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Methodological guide for ethnobotanical study of forest species in Amazonian and related communities

Guía metodológica para estudio etnobotánico de especies forestales en comunidades amazónicas y afines

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ABSTRACT

The ethnobotanical study is carried out due to the accelerated loss of traditional knowledge, forest degradation and natural habitats in Amazonian communities. This work proposes a methodological guide that facilitates accessibility for obtaining information in the ethnobotanical study of superior lignified and ruderal species for medicinal purposes and other uses. A survey was made that proposes the technique Interlocutor - Medium - Interlocutor for the dialogue, with a scientific character and the handling of the survey in three stages: application, validation and

generalization, obtaining the ethnobotanical information that the Amazonian communities treasure in agreement with their ethnicity of origin. The results demonstrated the effectiveness in the application of the survey through the relationship established between the researcher and community leaders, ancestral healers, farmers, housewives, people of different ages and other members with interest in the subject, facilitating accessibility for the location and identification of superior lignified and ruderal species for medicinal purposes and other uses.

Keywords: Communities; survey; participatory ethnobotany; methodological guide; medicinal plants.

RESUMEN

El estudio etnobotánico se realiza debido a la pérdida acelerada del conocimiento tradicional, degradación de los bosques y hábitats naturales en las comunidades amazónicas. Este trabajo propone una guía metodológica que facilite la

accesibilidad para la obtención de información en el estudio etnobotánico de especies superiores lignificadas y ruderales con fines medicinales y otros usos. Se confeccionó una encuesta que propone la técnica Interlocutor-Medio-Interlocutor para el diálogo, con un carácter científico y el manejo de la encuesta en tres etapas: aplicación, validación y generalización,

obteniéndose la información etnobotánica que atesoran las comunidades amazónicas en concordancia con su etnia de origen. Los resultados demostraron la efectividad en la aplicación de la encuesta a través de la relación que se establece entre el investigador y los líderes comunitarios, sanadores

ancestrales, agricultores, amas de casas, personas de diferentes edades y otros miembros con interés en la temática, facilitando la accesibilidad para la ubicación e identificación de especies superiores lignificadas y ruderales con fines medicinales y otros usos.

Palabras clave: Comunidades; encuesta; etnobotánica participativa; guía metodológica; plantas medicinales.

INTRODUCTION

In tropical forests there are important genetic resources of flora and fauna that are threatened as a result of increasing deforestation and loss of genetic resources, including non-timber forest products (NTFPs), which motivates awareness of the need to increase the value of forest resources to compete with other land uses.

The scientific society shows a growing concern for medicinal plants and the conservation of natural resources. Its culminating expression has been found in the Declaration of Chiang Mai, (1988), which serves as a starting point for implementing joint actions in the preservation of the ecosystem and its relationship with the environment, cited by Rodriguez (2014).

Research on the use of medicinal plants today, from an ambiocentric conception, is closely related to Ethnobotany, which defines the interrelationships between human groups, biodiversity, conservation guidelines of these species, in addition to phytochemical studies Rodriguez, (2014), nourished by various disciplines such as: botany, anthropology, chemistry, medicine, pharmacology, toxicology, agronomy, ecology, evolution, sociology, linguistics, history and archaeology and allows a wide range of approaches and applications. Gispert, Godoy and Lubowski, (2008) also mention the

intervention of the environment with its biomass, flora and cultural, ideological, political and economic phenomena.

Giulietti, (2005) points out that the most important aspect of this science is the recovery and study of the knowledge that humanity in general has had and still has about the properties of plants and their use in all areas of life. In this sense, ethnobotanical studies are essential because of: the accelerated loss of traditional knowledge; the degradation of forests and other natural habitats; the value of plants as a basis for the manufacture of nutritional supplements and/or medicines, of which only the pharmacological properties have been evaluated in less than 10 % of angiosperms; the insufficient information on the abundance and distribution of useful plants in the tropics and the scarce information on the impact of the extraction of useful plants on their natural populations.

In ethnobotanical research, oral sources are essential. The testimonies of people who share collective ethnobotanical knowledge are collected through audiovisual records, notebooks and other instruments Fajardo et al. These people are called informants and the methodology for obtaining data is interviews and surveys, which can be open or structured, individual or collective, etc.

Obregón, (2012) refers that the ethnobotanical study in communities is the first step in the therapeutic application of products of plant origin for the prevention and treatment of diseases. This is based on traditional, botanical and chemical knowledge and on clinical research of products obtained from medicinal plants and coincides with Cañigueral, (2000), who states that phytotherapy has a promising future due to the increase in the current demand of the world population as a non-aggressive treatment, as well as due to its aging and a consequent increase in the incidence of diseases.

Preserving traditional knowledge in the use of medicinal plants and the conservation of phytochemical resources of forest species for medicinal purposes in Amazonian ecosystems is a priority at present, which for Ecuador represents a policy

implicit in the National Development Plan "Toda una Vida" (2017), which it proposes:

"to promote the generation of bio-knowledge as an alternative to primary production for export, as well as the development of a system of biosecurity that protects the environmental conditions that could affect people and other living beings by promoting the rescue, recognition and protection of tangible and intangible cultural heritage, ancestral knowledge, world views and cultural dynamics".

The objective of this investigation is to propose a methodological guide that facilitates the accessibility for the obtaining of information in Amazonian communities and similar zones for the ethnobotanical study of superior lignified and ruderal species with medicinal aims and other uses.

MATERIALS AND METHODS

Selection of the research area

A description of the research area will be done in terms of the location of the community or zone, general data of the same in geographical limits, as well as the surface of the core area, buffer zone, relief and climatic conditions.

Tours of the study area will be conducted to learn about the territory, ecological, social and economic conditions; as well as the selection of population settlements, communities and areas of interest for the application of the survey, according to Rodríguez, (2014).

The case study was carried out in four communities of the Pastaza province: two (1 and 4), community "San Jacinto" and "El Placer" in the Tarqui Parish and the others in the Canelo Parish, communities Canelo and Bobonaza.

Survey reliability

It consists of three stages: application, generalization and validation. The first two is executed in different phases.

The application of the survey will be carried out by obtaining the information on the basis of the Theoretical Model of Communication for Development. Several visits to the communities will be taken into account with the objective of establishing affective relationships between the main community leaders, inhabitants, scientists and research support personnel, in order to provide that the information is obtained as truthfully as possible through a climate of trust and security on the part of the ethnic groups.

The surveys will be carried out in three phases, to determine knowledge of the

number of plants and uses, according to Rodríguez, (2014).

In the first phase, the community is selected and part I of the survey is applied to 20 to 35 people to determine its reliability, collecting the following information: name, gender, age, time of residence of the person in the region, degree of schooling and species used.

In the second phase, the same people are surveyed to determine the number

of species and their level of agreement in terms of knowledge in relation to the first phase. The third phase determines the reliability of the first part of the survey in order to know the level of coincidence in relation to the number of plants and uses through the "split-halves" method known as "Mitades partidas" Hernández, (2004), making two visits to the same person and applying the survey at that time (Figure 1).



Fig 1. - Format to verify the reliability of the survey in Amazonian communities

The generalization stage consists of applying the entire survey in two moments (see annex), in addition to a structured interview (phase III), which proposes the Interlocutor-Media-Interlocutor technique and considers the construction of messages and information through dialogue that allows the specialized interlocutor to consult the scientific content and with the target interlocutor the codes and

verbal forms, as well as the content, order and level, as well as the most appropriate moment to share the message. Between 13 and 15 visits can be carried out to the area for a period of five days per week. During the visits to the communities, information will be obtained taking into account: experience, culture related to the object of study and traditional practices, so it should be massive and evaluative on the use and employment of forest species of medicinal interest,

as well as ethnobotanical, demographic, ecological and plant formation data, through the use of open interviews and surveys.

In the validation stage, which is carried out in two stages (application and generalization), it is proposed to use the SPSS statistical package version 16.0. For the tabulation and

generalization of the data obtained from the survey, the Cronbach alpha method is recommended for reliability, for the comparison of the different elements of the ethnobotanical study the '2' test for a significance level of 5% and the Spearman correlation to establish the possible relationships between the variables of knowledge Sampieri, Fernández and Baptista, (2006).

RESULTS AND DISCUSSION

Stage 1: survey application

Actions for the development and implementation of the ethnobotanical survey for collection on the uses of medicinal plants

At the beginning of the work, the researcher must use an instrument (survey) of such magnitude that its design allows to obtain, from the particular characteristics of the area of study, the greatest and most precise information on the basis of a Theoretical Model of Communication for Development, which proposes the interrelationship between the Interlocutor-Media-Interlocutor (I-M-I). Reaffirming what was raised by Tintaya, (2003), quoted by Aguirre and Perez, (2012), the interculturality is, precisely, a movement of localization, of dialogue and relation, which allows to strengthen the local, based on the integration of experiences generated in the cultural encounters, traditions and medicinal uses of plants with different purposes:

1. Assist with internationally established Green and other survey designs, (2012), and adapt them to the specific objectives pursued in the research.
2. Design of the survey considering the knowledge of the members of the communities about the objective pursued by the researcher; it can include general and specific aspects, which guarantees that the data are the

most comprehensive of the plants of medicinal interest.

Time of application of the instrument (survey) in ethnobotanical studies for medicinal species and other purposes.

The survey in the application stage is carried out in three moments:

1. It is carried out with a minimum of 20 to 35 people depending on the size of the area under study, selecting those with the greatest knowledge in relation to the use of plants, taking into account the number of species they know and their use. The selection of people collects the following information: name, genus, age, time of residence in the region, degree of schooling and species used for medicinal or other purposes. People who are community leaders are interviewed to adapt the information to the social reality.
2. The survey already applied to the people chosen previously includes determining: number of species and level of coincidence of these in terms of knowledge (See Annex).
3. The surveys are validated using statistical methods based on the reliability of the instrument in the selected communities or related areas.

Stage 2: Generalization of the survey (aimed at the results to be obtained).

First moment

The survey to be used must be clear, it must use codes and the language of the participants must translate the contents and academic explanations so that they are understandable to the interlocutor.

The survey should be practical and comprehensive, the interlocutor should be the family and a participatory nature is suggested. The application of the survey should take into account the housing stock of the communities, at least one person per family nucleus or a sample of between 10 and 20% of

the total population, according to Rodríguez (2014).

To illustrate this stage of generalization of the survey, a case study is presented in which four communities were worked on with the two possible variants: taking into account the housing stock (communities Bobonaza and Canelo, Parish of Canelo, province Pastaza, Ecuador) or the total number of inhabitants (at least 20% of the population), in the community San Jacinto and El Placer, Parish of Tarqui in the same province and country.

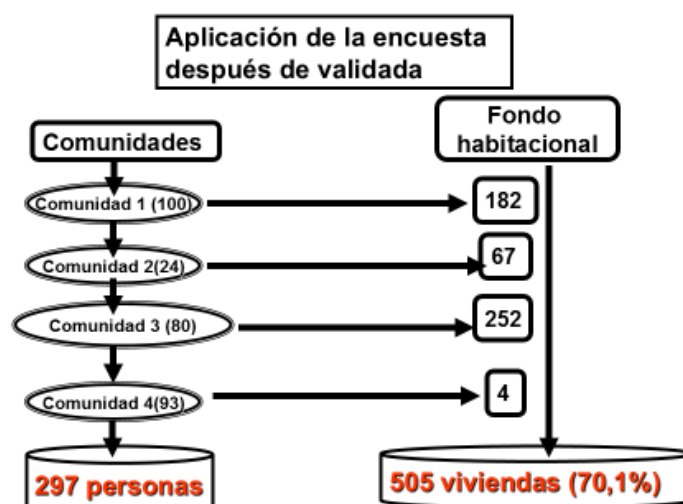


Fig 2.- Generalization of the survey for ethnobotanical studies

The results shown in figure #2 showed that, taking into account the housing fund for four Amazon communities in Pastaza province, Ecuador, 70.1 % of the houses were taken into account, at least one person per family nucleus. The number of inhabitants was in the range of 10-15 % of the total population for each community. (See figure 2)

Second moment

Once the survey has been designed and validated, it is discussed with the

staff of the group that supports the work of the communities (facilitators) and they are trained together with the main researcher in the generalization of the survey to a sample size "n" that will take into account at least 20 % of the housing stock or the number of inhabitants in the community for:

1. Obtain community member information from a predetermined sample size.
2. Apply the survey with the help of trained personnel adjusted to the Interlocutor-Media-Interlocutor (I-M-I) method.
3. Complete information on forest

ecosystems, in addition to species that are cultivated in small spaces or wild (ruderal) and that are of interest to the researcher (part II, survey), (See Annex 1).

4. Interview and obtain information from people who know the area of study (people from the communities, housewives, peasants, inhabitants, park rangers, foresters, forest engineers, agronomists, workers in the forest and/or agricultural sector), to locate and identify the species referred to with medicinal interest by the inhabitants of the communities, (part III, survey), (See annex).

Taking into account that the Ecuadorian Amazon communities are composed of people with low economic resources and geographically very isolated, in many occasions the fundamental basis for the treatment of diseases from the use of medicinal plants and other purposes is enriched with the ease of exchange of these different knowledge through rituals, Ethnic exchanges between communities, ethnicities and families, coinciding with what Tintaya and Soria, (2010) have proposed, referring to the fact that the intercultural subject is governed and developed in a historically specific and socially structured reality, takes place in a world where societies are increasingly interconnected through cultural contacts, intercultural processes and the environment.

Structured interviews are carried out with people recognized as direct users (forest rangers, doctors, shamans and others), to determine the species most frequently used, the place where they are obtained, part or parts of the plants used, associations of plants for the preparation of infusions or decoctions, other uses, form of preparation, dosage and routes of administration. In addition, the main medicinal species used for different ailments or other purposes are considered (parts III, IV and V of the survey), (See annex).

At the conclusion of these first two generalization phases, the most used species and those with priority use are selected, according to quantitative criteria (average use value and frequency of mention of the reported species) and qualitative criteria (local knowledge and potential use), identifying the people who accept to analyze and discuss the use of medicinal, forest and ruderal plants with other uses, supporting the researcher in the selection of species in the area. Those who report relevant information are given further visits to learn more about the use of certain species, local history, myths, legends and stories of interest.

Step 3: Data validation

Non-parametric statistical methods are used to validate the survey data.

- At least one person per household will be subject to the same validation methodology in the first and second phase, taking into account the community's housing stock, or at least 20 % of the population, given that communities are composed of different ethnic groups and led by a leader. Therefore, it should be taken into account what was suggested by Cáliz, (2010), who in a study of communities in Honduras obtained that, for the most part, community leaders provide more information, but the methodological proposals only state globally the actions to be carried out, and in the field process it is necessary to establish in detail the main activities of the process according to the economic, social and environmental conditions.

Identify and recognize species through comparison with species described in herbaria and taxonomy specialists, using live samples, photos or comparisons of plants collected for identification with herbaria in the Amazon region or at the country level. Subsequently, the database will be created through the systematization of

the surveys, taxonomic classification of the species, description of morphological aspects and distribution

of the plants inside and outside the country (Figure 3).

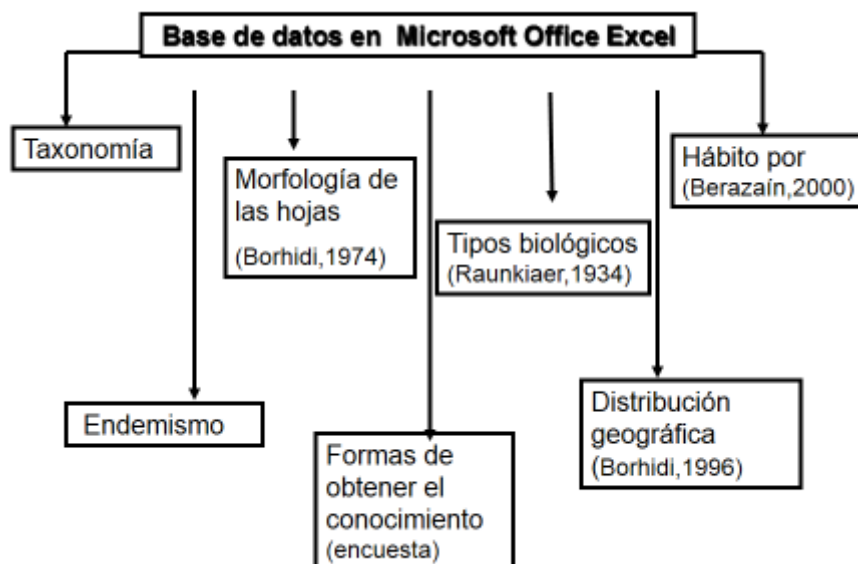


Fig 3.- Aspects to take into account for the construction of the database in the ethnobotanical study

ANNEX 1

Survey to be applied in the communities or areas for ethnobotanical studies on medicinal plants and other uses

Part I

Population survey (for each person referring a plant)

Survey # _____ Date: _____

Name: _____

_____ Code _____ # _____

Schooling: _____

_____ Sex _____ Age _____

Time of residence in the region _____

1. Plants used for medicinal purposes _____

2. Plant size: _____ Tree _____ Grass _____

Shrub _____

3. Leaf shape: _____ Heart-shaped _____

Round _____ Oval _____ Scalloped _____

4. By its edges: _____ Serrated _____ Smooth _____

5. Presence of hair: Yes _____ No _____

6. Ways to obtain knowledge of the use of medicinal plants:

Shamans _____ Empirical _____ Naturalist pharmacy _____

Tradition _____ Autodidactic _____

7. Person who prescribes the plant for medicinal purposes:

Home _____ Midwives _____ Naturalist _____

Hospital _____ No one _____ Shirts _____

8. Part of the plant used as a medicinal product:

Leaf _____ Flower _____ Bark _____ Seed _____

Fruit _____ Stem _____ Root _____ Whole plant _____

9. Types of area, region, locality:

Amazon _____ Community _____

Highlands _____

Coast _____ Forests _____ Farms _____

10. Types of diseases that can be cured with the use of the referred plant:

11. Main uses:

Medicinal ___ Cosmetic ___ Human food ___ Condiment

Artisan ___ Ornamental ___ Animal food ___ Ritual

12. The way they use them:

Cream ___ Local (filling) ___

Decoction (cooking)

Infusion ___ Ingestion by ___

Maceration

Other ___ Chewing ___ Syrup

13. Dosage or quantity of the plant to be used and frequency of daily use:

14. Location of the medicinal plant:

15. Association with other plants in their preparation for disease treatment:

Part II

Forest Ecosystem for each species:

1. Type of Ecosystem:

2. Species:

Scientific name: _____

3.

Family _____

Gender: _____

4. Porter: Use and destination:

5. Abundance:

_____.

6. Characterization of the plant formation or the understory:

Part III

- Interviews with forest rangers or pilots in the area.

- Location of species and identification by analogy with biological samples and photographs of species in the Amazon Herbarium of the area or at the country level, using specialists in taxonomy.

Part IV

Interview with the community doctor or shamans

1. Do you prescribe medicinal plants for the cure of diseases?

Yes _____ No _____

2. Do you prescribe the use of home-prepared green medicine?

Yes _____ No _____

3. Do you prescribe only the green medicine that is produced in naturist centers?

Yes _____ No _____

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