



Traditional use of the flora in the "el chile" the Pomoca Ejido, Tacotalpa, Tabasco, Mexico

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Abstract

Plant diversity in our country and indeed all over the world is used in different ways; therefore, the number of botanical families can vary depending on indigenous peoples and the culture that these human groups have maintained for generations, as well as their geographical area. This fact has led to a wealth of botanical knowledge and the development of traditional medicine. In this paper, the ethnobotanical knowledge used by the villagers in the "El Chile" Ridge area within the Pomoca Ejido of Sierra Tacotalpa in Tabasco is presented. Uni-structured interviews were carried out with the cooperation of the villagers to generate basic information about the use of plants in the region, using the ethnobotanical methodology proposed by Martin (2001). Subsequently, the entire area of the Pomoca Ejido was explored in order to gather information on the ethnobotanical knowledge in the "El Chile" ridge area. It was determined that 19% is used for medicinal purposes, 16% for consumption, 14% ornamental, 10% construction, 7% is used as firewood, 6% is timber-yielding, and another 6% provides edible fruit, 5% is used as forage, 4% is used for craftwork and the remaining 13% is used in various ways. In this sense, the main feature of ethnobotany is accomplished, which is to study the relationship between humans and plants through time in different cultural and ecological environments. The Pomoca Ejidos cultural wealth is further enriched by their inhabitants' knowledge; nevertheless, this is gradually being lost, as the younger members of the community are now more involved in outside activities and, in general, show little interest in learning traditional knowledge. However, there are still a few who are keen to learn; thus, it is in the best interests of the community to create areas of environmental culture in order to disseminate plant knowledge.

Key words: Ancestral Knowledge, anthropogenic factors, deforestation, ethnobotanical uses.

Resumen

Uso tradicional de la flora en "el chile", del Ejido Pomoca, Tacotalpa, Tabasco, México. La diversidad de plantas en nuestro país y en el mundo es usada de distintas maneras, por lo que el número de las familias botánicas varían dependiendo de los pueblos indígenas y de la cultura que estos grupos humanos han tenido por generaciones, así como del área geográfica donde se ubican. Este hecho ha favorecido a la riqueza del conocimiento botánico y al desarrollo de la medicina tradicional. En este artículo se presenta el conocimiento etnobotánico utilizado por los pobladores en el cerro "El Chile" del ejido de Pomoca, en la Sierra de Tacotalpa, Tabasco, México. Se realizaron entrevistas uniestructuradas a los pobladores para la generación de información básica acerca del uso de las plantas de la

región, utilizando la metodología de etnobotánica propuesta por Martín (2001). Posteriormente, se realizó un recorrido en toda la superficie correspondiente al Ejido Pomoca para la colecta de información sobre el conocimiento etnobotánico existente en el cerro "El Chile". Se determinó que el 19% es de uso medicinal, 16% de autoconsumo, 14% de ornato, 10% para construcción, 7% es usado como leña, 6% son maderables y otro 6% sus frutos son comestibles, el 5% son forrajeras, el 4% sirve para elaborar artesanías y el 13% restante son utilizados de diversas formas. En este sentido, se cumple la principal característica de la etnobotánica: estudiar la interrelación entre los seres humanos y las plantas a través del tiempo y de los distintos ambientes culturales y ecológicos. La riqueza cultural del Ejido Pomoca se construye por el

conocimiento que los habitantes han sido capaces de conservar; sin embargo, esto se está perdiendo poco a poco, los miembros más jóvenes de la comunidad ahora están más involucrados en otras actividades y, en general, muestran poco interés en el aprendizaje de los conocimientos tradicionales. Sin embargo, todavía hay algunos que están dispuestos a aprender; por lo tanto, es

en el mejor interés de la comunidad para crear áreas de la cultura ambiental con el fin de difundir el conocimiento.

Palabras clave: Saberes ancestrales, factores antropogénicos, deforestación, usos etnobotánicos.

which has developed over many generations. Toledo (1992, 2001) addresses this type of study through the body of knowledge, held by the inhabitants of the communities, of themselves and their surroundings; in other words, the aim is to try to understand the interactions between the inhabitants and their environment which would facilitate the participatory elaboration of plans and programs for the sustainable management of their own natural resources; in this case, the use, management and conservation of plant resources. However, this TK is under threat due to the increasingly rapid degradation of the rain forest, the lack of interest of younger generations living in the communities and the reduced availability of many species (Norris et al. 1999, Rebollar-Domínguez et al. 2008, Gómez-Álvarez 2012). In spite of this, the use of medicinal plants does represent an alternative by providing a measure of support, given the paucity of health services. In this respect, Aguilar (2003) reports that 80% of the world's population depends on indigenous knowledge to attend their medical needs, and at least 50% of the inhabitants of this planet depends on TK for their own subsistence, the subsistence of ecosystems and, more importantly, as a source of food.

Mexico is home to an enormous floristic diversity (Nepomuceno-Sánchez and Ishiki-Ishihara 2010), which most of the current uses of the plants come from the ancestral knowledge of the native groups (Espinosa-Moreno et al. 2012). However, this does not mean that the plants are used in the same way in every culture, thus the number of botanical families can vary according to the human group, and their culture, as well as the geographical area (Waizel-Bucay 2006), a fact that has propitiated a wealth of botanical knowledge and the development of traditional medicine.

The trajectory of traditional botanical culture in Tabasco is quite interesting

Resumo

Uso tradicional da flora "el chile" em Pomoca Ejido, Tacotalpa, Tabasco, Mexico. A diversidade de plantas em nosso País e no mundo é usada de diferentes maneiras, de modo que o número de famílias botânicas varia de acordo com os povos indígenas e a cultura que estes grupos humanos tiveram ao longo das gerações e da área geográfica onde estão localizados. Este fato levou à riqueza de conhecimento botânico e o desenvolvimento da medicina tradicional. Este conhecimento etnobotânico documentado é utilizado pelos colonos na colina "El Chile" ejido de Pomoca em Sierra Tacotalpa, Tabasco, México. Foram entrevistados moradores por meio de entrevistas semiestruturadas para a geração de informações sobre o uso de plantas na região, utilizando a metodologia etnobotânica proposta por Martin (2001). Posteriormente, verificou-se uma turnê por toda a região correspondente a Ejido Pomoca para coletar informações sobre o conhecimento etnobotânico na colina "El Chile". Determinou-se que 19% é usada para fins medicinais, 16% para consumo consumo, 14% ornamental, 10% da construção, 7% é usada como lenha, 6% são de madeira e outros 6% são frutas comestíveis, 5% são forragem, 4% é usado para artesanato e os 13% restantes são usados de várias maneiras. Neste sentido, a principal característica da etnobotânica é verdade: a inter-relação entre os seres humanos e as plantas através do tempo e em diferentes ambientes culturais e ecológicos. A riqueza cultural de Ejido Pomoca é enriquecido com o conhecimento que as pessoas têm sido capazes de reter; no entanto, isso está lentamente perdendo, porque os membros mais jovens da comunidade estão mais envolvidos em outras atividades e, geralmente, demonstram pouco interesse em aprender conhecimentos tradicionais. No entanto, ainda existem alguns que estão dispostos a aprender; portanto, é no melhor interesse da comunidade para criar áreas de cultura ambiental, a fim de difundir o conhecimento.

Palavras-chave: conhecimento ancestral, fatores antrópicos, desmatamento, usos etnobotânicos.

Introduction

According to Aguilar (2003) and Valdés-Cobos (2013), traditional knowledge (TK) can be defined as the collective insight of indigenous peoples with respect to their relationship with their habitat and nature,

considering the environmental deterioration undergone by the area in recent years (De Ita 1994, Van der Wal et al. 2011). The use of natural resources has played an important role since the beginning of mankind as they have always been used by humans to satisfy their basic needs, such as food sources, medicines, material for the construction of houses, fences and tools, as well as a diversity of raw materials, (Isidro-Vázquez 1997, Magaña-Alejandro 2012), all of which are a result of years of experience handed down in traditions from generation to generation.

In this way, the traditional knowledge held by farmers and indigenous people regarding the properties and uses of plant resources is one of the products of this mankind-nature identity (González-Esquinca et al. 2013). However, the rain forests of the state of Tabasco have undergone changes due to the dramatic deforestation carried out over the last five decades. At present, between 40 000 and 50 000 ha still exist, located in the mountainous area of the state, in the municipalities of Tenosique, Teapa, Tacotalpa, Macuspana and Huimanguillo (De Ita 1994, Castillo-Acosta and Zavala-Cruz 1996, Maldonado-Sánchez and Maldonado-Mares 2010).

In light of the above, it can be said that the existing plant resources of every community may be taken as tools to give direction to and shed light on the value of local and regional natural resources in order to achieve optimal management (Arcila-Torres et al. 2006). The aim of this study, therefore, is to analyze the ethnobotanical knowledge registered in the “El Chile” Ridge area of the Pomoca Ejido, which are used by the inhabitants.

Material and Methods

Study area

This study was conducted in the Pomoca Ejido (communal land) located in the municipality of Tacotalpa in the State of Tabasco, Mexico (Figure 1). This region is much more mountainous and consequently experiences higher rainfall than the rest of the

state. The Pomoca Ejido is located in the south of the state, at a height of 63 meters; between coordinates 92°39'33" longitude and 17°29'50" latitude (INEGI 2001). In 2005, the Ejido registered 570 inhabitants, and by 2010, the population had increased to 654 inhabitants, of which 330 are male and 324 are female (SEDESOL 2010).

Edafoclimatological information

The climate is warm-humid with rainfall throughout the year; code Af (m) w" (i) g according to the Köppen climatic classification, modified by García 1988. The region is characterized by a rainfall average of 3,000 to 4,000 mm per year. Although this kind of climate presents rainfall the whole year, this diminishes in December when the percentage of winter rainfall with respect to the annual is below 18%. The highest precipitation is registered in the month of September with 534 mm, and the lowest in April with 125 mm. Temperatures range between 22°C and 29°C; the hottest month is May with 28.9°C and the coldest is December with 22.4°C. There is one area at greater altitude where temperatures between 22°C and 24°C predominate (INEGI 2001).

The most representative soils of the Sierra (mountainous area) are leptosols, which are generally found in abrupt mountainous landscapes and vast plains of surface limestone. Vertisols are also found in depressions in flatlands or low hilly areas. In this region, fluvisols develop in the alluvial plains and are characterized by their formation over alluvial deposits, in areas subjected to periodic flooding. (Álvarez-Merino et al. 2013).

Characteristics of vegetation

The Sierra micro-region has a surface area of 19,754.40 ha of rain forest, which is equivalent to 12.7% of the surface area of the state (Arreola-Muñoz et al. 2011). The main type of vegetation corresponds to high and medium evergreen forest. In the community, medium-height evergreen forest predominates and the most common species are: *cachimbo* (macawood) (*Platymiscium yucatanum* Standl), *bellota de montaña* (holm oak)

(*Sterculia mexicana* R. Br.), *ramón* (ramon or breadnut tree) (*Brosimum alicastrum* Swartz.), *cedrillo* (mahogany) (*Guarea bijuca* DeCandolle), *jobo* (yellow mombin) (*Spondias mombin* L.), among others. Other plant associations found are the *acahuales* (secondary vegetation), *potreros* (pastures) and seasonal crops. Most of the area is employed as pastureland (approximately 42.60% of the territory). Similarly, 905 species have been identified: six families with

nine species of Bryophytes, eight families and 23 species of Pteridophytes, one species of Cycadophytes and 886 species of Magnoliophytes. In this last group, 75 families are dicotyledonous and 18 families are monocotyledonous; of these, 112 species are new reports for the flora of Tabasco (Centurión-Hidalgo et al. 2003, Magaña-Alejandro 2010, Beauregard-Solís et al. 2011, López-Hernández et al. 2011).

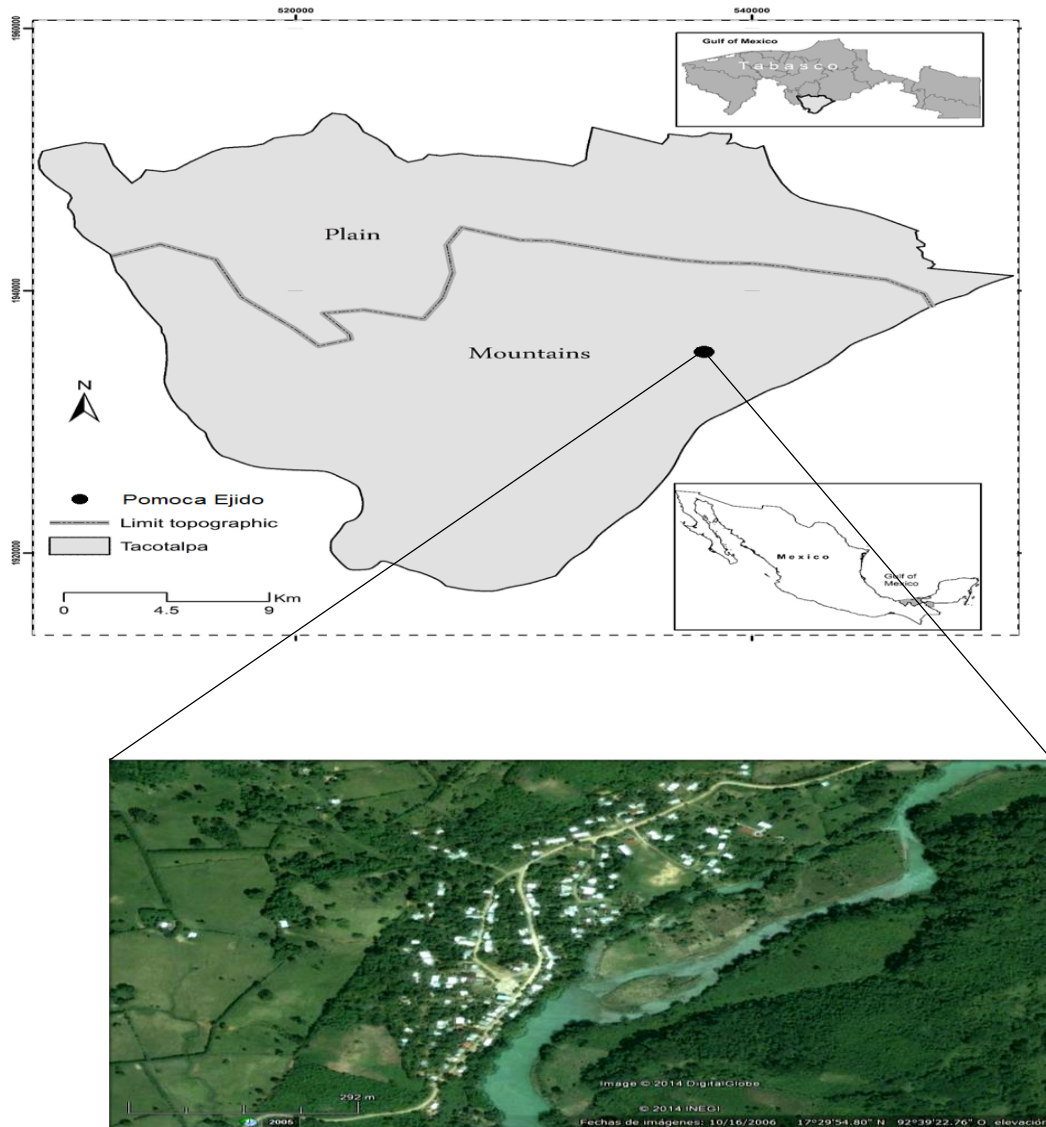


Figure 1. Location of the State of Tabasco and the Pomoca Ejido in Tacotalpa.

Information gathering

To evaluate the local availability of species, the vegetation in the studied

community was sampled. A visit to the Pomoca Ejido in the municipality of Tacotalpa in the State of Tabasco was

organized and carried out from the 1st to the 3rd of April, 2013. The methodology used to gather information on botanical diversity and ethnobotanical knowledge consisted of a transect walkthrough or exploration of the “El Chile” Ridge area which is located at a height of 1,047 m, with a very abrupt terrain and steep slopes (up to 80%). Exploration of the ejido was carried out in cooperation with a number of the inhabitants. During the transect, 12 stops were made at distances varying from 2 to 5 m in order to examine the surrounding vegetation.

Where possible, photographs were taken of the bark, branches, leaves and flowers of each plant species. In the extent possible the plants were identified in the field to prevent damage the ecosystem. All samples collected plants were placed in a press according to Martínez-Alfaro (2012). The identification of the plants was carried out with the help of the inhabitants’ knowledge and if this was not possible, dendrological characteristics from a manual elaborated by Ochoa-Gaona et al. (2008, 2012) were used, and by comparison with material from the herbarium of the University of Quintana Roo, Campus Cozumel. Any species that were not identified in this way were subsequently identified with the use of dendrological and taxonomic keys (Jiménez-Saa 1969, Navarro-Martínez 1992, López-García 1999, Rodríguez and Porras 2002, Pennington and Sarukhán 2005, Magaña-Alejandro 2006, Mariaca-Méndez 2012).

In addition 50 uni-structured interviews were carried out with the inhabitants of the ejido (25 women between 30 and 70 years of age and 25 men between 17 and 60) using the methodological model of ethnobotany proposed by Martin (2001) which, according to Magaña-Alejandro (2012), consists in obtaining maximum information from the population through active participation in the data-gathering stage. The information obtained was enriched and confirmed with direct observation during guided tour (Albuquerque et al. 2010). The plants were recorded in a list that inhabitants have under their charge.

Results

Floristic composition

A total of 61 individuals, belonging to 36 botanical families were registered during the transect exploration of the “El Chile” Ridge area. The Fabaceae family has 10 species, followed by Euphorbiaceae with 6 species and families Moraceae and Bignoniaceae with 4 species each, the rest of the families have between 1 to 2 species. The Fabaceae comprises a large number of predominantly herbaceous species, with very little representation in tropical regions, where most of them are woody. The importance of these is that most species are edible both human and animals and many of them have properties medicinal. However, other families while not having access to many species, some of which are used for construction, medical and even livestock feed, among other uses (Table 1).

Ethnobotany information

In relation to the above, the uses of the plant species registered are: 19% is for medicinal purposes, 16% is for consumption (food-different parts of the plant), 14% is for ornamental use, 10% is used in construction (door panels, tool parts, houses, etc.), 7% is used for firewood, 6% timber-yielding and another 6% with edible fruits, 5% is used as forage (for cattle or poultry), 4% is used in the elaboration of craftwork, and the remaining 13% is used in a number of ways (Figure 2). The plants found, and the uses they are given, are shown in Table 1.

This finding describe human-environment relationships; ie plants and traditional culture; but younger generation knows less uses, showing diminishing knowledge transfer between generations in the region that matches mentioned by Hernández-Xolocotzi (2012). The results show that of seven young men, who applied interviews, only three of them had this knowledge. Instead of women to be dedicated to the kitchen dominated a little more about the knowledge of certain plants.

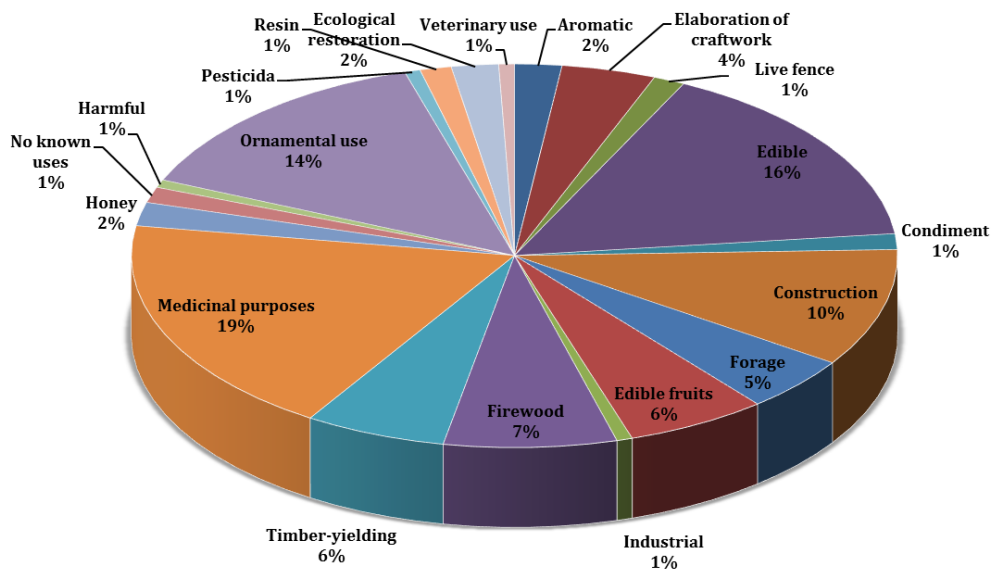


Figure 2. Use of plants in the "El Chile" Ridge area by the inhabitants of the Pomoca Ejido

Table 1. Plant species found in the "El Chile" Ridge area of the Pomoca Ejido, and their principle uses by the inhabitants.

Species	Use
Scientific name: <i>Acacia mayana</i> Lundell Common name: Piñuela Family: Fabaceae	Edible fruit, firewood and medicinal.
Scientific name: <i>Acalypha hispida</i> Burm. f. Common name: Colega de gato (Chenile Plant) Family: Euphorbiaceae	Ornamental
Scientific name: <i>Acalypha macrostachya</i> Jacq. Common name: Chamarrito (Copper leaf) Family: Euphorbiaceae	Edible young leaves
Scientific name: <i>Acalypha setosa</i> A. Rich. Common name: Japachobo (Cuban Copperleaf) Family: Euphorbiaceae	Cattle forage
Scientific name: <i>Alpinia purpurata</i> K. Schum. Common name: Japachobo (Red Ginger) Family: Zingiberaceae	Ornamental
Nombre científico: <i>Alpinia speciosa</i> (J.C. Wendl.) K. Schum. Nombre común: Hawallana (Shellflower) Familia: Zingiberaceae	Ornamental
Scientific name: <i>Annona reticulata</i> L. Common name: Nona (Custard apple) Family: Annonaceae	Edible fruit, firewood, timber-yielding, medicinal

Scientific name: <i>Annona muricata</i> L. Common name: Guanábana (Prickly custard apple) Family: Annonaceae	Edible fruit, firewood and medicinal
Scientific name: <i>Artocarpus altilis</i> (Parkinson) Fosberg Common name: Castaño (Breadfruit) Family: Moraceae	Edible fruit, ornamental, medicinal
Scientific name: <i>Artocarpus communis</i> J.R. Forst. & G. Forst. Common name: Castaña (Jackfruit) Family: Moraceae	Edible
Scientific name: <i>Asclepias curassavica</i> Griseb. Common name: Rompe o quiebra muelas (Scarlet milkweed) Family: Asclepiadaceae	Resin, medicinal, veterinary use and pesticide
Scientific name: <i>Astrocaryum mexicanum</i> Liebm. Common name: Chichón (Chocho palm) Family: Arecaceae	Edible flower and fruit, ornamental, wood for construction
Scientific name: <i>Bixa Orellana</i> L. Common name: Achiote (Achiote or lipstick tree) Family: Bixaceae	Edible, medicinal, condiment, firewood, industrial
Scientific name: <i>Blepharidium mexicanum</i> Standl. Common name: Popiste (Hackberry) Family: Rubiaceae	Construction
Scientific name: <i>Bougainvillea glabra</i> Choisy Common name: Bugambilia (Paper flower) Family: Nyctaginaceae	Ornamental, medicinal
Scientific name: <i>Brosimum alicastrum</i> Sw. Common name: Ramón (Breadnut) Family: Moraceae	Medicinal, forage, firewood
Scientific name: <i>Bursera simaruba</i> (L.) Sarg. Common name: Palo mulato (Gumbo-limbo) Family: Burseraceae	Medicinal, firewood, construction, forage and melliferous
Scientific name: <i>Byrsonima crassifolia</i> (L.) Kunth Common name: Nance (Nance) Family: Malpighiaceae	Edible fruit, firewood, medicinal, craftwork, construction
Scientific name: <i>Cedrela odorata</i> L. Common name: Cedro (Spanish Cedar) Family: Meliaceae	Timber-yielding, medicinal, construction, craftwork, ornamental
Scientific name: <i>Cenchrus echinatus</i> L. Common name: Cadillo (Southern sandspur) Family: Poaceae	Medicinal, forage (young leaves)

Scientific name: <i>Cestrum racemosum</i> Ruiz & Pav. Common name: Amargoso (Green Milkweed) Family: Solanaceae	Edible
Scientific name: <i>Citrus aurantium</i> Common name: Naranja agria (Bitter orange) Family: Rutaceae	Edible fruit, medicinal
Scientific name: <i>Cnidoscolus chayamansa</i> McVaugh Common name: Chaya (Tree spinach) Family: Euphorbiaceae	Edible, medicinal
Scientific name: <i>Cojoba arborea</i> (L.) Britton & Rose Common name: Coralillo (Wild tamarind) Family: Fabaceae	Wood for the elaboration of tools, edible, firewood
Scientific name: <i>Crescentia cujete</i> L. Common name: Jícara (Calabash tree) Family: Bignoniaceae	Ornamental, craftwork, construction, melliferous
Scientific name: <i>Croton glabellus</i> L. Common name: Cascarilla (Wild cinnamon) Family: Euphorbiaceae	Timber-yielding and medicinal
Scientific name: <i>Dendropanax arboreus</i> (L.) Decne. & Planch. Common name: Mano de mico (Angelica Tree) Family: Araliaceae	Wood for the elaboration of door panels, edible, fences
Scientific name: <i>Desmodium canum</i> Schinz & Thell. Common name: Cadillo (Wild granite) Family: Fabaceae	Aromatic, dangerous (toxic)
Scientific name: <i>Oeceoclades maculate</i> Lindley Common name: Orquídea (Monk orchid) Family: Orquidaceae	Ornamental
Scientific name: <i>Erythrina americana</i> Mill. Nombre común: Alcaparra (Dabdab) Familia: Fabaceae	Edible
Scientific name: <i>Erythrina folkersii</i> Krukoff & Moldenke Common name: Madre (Coral tree) Family: Fabaceae	Ornamental
Scientific name: <i>Ficus benjamina</i> L. Common name: Laurel (Weeping fig) Family: Moraceae	Comestible, ornamental
Scientific name: <i>Garcinia intermedia</i> (Pittier) Hammel Common name: Limoncillo (Lemon drop mangosteen) Family: Clusiaceae	Edible and used in construction

Scientific name: <i>Gliricidia sepium</i> Kunth ex Steud. Common name: Coccoite (Cacao shade) Family: Fabaceae	Living fences, forage, construction, craftwork, firewood
Scientific name: <i>Guazuma ulmifolia</i> Lam. Common name: Guácimo (West Indian elm) Family: Malvaceae	Edible, medicinal, forage, melliferous
Scientific name: <i>Heliconia latispatha</i> Benth. Common name: Platanillo (Golden lobster claw) Family: Heliconiaceae	Ornamental
Scientific name: <i>Hibiscus rosa-sinensis</i> L. Common name: Tulipán (Red hibiscus) Family: Malvaceae	Ornamental, aromatic
Scientific name: <i>Inga jinicuil</i> Schtdl. Common name: Jinicuil (Ice cream bean) Family: Fabaceae	Ornamental, edible fruit, used for ecological restoration
Scientific name: <i>Lippia dulcis</i> Trevir. Common name: Hierba dulce (Aztec sweet herb) Family: Verbenaceae	Edible, medicinal
Scientific name: <i>Lysiloma latisiliquum</i> (L.) Benth. Common name: Tzalám (Wild tamarind) Family: Fabaceae	Timber-yielding, firewood, furniture construction
Scientific name: <i>Macfadyena uncata</i> (Andrews) Sprague & Sandwith Common name: Peine de mico (Yellow bignonia) Family: Bignoniaceae	No known uses
Scientific name: <i>Manihot esculenta</i> Crantz Common name: Yuca (Tapioca) Family: Euphorbiaceae	Edible
Scientific name: <i>Manilkara zapota</i> (L.) P. Royen Common name: Zapote (Sapodilla) Family: Sapotaceae	Edible fruit and resin for the elaboration of chewing gum
Scientific name: <i>Maranta arundinacea</i> L. Common name: Sagú (Arrowroot) Family: Marantaceae	Edible
Scientific name: <i>Petiveria alliacea</i> L. Common name: Zorrillo (Guinea-hen weed) Family: Phytolaccaceae	Edible, medicinal
Scientific name: <i>Pimenta dioica</i> (L.) Merr. Common name: Pimienta (Jamaica pepper) Family: Myrtaceae	Edible, condiment, craftwork, firewood, medicinal
Scientific name: <i>Plecthranthus amboinicus</i> (Lour.) Spreng Common name: Oreganón u orégano brujo (Mexican Mint) Family: Lamiaceae	Medicinal

Scientific name: <i>Plumeria rubra</i> L.	Edible
Common name: Tabasqueña (Frangipani)	
Family: Apocynaceae	
Scientific name: <i>Psidium guajava</i> L.	Edible, wood for construction, ornamental,
Common name: Guayaba (Apple guava)	medicinal
Family: Myrtaceae	
Scientific name: <i>Senna occidentalis</i> (L.) Link	Aromatic, medicinal
Common name: Hormiguera (Coffee weed)	
Family: Fabaceae	
Scientific name: <i>Spondias mombin</i> L.	Edible, medicinal, craftwork, construction, timber-
Common name: Jobo (Hog plum)	yielding
Family: Anacardiaceae	
Scientific name: <i>Sterculia apetala</i> (Jacq.) H. Karst.	Edible seeds
Common name: Bellota (Panama tree)	
Family: Sterculiaceae	
Scientific name: <i>Tabebuia donnell-smithii</i> Rose	Timber-yielding, edible
Common name: Primavera (Gold tree)	
Family: Bignoniaceae	
Scientific name: <i>Tabebuia rosea</i> (Bertol.) DC.	Timber-yielding, for ecological restoration,
Common name: Macuilis (Pink trumpet tree)	ornamental, construction, medicinal
Family: Bignoniaceae	
Scientific name: <i>Tabernaemontana chrysocarpa</i> S.F. Blake	Medicinal, ornamental and forage for birds
Common name: Bola de venado (White milkwood)	
Family: Apocynaceae	
Scientific name: <i>Tamarindus indica</i> L.	Edible fruit, construction, medicinal
Common name: Tamarindo (Tamarind)	
Family: Fabaceae	
Scientific name: <i>Tectona grandis</i> L. f.	Timber-yielding, for ecological restoration, edible,
Common name: Teca (introduced) Common Teak)	ornamental
Family: Lamiaceae	
Scientific name: <i>Thelypteris interrupta</i> (Willd.) K. Iwats.	No known uses
Common name: Helecho (Willdenow's Fern)	
Family: Thelypteridaceae	
Scientific name: <i>Tradescantia spathacea</i> Sw.	Ornamental, medicinal, edible
Common name: Maguey morado (Moses-in-the-cradle)	
Family: Commelinaceae	

Scientific name: *Xanthosoma sagittifolium* (L.) Schott Ornamental, edible

Common name: Macal (Arrowleaf elephant's ear)

Family: Araceae

Scientific name: *Zephyranthes lindleyana* Herb. Ornamental, medicinal

Common name: Brujita (Fairy Lily)

Family: Amaryllidaceae

Source: compiled by the authors based on the exploration or transect carried out and the interviews applied.

Discussion

Sistematization traditional ethnobotanic knowledge (TEK), in that context gains importance as a core strategy in research and medicine, as well as the conservation of both (Valdés-Cobos 2013). According to Chan-Quijano et al. (2013), TK of plant management must be rescued, given their importance as natural medicinal remedies, food sources (human and animal consumption) and in the elaboration of craftwork, among other uses. It is important therefore to continue documenting all information – verbally and informally - in order to conserve and propitiate cultural affirmation for future generations in the Pomoca Ejido.

The discussion is organized in four aspects: 1) TK in contrast with regional contexts, 2) the medicinal plants uses in Pomoca, 3) particular differences in plant uses comparison with other study and 4) A missing information of plant TK .

1. It is important to highlight the use given to the diversity of plant species in the regional communities. Regardless of the actual number of species from market (some of them were found in this studio, such as *Annona muricata* L., *Artocarpus communis* J.R., *Bixa Orellana* L., *Byrsonima crassifolia* L., etc.), ethnobotanical wealth is a cultural aspect. In relation to this, in a market of Comalcalco, Tabasco, Magaña-Alejandro and Rivera-Rosales (2014) elaborated a list of 259 species; 25% of the species sold in the market are brought from other states of the

republic, mainly Puebla and Mexico, while 75% are species produced in the state of Tabasco. Of the species originating in Tabasco, 93.2% are vegetable species cultivated in the same municipality, making this an important regional market. Nine categories of use were recognized, the most common being medicinal purposes with 54%, thus demonstrating the extent of plant wealth within the state of Tabasco.

2. In a study carried out on a community of Quintana Roo (Chanchah Veracruz), Chan-Quijano et al. (2013) also registered 29 ethnobotanical species, of which 53% are used for medical purposes, 20% for consumption (food), 20% for both uses (medicinal and food) and 7% for ornamental purposes. However, the most important aspect presented in this work is the wealth of knowledge in the use of plants from the surroundings, giving alternatives for their management so as to continue enriching traditional knowledge.
3. A significant number of plants (145 species) used in indigenous areas of Colombia, have been recognized and registered in accordance with the following categories of use: food (58), animal feed (8), condiments (2), commercial (40), construction (3), insecticide (7), timber-yielding (2), medicinal (82), ornamental(11), reforestation (3), ritual (30), seed (5), shade (3), toxic (5) and other uses (32)

(Arteaga-Oliveros and Dueñas-Gómez 2014), demonstrating that, in these regions, traditional knowledge goes hand in hand with the cultural and plant diversity of its natural surroundings. However, in this study is presented which have more uses as

medicinal (28), edible (24), ornamental (21) Construction (15), firewood (11), edible fruits (9), timber-yielding (9), forage (7), other applications ranging from 3 to 1 in the community (Table 2).

Table 2. Number of times that the uses of the species found are mentioned.

Uses	Number of mentions
Aromatic	3
Elaboration of craftwork	6
Live fence	2
Edible	24
Condiment	2
Construction	15
Forage	7
Edible fruits	9
Industrial	1
Firewood	11
Timber-yielding	9
Medicinal purposes	28
Honey	3
No known uses	2
Harmful	1
Ornamental use	21
Pesticida	1
Resin	2
Ecological restoration	3
Veterinary use	1

Source: own elaboration based on interviews.

- González-Esquinca et al. (2013) presents 60 plant species of the Zoque communities (Rayón, Tapalapa, Tapilula and Copainalá in Chiapas), and registers the preparation and use given to each one of the species. The most interesting aspect of that study is the bio-cultural wealth reflected in the technique and characteristics used in the preparation of these recipes, thereby generating a cohesive element in the knowledge of the different

communities. This issue would be approach in other field research.

Our study describe biocultural diversity in Pomoca and following. Moreno-Calles et al. (2013) – in this case the “El Chile” Ridge area – valued for our contribution to the biocultural diversity of the ejido, due to:

- The large number of useful native and exotic plants, resulting from the cultural history of the ejido.

However, they are in danger due to the gradual deforestation of the area.

2. Each household is where the processes of experimentation and domestication of these plants take place (family vegetable gardens, orchards, field crops, etc.), and where traditional knowledge must be transmitted from one generation to the next.)

3. The development of experiences in the management of medicinal plants and their consumption by the inhabitants of the ejido and for their enormous variety in the agricultural areas. According to Pérez-Ramírez et al. (2012) it is possible to occupy open areas in the lower levels of the orchards, using containers (plant pots) as they are easy to move around.

4. The plants not only produce benefits, but also provide a setting for ritualistic activities; Carvajal-Correa and Huicochea-Gómez (2010) describe how religious ceremonies are frequently observed with agricultural production, as the owners-producers of the agricultural areas offer part of their first harvest to the gods to show their gratitude.

These four points demonstrate a large part of the current ethnobotanical wealth of Mexico. In relation to this, Luna-Morales (2002) states that more than five thousand vascular plants are exploited, by approximately eight million speakers of 54 indigenous languages.

A significant aspect of this cultural importance is the economic sustenance deriving from the commercialization of plants. It is important to take into consideration that the natural environment, in this case the plants, offers many services, which must be kept in mind while endeavoring to recover the desire to learn more from our ancestors regarding the use of these plants.

Conclusions

In the Pomoca Ejido, a rural community of Tabasco, the adjacent ecosystems were found to play an important role in satisfying the needs of the inhabitants as well as generating assets and services for their families, while plant resources in the “El Chile” Ridge area are also exploited with good management; unfortunately, however, the area is being affected by deforestation.

The cultural wealth of the Pomoca Ejido is further enriched by the knowledge that the inhabitants have been able to conserve; nevertheless, this is gradually being lost, as the younger members of the community are now more involved in other activities and, in general, show little interest in learning traditional knowledge. However, there are still a few who are keen to learn; thus, it is in the best interests of the community to create areas of environmental culture in order to disseminate plant knowledge. The majority of the species presented in this document are used for medicinal purposes; this is most likely due to the fact that there is only one small health center in Pomoca which is insufficient for the number of inhabitants. Edible plants occupy second place since every home has small vegetable gardens and orchards; some families also have hectares on the outskirts of the community where they can cultivate other crops, following the customs described for Tabasco regarding the use of local products. Finally, ornamental plants take third place due to the scenic beauty they represent and the manner in which they embellish every house in the community. In the case of the medicinal plants found in the ejido, it would be pertinent to create areas for the promotion of environmental awareness such as: interpretive trails and botanical gardens in the schools or, where possible, sites or spaces could be assigned for the creation of these conservation areas and their subsequent exploitation to create ecotourism centers.

Success in building community resilience often relates to adaptation strategies oriented to spread risk across asset classes

(diversification) and households or communities (sharing and pooling).

Further work must be carried out on the documentation of traditional knowledge held by indigenous communities, as these rural areas are a source of insight into traditions, flora usage and the rich cultural diversity of the region. There are still many communities and ejidos in Mexico where the uses given to the plants found in the surrounding areas have been recorded.

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