A traditional use of medicinal plants by indigenous Yokot´an of Nacajuca, Tabasco: A case study using quantitative techniques

Accepted 14th August, 2017

ABSTRACT

The use of medicinal plants was evaluated in qualitative form with the purpose of documenting the relative importance of these species and estimating the current state of the traditional knowledge of an indigenous community (Mazateupa) of the Yokot´an route, in Nacajuca municipality, Tabasco. This area in particular, is considered an agricultural sector of high confluence and denotes an appropriation of knowledge of villagers in the use and handling of plant species in the region. 50 surveys were randomly applied to persons between 40 and 80 years old and investigated with respect to the use and management of plants. Scheduled interviews were applied to those people who managed to a large extent demand for medicinal plants in the region. The data obtained from the consensus of informants were analyzed by the value index usage (IVU) and the level of meaningful use of TRAMIL. 122 species were recorded with 111 genera, grouped in 63 botanic families between medicinal, aromatic and magic religious; the best represented families were Asteraceae and Lamiaceae. 17 species with a higher level of meaningful use and 13 species with a greater IVU were reported. The documentation of the uses of medicinal plants in the influenced area revealed that the traditional knowledge is still deeply rooted among the community and kept the popular knowledge in the hands of healers and mothers head of household.

Keywords: Indigenous community, Nacajuca, medicinal plants, Yokot´an.

INTRODUCTION

Health problems and the difficult attainment of commercial medicines have led to the search for traditional medicine through the use and management of plants. The use of traditional medicine in the treatment of diseases is a practice that has been carried out since ancient times. These activities have undergone profound transformations and the values that the population has in relation to plants is disappearing with vertiginous rapidity (Caballero, 1986). At present, the use of medicinal plants gradually diminishes, while traditional knowledge is affected by the scientific revolution, losing much of the cultural legacy and natural resources. This fact is generated by diverse causes of socio-economic type that affect the continuity and reproduction of the traditional knowledge. Chavez and Arango (1998) estimated that among the major causes of cultural loss in traditional knowledge are the low valuation of the use of medicinal plants, loss of influence of traditional authorities in the decisions of the community and the homogenization of the Terrain due to monocrops.

From the scientific point of view, the few criteria of ethnobotanical evaluation, the lack of elaboration of documents and the experimental complexity with vegetal resources are the most frequent problems in the study of the current ethnobotany. Most of the ethnobotanical studies are descriptive in character and the analysis of the data is a rather difficult task (Alexiades, 1996).

Phillips and Gentry (1993), developed a technique to estimate the use value of plants, using the information obtained from the communities studied and based on the surveys that involve a certain number of informants; the data of each informant were then used to calculate the
number of applications of a given species.

According to Phillips (1996) and Marín et al. (2005), there are different methodologies which can be grouped into three different approaches: informant consensus, subjective location and summation of uses; the evaluation of these ethnomedical methodologies has been continuously reviewed; However, a statistical tool that generates objective results and manages a short time in the data collection has not been developed.

The objective of the present study was to evaluate through quantitative ethnobotany, the current state of traditional knowledge and therapeutic uses of the vegetal resource in an indigenous community in the municipality of Nacajuca, Tabasco. The information obtained is one of the few records of medicinal plants in the state of Tabasco, which serves as the basis for the selection of species in their scientific validation.

MATERIALS AND METHODS

Study area

Mazateupa belongs to the municipality of Nacajuca and is located at 18° 12’ 19” north latitude and 93° 00’ 36” west longitude (Figure 1). 4 km of the Nacajuca to Tecoluta road (INEGI, 2005). The etymology of its name is derived from the word chontalchäcpach which means Red Pital (Keller and Luciano, 1997). For the inhabitants of the place the name of Mazateupa means "Place of the deer".

The town is at 8 msnm, has 443 homes and a population of 1,995 inhabitants of which 1,010 are men and 985 are women. Of the total population, 949 are indigenous speakers of the Chontal language (INEGI, 2005). In this community, people are engaged in farming, agriculture (corn, beans and sugar cane) and the manufacture of handicrafts, mainly the backpacks, bags, hats, etc. Almost all the population professes the catholic religion, therefore, the most important religious festival is the one of San Lázaro that is the patron saint of the town and the one of the fifth Friday of the holy week, nevertheless, they also celebrate 4th of August to Santo Sunday.

The area belonging to the population of Nacajuca and the Chontal peoples of Tucta to Tecoluta, present fluvial eutric (Je) type soils. For its part, Mazateupa has soils corresponding to the Gleysol mólico. These soils have hydromorphic characteristics throughout the profile, meaning that they are flooded soils, their colors are gray with different tones and their texture is fine (Castro, 1991).

The climate is warm humid Am (f) with abundant rains in summer, has an average annual temperature of 26.4°C, being the monthly maximum in May with 30.8°C and the minimum average in January with 22.4°C. The precipitation regime is characterized by a total water fall of 1707 mm with a monthly maximum average of 735 mm in September and the monthly minimum of 63.9 mm in February (INEGI, 2005).

Analysis of information

Ethnobotanical studies are dependent on an effective application of a number of anthropological keys and botanical methodologies (Cotton, 1999). In this research, 50 surveys were randomly applied with a reliability level of 95% in the town of Mazateupa, an indigenous rural area in the municipality of Nacajuca, Tabasco.

Surveys were designed based on the structured interactions suggested by Martin (1995) and TRAMIL
(2004). In order to manage the IVU, programmed interviews were applied to the connoisseurs of medicinal plants in the community based on the criteria suggested by Cotton (1999) and Martin (1995). The plants collected during the surveys and interviews were treated according to herbal techniques for botanical samples, which were deposited in the UJAT Herbarium.

The identification of plant material was carried out using specialized literature such as Guatemala (Standley, 1974), Flora de Veracruz (Gómez-Pompa, 1996) and the catalog of vulgar and scientific names of plants in Tabasco (Magaña, 2006).

Responses provided by informants were organized into a database using Microsoft Excell. Quantitative indices were calculated for each of the species. According to Bermúdez and Velásquez (2002); these data can be used as indicators of the degree of consensus in the use of the species and the cultural importance of these plants in the community investigated. The following quantitative indices were used:

**Index of use value (IVU)**

The informants’ consensus approach and methodology was developed by Adu et al. (1979), Phillips and Gentry (1993) and Phillips (1996). This value expresses the importance or cultural value of a given species for all respondents interviewed. In order to estimate the general use value index of each species for all informants (IVUs), the following formula was used:

$$ IVUs = \frac{\sum_{i} UVi}{Ns} $$

Where: $UVi =$ number of uses mentioned by each informant $(i)$, for each species $(s)$ and $Ns =$ number of respondents surveyed.

**Significant use level TRAMIL (NUST)**

To estimate the level of significant use for each species and verify their cultural acceptance, the methodology proposed by Germosén (1995) was used. This methodology expresses that those medicinal uses that are cited with a frequency greater than or equal to 20% by respondents who use plants as the first resource for a given health problem can be considered significant from the point of view of their cultural acceptance and therefore deserve their scientific evaluation and validation.

$$ UST = \text{Use species (s)100 /nis} $$

Where: Use species (s) = number of citations for each species and $nis =$Number of respondents surveyed.

**RESULTS**

In the town of Mazateupa, 122 plant species were found, grouped into 111 genera and 63 families. The most representative families were Asteraceas and Lamiaceas. In the present study, it was verified that both men and women differ in their knowledge about the use of plants because of the 50 people who were surveyed using medicinal plants in Mazateupa, Nacajuca, are women (73%) and those who most often use plant resources in their diseases.

The average age of these people is 48 years with a minimum of 38 and a maximum of 78. The maximum schooling of one of the people surveyed is high school, while two of them surveyed said they do not know how to read and that their occupations are healers and housewives. It is worth mentioning that these area traditional doctors are supported with bibliography of external medicinal plants, reason why they are considered more updated with information.

As for the biological form that predominates in this area, grasses occupy 52%, with species such as the good herbs (Mentha piperita L.), Pachuli (Pogostemon cablin (Blanco) Benth) and star anise (Tagetes lucida Cav.). Among others, the second place is occupied by trees with 25% including mango (Mangifera indica L.), Guanabana (Annona muricata L.) and the cuajilote (Parmentiera aculeata Kunth) Seem) among others, and thirdly, the shrub forms 11% among which the wind blade (Eupatorium morifolium Mill.), Sauco (Sambucus mexicana C. Presl ex DC) and Higuera (Ricinus communis L.) are found.

On the other hand, 100 diseases were recorded, but ten were the most common, among which the most frequent reported cough was twelve times, cholesterol and inflammation of the stomach reported ten times each and for nerves and the Triglycerides reported nine times each.

In treating some of the infections different plants are sometimes used alone or mixed so that its effect is better; some recommend using the extract of the momo (Piper auritum HBK) and others the cinnamon mixture (Cinnamomum zeylanicum Breynne), the bougainvillea (Bougainvillea glabra Choise) and the lemon (Citrus lemon (L.) Buró) among others for cough. In the case of inflammation of the stomach they use plants such as majagua (Hampea macrocarpa L undel), chamomile (Matricaria chamomilla L.) and purple maguey (Tradescantia spathacea Sw.) among others. Figure 2 shows some of the medicinal plants that are frequently used in the municipality of Nacajuca.

Of the parts of the plants used that the informants mentioned for the elaboration of the remedies in the treatment of their diseases, the leaves are mostly used with 41%, followed by the branches with 12% and
thereafter, with 11% the fruits. The barks, flowers and other parts of plants use them to a lesser extent. The value-of-use index was worked with the collaboration of six informants selected from previous surveys. For the entire study, 13 species with the highest use value were presented (UVI between 1 and 1.83).

Table 1 shows the significant level of use for each of the species recorded, the index of use value and the respective use of the main species. The species with a higher IVU, reported in this research, are those in which the same part of the plant is used and in different forms, as well as in different categories of use; such is the case of citrus and some food species. In contrast, species with a lower IVU have a specific use.

Some of the species found in the category of medicinal food are avocado (*Persea americana*), papaya (*Carica papaya*), epazote (*Chenopodium ambrosioides*), guava (*Psidium guajava*), orange, lemon, grapefruit, mandarin (*Citrus sinensis, C. medica, C. reticulata*) and pumpkin (*Cucurbita moschata*). The medicinal species that also have ornamental use are bougainvillea (*Bougainvillea glabra*), aloe (*Aloe vera*), purple maguey (*Tradescantia spathacea*) and sauco (*Sambucus mexicana*), (Table 2). Other species that must be taken into account for their medicinal properties are swallow (*Euphorbia hirta*), purslane (*Portulaca oleracea*) and tobacco (*Nicotiana tabacum*).

Finally, seventeen species with a NUST higher than 20% were present. These include: ruda (*Ruta graveolens*) used for inflammation of the stomach, Peppermint (*Mentha piperita*) effective for menstrual pains, purple maguey (*Tradescantia spathacea*) recommended for cancerous problems, momo (*Piper auritum*) for problems of the gall bladder, aloe (*Aloe vera*) for blows and sprains, basil (*Ocimum basilicum*) on head heating. Table 2 shows the significant level of use for each of the species recorded, the index of use value and the respective use of the main species.

**DISCUSSION**

In general, women provided more information regarding medicinal plants, suggesting knowledge linked to their daily activities, an aspect that agrees with Cotton (1999), Arango (2004) and Magaña (2009), where they also reported that the greatest use of medicinal plants is by women.

The high costs of patent medicines, the side effects of chemical drugs and the tendency towards the natural make the community turn to medicinal plants and continue to believe in traditional medicine. According to Rojas (2005), as supporters of popular alternative treatments grow, health centers are less visited by people who resort to them because they are out of pocket.

The high number of diseases reflects the importance of medicinal plants in the locality. According to Magaña (2009), in Mazateupa, diseases such as acute respiratory infection, dermatitis, parasitosis, flu and fevers are very common.

Most of the diseases reported were treated on several occasions by the plants registered in this study. For this reason, the traditional knowledge of these indigenous communities must be taken into account since it is the only indigenous group in Tabasco that preserves the experience and practices obtained from previous generations. According to the information of the surveys, the most frequent forms of use were decoction (45%) and infusion (18%).

Decoction or cooking is mainly used to prepare medicines from hard parts of the plant, but can also be used with delicate parts. It is generally prepared in proportion to one part of the plant for 20 parts of water. The plant and water should be placed together before boiling begins (Fonnegra and Jiménez, 1990).

According to Marín et al. (2005), use value is bias if used as raised in several approaches in which the same species can increase its value when used for different types of remedy in the case of medicinal plants or as in the case of some ornamental that you can get arrangements, perfumes or as ornaments. These multiple possibilities of using a resource are mostly exclusive, so it should be considered only once per category. This approach is valid for a useful plant approach in general, however, medicinal species would obtain the lowest rates and their scientific value.
Table 1: Quantitative analysis of the different medicinal species of Mazateupa, Nacajuca, Tabasco.

<table>
<thead>
<tr>
<th>Common name</th>
<th>Species</th>
<th>IVU</th>
<th>NUST (%)</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sabila</td>
<td>Aloe vera L.</td>
<td>1</td>
<td>52</td>
<td>Hits Sprains Kidsneys Detoxify the blood Burn fat Cholesterol</td>
</tr>
<tr>
<td>Palo mulato</td>
<td>Burserasimaruba (L.) Sarg.</td>
<td>0.5</td>
<td>30</td>
<td>Urinary tract infection, Typhoid</td>
</tr>
<tr>
<td>Canela</td>
<td>Cinnamomum zeylanicum Breyne</td>
<td>1</td>
<td>50</td>
<td>Cough, Vaginal wash, Chickenpox, Hair loss, Fever, Cold</td>
</tr>
<tr>
<td>Sour lemon</td>
<td>Citrus limon (L.) Buró</td>
<td>1.17</td>
<td>66</td>
<td>Cholesterol, Triglycerides, Thyroid, Clean the lung, Cough, Vaginal wash, Chickenpox</td>
</tr>
<tr>
<td>Sweet orange</td>
<td>Citrus sinensis (L.) Osb.</td>
<td>1</td>
<td>48</td>
<td>Nerves, Epilepsy, Triglycerides, Clean the lungs, Inflammation of gums</td>
</tr>
<tr>
<td>Dragon's blood</td>
<td>Croton draco Schlech.</td>
<td>1.17</td>
<td>26</td>
<td>Astringent, Stress, Hemorrhages, Low pressure, Circulation, Varicose veins, Hemorrhoids</td>
</tr>
<tr>
<td>Eucalipto</td>
<td>Eucalitus globules L. abill.</td>
<td>0.67</td>
<td>26</td>
<td>Diabetes, Cough, Flu, and Varicella</td>
</tr>
<tr>
<td>Chamomile</td>
<td>Matricaria chamomilla L.</td>
<td>1.83</td>
<td>94</td>
<td>Inflammation of the stomach, cough, Vaginal wash, Chickenpox, Hair loss, Menstrual cramps, Nerves, Stress, Pain Spasm</td>
</tr>
<tr>
<td>Melissa</td>
<td>Mentha citrate Ehrn.</td>
<td>0.17</td>
<td>82</td>
<td>Toothache</td>
</tr>
<tr>
<td>Peppermint</td>
<td>Mentha piperita L.</td>
<td>1</td>
<td>70</td>
<td>Cough, Fever, Flu, Cold, Menstrual cramps</td>
</tr>
<tr>
<td>Banana</td>
<td>Musa paradisiaca L.</td>
<td>1</td>
<td>34</td>
<td>Goiter, Inflammation of the thyroid, Vomiting, Inflammation of the stomach, Wounds, Mushrooms</td>
</tr>
<tr>
<td>Albahacar</td>
<td>Ocimum basilicum L.</td>
<td>0.83</td>
<td>86</td>
<td>Conjunctivitis, Ofiadura, Head warming, Astonishment</td>
</tr>
<tr>
<td>Plantain</td>
<td>Plantago major L.</td>
<td>1</td>
<td>30</td>
<td>Chronic cough, Asthma, Deflate array Uterine cervical cancer, Vaginal lavage</td>
</tr>
<tr>
<td>Momo</td>
<td>Piper auritum H.B.K.</td>
<td>1.83</td>
<td>48</td>
<td>Dry cough, Asthma, Laryngitis, Pain, Gastritis, Rheumatism, Pancreas, Vesicle, Anemia, Delay of menstruation</td>
</tr>
<tr>
<td>Guava</td>
<td>Psidium guajaba L.</td>
<td>0.67</td>
<td>34</td>
<td>Dysentery, Stomach ache, Intestinal inflammation, Parasites</td>
</tr>
<tr>
<td>Rosemary</td>
<td>Rosmarinus officinalis L</td>
<td>0.83</td>
<td>82</td>
<td>Hair loss, Tendons, Delay of menstruation, Inflammation, Colic</td>
</tr>
<tr>
<td>Ruda</td>
<td>Ruta graveolens L.</td>
<td>0.67</td>
<td>86</td>
<td>Hemorrhages, Stress, Inflammation of the stomach, Evil eye</td>
</tr>
<tr>
<td>Elder</td>
<td>Sambucus mexicana Presl.</td>
<td>1</td>
<td>26</td>
<td>Asthma, Cough, Chichimeca</td>
</tr>
<tr>
<td>Macuíliz</td>
<td>Tabebuia rosea (Berth.) DC.</td>
<td>1.76</td>
<td>26</td>
<td>Typhoid, Mushrooms, Fever, Diabetes, Ulcers, Liver inflammation</td>
</tr>
<tr>
<td>Maguey purple</td>
<td>Tradescantia spathacea Sw.</td>
<td>1.33</td>
<td>94</td>
<td>Uterine cervical cancer, Infection, Wounds, Spasm of belly, Pain, Swelling of the stomach</td>
</tr>
<tr>
<td>Corn</td>
<td>Zea mays L.</td>
<td>1</td>
<td>70</td>
<td>Kidneys, Kidney stones, Tapiadura, Gallstones</td>
</tr>
</tbody>
</table>

IVU = Value Use Index; NUST = Level of significant use TRAMIL.

would be lost (Toscano 2006).

On the other hand, it would be subtracting importance to the species that are used for different diseases and with different vegetal organs, in comparison with other species that treat a specific disease and without any frequency of use in the community.

Finally, it is concluded that the town Mazateupa is very rich as far as medicinal plants is concerned since a high diversity of species was found, being that the women are the ones that have more knowledge than the men. On the other hand, it was also found that in the town of Mazateupa, the most notable causes of reported diseases are related to environmental conditions and domestic work, such as: humidity and smoke from the kitchen, among others.

The greatest number of herbal resources in Chontal communities is to resolve airway problems, although there were also numerous digestive problems. With all this it was observed that the traditional practitioners of the Yokot’an culture usually know the uses of hundreds of plants originating in their region, but they do not know the plants originating from other parts, which has led some to undergo training so as to have a broader knowledge.
ACKNOWLEDGEMENT

The authors would like to appreciate the efforts of Antonio Isidro Pérez, Antonia Jiménez Arias, Lázaro Isidro Hernández and Rufino Hernández López, Traditional doctors of the community in the course of this research and Apollonius for being an interpreter of the Chontal dialect.

REFERENCES


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