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Article

Ethnobotany of vegetal resources, their use and management in *Bustamante*, *Nuevo León* State

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Abstract:

An ethnobotanical study was conducted in *Bustamante* municipality, *Nuevo León* State, with the aim of knowing the species of plants that are used by the inhabitants of the region, as well as to know what kind of uses they give them. Visits to the municipality were held and a total of 52 people interviewed on the knowledge of plants and their use, which were collected and photographed for their taxonomic identification. Statistical tests of abundance and diversity and a similarity index of species and their use were applied. A total of 95 species in 84 genera and 44 families and 16 different kinds of use were recorded. The best represented genera were *Agave* and *Acacia*, and the Fabaceae family. The species with highest number of uses was *Prosopis glandulosa* first and *Ebanopsis ebano* in second place. The best represented categories were medicinal, food and ornamental. The stem,

trunk and branches are parts of the plant mostly used by the people. The vegetation of the submontane shrubland was represented by the largest number of species of ethnobotanical use in the region. People of *Bustamante* have extensive knowledge on the use of plants and establish their own processes in transferring this knowledge over time.

Key words: Abundance, diversity, Ethnobotany, medicinal, mesquite, use.

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Introduction

In the interdisciplinary study of plant resources, Ethnobotany is a field that investigates the interaction between human beings and their plant environment, in which it is possible to recognize three basic domains: a) cultural perception and classification of organisms, b) the biological and cultural aspects of plant utilization and c) the cultural bases and biological consequences of the management of biological resources by humans over time.

Ethnobotany has often been considered as a non-scientific discipline, due, among other things, to the lack of methodological rigor in an important part of the research being carried out. During the last years a strong trend of change of this situation has been generated. In this way several researchers have been using statistics and quantitative techniques for the description and analysis of ethnobiological data in the different areas of ethnobotany (Alexaides, 1996). These methods have proved to be a very useful tool for understanding the complex interactions between human populations and their environment.

Ethnobotanical research has acquired special relevance in the last three decades due to the growing loss of traditional knowledge of native societies and the

degradation of natural habitats. Throughout this period, some reviews on the nature and scope of ethnobotany have contributed to unify its theoretical field and to emphasize its role in biodiversity conservation and the development of local communities (Alexaides, 2003).

The conservation of native plant genetic resources and their germplasm, represented by floristic richness, which was once only a concern of specialist scientists, is now necessary at the national and global levels. It is mandatory to consider the economic waste due to the changes in poorly planned land uses that result in the loss of thousands of potentially useful species, which may have as yet unknown phytochemical applications, as well as germplasm for crop improvement, new species for food and human medicine and the production of new fibers or industrial materials.

Biological diversity is intimately related to the cultural diversity of a people (Toledo, 2003) and the cultures themselves give this added value to the natural resources and processed products they use to satisfy a very wide range of goods and services such as attention to health, food, clothing, construction, medicine and ritual and religious practices (Kvist *et al*., 1998; Ramihantaniariyo *et al.,* 2003; Arango, 2004; Hernández *et al*., 2005; Hurtado *et al.*, 2006).

Within the arid zones of the north of Mexico, *Nuevo León* State has vegetal communities of scrub type, characteristic of the Chihuahuan Desert (Rzedowski, 1978), where the use of native xerophilous plants by the inhabitants is not exceptional, and the agavaceous species, in particular magueyes, which are regularly exploited to support these rural populations (Alanís, 1981).

The people of the arid and semi-arid zones of the north of *Nuevo León* State have developed their own knowledge about the plants in their environment and use them regularly, whether for food, forage for their livestock, home medicine, condiments, construction or firewood among others. For this reason, the present study aims to know the species with ethnobotanical value, their forms of use, as well as to identify what type of regional vegetation they belong to, all with the purpose of managing

and making sustainable use of ethnobotanical resources in the *Bustamante* municipality, *Nuevo León.*

Therefore, the present study aims to contribute to the knowledge of the flora and its uses in the northwestern region of *Nuevo León*, particularly in the municipality of *Bustamante*, as a means of making it known and trying to preserve the botanical-cultural heritage (Monroy-Ortiz and Monroy, 2004), on the face of the intense land use change from forest or agricultural to urban in Mexico, which will lead to the loss of knowledge about the management and use of the regional flora.

Materials and Methods

Interviews

During 2014, 17 visits were made to *Bustamante* municipality, N.L., where semi-structured interviews were applied to a total of 52 people. The interviews consisted of direct talks with the inhabitants, where they were asked about the wild and cultivated plants of the region of which they had knowledge, as well as the or the uses that they give to each one of them. Field trips were carried out, during which occasional reports were made with the company of community informants. The species mentioned by the inhabitants were collected and the biological material was taken with the interviewees to know their common names; later the plants were identified with specialized botanical keys and recorded in the herbarium of the *Facultad de Ciencias Biológicas de la Universidad Autónoma de Nuevo León (UNAL) (*School of Biological Sciences of the Autonomous University of *Nuevo León*) (UNAL).

In order to estimate the cultural importance of the plants in the study area, the free listing method was applied (Alexiades, 1996; Paredes-Flores *et al*., 2007), which considers the number of times each species is mentioned during the interview. It

was sought to know: 1) the species of plants they use, 2) the type of products they produce, 3) how the product is processed, 4) how it is harvested, whether it is cultivated or wild, 5) the number of plants or parts of plants required and 6) how long the processing takes place.

Determination of use categories

Useful species for various activities were classified according to the ethnobotanical criteria of Alanís (2005). It establishes the following anthropocentric categories: construction, poles for livestock fences, preparation of tillage instruments, furniture and utensils, rural transportation, firewood and coal, fiber products, wax and raw material to manufacture rubber, medicinal, condiment, substitute soap, food, beverage products, fodder, ornamental and others.

Statistical analysis

In the present study regional plants were considered by family, genus, species and common name, as well as their use with which a database was elaborated. With this and the Diverse package (Guevara *et al.,* 2017) from the (R) Studio program (R Studio, 2012), the Monroy Abundance analysis was calculated to determine the percentage distribution of the most significant families; the Shannon-Wiener Diversity Index, which indicates the relative abundance of species in the ecosystem, as well as the Pielou Equity Index, which defines whether species are perfectly equitable in the community.

Through the Mesquite 3.04 computational package (Maddison and Maddison, 2015) was carried out an analysis of the hierarchical method of species and its relation to the use that is given to them in the community (uses), where the unweighted pair method of arithmetic mean (UPGMA) (Sokal and Michener, 1958) and Neighbor

Joining (NJ). Finally, the grouping of *taxa* by uses, their number, similarity and type of each plant were obtained, resulting in a dendogram in which the interaction between the species and their particular uses were shown.

Results

Floristic diversity

A total number of 95 species was recorded, which belong to 84 genera and 44 families. From the latter, six make up 47 % of the total (Figure 1), of which the best represented genera are *Agave* and *Acacia* with three species each. Fabaceae gathered 16 species, and is one of the most abundant taxa around the world, and with great economic importance (Poth, 2011).

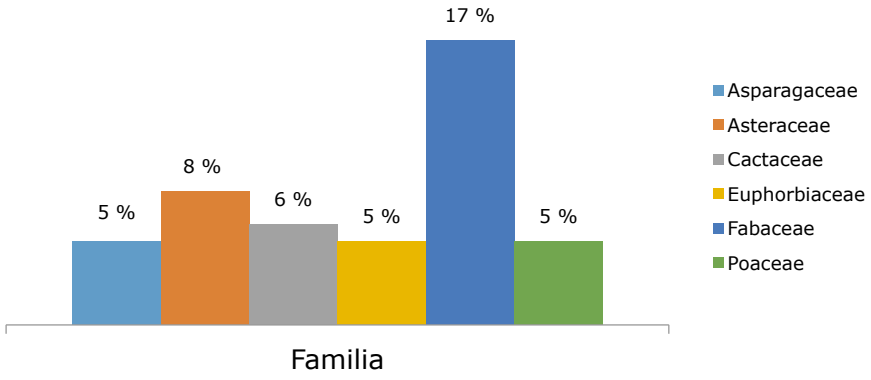
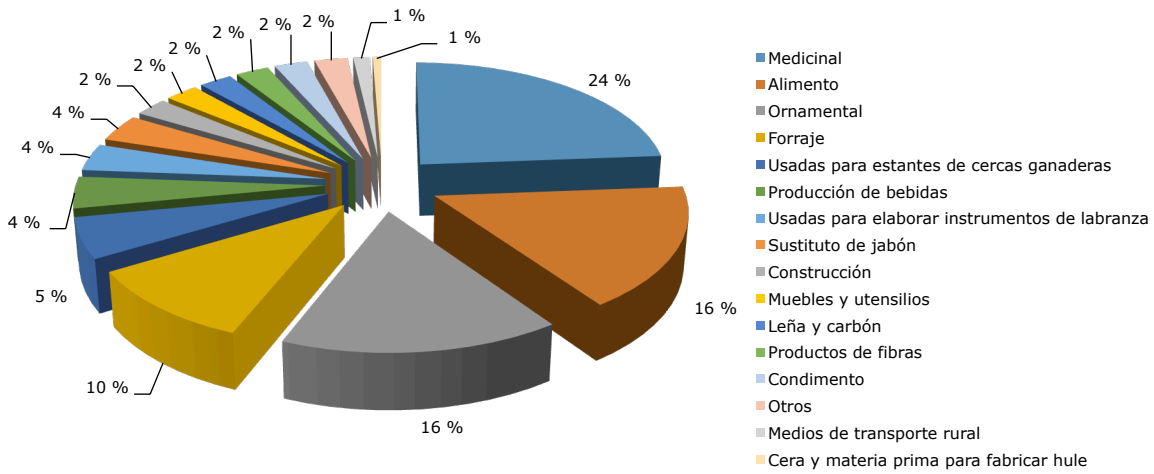


Figure 1. Main families with greatest percentages of species in the region.

Ethnobotanical analysis

As for the use of the species with ethnobotanical value, 16 main uses were registered, among them the medicinal ones (24 %), foodstuffs (16 %), ornamental (16 %) and fodder (10 %). It should be mentioned that, although the percentage of firewood and coal is low (2 %), it is very valuable for the region's inhabitants, even though there are not many species from which this raw material are obtained (Figure 2).



Medicinal = Medicinal; *Alimento* = Food; *Ornamental* = Ornamental; *Forraje* = Fodder; *Usadas para estantes de cercas ganaderas* = Poles for livestock fences; *Producción de bebidas* = Beverage products; *Usadas para elaborar productos de labranza* = Used to produce tillage tools; *Sustituto de jabón* = Soap substitute; *Construcción* = Building; *Muebles y utensilios* = Furniture and utensils; *Leña y carbón* = Firewood and coal; *Productos de fibras* = Fiber products; *Condimento* = Condiment; *Otros* = Others; *Medios de transporte rural* = Rural transportation; *Cera y materia prima para fabricar hule* = Wax and raw material to manufacture rubber.

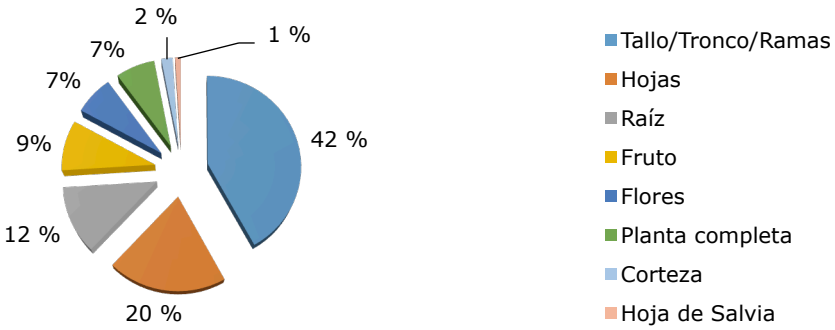
Figure 2. Percentage of use of plants with ethnobotanical importance.

The species with the greatest number of uses are mesquite (*Prosopis glandulosa* Torr.) with eight uses; the ebony (*Pithecellobium ebano* (Berland.) C. H. Müll.) with seven uses; the *chaparro Prieto* (*Acacia amentacea* DC) and *guaiacán* (*Guaiacum angustifolium* Engelm.) with six uses respectively, followed by *anacua (Ehretia anacua* (Terán & Berland.) IM Johnst.) and laurel (*Litsea pringlei* Bartlett) with four each (Table 1).

Table 1. Name, number and use of the main vegetal species used in *Bustamante*, N. L.

Scientific name	Common name	Number of uses	Use
Prosopis glandulosa Torr.	*Mezquite*	8	Building, poles for cattle fences, furniture and utensils, means for rural transportation, firewood and carbon, fodder and as ornamental plant.
Ebenopsis ébano (Bernard.) Barneby & J.W.Grimes	*Ébano*	7	Building, poles for cattle fences, furniture and utensils, means for rural transportation, firewood and carbon, food, fodder and as ornamental plant.
Acacia amentacea DC.	*Chaparro prieto/gavia*	6	Firewood and carbon, medicinal, beverages, fodder and other kinds of use
Guaiacum angustifolium Engelm.	*Guayacán*	6	Poles for cattle fences, medicinal, soap substitute, beverages and as ornamental plant
Ehretia anacua (Terán & Berland.) I. M. Johnst.	*Anacua*	4	Figure tools, food, fodder and ornamental
Litsea pringlei Bartlett	*Laurel*	4	Medicinal, condiment, food and other kinds of use

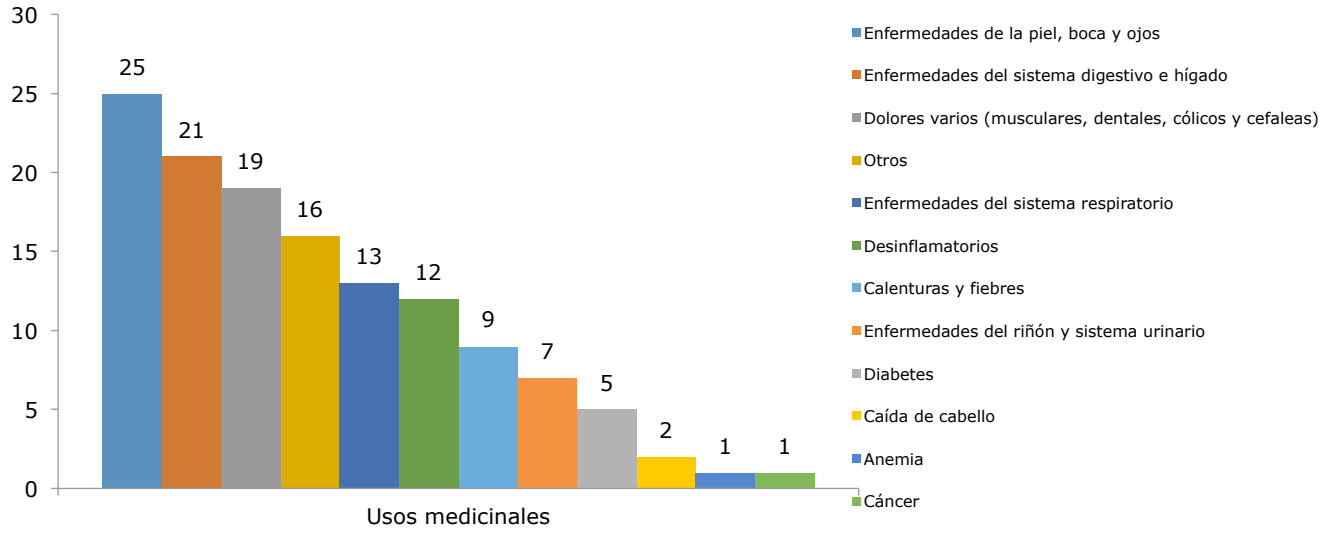
It is essential to the people to know which part of the plant is useful, since sometimes only the leaves, the stem or the fruit are used. The parts of the plants used were quantified and the trunk / stems / branches contributed 42 % to make firewood, charcoal, tillage tools, fences and other important uses for the locality. It is followed by leaves (20 %) which are often used to prepare tea, seasoning and food, mainly. However, root is highly prized for the preparation of medicines and foods, among other products (Figure 3).



Tallo/tronco/ramas = Stem/trunk/branches; *Hojas* = Leaves; *Raíz* = Root; *Fruto* = Fruit; Flores = Flowers; *Planta completa* = Complete plant; *Corteza* = Bark; *Hojas de Salvia* =Salvia´s leaves.

Figure 3. Percentage of parts used.

The medicinal use for the plants of *Bustamante*, Nuevo León, was predominant (24 %). Different uses were found, which were grouped by categories (Figure 4).

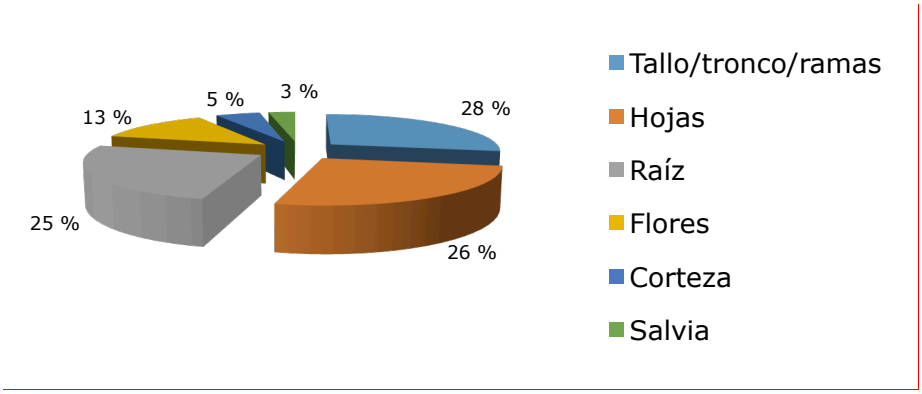


Usos medicinales = Medicinal uses; *Enfermedades de piel, boca y ojos* = Skin, mouth and eyes diseases; *Dolores varios* (*musculares, dentales, cólicos y cefaleas*) = Varios aches (muscular, dental, colic and headaches); *Diabetes* = Diabetes; *Caída de cabello* = Hair loss; *Anemia* = Anemia; *Cáncer* = Cancer

Figure 4. Categories of medicinal uses.

The most constant category (19 %) was skin, mouth and eye diseases, while the least mentioned were anemia and cancer, with 1 % respectively. In the "other uses" category are reported plants with less than 1 % of medicinal activity, including food supplements, buried nails, insect repellent, fractures, hemorrhoids, aphrodisiacs, among others.

With respect to the parts of the plants used for medicinal purposes, the stem/trunk/ branches was the most used with 28 % of the total plants, followed by the leaves with 26 %, the root with 25 % and the rest with less than 15 % of plants out of 61 uses (Figure 5).



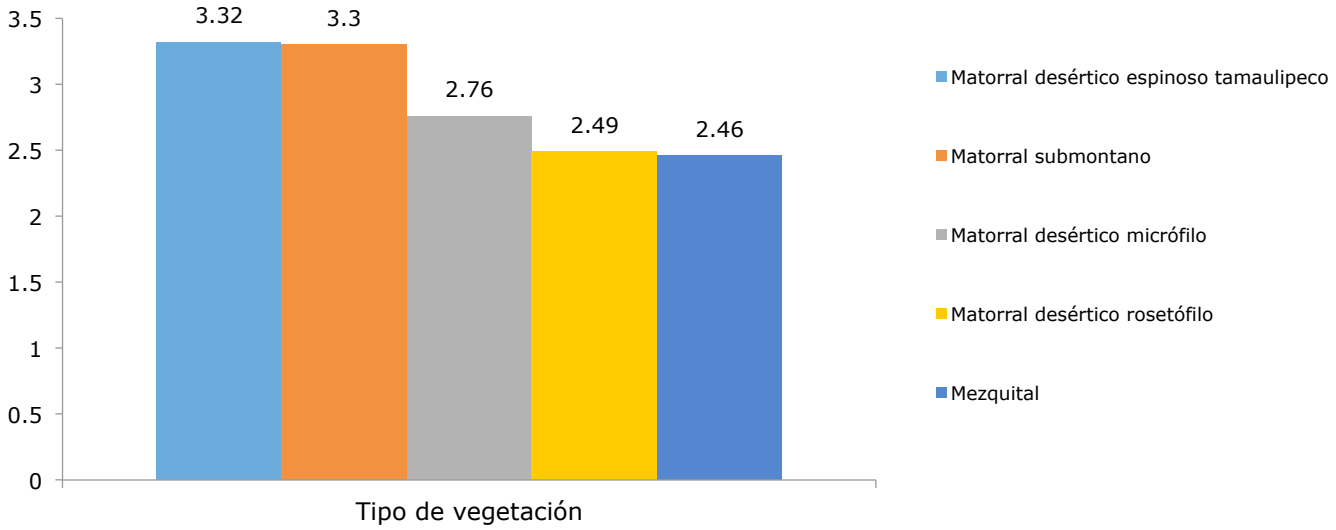
Tallo/tronco/ramas = Stem/trunk/branches; *Hojas* = Leaves; *Raíz* = Root; *Flores* = Flowers; *Corteza* = Bark; *Salvia* = Salvia.

Figure 5. Percent of plant parts used for medical endings.

Biodiversity indexes on the value of use of the plants of the region

The analysis of percentage distribution by families, according to the abundance index of Monroy, showed that the family best represented was Fabaceae with 17.89 % of the total species of this study, followed by Asteraceae with 8.42 %, Cactaceae with 6.32 %, and finally by Asparagaceae, Euphorbiaceae and Poaceae with 5.26 % each, while the rest of the families are composed of less than five species each.

The Shannon-Wiener Diversity Index revealed a diversity of 3.38 by the total number of individuals. The results of the specific analysis by type of vegetation are shown in Figure 6.

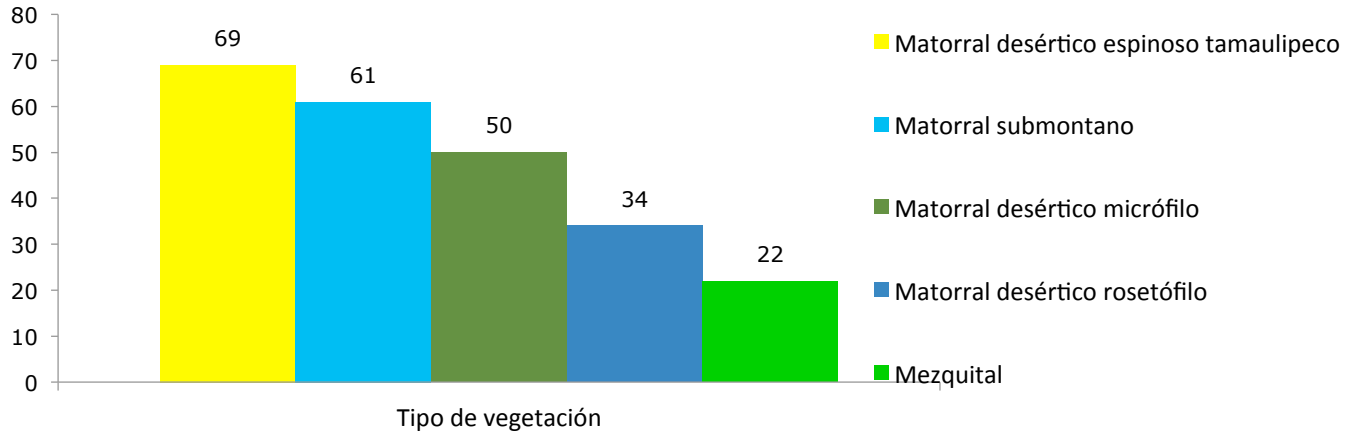


Tipos de vegetación = Types of vegetation; *Matorral submontano* = Submontane scrub; *Matorral desértico micrófilo* = Microphyllous desert scrubland; Matorral desértico rosetófilo = Rosetophile desert scrub; *Mezquital* = Mezquital.

Figure 6. Shannon-Wiener diversity index.

Based on data from the Shannon-Wiener diversity index, we calculated the Pielou Equity Index, which indicates an abundance of species of 0.73 for the total, while for the submontane scrub was 0.80 and in the microphyllous desert scrubland of 0.70 (Table 2).

It should be noted that some species are present in several types of vegetation, depending on the specific compatibility between them. (Figure 7). The specific difference between the submontane scrubland and the *Tamaulipas* thorny desert scrubland is minimal, as is their wealth by families; However, this is not the case for the microphyllous desert scrubland, which, although it contains a large number of species (50), the family size is smaller (22) than the proportionality between the two types of vegetation mentioned above (Table 2).



Tipos de vegetación = Types of vegetation; Matorral desértico espinoso tamaulipeco = Tamaulipan thorny desert scrub; *Matorral submontano* = Submontane scrub; *Matorral desértico micrófilo* = Microphyllous desert scrubland; Matorral desértico rosetófilo = Rosetophile desert scrub; *Mezquital* = Mezquital.

Figure 7. Species richness by types of vegetation.

Five main types of vegetation are found in *Bustamante* municipality: microphilic desert scrub, rosetophile desert scrub, submontane scrub, Tamaulipan thorny desert scrub and *mezquital.*

Table 2. Analysis of the diversity of the five types of vegetation in *Bustamante*, *Nuevo León*, as well as the richness of species and families.

Vegetation	Shannon-Weiner	Pielou	Species richness	Family richness
Microphyllous desert scrub	2.76	0.70	50	22
Rosetophile desert scrub	2.49	0.78	34	15
Submontane scrub	3.32	0.81	61	39
Tamaulipan thorny desert scrub	3.30	0.78	69	3
Mezquital	2.46	0.80	22	13

From the main uses and the species used for various purposes, a matrix of characters was elaborated, with which a UPGMA (Unweighed Pair Group Method with Arithmetic Mean or Method of arithmetic means with paired groups without weight) dendogram was made which uses a hierarchical clustering method, in which no specific weight is given to each character; thus, the algorithms of the Mesquite program worked only with the similarities of the matrix, and converted them into distances (Figure 8).

Three main major groups are identified: medicinal (8-11), forage (7), food (6) and other small groups consisting of plants with varied uses. In forages a reduced clade, in comparison to the previous one, can be observed where three small groups are included: the exclusively fodder ones, those that have uses like soap substitute and finally the producers of fibers and fodder, stands out between these clades the grouping of those used as soap substitute and fodder, and completely isolates those plants producing fibers and fodder, but finally the analysis groups these clades by fodder.

The group of medicinal plants is separated into four clades, which include purely medicinal, medicinal and beverage production, condiments and medicinal-ornamental. It should be noted that the clade of ornamental plants responds that a considerable number of them also have curative properties, so the grouping method UPGMA conglomerates these species in this group, with the clade brother of medicinal ornamental.


Dendograma (UPGMA) de usos
Prosopis glandulosa
Guaiacum angustifolium
Acacia amentacea
Litsea glaucescens
Ehretia anacua
Yucca filifera
Capsicum annuum var. Aviculare
Ebenopsis ebano
Brahea dulcis
Quercus polymorpha
Pithecellobium pallens
Acacia farnesiana
Cordia boissieri
Helietta parviflora
Condalia hookeri
Agave americana
Dasylirion texanum
Bumelia lanuginosa
Havardia pallens
Diospyros palmeri
Opuntia ssp.
Echinocereus enneacanthus
Leucaena leucocephala
Turnera diffusa
Selenicereus spinulosus
Physalis philadelphica
Mimosa malacophylla
Melothria pendula
Matelea gonoloboides
Mammillaria heyderi
Erythrina herbacea
Amaranthus palmeri
Celtis pallida
Euphorbia antisyphilitica
Agave lechuguilla
Yucca carnerosana
Ziziphus obtusifolia
Typha dominguensis
Sapindus saponaria
Agave bracteosa
Curcubita foetidissima
Evsenhardtia texana
Sporobolus pyramidatus
Setaria macrostachya
Hilaria mutica
Evsehardita polystachya
Bouteloua trifida
Acacia berlandieri
Bouteloua aristidoides
Tagetes lucida
Fouquieria splendens
Rhus virens
Machaeranthera pinnatifida
Leucophyllum frutescens
Karwinskia humboldtiana
Artemisia ludoviciana
Chrysactinia mexicana
Tecoma stans
Sophora secundiflora
Quercus fusiformis
Portulaca grandiflora
Platanus occidentalis
Parthenocissus quinquefolia
Parkinsonia aculeata
Myrospermum sousanum
Lantana camara
Chilopsis linearis
Caesalpinia mexicana
Celtis laevigata
Lippia graveolens
Litsea novoleontis
Poliomintha bustamanta
Lophophora williamsii
Clematis drummondii
Euphorbia colondrina
Larrea tridentata
Urtica chamaedryoides
Tiquilia canescens
Smilax bona-nox
Sedum praealtum
Salix nigra
Phoradendron villosum
Parthenium incanum
Parthenium hysterophorus
Oenothera rosea
Jatropha dioica
Indigofera suffruticosa
Heliotropium angiospermum
Hedeoma drummondii
Gnaphalium canescens
Flourensia cernua
Echinocereus poselgeri
Croton torreyanus
Acalypha monostachya
Allionia choisyi
1
2
3
4
5
6
7
8
9
10
11
Multiusos
Alimento/alimento/varios usos
Alimento/ornamental/varios usos
Construcción
Muebles/estantes
Producción de bebidas
Alimento/labranza
Alimento/forraje
Alimento
Producción de fibras/forraje
Sustituto de jabón
Forraje
Medicinal/ornamental
Ornamental
Condimentos
Medicinal/producción de bebidas
Medicinal

Dendograma (UPGMA) = UPGMA Dendogram; Multiuso = Multiuse; Alimento/alimento/varios usos = Food/food/varied uses; Alimento/ornamental/varios usos = Food/ornamental/varied uses; Construcción = Building; Muebles/estantes =Furniture/shelves; Producción de bebidas = Beverage production; Alimento/labranza = Food/tillage; Alimento/forraje = Food/fodder; Alimento = Food; Producción de fibras/forraje = Fiber production/fodder; Sustituto de jabón =Soap substitute; Forraje =Fodder; Medicinal/ornamental = Medicinal/ornamental; Ornamental = Ornamental; Condimentos = Condiment; Medicinal/producción de bebidas = Medicinal/ beverages; Medicinal = Medicinal.

Figure 8. Dendogram of species similarity by form of use.

Food plants are combined in a large main clade and small ones, where it can be clearly seen that the larger group contains plants that are only used as food, followed by a reduced group of three species that are used as food and for livestock (food-forage), as well as a small group of two species that, apart from being used as food, can also be made tillage instruments. Part of this clade is a smaller group of beverage production, which is associated with food resources for human consumption.

Finally, six other groups can be noticed whose main characteristic is that they have more uses than the others (of 4 to 8 uses by species); These species are known as "multipurpose species" or "multiuse species" because they can be used for a wide variety of activities. They are important for the people of the region because in their use are involved various structures such as fruits, stems, branches, leaves and even the root.

Discussion

The present study deals with ethnobotanical aspects for the state of *Nuevo León*, Mexico, in which the inhabitants of *Bustamante* are informed about the traditional uses of wild and cultivated plants; a total of 95 species were recorded, belonging to 84 genera and 44 families and 16 different uses. There are recorded native species already used by the ancient ethnic groups of the north of *Nuevo León* as *Chichimecas* and *Catujanos*, before the Spanish Conquest and the *Tlaxcaltecas* after it (Alanís and Foroughbakhch, 2008), a fact that demonstrates how far-reaching has been the transmission of empirical ethnobotanical knowledge from generation to generation in this culture.

The species found and the uses of the plants coincide with species assigned to the municipality (González-Stuart, 2010; Bustamante, 2013), and with those corresponding to the south-central state (Estrada *et al.,* 2012). In a similar study in the *Cumbres de Monterrey* National Park (PNCM), Estrada *et al.* (2007) recorded a greater diversity given the size of the area, but highlighted similar results in terms of the presence of species and type of uses given to plants.

The family with the largest number of species, Fabaceae, is due to its great abundance worldwide, of great economic impact (Poth, 2011). The second and third places correspond to the Asteraceae and the Cactaceae, also mentioned previously in studies of useful flora of *Nuevo León* by Estrada *et al.* (2012), and by other authors (González *et al*., 2010, Gheno-Heredia *et al.,* 2011), with respect to which subtle differences are recognized with the PNCM (Estrada *et al.,* 2007), where it reports to Asteraceae as the family with the greatest number of genera and Cactaceae as the most diverse family.

In this context, in *Tamaulipas*, Asteraceae is recorded as the second largest family (Hernández *et al*., 1991), considering that Fabaceae would gather more than 40 vegetal elements now belonging to the families Mimosaceae and Caesalpiniaceae. The species with a greater diversity of uses were *Prosopis*

glandulosa with eight uses followed by *Ebenopsis ebano*, this is attributed on the one hand that they are widely used in the construction in addition to species denominated multipurpose. Other important species of this type are *Acacia amentacea, Guaiacum angustifolium, Ehretia anacua* and *Litsea pringlei*, some of them recognized in this category by Alanís (2005) and Estrada *et al*. (2007).

From the 16 categories of plant use, "medicinal" is the one with the highest percentage of species (24), followed by food and ornamental (16), a similar result pointed out by other authors (Navarro y Avendaño, 2002; Monroy-Ortiz y Monroy, 2004; Estrada *et al*., 2007; González *et al*., 2010), which confirms that the use of plants is mainly aimed at satisfying basic needs such as health and food (Navarro and Avendaño, 2002), especially in health, when the expenses of the allopathic medical service become almost impossible to cover by the most humble sectors of the population.

It is important to mention that although the use of firewood and charcoal is represented with a low percentage (2 %) this resource is widely used by the people of the region. The present study found an affinity of medicinal species reported for Northeastern Mexico (González, 1988) and species recorded in the north and south of the state of Nuevo León (Alanís, 2005; Estrada *et al*., 2012; Bustamante, 2013); as well as the plants sold in Monterrey markets (González-Stuart, 2010).

The second category "food" with 16 % of species used (98), are the fruit and vegetable species its protagonists; "ornamental" is the third most diverse category (16 %), and although flowering plants are considered to be preferred by people, foliage species are the favorite species of the region, mainly trees and shrubs, which means that in addition to beautifying spaces and gardens, they fulfill the function of providing shade, especially during the summer when the sun's rays are more intense. With a different order, but between the second and third place is placed by Bustamante (2013) for these same categories.

The rest of the categories present a small percentage of species, within which the "fodder" is the fourth category (10 %), followed by species "used for fence posts" (5

%), "fiber production" (4 %), "beverage production" (4 %), "fuelwood and coal" (2).

On the other hand, the most used parts of the plant were stems, trunks and branches (41 %), where it can be seen that they are used to make firewood, coal, tillage tools, fences and other important uses for the community. Then the leaves (20 %) are used in tea, seasonings and various foods relevant in the region, and the root which is used as a curative and culinary resource.

Based on the different statistical analyzes to estimate the distribution, abundance and dominance of the plants of ethnobotanical use of the municipality Bustamante, NL, it turned out that the type of vegetation with greater abundance is the submontane scrub and the one of greater dominance and richness of species is the Tamaulipan thorny desert scrubland. It is possible to mention that between these two types of vegetation the transition zone or ecotone is present which is reflected in the number of species in both types.

Although the *mezquital* covers a greater surface in the municipality *Bustamante*, the diversity of species is smaller. With less number of species used is the microphyllous desert scrubland this perhaps because there are smaller community of people living in these areas and, therefore, less resources are used.

In order to identify and graph the similarity or distance between species and their uses, using the previous cladogram, based on the hierarchical cluster method, it was possible to highlight the important relationships of the species used in the region.

Conclusions

The 95 species in record are included in 44 botanical families; the most diverse family is Fabaceae, by number of genera and species, followed by Asteraceae and Cactaceae.

The species with the greatest number of uses is *mesquite* (*Prosopis glandulosa*), but

it can be recognized that in the region the multipurpose factor of the native species makes the most significant contribution of goods and services to the inhabitants through the various uses.

The category of use best represented is medicinal and food, and the dermatological and digestive system illnesses are the most commonly treated by the people of the region, which reaffirms once again the interest of man to cover their basic needs, health and food.

The type of vegetation with greatest abundance is the submontane scrub and with greater dominance and richness of species the Tamaulipan thorny desert scrub.

For all of the above, it can be established that the inhabitants of Bustamante have a wide knowledge on the use of plants and define their own processes in the transfer of this knowledge over time, so it is important to continue research and ethnobotanical documentation mainly in the vegetation areas of submontane scrubland as it houses the largest number of species in the region. This type of studies can serve as a basis for the development and implementation of future management and conservation programs, according to the local forest aptitudes and its history of use and exploitation of natural resources.

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Conflict of interests

The authors declare no conflict of interests

Contribution by author

Álvaro Ríos Reyes: field work, taxonomic identification of the studied species and writing of the manuscript; Glafiro Alanís Flores: field work, taxonomic identification and writing of the manuscript; Susana Favela Lara: field work, taxonomic identification and writing of the manuscript.