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Ethnobotanical study of the Chontal home gardens of Simón Sarlat, Centla, Tabasco, Mexico

Miguel Alberto Magaña Alejandro *, Adalberto Galindo Alcantara, Miguel Ángel Palomeque de la Cruz and y Karina de los Ángeles Ramírez Méndez

Juárez Autonomous University of Tabasco. Academic Division of Biological Sciences. Km 0.5, Villahermosa - Cárdenas Highway, junction to Bosques de Saloya. Mexico.

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Abstract

Human-plant interactions are complex and variable phenomena in the different ecological and cultural regions of the Mexican territory. They have obtained from their relationship with nature a series of knowledge, achieving in this way a management of natural resources. This relationship has led them to form small, highly diversified production units called home gardens. Therefore, the objective of this work was to carry out an ethnobotanical study of the home gardens of Simón Sarlat Centla, Tabasco, and Mexico. For this purpose, the study area was visited during the months of August 2020 to January 2021. People with gardens were selected and semi-structured interviews were applied to obtain information about the type of plants they have. Twenty-five orchards were studied in which the age of the people interviewed was between 40 and 80 years old. A total of 193 useful plants were identified in the home gardens, corresponding to 75 botanical families, with Lamiaceae, Solanaceae, Acanthaceae and Asteraceae standing out. Nineteen categories of use were established from the information provided. The category represented by the largest number of plants is ornamental plants with 67 species. Of the 193 species found in the orchards, their origin was identified, of which 125 were introduced plants and 68 were considered native, i.e., only 35% of the flora in the orchards is native. Finally, it is concluded that the home gardens of Simón Sarlat, Centla, Tabasco are very diverse, but that traditional knowledge is being lost because preference is being given to introduce species.

Keywords: Edible; Medicinal; Ornamental; Vegetable plants

1. Introduction

The biological richness of Mexico, its cultural diversity, as well as the long history of settlement of the territory, have resulted in the development of a vast ethnobotanical tradition. This includes the knowledge, use and management of a large number of plant species through complex forms of interaction between local communities and their plant environment [1, 2]. Human-plant interactions are complex and variable phenomena in the different ecological and cultural regions of the Mexican territory [3].

Human groups have obtained a series of knowledge from their relationship with nature, thus achieving a management of natural resources and building a man-nature relationship [4].

This relationship has led them to form small, highly diversified production units called home gardens, which is a multi-strata agroforestry system that is very common in subsistence economies and is characterized by a set of land use practices, involving the deliberate management of multipurpose trees and shrubs in intimate association with annual

* Corresponding author: Magaña Alejandro Miguel Alberto

Juárez Autonomous University of Tabasco. Academic Division of Biological Sciences. Km 0.5, Villahermosa - Cárdenas Highway, junction to Bosques de Saloya. Mexico.

and perennial agricultural crops and invariably, livestock; all within the household complex and carried out with family labor [5].

On the other hand, the family garden is also an integral part of the home of the families that own them; it is an extended space that satisfies some food and economic requirements, as well as ritual, play and recreational needs. It is also characterized by the importance of extensive local knowledge for the use of the environment, its biological, climatic, edaphological and geographical diversity; they are considered reservoirs of agrobiodiversity and areas of conservation of genetic resources for millennia [6, 7].

The gardens are spaces of social, cultural, and symbolic reproduction, which can manifest the cultural identity and use of natural resources of the family, community, or ethnic group, offering alternative strategies in the integrated management of resources [8].

In this context, Mexico has a high diversity of plant resources, many of which are efficiently conserved and exploited by indigenous groups for the sustenance of their food base, demonstrating a greater knowledge of their natural environment.

In the state of Tabasco, home gardens have been one of the agroecosystems that have been preserved over time and in recent years several studies have been conducted on these traditional systems [9, 10, 11, 12]. However, few studies have been carried out in the river region. On the other hand, only Van der Wall *et al.* [13] have conducted research on home gardens in physiographic zones at the state level and conclude that it is necessary to have more studies in the different physiographic zones since each zone has gardens with characteristics. Therefore, the objective of this work was to carry out an ethnobotanical study of the family gardens of Simón Sarlat Centla, Tabasco, Mexico, making a floristic characterization of the useful plants present and the uses given to the useful plants present in the gardens.

2. Material and methods

2.1. Area of study

The study area is in the town of Simón Sarlat in the municipality of Centla in the state of Tabasco at an average altitude of 1 m above sea level. It has a total population of 4,500 inhabitants [14]. It is bordered to the north by the Gulf of Mexico, to the south by the municipalities of Macuspana and Centro, to the east by the state of Campeche and the municipality of Jonuta, and to the west by the municipalities of: Centro, Nacajuca, Jalpa de Méndez and Paraíso (Figure 1).



Figure 1 Location of the study area

The study area has a warm humid Am (f) climate with abundant rainfall in summer, with an average annual precipitation of 1500-2000 mm. The soils are the result of the influence of three factors: the alluvial accumulation of sediments, the water provided by the rivers due to the high rainfall in the middle and upper basin, as well as the types of vegetation.

2.2. Activities in the area

- Fishing: The most important primary activity in the town and municipality of Centla.

- Agriculture: it is of the traditional type and is intended to meet the food needs of farmer families.
- Livestock: pastures adapted to low-lying areas subject to flooding dominate.
- Hunting: wild animals are still consumed by the inhabitants of the village.
- Forest harvesting: most of them are domestic for the construction of houses.

2.3. Method

Visits to the study area were made during the months of August 2020 to January 2021. The orchards were chosen randomly, forming a list of families, assigning a number to each one of them. The random selection was done by generating random numbers on a calculator, each number represented an orchard, and these were visited and sampled depending on the willingness of the owner. The delegate of the community of Simón Sarlat was visited to explain the nature of the project and request his permission to work in the aforementioned community. Subsequently, the people who still have home gardens on their properties were located. A list of about 35 people who could potentially participate in the project was obtained, but in some cases, there were negative responses, or the plots were not classified as orchards because they had monocultures. Finally, a total of 25 orchards were studied. Interviews were conducted with orchard owners, including semi-structured questions [15] to obtain information on the use and management of the plants in the orchard. Ethnobotanical collections were carried out, preparing herborized specimens and making photographic records of the plants in the field. The information fields were guided by the data from the Ethnobotanical Data Bank of Mexican Plants (BADEPLAN) of the Botanical Garden, Institute of Biology, and UNAM. Based on this information, a floristic inventory of the components of these production systems was made. Finally, the information was stored in the Excel database and the corresponding analyses were performed.

3. Results and discussion

Twenty-five orchards were studied in the Simón Sarlat rancheria of the municipality of Centla, Tabasco. The area of the orchards varied between 400 and 2000 m². The largest orchard corresponds to one located within a very large farm. It is worth mentioning that this orchard is more organized, as it has well-defined spaces for growing vegetables and fruit trees, which was not observed in the other orchards.

The time dedicated to the care and maintenance of the garden's ranges from one to six hours a day, which corresponds to almost a full day's work. As for the age of the orchards, the oldest one is about 50 years old, and the most recent ones are nine years old. The age of the people interviewed is between 40 and 80 years old. Likewise, the level of schooling of the orchard owners is quite low, as 70% only have primary schooling. Of the remaining 30%, four people have high school or incomplete high school, another is a technician, and two others are university professionals (Figure 2). It is important to mention that none of the people are trained in agricultural activities and that everything they know was learned from their parents.

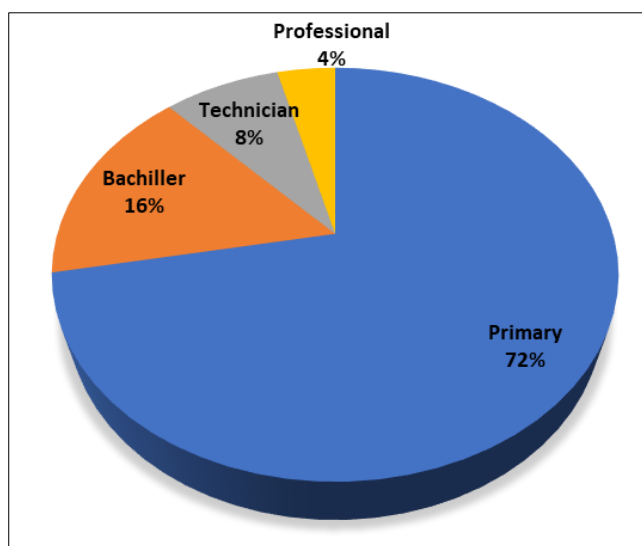


Figure 2 Level of schooling of the persons interviewed

A total of 193 useful plants were identified in the home gardens, corresponding to 65 botanical families, with Asteraceae, Fabaceae, Araceae and Zingiberaceae standing out among others (Figure 3). The difficulties in identification were due to the great abundance of exotic ornamental plants that are not very common in national botanical books, nor deposited in herbaria, however, was it necessary to go to different catalogs, mainly of ornamental plants from other countries because they are introduced plants. It is important to note that the list included and counted some varieties considered by the inhabitants as different plants but belonging to the same species, such as the mango plant (*Mangifera indica*) with approximately 8 varieties.

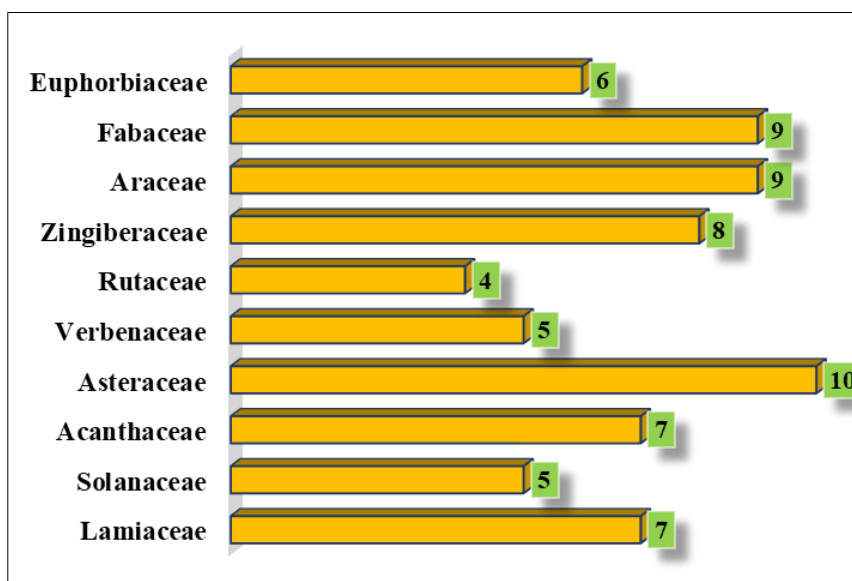


Figure 3 Botanical families with the highest number of species

Regarding the use assigned to the plants, 19 categories of use were established based on the information provided during the field trip. The category represented by the largest number of plants is ornamental with 67 species, followed by edible with 42 and medicinal with 38. Within the categories that are only represented by a single species, there are those that serve as living fence, enclosure, and shade, respectively (Figure 4). In a study conducted by Zuluaga [16] in orchards, gardens, paddocks, and marketplaces in the municipality of Cota (Cundinamarca) he found 172 medicinal plants, about five times more than those found in orchards studied in Simón Sarlat, Centla, Tabasco. The lower richness of medicinal plants found in this study may be related to the fact that the location of the community is relatively close to two towns where there are nurseries that sell many introduced ornamental plants, even though there are other indigenous Chontal areas where medicinal plants predominate.

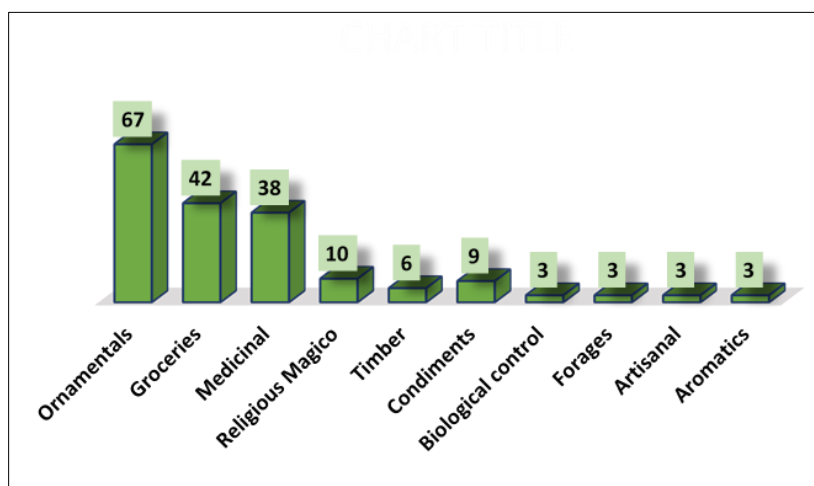


Figure 4 Main uses of plants from home gardens

Medicinal, edible, and ornamental flora are important in a family garden, since the first is used to heal minor ailments, the second to feed the family and the third to beautify the place [17, 18, 19, 20]. It should be noted that the flora for ornamental use is the most important in all the orchards studied (67 species), because it favors the beautification of the space, where the aesthetic value of the orchards is culturally important for the families. In many cultures, the tendency to beautify their orchards is common, as studies carried out in Cuba [21], Guatemala [22] and Mexico [17] have found that ornamental plants are always the most abundant.

Of the 193 species found in the orchards, their origin was identified, of which 125 were introduced plants and 68 were considered native, that is, only 35% of the flora in the orchards is native, which could mean that the family orchards of Simón Sarlat, Centla, Tabasco conserve very few plant resources of the region and this could be linked in one way or another to the loss of traditional knowledge, especially in the use and management of native plants that could have some potential. Comparing the result of this work with that of Leiva et al., [22] in Guatemala, where in the orchards there are about 52% of native plants, it could be considered that for Simón Sarlat, Centla, the percentage obtained is very low since introduced plants predominate. However, it should be noted that in the case of Guatemala, most of the orchards are in areas where there are indigenous communities that conserve a wide range of wild flora, which they use to meet their needs

4. Conclusion

- In the family gardens of Simon Sarlat there is a wide diversity of plants, with multiple uses that contemplate an interest such as ornamental, food, medicinal, reforestation, biological control, religious magic, living fences among others.
- The orchard is not only a productive space, but also a space where the owner's interest in beautifying their surroundings and generating a welcoming and modified aesthetic according to their taste is linked, mainly women. This interest was reflected in the high proportion of ornamental plants found in the gardens.
- The most common ornamental plants in the home gardens of Simón Sarlat, Centla, Tabasco are bugambilia, crotos, dracenas, among others. Edible plants include papaya, tomato, chili peppers, plum, etc. And in the medicinal ones are the belladonna, maguey morado, albahacar and matalí among others.
- The flora of the home gardens is dominated by introduced and cultivated plants, which is evidence of the strong ecological and cultural transformation that this region of the municipality of Centla has undergone during its history. Native plant resources and traditional knowledge about their management have been lost and this could mean the loss of important phylogenetic resources for the development of the region.
- In general terms in Simon Sarlat, the gardens do not have a substantial economic contribution to the income of the families, since they live mainly from fishing and the house, but the inhabitants are interested in producing some species for their own consumption.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that they have no competing interests.

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