

# Economic Potential for Amate Trees



*Ficus* (Fig Tree) Species of Guatemala

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# Introduction

Entire monographs have been written on the bark paper of the Maya and Aztec codices (Van Hagen 1944). And there are plenty of scholarly botanical studies of *Ficus* trees of the family Moraceae.

But on the Internet there is usually total confusion in popular web sites about the differences between strangler figs and normal fig trees. It is unclear to which degree the bark paper comes from a strangler fig tree, or also from another *Ficus* species which is a normal tree (not dedicated to wrapping its roots around a host tree). But all this needs further research since 90% of the books and about 99% of the articles are on bark paper of Mexico. Indeed bark paper is still made in several parts of Mexico (to sell the tourists interested in Aztec, Maya and other cultures).

Since we are in the middle of projects studying flavorings for cacao, Aztec and Maya ingredients for tobacco (more than just tobacco), colorants from local plants to dye native cotton clothing, and also trying to locate all the hundreds of medicinal plants of Guatemala, it would require funding to track down and study every species of *Ficus*. But since we are interested in all utilitarian plants of Mesoamerica, we wanted at least to prepare an introductory tabulation and a brief bibliography to assist people to understand that

- strangler figs strangle other trees; these are very common in Guatemala
- But there are many fig trees which are not stranglers
- Figs for candy and cookies come from fig trees of other parts of the world
- Not all bark paper comes just from amate (*Ficus*) trees

For photographs we show in this first edition only the two fig trees which we have found in the last two months of field trips. We will need to see their flowers before we can identify precisely which species of *Ficus* they are (but they not typical strangler figs, unless their host already was “strangled” and rotted away decades ago!).

During the coming year we will find, photograph, and publish the more common strangler and non-strangler figs of Guatemala.

So month by month we will advance in our studies of the utilitarian plants of the Aztec and Maya areas of the world, the area known as Mesoamerica: Mexico, Guatemala, Belize, Honduras, El Salvador, Costa Rica and Nicaragua. The heartland is Mexico and Guatemala.



The result of this image is accomplished by mixing 6 photos in HDR technique.

# Introductory Tabulation of a sample of Ficus species of Mesoamerica

There are 22 species of *Ficus* for Mexico (Ibarra et al.:2012:392) and at least 36 or more *Ficus* species included in Parker's book on Trees of Guatemala (2008.556-564). Dozens more exist in the rest of Mesoamerica. I list only a sample here.

In bold font I emphasize which species can be used to make bark paper. There are many non-*Ficus* trees which can also produce a bark-paper. So the ethnobotany gets complicated very quickly. But at least now we have initiated this research project and want to show our first photographs and our initial tabulations. I provide a separate tabulation to list all trees of other kinds of trees which can also make paper.

The best discussion of which trees can be used to make paper in Mexico is in the PhD dissertation of Lopez. Here we list only *Ficus* species; Although Lopez is often an original source, the tabulation of Robles is the easiest to follow (2011: 216). There are also lists in the PhD dissertation of Maya (2011).

Scientific name	Common name	Uses
<i>Ficus calyculata</i> Miller		Listed in dissertation of Lopez as one of many sources of bark paper.
<i>Ficus citrifolia</i> Mill.	Higuerón.	Medicinally it has served to cure infections, sores, as masticatory and worming.
<i>Ficus obtusifolia</i> Kunth	Higuerón.	No known use
<i>Ficus cotinifolia</i> Kunth		Has been used medicinally in bruises, sores and intestinal problems. And for manufacturing a paper called "bark paper".
<i>Ficus oerstediana</i> Kunth	Higuerón.	Its wood has applications for posts.
<i>Ficus glabrata</i> Kunth	Amate	Its sap is used as a vermifuge.
<i>Ficus padifolia</i> Kunth	Amatillo	Medicinal uses made of this plant are against toothache and in cases of inflammation of the breasts of lactating women.

<i>Ficus goldmanii</i> Standl	Matapalo, higuerón	Its ripe fruits are somewhat nice. Also used to make bark paper.
<i>Ficus insipida</i> Willd. subsp. <i>Insipida</i>		Soft wood, used for construction
<i>Ficus padifolia</i> H. B. K.		Listed in dissertation of Lopez as one of many sources of bark paper.
<i>Ficus pertusa</i> L.f.	higuerón	Bark paper.
<i>Ficus petiolaris</i> Kunth	amate amarillo	Bast used in Mexico for manufacturing a paper called "bark paper". Locally has some medicinal uses.
<i>Ficus jaliscana</i> S. Watson		No known use
<i>Ficus radula</i> Willd.		No known use
<i>Ficus maxima</i> Mill		Treating parasites
<i>Ficus involuta</i> Miq.		For manufacturing paper
<i>Ficus segoviae</i> Miq.		No known use
<i>Ficus mexicana</i> (Miq.) Miq.		No known use
<i>Ficus tolucensis</i> (Liebm.) Miq.		Bast used in Mexico for manufacturing a paper called "bark paper".
<i>Ficus nymphaeifolia</i> Mill.	Higuerón	No known use
<i>Ficus velutina</i> Kunth ex Willd.	Higuerón	No known use

## Introductory Bibliography to Amate Trees (*Ficus* species) of Mesoamerica

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

2000 Checklist of the Vascular Plants of Belize with Common Names and Uses. The New York Botanical Garden Press, New York.

### **BERG, Cornelis C.**

2001 Moreae, Artocarpeae, and *Dorstenia* (Moraceae), with Introductions to the Family and *Ficus* and with Additions and Corrections to Flora Neotropica Monograph 7. *Flora Neotropica* Monograph 83: 1–346

### **BURGER, W. C.**

1977 Moraceae. *Fieldiana Botany* 40:94–215.

### **CARVAJAL, Servando**

2007 Moraceae. Flora del Bajío y de Regiones Adyacentes. Fas. 147.  
[www1.inecol.edu.mx/publicaciones/resumeness/FLOBA/Moraceae147.pdf](http://www1.inecol.edu.mx/publicaciones/resumeness/FLOBA/Moraceae147.pdf)

### **CONDIT, I. J.**

1947 The Fig. Chronica Botanica Co., Waltham, Mass.

### **CONDIT, I. J.**

1955 Fig Varieties: A Monograph. *Hilgardia*: 11: 323-538

### **DRUMMOND, J.**

1991 Determining and processing quality parameters in geographic information systems

### **DURAN-Ramírez, Carlos Alberto, FONSECA–Juárez, Rosa María and Guillermo IBARRA–Manrique**

2010 Estudio florístico de *Ficus* (Moraceae) en el estado de Guerrero, México. Floristic study of *Ficus* (Moraceae) in the state of Guerrero, Mexico. *Rev. Revista mexicana de Biodiversidad* vol. 81 no. 2 México ago. 2010.

Available on-line, at no cost.

[www.scielo.org.mx/scielo.php?script=sci\\_arttext&pid=S1870-34532010000200003](http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1870-34532010000200003)

### **GRANDTNER, M. M.**

2005 Elsevier's Dictionary of Trees: Volume 1: North America, Elsevier Science, 1529 pages. Pages 358-360 list dozens of *Ficus* species for Mesoamerica.

### **IBARRA-Manriquez, Guillermo, CORNEJO-Tenorio, Guadalupe, GONZALES-Castaneda, Nahu, PIEDRA-Malagon, Eva María and Albino LUNA**

2012 En genero *Ficus* L. (Moraceae) en Mexico. *Botanical Sciences* 90 (4): 389-452.

One excellent feature of this well presented opus are the line drawings of each species. Fresh, clean, adequate size drawings.

### **LANSKY, Ephraim Philip and Helena Maaria PAAVILAINEN**

2010 Figs, the Genus *Ficus*. Traditional Herbal Medicines for Modern Times. CRC Press. 415 pages, 204 illustrations.

### **MARTINEZ Alfaro, M.A; EVANGELISTA, V; MENDOZA, M.; Morales, G.; TOLEDO-Cortina, G. and WONG-León, A.**

1995 Catálogo de plantas útiles de la Sierra Norte de Puebla. Cuadernos del Instituto de Biología 27. Jardín Botánico, Instituto de Biología UNAM, Mexico.

### **MOLINA-Rosito A.**

1975 Enumeración de las plantas de Honduras. *Ceiba* 19:1-118.

### **PARKER, Tracey**

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

Useful, but is a compendium of data from Standley and comparable earlier field workers. Not very much fresh new field work for this booth. Nonetheless it really helps to have 98% of the Guatemalan trees all in one single book.

But it would have helped to have more first-hand information over and above what is already in the earlier monographs.

### **PENNINGTON, T. D. and J. SARUKAHN**

2005 Árboles tropicales de México. Manual para la identificación de las principales especies, tercera edición. Universidad Nacional Autónoma de México y Fondo de Cultura Económica, México, D. F. p. 142–145.

### **SANDVD, K, at al.**

1992 Bark, the formation, characteristics, and uses of bark around the world. Timber Press.

### **STANDLEY,P. C.**

1917 The Mexican and Central American species of *Ficus*. Contributions from the United States National Herbarium Volume 20:1–35. Govt. Print. Off, Washington, DC.

### **STANDLEY,P.C.**

1922 Trees and shrubs of Mexico. Contribution of the United States National Herbarium 23:171–516.

### **WEIBLEN, G. D.**

2002 How to be a fig wasp. *Annual Review of Entomology* 47:299-330.

### **WIEBES, J. T.**

1979 Co-evolution of figs and their insect pollinators. *Annual Review of Ecology and Systematic* 10:1-12.

## Web sites which are useful when learning about Ficus trees

There are many web sites, we list just an introductory sample because there are already plenty of articles and monographs of *Ficus*, especially of Mexico

[www.ars-grin.gov/misc/mmpnd/Ficus.html](http://www.ars-grin.gov/misc/mmpnd/Ficus.html)

Sorting Ficus names; an unbelievably complete list of seemingly hundreds of scientific names of Ficus trees and indicating which is a synonym of which.

[www.scielo.org.mx/scielo.php?script=sci\\_arttext&pid=S1870-34532010000200003](http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1870-34532010000200003)

Estudio florístico de *Ficus* (Moraceae) en el estado de Guerrero, México, listed in the bibliography under DURAN 2010.

[www.medicinatradicionalmexicana.unam.mx/monografia.php?l=3&t=&id=7104](http://www.medicinatradicionalmexicana.unam.mx/monografia.php?l=3&t=&id=7104)

The Atlas de las Plantas de la Medicina Tradicional Mexicana provides a very brief summary of several species, but one at a time, including *Ficus cotinifolia*, *Ficus glabrata*, *Ficus tecolutensis* and others.

[www.reservasdeguatemala.org/web/documentos/especies\\_forestales\\_guatemala.pdf](http://www.reservasdeguatemala.org/web/documentos/especies_forestales_guatemala.pdf)

A simple but useful list. However weak for Ficus species: lists only nine meager species.

## Introductory Bibliography on bark paper from amate

You can find complete bibliographies in monographs and technical ethnobotanical articles. But here we list enough key resources to provide abundant information to get started to better understand how to make bark paper from native trees of Mexico (and thus, in theory, what could be introduced into the other Maya and Aztec-related countries of Mesoamerica).

### AMTIH, Jonathan D.

1995 The Amate Tradition. Mexican Fine Arts Center Museum, Mexico, D.F.

### BERENZON, B.

1996 Los Señores del Papel: Papel, Escritura y Códices en Mesoamérica. Pangea Editores. México, D.F.

### BODIL, Christensen and Samuel MARTI

1972 Witchcraft and Pre-Columbian Paper. Ediciones Euroamericanas Klaus Thiele, México, D.F.

### FREDERICK, Jennie

2004 Lacandon Maya Bark Cloth: Hu'un', in Hand Papermaking 19/2 (2004), pp. 23-30.

### GALLINIER, J.

1979 Les Indies Otomis. (ed.). Collection Etudes Mesoamericaines II. Mision Arqueologica y Etnológica Francesa en Mexico. Mexico.

### GALLINIER, J.

1987 Pueblos de la Sierra Madre. Etnografía de la comunidad otomí (Colección Clásicos de la antropología. Instituto nacional Indigenista-Centro francés de estudios mexicanos y Centroamericanos. México.

### GARTNER, B.

1995 Plant stem: Physiology and functional morphology. Academic Press. 441 pages.

### HUNTER, Dard

1927 Primitive papermaking. An account of a Mexican sojourn and of a voyage to the Pacific islands in search of information, implements and specimens relating to the making and decorating of bark-paper. Chillicothe.

### HUNTER, Dard.

1943 Papermaking: The History and Technique of an Ancient Craft. Dover Publications, Inc., New York City, NY.

### LENZ, Hans

1949 Las fibras y las plantas del papel indígena mexicano. Cuadernos Americanos. Volumen 8, Mayo-Junio, Número 3. pp. 157-169.

### LENZ, Hans

1984 Cosas de papel en Mesoamérica. Prólogo por José Miguel Quintana. México, D.F., 511 pages.

### LOPEZ Binnquist, Rosaura Citlalli

2003 The Endurance of Mexican Amate Paper: exploring additional dimensions to the sustainable development concept. PhD dissertation, University of Twente. 330 pages.

This is the best recent work I have yet seen. Would be nice to see comparable studies for Guatemala, Belize, Honduras, and El Salvador. Her pages 320-322 list all species usable for bark paper by each of about a dozen authors (curiously Victor von Hagen is not in her list).

### LOPEZ Binnquist, Rosaura Citlalli

2004 Amate papel de corteza mexicana (*Trema micrantha* (L.) Blume): estrategias de extracción de corteza para enfrentar la demanda", in M. Alexiades and P. Shanley (eds.), Conservación y medios de subsistencia. Diversos casos sobre productos forestales no maderables en América Latina, vol. 3, Cifordfideu. Indonesia: 387-413.

### LOPEZ, Citlalli

2005 Amate: presente de un papel tradicional de corteza. In La riqueza de los bosques mexicanos: más allá de la madera. Experiencias de comunidades rurales, pp. 31-35. Secretaría de Medio Ambiente y Recursos Naturales (Semarnat).

### LOPEZ, Isais and M. V. MEEREN

2009 Papel amate. CONABIO, Biodiversitas 82::11-15.

### MAYA Moreno, Ruben

2011 El papel amate, soporte y recurso plástico en la pintura indígena del centro de México. PhD dissertation, Universidad Complutense de Madrid, Department of Painting. 461 pages.

The copious number of photographs of the step by step processing of the bark makes this one of the absolute best resources to understand how the paper is really made. It is not "bark" at the end of the process, it is boiled, steamed, mashed remains of inner bark, applied in a mud-like form to a frame. So it really is "manufactured" paper. The bark simply is what is the base material.

This dissertation is available on-line.

### OETTINGER Jr., Marion.

1986 Concarino: Mexican Folk Art. San Antonio, Texas: San Antonio Museum of Art.

**PIEDRA-Malagón, Eva María, RAMIRZ Rodríguez, Rolando, and Guillermo IBARRA-Manríquez**

2006 El género *Ficus* (Moraceae) en el Estado de Morelos, México *Acta Botánica Mexicana*, núm. 75, 2006, pp. 45-75, Instituto de Ecología, A.C. México.

[www.redalyc.org/pdf/574/57407503.pdf](http://www.redalyc.org/pdf/574/57407503.pdf)

**QUINTANAR-Isaias, Alejandra, LOPEZ Binnquist, Citalli, and Maria VANDER MEEREN**

2008 El uso del floema secundario en la elaboración de papel amate. *ContactoS* 69, 38–42.

Available on-line. This is an excellent technical (chemical, botanical) description of the layers of bark.

**ROBERTSON, Donald.**

1959 Mexican Manuscript Painting of the Early Colonial Period. University of Oklahoma Press, Norman, OK.

**ROBLES Vargas, Bertha**

2011 Estado actual del conocimiento de la elaboración del Papel Amate. Thesis, Ingeniero Forestal, Universidad Autónoma Chapingo

Available on-line.

Also includes a list of plant species which provide colorants. Provides an abundance of snapshots of how the paper is manufactured.

It is ironic that two very lengthy PhD dissertations on bark paper came out the same year, 2011. Although the paper is called “amate paper” in fact both dissertations list all the other trees used.

**SANDSTROM, Alan R. and Pamela E. SANDSTROM.**

1986 Traditional Papermaking and Paper Cult Figures of Mexico. University of Oklahoma Press, Norman, OK.

**SANGER, Chloe.**

1990 Arts and Crafts of Mexico. Chronicle Books, San Francisco, CA.

**SCHWEDE, R.**

2012 Über das Papier der Maya-Codices und einiger altmexikanischer Bilderhandschriften. Dresden.

**SCHWEDE, R.**

1916 Ein weiterer Beitrag zur Geschichte des altmexikanischen Papiers', in *Jahresbericht der Vereinigung für angewandte Botanik* 13 (1916), pp. 4-55.

**STARR, Frederick**

1900 Mexican Paper, in: *American Antiquarian and Oriental Journal* 22 (1900), pp. 301-309.

**TEIJGELER, Rene**

2006 Amate From cloth, manuscript to painting, On-line.

A good general survey of the literature, though a challenge to know whether it is based primarily or entirely on library research or whether there is first-hand research in Mexico.

A note says: “Teijgeler, R., The politics of amate and paper in Mexico. In: *IPH Congress Book 2006, vol.16*. Marburg: International Association of Paperhistorians. To be published soon.”

**TOLSTOY, P.**

1963 Cultural Parallels Between Southeast Asia and Mesoamerica in the

Manufacture of Bark Cloth', in: *Transactions of the New York Academy of Sciences, Series 2*, 1963 (25/1), pp. 646-662.

**TSCHUDIN, W. F.**

1961 Älteste Papierbereitungsverfahren in Mittelamerika. Zusammenhänge

zwischen Tapa, Maya-und Otomipapier', in: *Textil-Rundschau* 12 (1961), pp. 3-12 and 16.

**VANDER MEREEN, M.**

1995 El Papel Amate: Tecnología, Composición y Alteraciones. Imprimatura, Revista de Restauración. pp. 3-12.

**VANDER MEREEN, M.**

1997 El papel amate, origen y supervivencia. *Arqueología Mexicana* 23: 70-73.

**VASQUEZ, C.**

1998 *Trema micrantha* (L) blume (Ulmaceae): a promising neotropical tree for Site amelioration of deforested land. *Agroforestry Systems* 40: 97-104.

**RODRIGUEZ, O.**

1995 Land Use conflicts and planning strategies in urban fringes: a case study of Western Caracas, Venezuela

**TOOR, Francis.**

1939 Mexican Popular Arts. Francis Toor Studios, Mexico, D.F.

**TROIKE, Nancy**

1979 Observations on Some Material Aspects of the Codex Colombino. University of Texas at Austin: Reprinted by permission from TLALOCAN, Vol. VI, No.3, 1970.

**VERDINELLI, Bocco**

1990 Gully erosion analysis using remote sensing and geographic information systems: a case study in Central Mexico

**Von HAGEN, Victor**

1944 The Aztec and Maya Papermakers. J.J. Augustin Publisher, New York.

This is the best known monograph on amate tree paper. But hopefully in the last seventy years other scholars have been able to learn even more about the tree and the paper. It would be helpful to have a modern ethnobotanical study of bark paper and the amate tree, to help clear up the differences between strangler figs and normal fig trees (and between *Ficus* of Mesoamerica and *Ficus* of the “fig tree” in other parts of the world).







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Photographs by Nicholas Hellmuth