

PLANTS OF THE POPOL VUH, THE SACRED
BOOK OF THE MAYAPLANTAS DEL POPOL VUH, EL LIBRO
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SUMMARY

A compilation of the plants mentioned in the sacred book of the Mayans Popol Vuh, recognized as the framework of their cosmogony that was written in the K'iche' area in Guatemala around the year 1550 was made. Thirty-two different species were identified, from 21 plant families, all native to Mesoamerica. The largest number of species was in Fabaceae with four species, Moraceae and Solanaceae with three species each, in addition to Bromeliaceae, Cucurbitaceae, Malvaceae and Poaceae with two species each. The five most important and frequently named species are maize (*Zea mays*), jícara (*Crescentia cujete*), copal (*Protium copal*), rubber (*Castilla elastica*) and cocoa (*Theobroma cacao*). Eleven species were identified, such as pito wood (*Erythrina berteroana*) and zibak (*Cyperus canus*), considered of cosmogonic significance and food plants that are integrated into five groups: fruit trees [zapote (*Manilkara zapota*), nance (*Byrsonima crassifolia*), jocote (*Spondias mombin*), anona (*Annona reticulata*), matasano (*Casimiroa edulis*)], grains and seeds [maize, beans (*Phaseolus lunatus*), cocoa, pataxte (*Theobroma bicolor*)], vegetables [squash (*Cucurbita moschata*), tomato (*Solanum lycopersicum*), chilacayote (*Cucurbita ficifolia*)], flavourings [chili (*Capsicum annuum*)], and beverages [maguey (*Agave americana*)]. Seven species were domesticated: maize, squash, chilacayote, tobacco (*Nicotiana tabacum*), beans, tomato and cocoa and others for medicinal purposes, fuel and instruments. The description of the creation of man asserts the close relationship of the Mayan culture with plant biodiversity; moreover, the famous milpa, a multi-species Mesoamerican agroecosystem is mentioned that was practiced by their gods.

Index words: Cosmogony, milpa, plant families, Popol Vuh, sacred book, species.

RESUMEN

Se realizó una compilación de las plantas mencionadas en el libro sagrado de los mayas Popol Vuh, reconocido como marco de su cosmogonía que fue escrito en el área K'iche' en Guatemala alrededor del año 1550. Se identificaron 32 especies diferentes, de 21 familias de plantas, todas nativas de Mesoamérica. El mayor número de especies fue en Fabaceae con cuatro especies, Moraceae y Solanaceae con tres especies cada una, además de Bromeliaceae, Cucurbitaceae, Malvaceae y Poaceae con dos especies cada una. Las cinco especies más importantes y frecuentemente nombradas son maíz (*Zea mays*), jícara (*Crescentia cujete*), copal (*Protium copal*), caucho (*Castilla elastica*) y cacao (*Theobroma cacao*). Se identificaron 11 especies como madera de pito (*Erythrina berteroana*) y zibak (*Cyperus*

canus), consideradas de importancia cosmogónica y plantas alimenticias que se integran en cinco grupos: frutales [zapote (*Manilkara zapota*), nance (*Byrsonima crassifolia*), jocote (*Spondias mombin*), anona (*Annona reticulata*), matasano (*Casimiroa edulis*)], granos y semillas [maíz, frijol (*Phaseolus lunatus*), cacao, pataxte (*Theobroma bicolor*)], hortalizas [zapallo (*Cucurbita moschata*), tomate (*Solanum lycopersicum*), chilacayote (*Cucurbita ficifolia*)], saborizantes [ají (*Capsicum annuum*)] y bebidas [maguey (*Agave americana*)]. Se domesticaron siete especies: maíz, zapallo, chilacayote, tabaco (*Nicotiana tabacum*), frijoles, tomate y cacao y otras con fines medicinales, combustible e instrumentos. La descripción de la creación del hombre afirma la estrecha relación de la cultura maya con la biodiversidad vegetal; además, se menciona la famosa milpa, un agroecosistema mesoamericano multiespecífico que fue practicado por sus dioses.

Palabras clave: Cosmogonía, especies, familias de plantas, libro sagrado, milpa, Popol Vuh.

INTRODUCTION

The two most prominent books recognized as the sacred books of the Mayan people are the Popol Vuh and the Chilam Balam. The objective of this study was to investigate the botanical knowledge implicit in the Popol Vuh, Popol Wuj or Pop Wuj, that means "the book of time" or "book of events", widely accepted as a reference framework of the Mayan cosmogony (Sam Colop, 1999). The manuscript was written around 1550 by an anonymous indigenous person based on oral tradition and remained hidden until 1701-1703, when the priest Francisco Ximenez transcribed it into Castilian Spanish. In 1857, The French Brasseur de Bourbourg denominated the indigenous document the Popol Vuh, a name that has remained to date (Recinos, 2002). The plants mentioned in the sacred book are presented after the study carried out through the exhaustive analysis of the three editions of the book translated by Guatemalan scholars Adrián Recinos (Recinos, 2002), Adrián Inés Chávez (Chávez, 2008) and Luis Enrique Sam Colop (Sam Colop, 1999).

MATERIAL AND METHODS

The review focused on searching for plant names mentioned in the three editions of the original book written by Guatemalan scholars Adrián Recinos (Recinos, 2002), Adrián Inés Chávez (Chávez, 2008) and Luis Enrique Sam Colop (Sam Colop, 1999), which were then entered into a preliminary database including the common names of each, both in Mayan and Spanish. To identify the referred species, comparative analyses of the common names reported in the published floras were carried out, including the flora and biodiversity of Yucatan (Durán-García *et al.* 2016, Standley, 1930) and the Flora of Guatemala (Gentry and Standley, 1974; Nash and Williams, 1976; Standley and Steyermark, 1946a; 1946b; 1949; 1952; 1958; Standley and Williams, 1967; 1970; Standley *et al.*, 1974; Swallen, 1955), as well as floristic and ethno-floristic listings (Barrera *et al.*, 1976; Carnevali *et al.*, 2010; Sosa *et al.*, 1985). The nomenclature of all the species names was verified in The Plant List (<http://www.theplantlist.org/>) database, now superseded by the World Flora Online (WFO, 2022).

RESULTS AND DISCUSSION

A total of 32 different plant species were identified. All the species are native to Mesoamerica and belong to 21 different plant families. The families with the highest number of species are Fabaceae with four, Moraceae and Solanaceae with three species each, and Bromeliaceae, Cucurbitaceae, Malvaceae and Poaceae with two species each (Table 1). The three editions of the book reviewed mentioned 22 of the 32 species; one species, tomato, (*Solanum lycopersicum*) is mentioned only in the edition of Sam Colop (1999), pita (*Aechmea magdalenae*) is mentioned only in the version of Chávez (2008) and five other species are only mentioned by Recinos (2002): squash (*Cucurbita moschata*), ramón or iximché (*Brosimum alicastrum*), amate (*Ficus cotinifolia*), chipilín (*Crotalaria longirostrata*) and cattail (*Typha domingensis*). Recinos (2002) points to *Typha dominguensis* as the plant species used to create woman, whereas the versions by Chávez (2008) and Sam Colop (1999) mention zibak (*Cyperus canus*, *sensu* Standley & Steyermark, 1958) as the plant used to create the female body. Agave (*Agave americana*) was mentioned by Chávez (2008) and Sam Colop (1999), the first in reference to the place where all the events described in the Popol Vuh took place, and the second in reference to the beverage made from it.

The description of the attempts of how the gods created man asserts the close relationship of the Mayan culture with plant biodiversity. In the first attempt, they used clay but, this material lacked strength and reasoning; thus, they

decided to destroy it. They used wood for their second attempt: tzité (*Erythrina berteroana*), a species of the Fabaceae family, to create man (Standley and Steyermark, 1958), and zibak (*Cyperus canus*), a plant, to create woman. It narrates how these wooden beings, unable to invoke their creators, were destroyed by the gods. It was then that the gods created men from maize, which was brought to them by four animals from Pan Paxil Pan K'ayala', a place full of trees producing edible fruit that, according to specialist scholars, is a mountain located in the Mexico-Guatemala border and is the place of origin of maize (López *et al.*, 2012; Navarrete, 2002). The text reads: "...Then, the yellow ears, the white ears, were ground. Nine grinds Ixmukane gave them...". According to Sam Colop (1999), the nine grinds allude to the nine lunar cycles that approximately correspond to the length of human gestation. According to Mayan mythology, we descend from these beings created from maize.

In addition to maize, tzité and zibak, 11 other species were identified that can be considered of cosmogonic significance. Plant species used in ceremonial acts related to deities were also identified, such as copal (*Protium copal*), a sacred species, whose resin is burned as an offering to the gods. Fourteen species of food plants were identified, which can be classified into five groups: fruit trees [zapote (*Manilkara zapota*), nance (*Byrsonima crassifolia*), jocote (*Spondias mombin*), anona (*Annona reticulata*), matasano (*Casimiroa edulis*)], grains and seeds [maize (*Zea mays*), beans (*Phaseolus lunatus*), cocoa (*Theobroma cacao*), pataxte (*Theobroma bicolor*)], vegetables [squash, tomato, chilacayote (*Cucurbita ficifolia*)], flavourings [chili (*Capsicum annum*)] and beverages (agave). Seven species were domesticated by the ancient Mesoamerican people: maize, squash, chilacayote, tobacco, beans, tomato and cocoa; moreover, they recorded several times the milpa, a unique multi-species Mesoamerican agroecosystem, practiced by their goddess, to produce maize, beans, squash and chili. The word milpa is mentioned several times in texts, as in the passage in which Ixmukané (the creator goddess) asks Ixkik (the mother goddess) to bring food from the milpa to prove her authenticity.

Another group of plants are those used to make utensils such as the jícaro (*Crescentia cujete*) – the container that the Mayans commonly used to eat their food and make offerings to the gods – and rubber (*Castilla elastica*), which together with *Ipomoea alba*, was used to manufacture rubber balls. (Hosler *et al.*, 1999; Larqué-Saavedra, 2016; Venkatachalam *et al.*, 2013). In the words of Fray Bernardino de Sahagun: "...there is a gum from a tree that grows in the warm lands... Once coupled one with the other, which is something that curdles and ends black...", "...these are made from the juice of a certain herb... said juice is

Table 1. Plant families, species, common names and Mayan names referred in the Popol Vuh.

Plant family	Species name	Common names	Mayan names and other common names [†]
Agavaceae	<i>Agave americana</i> L.	Maguey	<u>Kí</u>
Anacardiaceae	<i>Spondias mombin</i> L.	Jocotes	<u>Q'inom</u> , abal, xk'inin
Annonaceae	<i>Annona reticulata</i> L.	Anona	<u>K'awex</u> , op, poox
Asteraceae	<i>Tagetes lucida</i> Cav.	Pericón	---
Bignoniaceae	<i>Crescentia cujete</i> L.	Guacal, jícara, jícara	<u>Mulul</u> , homa'
Bromeliaceae	<i>Aechmea magdalenae</i> (André) André ex Baker	Pita	---
Bromeliaceae	<i>Tillandsia brachycaulos</i> Schltdl	Pie de gallo, Pata de gallo, bromelia	Chu
Burseraceae	<i>Protium copal</i> (Schltdl. & Cham.) Engl	Copal, pom	<u>Pom</u> , pom
Convolvulaceae	<i>Ipomoea alba</i> L.		Suput
Cucurbitaceae	<i>Cucurbita ficifolia</i> Bouché	Chilacayote	<u>Ooc</u> , q'oq'
Cucurbitaceae	<i>Cucurbita moschata</i> Duchesne	Calabaza, calabacilla	K'um, ts'ol
Cyperaceae	<i>Cyperus canus</i> J.Presl & C. Presl.	Zibak, Sibaque	
Euphorbiaceae	<i>Croton draco</i> Schltdl. & Cham	Árbol rojo de grana, árbol de la sangre:	---
Fabaceae	<i>Crotalaria longirostrata</i> Hook. & Arn	Chipilín	<u>Much</u>
Fabaceae	<i>Erythrina berteroana</i> Urb	Frijol del pito, madera del pito Tz'ite', Tzité	<u>Tzite</u>
Fabaceae	<i>Gliricidia sepium</i> (Jacq.) Kunth ex Walp.	Canté, árbol amarillo, Q' ante'	Kuchunuk, sakyab
Fabaceae	<i>Phaseolus lunatus</i> L.	Frijol	<u>Kinaq</u> , ib
Malpighiaceae	<i>Byrsonima crassifolia</i> (L.) Kunth	Nance	<u>Tapa'l</u> , chi'
Malvaceae	<i>Theobroma bicolor</i> Bonpl.	Patashte	<u>Peq</u> , balamte'
Malvaceae	<i>Theobroma cacao</i> L.	Cacao	<u>Kako</u> , kakaw
Moraceae	<i>Brosimum alicastrum</i> Sw.	Iximché, ramón	Oxx
Moraceae	<i>Castilla elastica</i> Sessé ex Cerv.	Hule, Caucho, goma	<u>Ki'c</u> , k'ik'che'
Moraceae	<i>Ficus cotinifolia</i> Kunth.	Amate	Hu'un
Pinaceae	<i>Pinus caribaea</i> var. <i>hondurensis</i> (Sénécl.) W.H.Barrett & Golfari	Ocote, trementina, pino	Huhub
Poaceae	<i>Muhlenbergia macroura</i> (Kunth) Hitchc.	Pajonal	---
Poaceae	<i>Zea mays</i> L.	Maíz	<u>Ixim</u> , ixi'im
Rutaceae	<i>Casimiroa edulis</i> La Llave	Matasano	<u>Ajaché</u> , chooch
Sapotaceae	<i>Manilkara zapota</i> (L.) P. Royen	Zapote	<u>Tulul</u> , ya'
Solanaceae	<i>Capsicum annuum</i> L. var. <i>glabriusculum</i> (Dunal) Heiser & Pickersgill	Chile	<u>Ik</u> , ik
Solanaceae	<i>Nicotiana tabacum</i> L.	Puro, Cigarros, Tabaco	<u>Sik</u> , jic, k'uts
Solanaceae	<i>Solanum lycopersicum</i> L.	Tomates	P'aak
Typhaceae	<i>Typha domingensis</i> Pers.	Espadaña	Puh

[†]Names listed under "Other common names" include names in K'iche' Maya (underlined) and Yucatec Maya found in other sources.

Table 2. Uses of the plants mentioned in the Popol Vuh.

Plant family	Species	Referred in the Popol Vuh as...			Uses reported in the literature at present
		Cosmogony construction	Food	Utensil	
Agavaceae	<i>Agave americana</i>		✓		Beverage, medicine, ornamental, textile
Anacardiaceae	<i>Spondias mombin</i>		✓		Beverage, food, forage, timber, medicine, melliferous plant
Annonaceae	<i>Annona reticulata</i>		✓		Food, medicine
Asteraceae	<i>Tagetes lucida</i>	Burnt as an offering in the altar of the gods			Spice, insecticide, medicine, ritual, ornamental
Bignoniaceae	<i>Crescentia cujete</i>	The fruits represent the heads of Hun-Hunahpú and Vucub Hunahpú		Container	Handcrafts, food, timber, medicine, melliferous plant, ritual, toxic plant, utensil, oil producing, live fence
Bromeliaceae	<i>Aechmea magdalenae</i>			Sling	Handcrafts, beverage, food, melliferous plant, textile, utensil
Bromeliaceae	<i>Tillandsia brachycaulos</i>				Medicine, ornamental
Burseraceae	<i>Protium copal</i>	Burnt as an offering (spirits) to the creation of the Sun			Timber, medicine, resin, ritual
Convolvulaceae	<i>Ipomoea alba</i>	Used for manufacturing rubber balls for the Mesoamerican ball game		Rubber balls	Ornamental, utensil
Cucurbitaceae	<i>Cucurbita ficifolia</i>	As a replacement of the heads of Hun-Hunahpú and Vucub Hunahpú	✓		Bioremediation, food
Cucurbitaceae	<i>Cucurbita moschata</i>		✓	Container	Food, forage, medicine, ritual
Cyperaceae	<i>Cyperus canus</i>	Used in the second attempt to create woman			Handcrafts, ornamental
Euphorbiaceae	<i>Croton draco</i>	The sap of this tree was used to replace the heart of Princess Ixkik			Medicine
Fabaceae	<i>Crotalaria longirostrata</i>	Hunahpú and Ixbalanqué used this plant to defeat the lords of Xibalbá (Hun-Camé and Vucub-Camé)			Food, medicine
Fabaceae	<i>Erythrina berteroana</i>	Used in the second attempt to create man			Live fence, food, forage, toxic plant, handcraft, dyeing, medicine
Fabaceae	<i>Gliricidia sepium</i>				Agronomy, live fence, food, forage, timber, medicine
Fabaceae	<i>Phaseolus lunatus</i>		✓		Food
Malpighiaceae	<i>Byrsonima crassifolia</i>		✓		Beverage, food, timber, medicine, melliferous plant
Malvaceae	<i>Theobroma bicolor</i>		✓		Food
Malvaceae	<i>Theobroma cacao</i>		✓		Beverage, food, industrial, medicine
Moraceae	<i>Brosimum alicastrum</i> ssp. <i>alicastrum</i>				Food, forage, timber, medicine, ornamental
Moraceae	<i>Castilla elastica</i>	Used for manufacturing rubber balls for the Mesoamerican ball game		Rubber balls	Food, rubber, medicine, ritual, utensil
Moraceae	<i>Ficus cotinifolia</i>			Paper	Medicine, ornamental, paper

Table 2. Continued.

Plant family	Species	Referred in the Popol Vuh as...			Uses reported in the literature at present
		Cosmogony construction	Food	Utensil	
Pinaceae	<i>Pinus caribaea</i> var. <i>hondurensis</i>			Torch	Food, timber, medicine, resin
Poaceae	<i>Muhlenbergia macroura</i>				Construction material, forrage, paper, utensil
Poaceae	<i>Zea mays</i>	Used as the definitive material to create man and woman	✓		Food, industrial, medicine
Rutaceae	<i>Casimiroa edulis</i>		✓		Food, medicine, toxic plant
Sapotaceae	<i>Manilkara zapota</i>		✓		Chewing gum, food, timber, medicine
Solanaceae	<i>Capsicum annuum</i> var. <i>glabriusculum</i>		✓		Food, spice, medicine
Solanaceae	<i>Nicotiana tabacum</i>	Provided as a sign of nobility			Medicine, ornamental, ritual
Solanaceae	<i>Solanum lycopersicum</i>		✓		Food
Typhaceae	<i>Typha domingensis</i>	Used in the second attempt to create woman			Handcrafts, bioremediation, food, construction material, forage, utensil

cooked, which hardens upon boiling, and once converted into dough, it is given the desired shape" (Díaz, 2009). The uses of the plants of the Popol Vuh are presented in Table 2 where it can be appreciated that the species have an average of 3.5 uses.

Another relevant characteristic of the flora is that 28 % of the species are evergreen trees, 22 % deciduous trees, 28 % perennial grasses, 19 % annual grasses and 3 % shrubs. Of the 32 species, 16 of them are native to this region, five species stretch to northern of South America, 10 other are distributed throughout tropical America, and one species is cosmopolitan. Agave is the only species that could be introduced into the Mayan Zone. Moreover, 26 species grow in tropical forests with warm, dry to humid climates. Four species are typical of temperate or cool climates: pajón (*Muhlenbergia macroura*), pericón (*Tagetes lucida*), chilacayote and agave; and other two, cattail (*Typha domingensis*) and zibak, are characteristic of aquatic or subaquatic environments.

The data presented in this study, identifying the plant species, reveal the deep knowledge that the Mayans possessed about the flora of both the lowlands and the highlands of the region, as well as on the value and significance of domesticated and wild plant species, undoubtedly relevant in cultural terms.

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