

Ethnobotany of the coastal zone of the municipality of Paraíso, Tabasco, Mexico

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² First level clinic Ciudad del Carmen, Campeche, México. Petróleos Mexicanos. Av. Constelación Pleyades S/N between constellation dragon and constellation Pegaso, Fracc., Santa Rita, Ciudad del Carmen, Campeche, Mexico.

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Magna Scientia Advanced Research and Reviews, 2025, 15(02), 044-050

Publication history: Received on 08 October 2025; revised on 18 November 2025; accepted on 20 November 2025

Article DOI: <https://doi.org/10.30574/msarr.2025.15.2.0134>

Abstract

This article explores the ethnobotanical knowledge of the coastal zone of the municipality of Paraíso, in the state of Tabasco, Mexico. Through botanical walks through all the coastal communities of the municipality and a bibliographic review of studies carried out in the Chontalpa region, the traditional use of local flora by the communities is documented. Plants were identified and classified into various categories of use: medicinal, edible, timber, handicraft, forage, construction, firewood, shade, ritual and ornamental. The results reveal a deep interrelationship between the population and its plant environment, highlighting the importance of species such as coconut (*Cocos nucifera*), cocoa (*Theobroma cacao*), mangroves, various ornamental species and some trees in the region. The impact of modernization and industrial development on the preservation of this ancestral knowledge and local biodiversity is also analyzed. This study underscores the urgency of documenting and revaluing ethnobotanical knowledge as a fundamental tool for the conservation of the biocultural heritage of the coast of Tabasco.

Keywords: Useful Flora; Edible Plants; Medicinal Plants; Ornamental Plants

1. Introduction

Ethnobotany is the scientific discipline that studies the relationships between humans and plants over time and in different cultures [1]. Mexico, as a megadiverse and multicultural country, is a fertile territory for ethnobotanical research. The state of Tabasco, in the southeast of the country, is home to a vast biological and cultural wealth, largely unexplored from an ethnobotanical perspective. The increasing deterioration of the humid Mexican tropics, and especially the coastal area of the municipality of Paraíso (Figure 1), has been a cause for concern by a large sector of the population, including the scientific community [2].

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Figure 1 Deforestation for the construction of a road in the coastal zone

The municipality of Paraíso is in the subregion of Chontalpa, on the coast of the Gulf of Mexico. Its territory is characterized by a coastal plain with an average altitude of 2 meters above sea level, which gives rise to a complex network of lagoons, estuaries, swamps, and strips of coastal dunes and mangroves [3]. These ecosystems are home to a particular flora, adapted to the conditions of high salinity and flooding. The communities that inhabit this area, mostly of Chontal descent and dedicated to fishing and agriculture, have developed over generations a deep knowledge about the uses and properties of the plants that surround them [4].

The main objective of this article is to document and analyze the ethnobotanical knowledge of the coastal area of the municipality of Paraíso, Tabasco. Through tours of the different communities in addition to the compilation and synthesis of bibliographic information, it seeks to offer a general overview of the useful plants of the region, their forms of use and their importance in the daily life of their inhabitants, as well as the challenges faced by this traditional knowledge in the current context of rapid industrial development and environmental change.

2. Methodology

This study is based on walking and vehicle tours throughout the coastal area of the municipality of Paraíso, from the Aquiles Serdán ranch to Arroyo Verde, which borders the municipalities of Comalcalco and Cárdenas. In addition, an exhaustive review of the available scientific literature on the coastal flora and ethnobotany of the state of Tabasco is carried out, with a particular focus on the Chontalpa region. Various sources were consulted, including scientific articles, theses, books, and technical reports from academic and governmental institutions [4];[5];[6].

The information collected was analyzed and systematized to identify the plant species used, their common and scientific names, the parts of the plant used, the methods of preparation and the categories of use. Given the scarcity of specific ethnobotanical studies for the coastal area of Paraíso, extrapolation of data from neighboring municipalities with similar ecosystems and cultural contexts, such as Cárdenas, Comalcalco, was used, always indicating the origin of the information.

Tables and graphs were created to present in a clear and concise manner the most relevant data, such as the botanical families with the highest number of useful species and the proportion of plants in each category of use.

3. Results

3.1. The Useful Flora of the Paradise Coast

Ethnobotanical knowledge on the coast of Paraíso is vast since, of the 428 species reported by Magaña in 2010, 77% have some use, especially because they cover a wide range of uses that are vital for the subsistence, health and culture of its inhabitants.

Below are only the main categories of use and some of the most representative species.

3.2. Medicinal Plants



Figure 2 Basil plant (*Ocimum basilicum*), inside an orchard on the coast of Paraiso

The use of plants to treat diseases is one of the most deeply rooted practices in communities in the region. Knowledge is transmitted from generation to generation, mainly orally. Among the most common conditions treated with local herbs are respiratory, gastrointestinal, and skin diseases.

Some of the most important medicinal plants are

- **Purple maguey** (*Tradescantia spathacea*): Used to treat respiratory problems, such as cough and asthma. An infusion is prepared with its leaves [4].
- **Guarumo** (*Cecropia obtusifolia*): The infused leaves are used to control blood glucose levels, being a popular remedy for diabetes [4].
- **Momo** (*Piper auritum*): In addition to its culinary use, its leaves are used to relieve stomach pains and as an anti-inflammatory.
- **Sábila** (*Aloe vera*): The mucilage in its leaves is applied topically to treat burns, wounds, and skin conditions.
- **Coconut** (*Cocos nucifera*): Coconut water is consumed as a rehydrator and for kidney problems. Coconut oil has antibacterial properties.

3.3. Edible Plants



Figure 3 and 4. Beach grape tree (*Coccoloba uvifera*) and Gogo grape tree (*Salacia elliptica*) in the coastal dunes of Paraiso, Tabasco

The diet of Paraíso's coastal communities is supplemented by a variety of plants, both grown in home gardens and collected from the surrounding vegetation [6].

- **Coco** (*Cocos nucifera*): It is one of the most important plants in the coastal area. Its pulp and fresh water are consumed. Oil is extracted from the dried pulp and traditional sweets are made. Coconut palms are an iconic element of the landscape of Paraíso.
- **Cacao** (*Theobroma cacao*): Although its cultivation is more intensive inland in the Chontalpa, it is also found in the family gardens of the coastal area. It is used to prepare the traditional pozol, a pre-Hispanic drink based on corn and cocoa.
- **Diverse fruit trees**: In patios and plots, trees such as mango (*Mangifera indica*), nance (*Byrsonima crassifolia*), guava (*Psidium guajava*), and various citrus fruits (*Citrus* spp.) are common [5].
- **Vegetables**: Various herbaceous plants are consumed that they plant within their gardens, and that are added to stews such as tomatoes (*Solanum lycopersicum*), coriander (*Coriandrum sativum*) and different chili peppers (*Capsicum* spp.).

3.4. Plants for Construction and Handicrafts



Figure 5 and 6 Timber macuilíz tree (*Tabebuia rosea*) and round guano palm (*Sabal mexicana*) for handicrafts

The region's forest resources have historically been the main source of materials for housing construction and household goods.

- **Palms**: Various species of palms, such as the royal palm (*Roystonea dunlapiana*) and guano (*Sabal mexicana*), are used to roof traditional dwellings.
- **Woods**: Trees such as cedar (*Cedrela odorata*), mahogany (*Swietenia macrophylla*) and macuilíz (*Tabebuia rosea*) are prized for their wood for the construction of houses and furniture, although their availability has decreased due to deforestation.
- **Vines**: Various species of lianas are used as ropes to tie the structures of the houses and for basket tie the basket vine (*Xmilax dominguensis*), [2].

3.5. Ritual and Ornamental Plants



Figure 7 and 8 Toloache plant (*Datura stramonium*) and different ornamental species common to the coast of Paraíso

The local flora also plays an important role in the spiritual and aesthetic life of the communities.

- **Cacao** (*Theobroma cacao*): In addition to its nutritional value, cacao has a deep cultural and ritual significance, inherited from the Mayan culture. It is used in offerings and ceremonies.
- **Cempasúchil** (*Tagetes erecta*): Although it is not native to the region, it is cultivated for Day of the Dead celebrations.
- **Ornamental flowers**: A wide variety of flowers are grown in the gardens of houses to beautify the environment, such as the tulip (*Hibiscus rosa-sinensis*), bougainvillea (*Bougainvillea glabra*), Ixora (*Ixora coccinea*) among many others [3].

4. Graphs and Relevant Data

To illustrate the relative importance of the different categories of use, the following graph is presented on the home gardens in the coastal area of Paraíso.

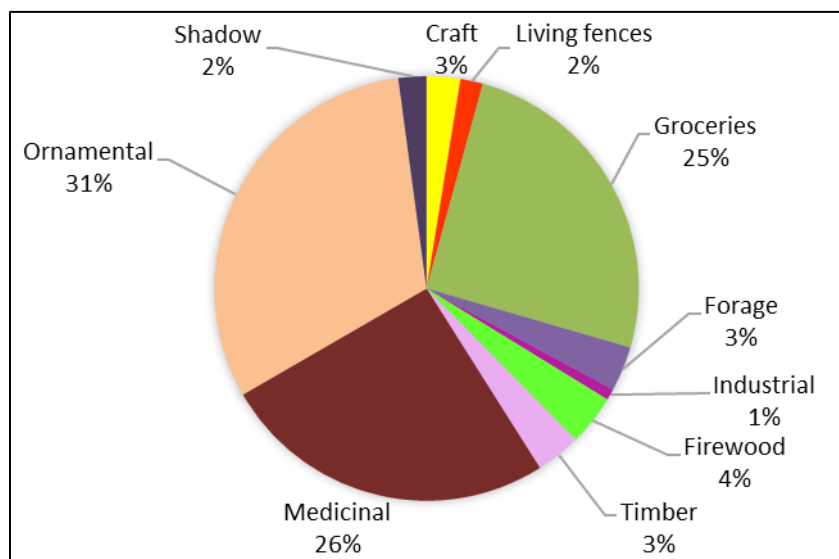


Figure 9 Percentage of species by category of use on the coast of Paraíso

Below is a table with ten of the most important plant species in the coastal area of Paraíso, based on their use value reported in studies of the region and their presence in local ecosystems [4]; [5]; [6].

Table 1 Main Plant Species of Ethnobotanical Use on the Coast of Paraíso

Scientific Name	Common name	Family	Main Uses
<i>Cocos nucifera</i>	Coconut	Arecaceae	Edible, medicinal, construction, oil
<i>Chrysobalanus icaco</i>	Icaco	Chrysobalanaceae	Edible, medicinal, candy
<i>Tradescantia zebrina</i>	Matalí	Commelinaceae	Medicinal, ornamental
<i>Cecropia obtusifolia</i>	Guarumo	Urticaceae	Medicinal
<i>Piper auritum</i>	Momo	Piperaceae	Edible, medicinal
<i>Sabal mexicana</i>	Round Guano	Arecaceae	Construction (roofs)
<i>Rhizophora mangle</i>	Red mangrove	Rhizophoraceae	Construction, firewood, medicinal (bark)
<i>Byrsonima crassifolia</i>	Nance	Malpighiaceae	Edible, medicinal
<i>Psidium guajava</i>	Guava	Myrtaceae	Edible, medicinal
<i>Cedrela odorata</i>	Cedar	Meliaceae	Timber (construction, furniture)

5. Discussion

The results of this research show the existence of a rich and complex system of ethnobotanical knowledge in the coastal area of Paraíso, Tabasco. This knowledge not only represents a cultural heritage of incalculable value but is also a pillar for the subsistence and well-being of local communities [2]. The diversity of uses of flora reflects a deep adaptation to the environment and sustainable management of natural resources throughout history.

However, this biocultural heritage is at a crossroads. The expansion of the oil industry, with large-scale projects such as the port and refinery of Dos Bocas [7], accelerated urbanization, and the replacement of traditional agricultural practices with monocultures, are generating strong pressure on coastal ecosystems and local culture. Deforestation of mangroves and water and soil pollution threaten the availability of many useful plant species [8].

At the same time, the transmission of traditional knowledge is interrupted by factors such as migration, changes in educational models and the devaluation of local knowledge in the face of the products and practices of globalized culture. The loss of this knowledge not only implies cultural impoverishment, but also the loss of options for more sustainable and resilient development.

6. Conclusion

The coastal area of Paraíso, Tabasco, has a remarkable ethnobotanical wealth that is fundamental for the life of its inhabitants. Ornamental, medicinal, edible, building and ritual plants constitute a biocultural heritage that reflects a deep connection between people and their environment.

It is imperative that more field research be conducted to document in a detailed and systematic manner the specific ethnobotanical knowledge of the Paraíso communities, before it is lost. Conservation of this knowledge and its integration into local development and environmental conservation strategies are key to ensuring the sustainability and well-being of the region [8]. Protecting Paraíso's coastal ecosystems is ultimately protecting a culture and way of life that has much to teach about resilience and adaptation in an ever-changing world.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict-of-interest to be disclosed.

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