-CATIE: 439), impressive mass of white-pink flowers on a tree.

*Cestrum racemosum* (Chízmar 2009:302-303).

**Clavellina**, *Pseudobombax ellipticum* [www.flickr.com/photos/robregon/4612328661/](http://www.flickr.com/photos/robregon/4612328661/)

<http://fiveprime.org/hivemind/Tags/pseudobombaxellipticum/> Interesting a dozen gorgeous spectacular photographs.

**Clavellina**, *Bombax palmeri* Clavellina is another typical Spanish misnomer in that five (or more) flowers absolutely unrelated to each other have the identical name, Clavellina. One is a cactus!

**Coralillo**, *Russelia equisetiformis*

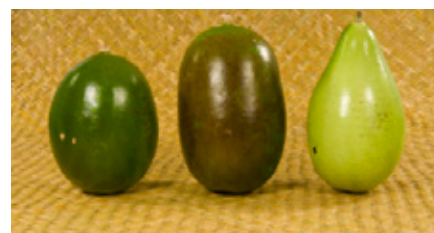
*Ipomoea pes-caprae*, beach morning glory.

**Jicaro**, *Crescentia alata*, and/or *Crescentia cujete* calabash tree, has a flower that should be compared with scenes in Mayan art.

*Lacmellea standleyi*,

**Mexican Butterfly weed**, Blood Flower, *Asclepias curassavica*

**Mexican primrose willow**, *Ludwigia octovalvis*





**Peacock Flower** or chaparral in Spanish, *Caesalpinia gaumeri*

*Pentalinon andrieuxii*

**Tobacco flowers**, *Nicotiana tabacum* and *Nicotiana rustica*

**Zinnia**: it always helps to let people in North America understand how much of what they have originated in Mexico or Central America.

### Plants which are sacred

I would not rule out that some of the flowers of the plants listed below may also be sacred.

Beans

Chile-seeds

Coral tree, seeds of tzite, arbol de pito, (divination),  
*Erythrina corallodendron*,  
*Erythrina berteroana*; Parts edible, part toxic (Morton 1994)



Planting a Ceiba in FLAAR headquarters

Jicaro, *Crescentia kujete*

Morro, *Crescentia alata*, Villar p. 45, 87 (Popol Vuh)

Palo de lagarto, Limoncillo, Naranjillo, *Zanthoxylum procerum*

Palo de Lagarto, Chanté, *Zanthoxylum microcarpum*,

Naranjillo *Zanthoxylum elephantiasis* (Estacion biologica Las Guacamayas)

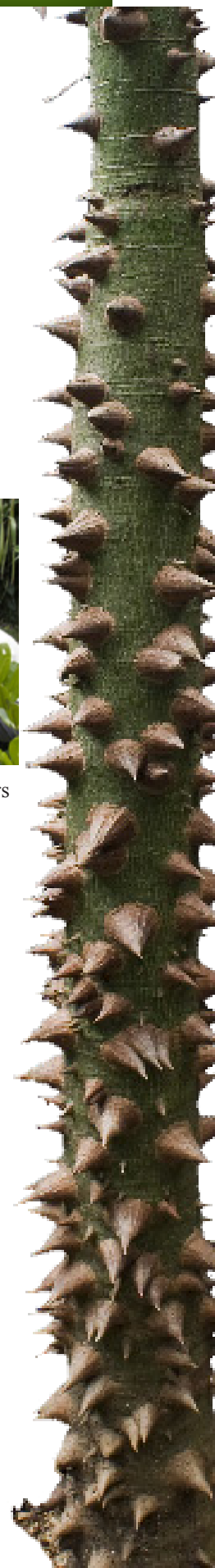
Bianca Beatriz Bosarreyes Leja

Lagartillo: *Alibertia edulis*, *Heliotropium* (CR); *Zanthoxylum* (CR)

Lagarto: *Abelmoschus* (C); *Zanthoxylum* (CR)

Lagarto amarillo: *Zanthoxylum* (CR)

Lagarto negro: *Lacmellia* (CR); *Zanthoxylum* (CR)







Palo de lagarto, *Ceiba aesculifolia*, may have spines like “ceiba”

Ceiba, *Ceiba pentandra*, Sacred Maya tree, national tree of Guatemala

*Ceiba schottii*, but primarily in Yucatan (not in Guatemala).

Jocote de jobo: *Spondias* (N)

Jocote de mico: *Simarouba* (N)

Jocote montero: *Spondias* (N)

Pochote, typical Spanish imprecise designation: can stand for many different trees with spines, *Bombacopsis quinata* (not listed for Guatemala), or *Ceiba aesculifolia* (listed as palo de lagarto above).

Pochote could also be *Bombax vitifolium*, for Sayaxche area of Peten.

Squash, planted near the ballcourt, (Popol Vuh)

Squash seeds fall from head suspended over ballcourt, (Popol Vuh)



Jocote tree

### Plants mentioned in myths

(see appendix on plants of the Popol Vuh)

- bromeliad
- oak trees, encinos, growing on the ballcourt area
- ocote, pitch pine, as torches, to light caves, etc
- rushes, tule
- sauco, *Sambucus mexicana*



Pochote tree at Sachayche, Peten

### Plants to produce Alcohol

- agave, Agave Sisal, *Agave fourcroydes*
- Balche
- Chicha, fermented drink from maize
- White Maya Tree, *Miconia argentea* (ambergriscaye.com)
- Cashew nut wine (Standley and Record 1936:43)
- *Acrocomia mexicana*, Coyol (Standley and Record 1936:79)
- Coyol, *Acrocomia aculeata* (Chízmar 2009:66-70), (Balick 1990)
- Cacao, *Theobroma cacao*



Cacao showing seeds used to produce alcohol



Relacion de Merida (11:49) indicates that the roots of a maguey agave were used with balche in northern Yucatan (LucidConsciousness.com).

This list will be expanded as I hope that books such as Alcohol in Ancient Mexico (Bruman 2000) and the PhD dissertation by Litzinger (1983) will list additional plants.

### Plants used for drugs

- Datura; most claims for use are overstated; but I would still estimate that datura was known and used (just that most discussions mis-identify the flowers). *Datura* flowers stand up; *Brugmansia* flowers hang down.
- Florifundia, *Brugmansia* species. Although not listed as native to Guatemala (Wikipedia) in fact this flower is common today, including in public parks of Guatemala.
- Guarumo, smoked in Alta Verapaz, *Cecropia obtusifolia* (Standley and Steyermark 1946:22). MacVean indicates that *Cecropia peltata* is smoked in Peten (2003:48), also known as Guarumo throughout Guatemala and trumpet tree in Belize.
- Habin (Peten), Dogwood (Belize), *Piscidia piscipula*; also fish poison
- Tobacco, *Nicotiana tabacum* and *Nicotiana rustica*
- Water lily, *Nymphaea ampla*, probably more commonly used than given credit for.
- Morning glory (used in Central Mexico; not yet as well known for Maya)
- fly agaric skins, *Amanita muscaria*
- Sinicuichi, *Heimia salicifolia*, Reko, Victor A (1926). "Sinicuichi". La Revista Médica de Yucatan 14: 22–27.
- *Quararibea funebris*, Rosita de cacao,
- Ipecac, raicilla, *Cephaelis ipecacuanha*, induces vomiting.
- *Tanaecium nocturnum* (Zidar, on-line). Does occur in Guatemala (Trees of Guatemala, p. 86)



Brugmansia



Water lily



- *Virola guatemalensis*, sangre (has a red sap).

It might be educational to check what chemicals amaranth flowers or roots may have. Ratsch notes that species elsewhere in the world are so used.

It is debated whether the appropriate mushroom was available to the Maya in pre-Columbian times.

Also check Almendro (Peten), Cabbage bark (Belize), *Andira inermis*, as possible narcotic use (Parker 2008:450).

This list will be expanded, though hallucinogenic and narcotic drugs are not a focus of my research. However I suspect that the Maya took drugs in about every orifice of their body except their ears. Every other tribe living in tropical America ingested about every tasty chemical they could get their hands, mouths, noses and body parts close to. The Maya even included enemas as a way of getting even more chemicals into their bodies.

Trying to pretend the “peaceful” Maya spent their time raising maize, doing astronomy, writing hieroglyphic texts and building pyramid-temples completely and conveniently avoids seeing what life was really like in the palace acropolises, plazas, and temple rooms for over a thousand years. The list above is 14 plants specifically for the Maya area, which is actually more than most monographs on drugs list. Any student or scholar who really had an interest in tasty chemicals could surely discover twice this number of plants. So to ignore the rather obvious readily available drug plants in the Maya area in monographs on the Maya is a tad unrealistic.

Note that we do not list plants used as drugs by the Aztec unless the plant could also grow in Guatemala.

But chemicals are not our research topic. We are interested in the iconography of sacred flowers and plants, and in utilitarian plants, plus which flowers were featured as hieroglyphs.

### Plants or trees that are used to produce incense

- Balsam, *Myroxylon* species,
- Copal pom, *Bursera microphylla*
- pom, copal incense *Protium copal*
- Palo-jote, muliche, indio desnudo, *Bursera simaruba*





- pine resin as incense, *Pinus pseudostrobu*, *Pinus oocarpa*.
- Liquidambar, arbol de estoraque, *Liquidambar styraciflua*
- Croton (cochinal croton) red tree sap *Croton sanguifluus* (Popol Vuh)
- Quercus species (oak tree)
- Rubber, hule, *Castilla elastica*
- marigold, flor de muerto, *Tagetes erecta*, *Dahlia variabilis*, *Tagetes lucida*, burned with pericon blanco, decorates cemeteries (Atran et al. 2004:93).
- *Stevia eupatoria*; more often medicinal than incense
- *Hymenaea courbaril* (Stross, UTexas course outline).
- *Vanilla planifolia*



Bitumen was also used as an incense in some parts of Mexico, but this is not a plant product.

### Plants used in divination (in addition to incense)

Muc ceh. An herb used in witchcraft. Standley, Bolles; but no identification of what species.

In addition to incense, Icohol is used in divination; see that category (alcohol).

### Mushrooms & Fungi

Morales, Bran, Caceres, and Flores, of the Proyecto Hongos Comestibles de Guatemala, Diversidad, Cultivo y Nomenclatura Vernácula studied in all the Highland departments of Guatemala. The resulting list is impressive. It would be nice to see comparable lists for the lowlands: Peten and Alta Verapaz.

Marigold, flor de muerto







Since their list is available on-line (just Google the title from our bibliography) there is no need to repeat their list here.

These biologists are from the Departamento de Microbiología, Escuela de Química Biológica, Instituto de investigaciones Químicas y Biológicas, Facultad de Ciencias Químicas y Farmacia, Dirección General de Investigación, Universidad de San Carlos de Guatemala.

### Plants used for medicine

There are hundreds and hundreds of plants used for medicine. Since there are already dozens of monographs on pre-Columbian medicinal plants, I do not try to keep up with the huge number of species used for medicine. Yes, I am interested in medicinal plants, but first we have hundreds of sacred and edible plants to photograph and then more hundreds of utilitarian plants. With funding we can achieve more, with no specific funding, we cover as much as we can with long hours at nights and on weekends.

Please realize that many plants are toxic, even if “edible” or “medicinal.” We do not recommend trying any plant for any purpose.

The plants here I harvested from the book Campeche en Flor and Guatemala Arboles Magicos y Notables and lists of plants elsewhere. To complete the list of medicinal plants would take longer than all other categories put together, so should be a separate opus and separate project.

Canak, arbol de las manitas, *Chiranthodendron pentadactylon*

*Caesalpinia pulcherrima*

Esquisuchil, *Bourreria huanita*

Guayacan, *Guaiacum sanctum*

*Guazuma tomentosa*

Liquidambar

Logwood, also makes dye

Madre de cacao



pochote, *Ceiba aesculifolia*,

*Rhoeo discolor*

Sauco, *Sambucus mexicana*

Sea bean, *Merremia discoidesperma* ([www.beachbeans.com](http://www.beachbeans.com))

Sorosi, fruit of a vine, *Momordica charantia*

*Stevia eupatoria*

### Plants to produce colorants (dye)

*Aloe vera*, sabila.

Añil, Anile, *Jacobinia spicigera* (Standley & Dahlgren 1931:360)

Arrabidaea species (Standley & Dahlgren 1931:353)

Black zapote, *Diospyros digyna*

Fustic, *Chlorophora tinctoria*, dye; wood utilitarian

Indigo, *Indigofera suffruticosa*

Jagua, *Genipa caruto* (Standley & Dahlgren 1931:367)

Niij, in Mesoamerica lacquer is also from an insect as it is in Asia (from the lac insect). We have found the Maya equivalent in Guatemala, still used by Maya craftsmen today (and already known to biologists at Universidad del Valle in Guatemala). The insect looks just like the cochinitilla on a cactus but the varnish one is much larger. It is called niij in the local Mayan language, and it needs a host plant (Jocote tree is the most common). The insect on the jocote tree provides a varnish-like protective liquid, not a color.

Madre de cacao, *Gliricidia sepium*; Ralph Roys (1967: 161) lists this as cante, yellow dye tree.



*Ceiba aesculifolia*



Aloe, sabila



Natural Dye



Mangrove, mangle, *Rhizophora mangle*, dye

Palo de pito, coral tree, Tzite, *Erythrina corallodendron*

Palo de tinta, *Haematoxylum campechianum*, logwood

Putunin, *Eupatorium albicaule*, (Standley & Dahlgren 1931:384-385)

I will add another dozen plants when time is available (since my days are also filled with work on ethnozoology, iconography, and advanced digital imaging technology). Lundell adds another six:

*Syckingia salvadorensis* (standl.) Standl. Chacahuante, chactemuch, palo colorado.

*Indigofera suffruticosa* Mill. Chob, añil

*Morinda yucatanensis* Greenm. Xhoyoc, bejuco piñoncillo

*Caesalpinia platyloba* Wats. Chacte

*Ditaxis tinctoria* (Millsp.) Pax & Hoffm. Tinta roja

Additional colorants are listed in the recent monograph by Houston et al. (2009:1003-1009) on ancient Maya color. Their list is exhaustive, but provides no photographs of the actual plants. Nonetheless the amount of weeks in a library and/or on the Internet to prepare their list is impressive. As soon as there is time to alphabetize the list, either by botanical binomial or common local name I can add the plants from their list that are missing in my list and cite the sources.

It would make a great dissertation for a student to go out, find each and every plant in the list of Houston et al., and prepare a recipe, and show actual color samples. Actually one person has done this already (decades before the book on color was conceived) for scores of local plants but it has been over 40 years (literally) since I saw the original (one copy is all that exists) in a library.

### Plants to make clothing

amate, *Ficus* species, bark paper was used as clothing in addition to as paper

cotton, *Gossypium hirsutum*, is native to Americas as other cotton was in Egypt also

agave, especially in areas where these plants grow.

Several other plants can produce thread or cloth.



### Plant material used for basketry, ropes, mats

The diversity of materials used for basketry is considerable. Each part of Guatemala has different materials (since their local eco-system is different). So this segment of the list will continue to grow.

Another dozen plants used for making baskets are in the FLAAR Report on Guatemalan basketry, available as a PDF from our [www.maya-archaeology.org](http://www.maya-archaeology.org). In the meantime here is an introductory list of about two dozen plants used for making petates, baskets, and cordage.

Capulin, *Trema micrantha*; bark produces cordage (Parker p. 928).

Capulin, *Muntingia calabura*, fiber from bark for baskets (MacVean 2003:62).

*Carludovica palmate*, can be used for making hats.

Cattail, *Typha angustifolia* (Lundell)

*Desmoncus quasillarus*, stalks used to make baskets (Palenque area)  
Vogl et al. 2002: 637

Guano, *Sabal mexicana*; thatch palm, but also for hats and mats (Lundell)

Wild cotton, *Hibiscus pernambucensis*,

Mano de leon, *Hampea stipitata*;

Mimbre, *Monstera pertusa*, peel the roots for material for baskets (MacVean 2003:32)

Nance, *Byrsonima crassifolia*, strong fiber (Bye and Linares 1990:158)

*Philodendron*, *Philodendron* sp., roots used for baskets;  
weven in pre-Columbian times (Tikal, Early Classic burial; Moho

Sisal, maguey, henequen, *Agave sisalon*, *Agave fourcroydes*

Maguey, *Furcraea* species

Tule, *Typha dominguensis*



Basketry



Nance flower



Materials for making basketry





Lundell also mentions the following:

*Aechmea magdalenae* André. Cham, piñuela

*Sida acuta* Burm. Chichibe

*Abutilon lignosum* (Cav.) Don. Zacxiu, yaxholche

*Muntingia calabura* L. Capulin (Chízmar 2009:244-246)

*Heliocarpus* spp.

*Hibiscus tiliaceus* L. Xtolol

*Guazuma ulmifolia* Lam. Pixoy

*Belotia campbellii* Sprangue. Moho

### Plants for other utilitarian use

Aceituno, wild pigeon plum *Hirtella racemosa*, *H. americana*, *H. triandra*

Bottle gourd, *Lagenaria siceraria*

*Curatella americana*, leaves used for sandpaper (Lundell 1938)

Escoba palm, *Cryosophila argentea*, common in Peten; easily to identify due to medium size and lower trunk covered in spines.

*Cryosophila stauracantha*, Belize (Ford 2008:Table 3).

*Belotia mexicana*, bark to tie broom material together (Vogl et al. 2002: 637)

*Mangifera indica*, broomstick (Vogl et al. 2002: 637)

*Ochroma lagopus* to carry heavy loads (Vogl et al. 2002: 638)

Cotton-like fiber from Ceiba, for pillows

*Ochroma*, balsa

*Typha angustifolia*

*Thrinax* (chit) are all mentioned by Lundell 1938.

I have seen comments on about four different plants that can produce soap: one is here: Soap tree, *Sapindus saponaria*.





*Arthrostylidium pillieri* and *Arthrostylidium spinosum* are used for fish spears (Lundell 1938).

### Utilitarian use: tanning

Four trees, whose bark is used for tanning (Lundell 1938)

*Rhizophora mangle* L. (tapche, red mangrove),

*Curatella americana* L. (saha),

*Pithecolobium albicans* (Kunth) Benth. (chimay),

*Albizzia lundellii* Standl.

I would add (for tanning)

Nance, *Byrsonima crassifolia* (Bye and Linares 1990:158)

### Utilitarian use: poisons

Lundell lists four plants used for fish poison

*Paullinia*,

*Serjania*,

*Jacquinia*,

*Salmea*,

### Plant materials used in constructing houses, (Palms)

*Asterogyne martiana*

Lancetillo, *Astrocaryum mexicanum*

*Copernicia argentata*

Corozo, cohune, *Attalea cohune*, thatch palms

Corozo, *Attalea butyracea*

Guano Palm, *Sabal mauritiiformis*, *Sabal mexicana*; thatch palms,

*Sabal pumos*



Corozo palm



*Sabal uresana*

*Sabal yapa*

Santa Maria, lemonwood, *Calophyllum brasiliense*

Bayal, palm, but a vine, *Desmoncus schippii* used for wall material not thatch.

Plus other palm tree species; but the above are the most common in the Peten area

*Brahea aculeate*, palmilla

*Brahea dulcis*, capulin

*Gaussia maya*

*Roystonea regia*

*Thrinax radiata*



Guano palm

Grass, *Imperata contracta*, occasionally used for thatch (Lundell 1938) (not often in Peten, where palm is used most often).

Plus other palm tree species; but several of the above (guano and corozo) are the most common in the Peten area.

### **Plant materials used in constructing houses, fences, etc (other than palms)**

You could probably find scores and scores of trees used for construction of houses, furniture, and even more for building fences. I list here only a few (later updates will list more). The purpose of this first edition is primarily to show the plant categories and give a general idea of how the long-range project is being organized.

Almendro (Peten), Cabbage bark (Belize), *Andira inermis*,

Barba Jolote, *Pithecellobium arboreum*, *Cojoba arborea*

Bucut, *Cassia grandis* (OFI-CATIE: 439)



Bulhop (Peten), Bullhoof (Belize), *Drypetes brownii*,

Spanish Cedar, Cedro, *Cedrela odorata*, *Cedrela mexicana*

Cedrillo, *Guarea glabra*

Chichipate (Peten), Billy Webb (Belize) *Acosmium panamensis*, *Sweetia panamensis*.

craboo *Byrsonima crassifolia*

Fustic, *Chlorophora tinctoria*, dye; wood utilitarian

Guanacaste, *Enterolobium cyclocarpum*; large tree, useful for lumber.

Guayacan, is a typical Hispanic name used for many unrelated trees. *Guaiaacum sanctum* is the one intended for this listing.

Habin (Peten), Dogwood (Belize), *Piscidia piscipula*,

Higuerillo, *Vitex gaumeri*, yax nik (Ford 2008: Table 3).

Madre de cacao, Cante, *Gliricidia sepium*,

Mahogany, caoba, *Swietenia macrophylla*

Malerio, *Aspidosperma cruentum* (Ford 2008: Table 3).

Matilisqueate, roble de savana, *Tabebuia rosea*.

Palo blanco, gold tree, *Roseodendron donnell-smithii*

*Philodendron*, roots used as “rope”

puk-te: bullet tree, *Bucida buceras*

Rosewood, *Dalbergia stevensonii*, construction.

Tamarind, *Dialium guianense* (Chízmar 2009:179-181).



Madre de Cacao flower





Tiricio, spoon tree *Trichilia havanensis*

white milkwood, lechoso, *Tabernaemontana alba*

Zapatero, Negrito, *Simaruba glauca*; also oil from the seed.

Plants from Mexico but outside Maya area:

*Dioon edule*, used for starch

*Dioon spinulosum*



Banana Plant

### Most common introduced plants (not native)

Banana

Citrus fruits

Onion

Grains (oats, wheat, barley, rye)

Rubber tree from Brazil (there was a different species already in Mesoamerica, but that is not the rubber tree used for tires and other products today).



Bananas growing in ethnobotanical garden surrounding FLAAR headquarters



## Acknowledgements

Capable photography has been contributed by Jaime Leonardo, Sofia Monzon, Jennifer Lara. Recently Daniela da'Costa has begun to work with our photo teams also. Capable work in Adobe Photoshop has been undertaken by all of them plus Juan Luis Sacayon.

PDFs have been put together by many of the above as well as biologist Priscila Sandoval and archaeology students Ana Cristina Guirola and Antonieta Cajas. The present edition, especially the layout of the photographs, is the graphic design work of Josue Daniel Mazariegos Ochoa

Biological research has received help from Guatemalan biologists Eduardo Sacayon, Mirtha Cano, and Priscila Sandoval.

We appreciate the access to plants at the zoo in Guatemala City (yes, they also have nice ceiba and other trees in the La Aurora zoo). We thank the helpful people at the botanical garden in Guatemala City plus managers and guides at CECON in Monterrico (Centro de Estudios Conservacionistas, Universidad de San Carlos in Guatemala City). We thank the owner and managers and guides at AutoSafari Chapin for access to the plants and trees there (plus access to the animals and birds). We thank the managers of Estación Biológica "Las Guacamayas", Parque Nacional Laguna del Tigre, Peten, Guatemala for access and hospitality while there.

We appreciate the hospitality provided at the Missouri Botanical Garden by Charles Zidar as well as sharing of his information with us.



Daniela da Costa on a field trip



Sofia Monzon taking pictures of waterlilies at Monterrico, photo by Cristina Guirola

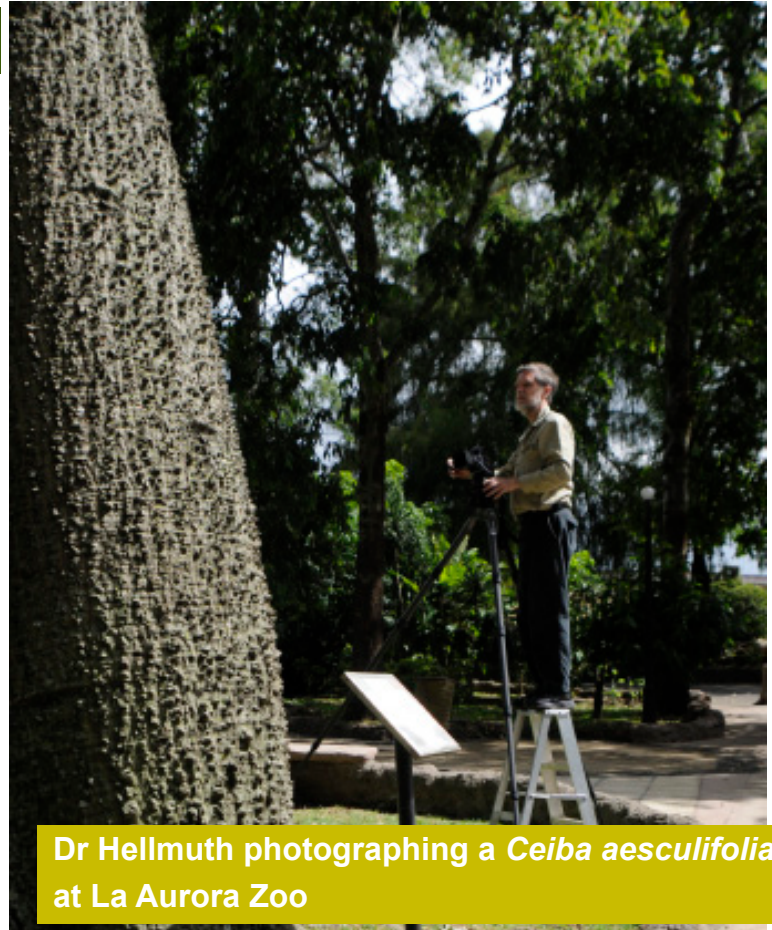


Jennifer Lara taking pictures of avocados at Antigua Guatemala, photo by Gustavo Gallegos





AutoSafari Chapin



Dr Hellmuth photographing a *Ceiba aesculifolia* at La Aurora Zoo

Estación Biológica  
“Las Guacamayas”







## Appendix A

### Thematic division of plants: comparison of Lundell and Hellmuth

Lundell lived and worked in Campeche and Peten for decades. He was a botanist and write his lists from his experience.

I have lived in Peten many many years (started visiting in 1963) and have photographed Puuc, Chenes, and Rio Bec architecture of Maya sites of Campeche, Quintana Roo, and Yucatan over several decades. Plus I have visited the Maya sites of Tabasco and Chiapas during the 1960's through 1990's.

My thematic categories are based first on iconography and sacred plants; then on common-sense categories. My theme categories are intended to assist archaeologists, epigraphers, iconographers, and ethnographers (obviously ethnobotanists also). I assume that botanists will know the plants inside out from their own training in biology.

I have no formal university training in biology, zoology, or botany (other than what I have learned from decades in the Maya area, including many years living in the remote rain forests before population hit these areas).

A further reason for the categories I have selected is to help interested lay people and students to learn the interesting, useful, and sacred plants of the Maya peoples. By 2010 my theme categories were well established. The report was issued in May 2011 and put on the [www.maya-archaeology.org](http://www.maya-archaeology.org) web site in June.

During research to finalize the report I stumbled upon an article on edible mushrooms of Guatemala, and realized this was a kind of plant that was not in my list anywhere. So I felt that it should be added as a separate category, since there are 70 species of edible mushroom in Guatemala alone. I would calculate there would be a few different species in Belize, Honduras, El Salvador and lots of different species in Mexico. What is notable is that I do not remember seeing mushrooms in any other list of food plants for the Maya. Perhaps they were in front of me and I simply did not notice. I will have to look at Lundell to see if mushrooms are listed there. Surely mushrooms are listed in good lists, but I sure did not notice.

And another rational behind my theme groups is to assist dividing the huge mass of plants into topics that would fit on individual web pages. Web pages of excessive length are not always fruitful. If there is more material than can fit on a single web page, then that material should be put into a PDF as a download.





Presently, each theme will receive one page on our [www.maya-archaeology.org](http://www.maya-archaeology.org) web site. Later, as we can afford to hire botanists, we will expand coverage to every single solitary individual plant: one page per plant. This will be a separate new web site on Maya ethnobotany, since this many new pages would max out our Maya archaeology web site.

For all of the above reasons it is understandable that my grouping of plants will tend to differ from groupings of a botanist. Actually now that I am creating the tabulation below, I am pleasantly surprised how many of my categories are comparable to those of Lundell. The only category I missed was trees for dugout canoes. So this category I will add. It is worth commenting that Lundell was primarily interested in trees: he worked for the chicle company. I am interested in every plant, and especially in flowers.

I did not find the list of Anabel Ford until mid-2011, so did not have it available for my categories, nor did I have her list of over 400 plants when I made my list. I had used individual pages of El Pilar documents when I was searching for extra information plants that I had already found.

Both Lundell and Ford have a category for ornamentals: I do not have this category since my list is focused on utilitarian use: food, construction, or sacred. However utilitarian is a valid cultural category.

I do not include forage since the Classic Maya had no cattle.

Tannin, gum, latex and poison I would include within other categories. "Production" is a category I would have to ask what it means. Fuel is a valid category but pine and other fuel plants tend to have other uses and thus would mostly be in my list under other uses.

Of all the thematic listings, I would like to add "for dugouts" from Lundell and fuel from Ford. These, plus my categories, cover about all the thematic categories that will assist transmitting this information to the readers of our publications. I fully understand that we also need the original indigenous Mayan categories too. This would be a valid project for a linguist, ethnographer, or ethnobotanist that had time, funding, and expertise with linguistics.



Lundell 1930's	Hellmuth 2010-2011	Ford, El Pilar, Belize
HUMAN FOODS:	Edible plants	food
cereals and vegetables	Grains	
	Vegetables	
	Edible leaves	
	Berries	
Cultivated, semi-, fruits	Fruits: all annona	
	Fruits	
	Fruits named "sapote"	
	Fruits from vines or cacti	
	Other fruits (not in trees)	
Wild fruits	Nuts	
	Seed pulp	
	Cooling oil	oil
	Other plants	
	Root crops	
Seasoning, flavoring	Water plants	
	Flavoring, herbs, spices	spice
	Flavoring for cacao	
	Flowers, sacred	
	Flowers, edible	
	Plant for cosmetics	
	Flowers for earrings	
	Additional flowers	
	Sacred plants	ritual
Beverage plants	Plants in myths	
	Plants produce alcohol	beverage
	Plants for drugs	
	incense	
Dye plants	Medicinal plants	medicine
Fiber plants	colorants	dye
cordage	Clothing (fibers etc)	fiber
Misc. useful plants	basketry, ropes	
thatching materials	Other utilitarian use	
timbers	Construction: palms	
	Construction: other plants	construction
For dugouts		
decorations		
Shade trees, ornamentals		
		fuel
		production
		ornamental
		poison
		forage
		tannin
		gum
		latex
	Introduced plants	



## Appendix B

**VILLAR ANLEU, Luis**

2006 Guatemala Arboles Magicos y Notables. Artemis Edinter Editores, Guatemala City.

The book by Luis Villar Anleu is one of the better resources for a full-color photographic record of trees which had a sacred or other special value for the Quiche Maya. Most of these same species were revered or used by the Classic Maya of Peten in earlier times. Naturally some species are found only in the highlands, some mainly in the Peten and Verapaz lowlands, and a few are more common in the Pacific coast and piedmont.

The book of the Popol Vuh that is available to us today comes from the Quiche highlands. But the origin of these sacred myths is clearly in the Lowlands. The concept of a large sacred bird in a fruit tree is found two thousand years ago in the Pacific lowlands of Izapa (the Mexican side of the Guatemalan border, between Tapachula, Chiapas and the border).

Other representations of the specific features of Hunahpu using his blowgun to aim at 7 Macaw are found on the lids of Early Classic pottery from the Peten Lowlands. Indeed these representations are in full three-dimensional ceramic modeling. My point is that there were probably diverse regional versions of the Popol Vuh, with slightly different plant and animal species featured. Most of the animals featured in the Popol Vuh are more common in the Lowlands of Peten than in the Highlands of Quiche.

One feature of the book by Villar is that the photographs of the trees are excellent; frankly they are much better than other photos in other books.

A few major sacred trees are missing, such as frangipani (flor de Mayo), balche, nance, but for the trees that he does include, the book is attractively presented.

Ocote, p. 22 (Popol Vuh, as torches)

Encinos, p. 24, 81 (Popol Vuh, growing on ballcourt and in general)

Balsamo, p. 31, Pacific coastal plain

Copal, p. 31, *Bursera excelsa*,

Copal, p. 31, *Protium copal*

Liquidambar, arbol de estoraque, p. 31, 113, incense, Verapaces

Palo-jicote, muliche, indio desnudo, p. 31, 34, incense

Tzite, Palo de pito, pp. 43, 45, 66, seeds for divination; created men (Popol Vuh)

Zibak, p. 45, created women (Popol Vuh)

Jicaros, *Crecentia kujete*, p. 45, 87 (Popol Vuh)



Morros, *Crecentia alata*, p. 45, 87 (Popol Vuh)

Amate, p. 49, source of bark paper

ilamo, p. 54, several species, associated with sacrifice in Highlands

Saúco, pan de tzolo'h, p. 55, edible

Arbol de hormiga, p. 58-59, drums are made of this wood

Zapotes, p. 66, edible

Cacao, pp. 67-69

Pimenta gorda, pp. 70-71

Canak, mano de leon, mano de mico, arbol de las manitas, majagua, pp. 72-72, Highlands only

Aguacate, pp. 74-75

Iximche, ramon, pp. 76-77

Guayaba, pp. 78-79

Hule, pp.88-89

Chico zapote, p. 93

Esquisuchil, pp. 126-131, medicinal, sacred among Aztecs, perfume

Ceiba, pp. 135-139





## Bibliography

This is an introductory bibliography. You can get a more complete bibliography in any major monograph.

I will list the web sites in the reports on individual plants.

Since with a staff of 20+ there are not really any universities which have space for the FLAAR team, I have not been on-campus for about six years now. Ironic since I loaned my entire library to the Museo Popol Vuh, Universidad Francisco Marroquin. The other irony is that although I live only about 3 km from the university, it's such a pain to be limited to opening hours of a university or museum library so I built up a basic (small) second library of ethnobotany and ethnozoology in the FLAAR offices. Since I live in the same building I have access to my books 24 hours a day.

Although my background is at universities, frankly I prefer to work from my excursions to do photography and asking local people what plants they use. So I did not use either of Lundell's useful works in the initial preparation of this comprehensive listing of Maya plants and flowers. Once I was through building up my own list, by reading tons of web sites after I came back from the field, then I compared my list with that of Lundell 1938. We each found plants not listed by the other, so the trade was about equal.

Although a biologist could hopefully add many titles, what we have gathered together on the following pages is a good start for iconographers, epigraphers, archaeologists, ethnographers as well as botanists who are interested in the plants related to pre-Columbian cultures.

For the articles, they are endless. It is much easier for a scholar to go to the bibliography in a monograph, plus on the Internet, and get the technical articles. So we concentrate on finding and listing the monographs, since we can purchase them at reasonable price. It is hard for us to obtain articles because of the excessive prices demanded by resellers.

The bloodsucking resellers of articles from scholarly journals should be ashamed of their pricing of reprints. It is sad that scholars allow this to happen, though I am fully aware of the tradition of having your articles in peer-reviewed journals. To us, peers include our readers, which so far are over a million people in recent years. Our goal is to provide information to as wide an audience of interested people as possible. We include scholars and students but also wish a wider general public to learn about the ethnobotany of the Maya without the public being at the mercy of sensationalistic or other skewed visions. It is sad when the public learns more from Domesday in 2012 than from archaeological tomes. A good balance are the informative publications such as those by botanist Ana Lucrecia de MacVean, Universidad del Valle, Guatemala.



It is much faster to publish our own articles electronically rather than go through peer reviewed journals (which are read, at most, by a few thousand people during an entire year). Our FLAAR Reports are read by that many people in a single month, plus this way we can include full-color illustrations. So we issue our own reports in PDF format (as free downloads).

### Coverage is for Maya plants; not Aztec or Mixtec

To keep this project realistic, we cover plants of interest to the Maya people, past, present and future. I also do research on Olmec, Teotihuacan, Aztec, Mixtec, Toltec, Zapotec and Classic Veracruz iconography, ethnobotany, and ethnozoology, but these cultures are not the focus of the present report on FLAAR research of recent past and present years.

For the Maya coverage is primarily on Guatemala, then Belize (since the output is manageable) and less thorough on Mexico (due to the immense size of the bibliography on plants of Mexico). I am interested in Honduras and FLAAR has done iconography photography there over many decades, but books on Guatemala are more realistic for us to access. We do not have any university providing us facilities nor funding; and there are no outside grants for this long-range ethnobotanical study either. Nonetheless, the list of plants on previous pages is more complete in many theme areas than that of the exceptionally well done summary by Lundell. I would have to check scores of articles and dozens of monographs on Mayan agriculture, but I would be pleasantly surprised if any of them had a tabulation that is as complete as in the previous pages.

We could do even better photography and provide more coverage if grants and funding were available, but we have done our best with our resources.

### FLAAR is open to cooperating with botanical gardens and university departments

For both research and teaching purposes the FLAAR Photo Archive section on Mayan ethnobotany probably is one of the larger photography reference archives for those plants and flowers that we have found and photographed. Rather than having a few photos of thousands of species, we may have 500 photographs of a single species (such as of “wiskil”)

Although water lilies are a common flower, and often photographed, and readily available, I would calculate that our photo archive is one of the largest available, and not many other archives have images of 60 MB each photo. Plus our photos are not totally burned out in the white part of the spectrum. We also have underwater images of the water lilies.



If a botanical garden, or university, or museum of natural history wishes to do joint projects with us, this means that we would tend to make major sections of our photo archive available to that institution in return for their help in raising funds for our projects.

And this is a good time to point out that although FLAAR has enviable quantity and quality of professional photography equipment, both for lab and for field trips, we are not wealthy in cash and are not ourselves a source of funding. We have been successful due to decades of grinding hard labor out in the field and years of working 12 to 14 hour days, 7 days a week in our office. This makes up for our lack of affluency in cash.

If we also had adequate funding, considering our experience, our knowledge of where to go for most species, we would be a good partner for any institute in Latin America, North America, Europe or Asia.

We know people who know where to find plants. We are familiar with security issues in Guatemala, And our Guatemalan staff are familiar with their colleagues in the country (Hellmuth, by accident of birth, was not born in Guatemala, but has certainly made up for this by producing information of use to Guatemalan students and scholars for decades). We are also proud of the number of capable Guatemalan students who have received priceless training in digital photography, digital imaging, and report writing at FLAAR.

### Comment on coverage of plants by the various countries of Mesoamerica

Mexico has produced dozens of gorgeous coffee table books on the plants and flowers of Mexico. This is because many successful commercial companies in Mexico have a tradition to issue an annual "Christmas present" corporate presentation book on topics of interest to local national pride.

Guatemala has produced a few such books on topics of national pride, but nowhere near as many as has Mexico.

We at FLAAR Mesoamerica would enjoy cooperating with corporations to produce corporate-sponsored books on utilitarian plants of the Mesoamerican companies.

Costa Rica has produced the most titles on flora and fauna of any country in Central America. Plus the illustrations are all in color. And each tome covers the selected topic pretty well.

Belize does well with web sites on botany related to the Maya culture (we mention one below). But I have not seen as many coffee table books on ethnobotany of Belize as exist for Mexico or even Guatemala.



One of my goals with this FLAAR Reports is to encourage institutes, individuals, and corporations to move forward with better coverage of the tropical plants of their countries. I have not seen monographs from Honduras or El Salvador, for example, at the level of the books produced in Costa Rica and Mexico. FLAAR would be glad to cooperate with botanists from these countries (and in Costa Rica, Belize, and Mexico also).

But FLAAR is rather obviously dedicated with an interest, enthusiasm in working with botanists, co-authors, and book producers in Guatemala to generate funding from private individuals and corporations to move our digital photography of plants forward to completion so that hard-cover coffee table books as well as scholarly monographs can be produced.





## Bibliography

When we know the page count of a monograph, we list this as an extra feature.

If you know of a book which I should include, please let me know at [ReaderService@FLAAR.org](mailto:ReaderService@FLAAR.org).

Articles I list in a separate bibliography (at the end of the list of monographs); I prefer to list monographs in a dedicated list on books, since books are more likely to have adequate photographic coverage. I have seen too many articles with zero photographs. I have even seen entire theses with practically no photographs whatsoever!

Web sites we are gathering a list, which will be in the chapter-by-chapter summaries over the course of on-going research. But I would definitely include there the web sites of Jim Conrad (Yucatan), El Pilar (Belize) and Ambergris Caye (Belize).

### **ALLEN, Paul Hamilton**

1956 The Rain Forests of Golfo Dulce. University of Florida Press. Reissued 1977, Stanford University Press

### **AJQUIJAY ON, Adela**

1997 CholQ'Utu'n recetario de cocina Maya.Iximulew, Guatemala 296 pages.

This is one of the few cookbooks that is really based on actual Maya cooking, albeit of course in today's world.

### **ANDERSON, E. N. et al.**

2003 Those who bring the Flowers: Maya ethnobotany in Quintana Roo, Mexico. El Colegio de la Frontera Sur, Chetumal, Mexico.

### **ATRAN, Scott., XIMENA, Lois, and Ediberto UCAN EK**

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

### **ARAGON, Claudia**

2004 Arboles de Costa Rica. Trees of Costa Rica, Vol. III. INBIO, Costa Rica. 556 pages.



Trees of Guatemala is only in English and was written outside Guatemala. Trees of Costa Rica is bilingual, is written entirely in Costa Rica, and published in Costa Rica. In general, INBIO of Costa Rica has published more scholarly research than any institute in any other country of Central America.

And, the print quality of the INBIO books is consistently better than most monographs or journals published elsewhere in Central America. But, no book is perfect. The significant downside of this handsome publication is that you can't see much or any detail on the flowers. The fruit is adequately shown, and of course the leaves are perfectly illustrated, but weak on any dedicated to the flowers other than showing them at a size that is not large enough to really assist a curious reader.

Font is very small and pages don't open adequately to read the book comfortably. I bet that if you tried to open any page the binding would crack and the book would fall apart before you finished reading it.

I seem to have found only Volume III (at a book fair in Guatemala about two years ago).

**ARELLANO Rodriguez, J. A., FLORES Guido, J.S. GARRIDO Tun, J. and Cruz BOJORQUEZ, MM.**

2003 Nomenclatura, Forma de Vida, Uso, Manejo y Distribucion de las Especies Vegetales de la Peninsula de Yucatan. Universidad Autonoma de Yucatan, Merida, Mexico.

**ARIAS, Salvador**

2010 Diversidad de cactaceas y su aprovechamiento en Mexico. Instituto de Biologia, Jardin Botanico, UNAM. PowerPoint, on-line. 27 slides.

**Asociacion Bioltza**

2001 Plantas medicinales utilizadas por los Itzes San Jose Peten. La Asociacion Bio-itza. 130 pages.

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Someone forgot to put any pagination in this book, and I somehow am thus not inspired to count the pages myself. Shows a purple water lily flower and not the correct white one. Sadly does not mention which flowers are native and which are introduced. But if you wish to have a garden in Central America, or you wish to see photographs of several hundred flowers, this book could potentially be useful.

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2010 Valoración química nutricional de la harina de semilla de diferentes especies de Inga (I. jinicuil, I. laurina, I. vera). Estudios preliminares para su incorporación en la dieta de la población rural. Universidad del Valle de Guatemala. 80 pages. On-line.



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**BRUMAN, Henry J.**

2000 Alcohol in Ancient Mexico. University of Utah Press, Salt Lake City.

An update of his PhD dissertation of 1940. Whew, nice to still be working on a topic after 60 years !

**BUTLER, Mary**

1935 Piedras Negras Pottery. Piedras Negras Preliminary Papers, University Museum, No. 4.

**CACERES, Armando** (editor)

2006 Vademecum nacional de plantas medicinales. Ministerio de Salud Pública y Asistencia Social; Programa Nacional de Medicina Popular Tradicional y Alternative, USAC.

I have two completely different editions; but only front cover is different. Inside is comparable but the 2009 edition has 314 pages; the 2006 edition has 262 pages. The first one I obtained was published Editorial Universitaria, Universidad de San Carlos de Guatemala, dated 2009. Only recently did I find the earlier edition.

**CAMACHO Pulido, Juan R.**

2005 Plantas comestibles silvestres especies de mayor uso. IMSS, Mexico. 104 pages.

In coffee table book format, but not really a slick style. Actually includes many plants that are not in other books. But most is on the dry areas of Mexico, including the north, so not really pertinent to the Maya homeland. But still worthwhile as a reference due to mention and nice photographic coverage of plants that are not commonly included in other books. One example would be the water plant, berro, pp. 20-21.

**CASO Barrera, Laura** and **Mario ALIPHAT**

2006 Cacao, Vanilla and Annatto: Three Production and Exchange Systems in the Southern Maya Lowlands, XVI-XVII Centuries Journal of Latin American Geography - Volume 5, Number 2, 2006, pp. 29-52.

**CASTILLO MONT, Juan J.**

1999 The Palms of Guatemala and their ornamental uses. Acta Horticulturae 486, 33-39.





**CHRISTENSON, Allen J.**

1997 Sacred Tree of the Ancient Maya. Maxwell Institute, BYU, Provo, Utah. On-line. Volume 6, Issue -1, Pages 1-23.

**Chízmar FERNANDEZ, Carla**

2009 Plantas comestibles de Centroamerica. Instituto Nacional de Biodiversidad, INBio, Costa Rica. 360 pages.

**COE, Sophie D.**

1994 America's First Cuisines. University of Texas Press. 288 pages.

**COE, Sophie D. and Michael D. COE**

2007 The True History of Chocolate, Second Edition. Thames & Hudson. 288 pages.

**CONRAD, H. S.**

1905 The waterlilies: A monograph of the genus Nymphaea. Carnegie Institution, Washington, D.C.

**COUPLAN, François**

1998 The Encyclopedia of Edible Plants of North America: Nature's Green Feast. Keats Publishing, Inc. 584 pages.

Useful for USA and perhaps Canada, but the author clearly states he does not intend to cover "tropical Mexico." However technically, geographically, "North America" extends as far south in Mexico as the Isthmus of Tehuantepec. This book specifically excludes tropical Veracruz and tropical West Mexico. I would suggest retitling the book "USA, Canada, and Northern Mexico since the edible plants of Highland Central Mexico get complex quickly.

Has a nice glossary and ample bibliography, but again, this is not a book that covers pre-Columbian Mesoamerica. Nonetheless, many plants from Mesoamerica are also grown in northern Mexico and southern USA, so the book is an acceptable reference.

Only a small portion of the plants are illustrated (in nice line drawings by the author). No photographs; not even B&W.

**CROW, Garrett E.**

2002 Plantas acuáticas del Parque Nacional Palo Verde. Aquatic Plants of Palo Verde National Park and the Tempisque River Valley. Editorial INBio. 296 pages.



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1977 Spanish red. An ethnogeographical study of cochineal and the Opuntia cactus. Transactions of the American Philosophical Society, Vol. 67, part 5. Philadelphia: American Philosophical Society. 84 pages.

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2003 CRC Handbook of Medicinal Spices. CRC Press. 333 pages.

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**ESTRADA Chavarría, Armando and Alexander RODRIGUEZ GONZALEZ**

2009 Flores de pasión de Costa Rica: Historia natural e identificación. Editorial INBio. 448 pages.

**FEDICK, Scott**

2010 The Maya Forest: Destroyed or cultivated by the ancient Maya? PNAAS, Proceedings of the National Academy of Sciences. Vol. 107, no. 3: 953-954.

**FIGUEROA** viuda de **BALSELLS, Catalina**

2006 Cocina Guatemalteca arte, sabor y colorido. Editorial Piedra Santa. 140 pages.

It would be nice to have a book on recipes related to the Maya and their indigenous foods. Most cookbooks, such as the one here on Guatemalan recipes (except for rare ones in Mexico) tend to include onions, lemons, and a dozen foods that are not pre-Columbian.

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2006 Chocolate and Vanilla. Clarkson Potter. 144 pages.



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2002 Foods of the Maya: a taste of the Yucatan. University of New Mexico Press. 128 pages.

**GOMEZ-Pompa, Arturo, ALLEN, Michael F., and Scott L. FEDOCK**

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659 pages.

**GUERRERO, Cristina and Elena GALANTE MARCOS**

2009 Secretos de los humedales. Editorial INBio.

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1998 Mayan Cooking: Recipes from the Sun Kingdoms of Mexico. Hippocrene Books. 371 pages.

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2005 Plantas ornamentales nativas de Costa Rica. Native Ornamental Plants. 3rd Edition. INBio. 269 pages.

The Instituto Nacional de Biodiversidad has published more books on flora and fauna of tropical Central America, with more nice color photos, professionally printed on quality paper than any other country in Mesoamerica.

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1995 Plantas medicinales comunes de Honduras. Tegucigalpa, Honduras: Litografía López – UNAH, CIMN-H, CID/CIIR,GTZ.

**HOUSTON, Stephen, BRITTENHAM, Claudia, MESICK, Cassandra, TOKOVININE, Alexandre, and Christina WARINNER**

2009 *Veiled Brightness: A History of Ancient Maya Color*. University of Texas Press. 148 pages.

Mostly on the cultural associations of color; for plant sources of color has short chapter but an extensive list back in an appendix area. This is not a book on ethnobotany, it is a discussion of color which includes color from plants. The list of plants which provide colorants, Appendix pp. 103-109, probably took someone many months in a really good library, and represents a huge amount of work.

What would be a good next step is for a student to take this list, find each plant one by one, and do an ethnobotanical study of them all.

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2002 La vegetaion de Calakmul, Campeche, Mexico: Clasificacion, descripcion y distribucion. Boletin de la Sociedad Botanica de Mexico, Dic, Num. 71, pp. 7-32.

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**MENDIETA, Rosa Ma.** and **Silvia DEL AMOR.**

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1996 Amaranth to Zai Holes. Echo. 404 pages. (On-line, [echonet.com](http://echonet.com))

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Includes mention of baskets and other non-ceramic, non-stone materials: namely plant materials.

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n.d. Contribution al conocimiento de los hongos comestibles de Guatemala. Proyecto Hongos Comestibles de Guatemala, Diversidad, Cultivo y Nomenclatura Vernácula. Departamento de Microbiología, Escuela de Química Biológica, Instituto de investigaciones Químicas y Biológicas, Facultad de Ciencias Químicas y Farmacia, Dirección General de Investigación, Universidad de San Carlos de Guatemala. On-line. 19 pages.

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1981 Atlas of medicinal plants of Middle America: Bahamas to Yucatan. Springfield, Illinois: Charles C. Thomas.

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2002 Books for Business. 200 pages.



**NATIONS, James D.**

2006 The Maya Tropical Forest: People, Parks and Ancient Cities. University of Texas Press. 368 pages.

**NIEMBRO-ROCAS, Anibal**

1986 Arboles y arbustos utiles de Mexico. Editorial Limusa, Mexico, D.F.

1993 Campeche en Flor. Universidad Autonoma de Campeche, Centro de Investigaciones en Bosques Tropicales, Campeche, Mexico. 226 pages.

Carefully identifies which plants are native and which were introduced from other parts of the world. Photographs are typical home-made but serve their basic purpose to show several hundred Campeche flowers. Campeche is a good chunk of the former and present Maya homeland. Would be helpful if a book like this were available on Chiapas, Tabasco, Yucatan, Quintana Roo, Campeche, Peten, and other parts of pre-Columbian Mesoamerica.

I hope botanists can use books such as this to see why over-exposed white color removes all and any detail of the flower.

**OCAMPO, Rafael and Michael J. BALICK**

2009 Plants of Semillas Sagradas: An Ethnomedicinal Garden in Costa Rica. Finca Luna Nueva Extractos de Costa Rica, S.A. 109 pages.

Medicinal plants of Central America. Covers primarily Costa Rica and its neighbors but also includes Guatemala. Available on-line. Excellent book, helpful descriptions; photographs are all in color and mostly good quality.

**OLAYA, Clara Ines**

1991 Frutas de America torpical y subtropical: Historia y usos. Group Editorial Norma 179 pages.

Well illustrated coffee-table book. Shows tree, fruit, flower, recipes, but only of the more popular fruits. Good for each fruit it does cover, but this is not an encyclopedia of all fruits of tropical America whatsoever.

**OLMSTED, I, and G. R. DURAN**

1987 Listado floristico de la Reserva de Sian Ka'an. Amigos de Sian Ka'an, Puerto Morelos, Quintana Roo, Mexico. 71 pages.





**PARKER, Tracey**

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

A great book. Even without a single photograph (other than the one on the front cover) this is still an essential book. However this book is not intended to be for ethnobotanical uses. In the future would help to have an ethnobotanical co-author. So although this book is a bible, you still need the ethnobotanical monographs on Mexican trees and hundreds of articles to get the full picture of the ethnobotany of trees for the Maya past and present. I would add that this book is really reasonable priced considering it is over a thousand pages.

A complete index to this book is available on-line: [www.bookmasters.com/marktplc/02192index.pdf](http://www.bookmasters.com/marktplc/02192index.pdf)

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1963-74 Plantas cultivadas y animales domesticados en América equinoccial, Vol. 1-4. Cali, Colombia, Imprenta Departamental.

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1997 The genus Inga. Botany. Royal Botanic Gardens, Kew. 844 pages

**PENNINGTON, T. D. and E. C. M. FERNANDES, editors**

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1991 The Pines of Mexico and Central America. Timber Press, Portland, Oregon.  
231 pages.

Thorough, but a botanist's book, not an ethno-botanists'.

**PETER, K. V.**

2001 Handbook of Herbs and Spices. Woodhead Publishing. 336 pages.  
Grossly overpriced.



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**POPENOE, Wilson, et al.**

1921 Inventory of Seeds and Plants Imported by the Office of Foreign Seed and Plant Introduction during the period from October 1 to December 31, 1916. Bureau of Plant Industry.

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1993 Lista anotada de las plantas medicinales de uso actual en el estado de Quintana Roo, Mexico. Central de Investigaciones de Quintana Roo. 195 pages.

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**RATSCH, Christian**

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**ROBICSEK, Francis**

1979 Smoking Gods: Tobacco in Maya art, history, and Religion. University of Oklahoma Press. Norman, OK. 258 pages.



**ROBLES GIL, Patricio (editor) and Rodolfo DIRZO (author)**

1994 Diversidad de flora Mexicana. CEMEX. 191 pages.

Primarily a coffee-table book. Not a systematic descriptive book. But does have nice photos.

**ROELING, Sebastiaan**

2007 Lacandon Glossary, from Shadows of Bonampak; An extensive Ethnography of the Lacandon Maya of Chiapas, Mexico. (<http://home.planet.nl/~roeli049/gloseng.pdf>)

**ROSEN, Winifred and Andrew T. WEIL**

2004 From Chocolate to Morphine: Everything You Need to Know About Mind-Altering Drugs.

**ROSENGARTEN, Frederic, Jr.**

1984 The Book of Edible Nuts. Dover. 384 pages.

Helpful book but definitely not focused on Mesoamerica. For example, although includes coconuts, does not have chapters on palm “nuts” such as corozo palm. Yet he includes seeds: from pumpkin and watermelon! Totally missing is a chapter on the walnut (my second favorite nut food, after cashew). Nonetheless, essential reading if you need insight into the few nuts that he does cover which also occur in Mesoamerica.

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1965 Ritual of the Bacabs. University of Oklahoma Press, Norman.

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Not a book I would rush out to buy. There are better (more comprehensive) monographs on sacred plants of Mesoamerica.

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1936 The Forests and Flora of British Honduras. Publication 350, Botanical Series Vol. XII, Field Museum of Natural History.

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1974 Flora of Guatemala. Fieldiana: Botany, Vol. 24, Part X, Numbers 3 and 4. Field Museum of Natural History.





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1976 Maya History and Religion. University of Oklahoma Press. 3rd Printing.

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2004 Passiflora: Passion Flowers of the World. Timber Press. 432 pages.

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2004 Los increíbles higueros. Editorial INBio. 123 pages.

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1950 Foods America gave the World. L. C. Page & Company.

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Florida Press.

(for Charles ZIDAR, see articles below; we keep track of references by books and articles; this way it  
is easier for us to track down each kind of reference to add to our reference library.)

**Zamora, Nelson and Terence D. PENNINGTON**

2001 *Guabas y cuajiniquiles de Costa Rica*. Editorial INBio. 200 pages.

### **Bibliography: Articles**

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a bibliography. It is easier to see the monographs if they are not surrounded by articles.

Thousands of articles can be found. I prefer to list the monographs, since in these you can find all the  
articles. Since the Internet is available to Google any subject, any plant, and get all the articles, this is  
more realistic than re-listing every article here. But I do list those articles which are especially useful, or  
which I have consulted myself.

**ANDRADE-CETTO, Adolfo and Michael HEINRICH**

2005 Mexican plants with hypoglycaemic effect used in the treatment of diabetes. *Journal of  
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**AVENDANO, A., CASAS, A., DAVILA, P. and R. LIRA**

2006 Use forms, management and commercialization of “pochote” *Ceiba aesculifolia* (H.B. & K.)  
Britten & Baker f. subsp. *parvifolia* (Rose) P.E. Gibbs & Semir (Bombacaceae) in the  
Tehuacán Valley, Central Mexico. *Journal of Arid Environments*, Volume 67, Issue 1, October  
2006, Pages 15-35

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Nicholas Hellmuth photographing ceiba

Nicholas Hellmuth and Sofia Monzon photographing waterlily  
eco-system in Guatemala, 2010.







FLAAR has one of the largest archives of photographs of the water lily in the world. This is in part because this plant was the subject of Dr Hellmuth's PhD dissertation (available in coffee table edition as *Monster und Menschen in der Maya Kunst*, ADEVA, 1987; available from FLAAR in hardcover and leather bound autographed edition).

The second reason we are building up such a large photo archive on the water lily is because this is the flower most frequently pictured in Mayan art. Why is it so common? Hmmm, seems the flower has some tasty ingredients.

But so far I have resisted trying these. Our main interest is the iconography, epigraphic, mythical, and ethnobotanical value of this plant. But we estimate this plant was a major "food" resource for the pre-Columbian peoples.



