Article **Journal-Urban-Rural and Regional Economy**
June, 2021 Vol.5 No.8 7-13

Use and management of cacti in the Serranía del Iñao National Park and Integrated Management Natural Area (PN-ANMI)

Uso y manejo de las cactaceas del parque nacional y área natural de manejo integrado Serranía del Iñao (PN-ANMI)

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DOI: 10.35429/JURRE.2021.8.5.7.13 Received March 01, 2021; Accepted June 30, 2021

Abstract

The study was conducted to document and evaluate the use of cacti in communities of PN-ANMI Serranía del Iñao, through interviews and field trips with local informants. We identified the scientific name, common name, synonyms of the species, taxonomic description, use, and some processing practices. We documented a total of 12 cactus species belonging to 11 genera grouped in eight categories of use: construction, veterinary, food, fodder, firewood, crafts, miscellaneous, medicinal, most of these species are miscellaneous and food use. According to the gender (sex), men are the greater use to give these species (21 reports) than women that is due to direct contact with the field and some farm practices. Finally, we analyze the reduction of natural populations and management that gives these species.

Tor catalog, Cactaceae, interview, Processing, Species

Resumen

Bolivia es considerado uno de los países con mayor riqueza de familias de cactáceas, por lo que se realizó el estudio para catalogar y evaluar el uso de cactáceas en comunidades del PN-ANMI Serranía del Iñao. A través de entrevistas y recorridos de campo con informantes locales donde se registraron: nombre científico, nombre común, sinónimos de las especies, descripción taxonómica y algunas prácticas de procesamiento, se documentó un total de 12 especies de cactáceas, pertenecientes a 11 géneros agrupados en ocho categorías de uso: construcción, veterinaria, alimenticia, forrajera, leña, artesanal, miscelánea, medicinal; la mayoría de estas especies tienen uso misceláneo y alimenticio. Según el género (sexo), los hombres son los que más utilizan estas especies (21 reportes) que las mujeres, esto se debe al contacto directo con el campo y a algunas prácticas no agrícolas. Finalmente, se analizó la reducción de sus poblaciones naturales y el manejo que se le da a estas especies.

Catálogo, Cactus, Entrevista, Tratamiento, Especies

Citation: HUAYLLA, Luis, ORIAS-SOLIZ, Jorge and SALVATIERRA, Celmi. Use and management of cacti in the Serranía del Iñao National Park and Integrated Management Natural Area (PN-ANMI). Journal-Urban-Rural and Regional Economy. 2021. 5-8: 7-13

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Introduction

Background

Bolivia, after Mexico, is considered the country with the greatest diversity in the cacti family. Species of this family have often been collected for commercial purposes among collectors in Europe, the United States, Germany or Japan designating different names for the same taxonomic identity (Buxbaum, 1969). On the other hand, scientific knowledge about the cacti family is very scarce, particularly for Bolivia. (Navarro, 1996).

Approximately 128 species of cacti are distributed in Bolivia (Navarro, 1996). According to López (2003) the floristic richness of the cacti family for the inter-Andean dry valleys of Bolivia is distributed from 1,500 to 3,200 m of altitude, represented in 25 genera and 121 species. Wood (2005), apparently 80 species are recorded for the inter-Andean dry valleys that only grow in Bolivia, belonging to diverse growth habits, where some are creeping, globose, shrubby, even arboreal from less than 1 cm Blossfeldia liliputanea, up to 15 m Neoraimondia herzogiana.

The Serranía del Iñao National Park and Integrated Management Natural Area (PN-ANMI-SI), includes the municipalities of Villa Vaca Guzmán (Muyupampa), Monteagudo, Padilla and Villa Serrano, bordered to the north and east by the department of Santa Cruz, to the south with the municipality of Monteagudo and Villa Vaca Guzmán, to the west with the municipalities of Villa Serrano and Padilla. It has an approximate extension of 2630.9 km2. It is within a varied altitude range that goes from 600 to 2,800 meters above sea level, varied temperature with a minimum -10º C and maximum 32º C., with precipitations of 1000 - 1200 mm. With a relative humidity it varies between 76% in the rainy season and 55% in the dry season (SERNAP 2008).

The ethnobotanical studies carried out in the area have acquired interest and importance in recent decades due to the loss of traditional knowledge and the degradation of the forests (Carretero 2005). The importance of useful plants is reflected by the need to satisfy their needs for clothing, protection, tools and food. On the other hand, the species of the Cactaceae family are mostly reported or used as fuel, construction, traditional medicine, ceremonies, fodder and others.

Materials and methodology

Field materials used in this research:

- GPS, (For Longitude, Latitude and height data)
- Photo camera
- Newspaper sheets
- Shear's
- Map
- Machete
- Indelible markers
- Field notebook
- Field board
- Presses

Cabinet materials

Plant dryer for the collected species.

Stationery

Specimens from the Herbarium of the South of Bolivia (HSB) and the Geographic Information Systems tool for the elaboration of the map (areas that were studied).

Methodology

The study was carried out in the Serranía del Iñao NP-ANMI, where eight communities were selected: Azero Norte, Bella Vista, Entierrillos, Iritipi, Monte Grande, Santiago de las Frias, Ticucha and Timboy Pampa See (Annex 1). Semi-structured interviews were conducted in each of the communities (Choque 2009; Orias; Felipez; Terán; 2010) see (Annex 2), where eight use categories were established as priorities; Miscellaneous, Construction, Veterinary Use, Fodder, Medicine, Firewood, Technological Use and Human Food.

The research project use and management of cacti in the PN-ANMI Serranía del Iñao, has the purpose of inventorying, analyzing the use and management of cacti and some processing practices, based on the bibliographic review of the theses carried out in the area, we proceeded to collect information related to the issue of study. The ethnobotanical studies carried out in the area, where they interviewed 30 informants per community between men and women (Choque 2009; Orias; Felipez; Terán; 2010).

ISSN-On Line: 2524-2083

Based on the list prepared through theses, the botanical collections were carried out in two campaigns (outing to the field), based on the herborization protocol that consists of: collecting, pressing, description of the species and drying of each one of the samples of the species (a special dryer for plants is used).

Photographs were taken of each of the species (the entire plant, parts of the plant, flowers and fruits). Likewise, the taxonomic description was carried out, through consultations and review of the specialized bibliography on the subject. On the other hand, additional revisions were made within the scientific collection of the Herbarium of Southern Bolivia (HSB).

The verification of the scientific names of the species was carried out through the Missouri Botanical Garden website (www.tropicos.org).

The data processing stage was carried out once the information was homogeneous and without errors, the analysis was carried out using Excel, through dynamic tables (a tool used for data summary and data manipulation).

For the proposal of management alternatives, an analysis was made relating to the criteria of the people interviewed, through a participatory approach with the communities.

Results and discussion

Results obtained

For the PN-ANMI Serranía de Iñao, 12 species of cacti have been identified, which belong to 11 genera. Within the identification process, the description of the species is shown (List Nº1). With respect to the use of the species, they are grouped into 4 graphs mentioned as follows:

Usage categories by community, usage categories by gender, number of usage reports by community, number of reports by gender.

The species Cereus stenogonus, Echinopsis sp, Harrisia tetracantha and Opuntia brasiliensis, are widely used by the communities of the PN-IMNA Serranía del Iñao see (Table 1).

Listing No. 1

- Registered species of the Cactaceae family in the Serranía del Iñao.
- Disocactus Ramulosus (Salm-Dyck) Kimnach
- Common Name: Penca penca female
- Synonyms: Cereus ramulosus Salm-Dyck

Description: woodland plants

- Epiphytes in the jungle; They have flat stems, with serrated margins, first erect and then pendulous, without thorns.
- Pink and carmine flower.
- Use and processing practice: Forage (cacti for direct use for pig feed).
- Rhipsalis Floccosa Salm-Dyck ex Pfeiff.
- Common Name: Penca penca male, morel
- Synonyms: Lepismium tucumanense (FAC Weber) Backeb. – Rhipsalis floccosa subsp.
- Tucumanensis (FAC Weber) Barthlott & NP taylor
- Description: It is a fleshy, cylindrical-suspended perennial epiphyte plant with white flowers.
- Use and processing practice: Forage (cactus for direct use for food, Pigs, Miscellaneous (clarifier
- Grinding all the green part of the plant, It is thrown into the bucket of cloudy water) Food (edible fruit)
- Opuntia Brasiliensis (Willd.) Haw.
- Common Name: Tunilla
- Synonyms: Brasiliopuntia brasiliensis (Willd.) A. Berger - Cactus brasiliensis Willd.

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- Description: Tree approximately 5 m tall. Stem cylindrical and green, holding bright green branches based on flattened segments, oval and thorny. Flowers near the apex are yellow, saucer-shaped.
- Fruit, spherical, fleshy yellow, orange and has areolas equipped with short yellow thorns.
- Use and processing practice: ornamental, miscellaneous (the cactus stalk was used as shampoo, the stalk was crushed and put in water to wash the head afterwards), food (the fruit is edible raw), Miscellaneous (clarifier by grinding all the root of the plant, it is put in the cloudy water to clarify it) Medicine (for fever the root is used)
- Harrisia Tetracantha (Labour.) DR Hunt
- Common Name: piskaluru
- Synonyms: Cereus tephracanthus Steud. - Roseocereustetracanthus (Labour.) Backeb.
- Description: Rarely arboreal shrub
- 4 ─ 5 m high. Succulent stem with ramification, ascending branches in the middle part. Ribs 3-6 (7 rare). hermaphroditic flowers; large, solitary, nocturnal, ephemeral, funnel-shaped, white. Fruit, fleshy, indehiscent berry, edible yellow, orange or red with good flavor. Black seeds, very wrinkled.
- Use and processing practice: Food, Miscellaneous (clarifier, the crushed trunk is used to clarify water), medicine (It is used for diarrhea, the whole plant is used, boiled and drunk).
- Cereus Stenogonus K. Schum.
- Common Name: Ulala, carapari
- Synonyms: Cereus dayamiiSpeg. – Cereus roseiflorus Speg.
- Description: Tree approximately 8 m high; Stem rounded, succulent with branching, ascending branches. Ribs from 4 to 5 and with 2 to 3 spines. Solitary white hermaphroditic flowers with numerous stamens.
- Fleshy and glabrous berry fruit.
- Processing use and practice: food, fodder, miscellaneous (clarifying agent, the stem is sliced and placed in cloudy water)
- Echinopsis SP. Zucc.
- Common Name: Añapanco
- Description: generally globose plants with sharp ribs and shoots at the base. Its flowers are thin and long with scales on the receptacle and with dense hairs.
- Use and processing practice: medicine (It is used for gastritis, the fruit is boiled until it is well cooked, then its water is drunk), (It is used for kidney and liver disease, the fruit is scraped in boiled water and taking).
- Peifera Monacanthum (Griseb.) PV heath
- Common Name: penca penca female
- Basionyms: Lepismium monacanthum (Griseb.) Barthlott; Rhipsalis monacantha Griseb.
- Description: epiphytic plant; Quadrangular stems with branching, ascending branches.
- Ribs from 3 to 4 and with 3 to 5 spines. Solitary orange hermaphroditic flowers with numerous stamens. Fruit capsule fleshy and glabrous.
- Use and processing practice: Fodder
- Epiphyllum Phyllanthus (L.) Haw.
- Synonyms: Cactus phyllanthus L. - Cereus phyllanthus (L.) DC.

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– Description: Erect, highly branched plants; main woody stems and terminal stems flat, thin, 3 to 8 cm wide and up to 1m long, bright green with purple margin, crenate edge without spines, nocturnal flower, thin floral tube with little presence of scales; oblong fruit, 7 to 9 cm long and 2 to 3 cm wide, long, black, numerous seeds.

– Use and processing practice: Ornamental.

– Rhipsalis cf. Baccifera (JS Muell.) Stearn

– Common Name: morel

– Synonyms: Rhipsalis cassytha Gaertn. - Rhipsalis cassythavar. Mauritanian DC.

– Description: hanging epiphytic plant, 1 to 9 long; compound areoles with one or two bristles; stems long, cylindrical, slender, 4 to 6 mm in diameter; small, greenish-white numerous flowers along young branches; spherical fruits, white or pink, 5 to 8 mm in diameter.

– Use and processing practice: fodder

– Cleistocactus Brookeae. Cardenas

– Common Name: Foxtail

– Synonyms: Cleistocactusbrookeae subsp. vulpis-cauda (F. Ritter&Cullmann) Mottram - Cleistocactusvulpis-cauda F. Ritter&Cullmann

– Description: shrubby plant; areoles with numerous small spines; stems long, cylindrical, slender, 4 to 6 mm in diameter; numerous flowers along young red branches; spherical, pink fruits.

– Use and processing practice: medicine (It is for diarrhoea, the whole plant is used, boiled and taken).

– Pereskia Sacharosa Griseb.

– Synonyms: Pereskiasaipinensis Cárdenas

– Description: shrubby plant or small tree

– From 2 to 5 m. or higher, the diameter of the trunk reaches 10 to 20 cm; branches green, then thicker and covered with brown bark; lanceolate leaves 3 to 12 cm long, barely succulent; areoles with 5 dark spines; clustered pink flowers.

– Monvillea SP.

– Common Name: Ulala

Description: highly branched plant from the base. The very thin stems can reach 2 meters in length, have up to nine more or less rounded ribs; circular areoles with spines of various shapes. Flowering, nocturnal, on the old branches. Use and processing practice: Smoking-coking burns the trunk and from the ashes tanimbo is made, food (the fruit is eaten raw) Description of the categories of use by the community studied

In figure 22, 8 types of categories of use have been reported, the category with the highest number of reports is for food, followed by the miscellaneous category (it is used for various things, eg, as ash, among others) and medicine. The categories with the lowest averages in the different communities were veterinary, forage, these are based on the number of reports obtained from the interviews.

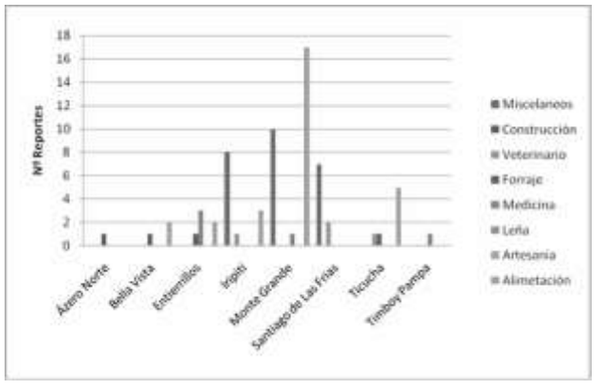

Figure 1 Usage categories by community

Figure 22.1, the difference in terms of knowledge of species by categories of use by gender, is more noticeable in the category miscellaneous and food where men reported knowing these species and women only mention 12 reports for the category food and miscellaneous 5 reports.

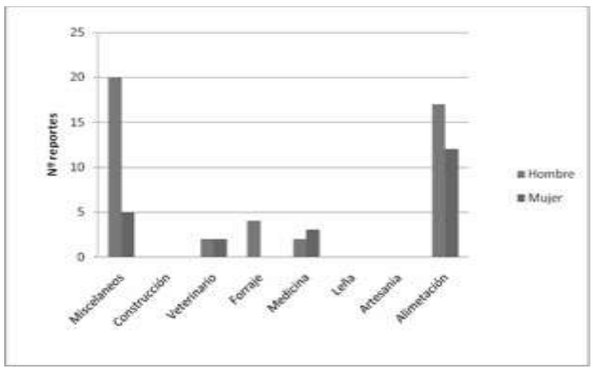

Figure 2 Categories of use by gender

In Figure 22.2 According to the number of usage reports per community; the community of Monte Grande presents 37 reports and the community of Iritipi 16, they are the ones with a high use value; Timboy Pampa 8 and in the other communities only present 2 - 6 reports.

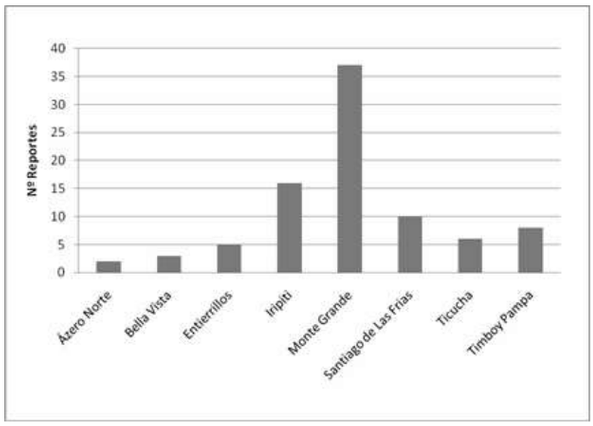

Figure 3 Number of usage reports per community

In Figure 22.3, it is observed that the number of reports by gender (sex). It is the men who reported in most of the communities of the Serranía del Iñao PN-ANMI, with the exception of the communities of Ticucha and Entierrilos where women mention with an average of (5) and (3) reports.

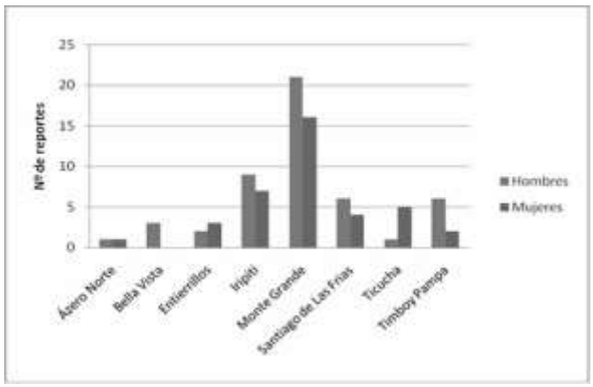

Figure 4 Number of reports by gender

Species	Applications	Cultural Status
Cereus stenogonus	1.2, 5.6	s
Opuntia brasiliensis	1,3,4,5	s, c
Harrisia tetracantha	1.3.5	s
Rhipsalis floccosa	1.2.5	s
Monvilleasp.	1,5,6	s

Table 1 Most used cacti of the PN-ANMI Serranía del Iñao.

Uses: 1 = food; 2 = forage; 3 = medicine; 4 = ornamental; 5 = clarify the water; 6 = tuxedo. Cultural status: s = wild collected; c = cultivated.

Discussion

Currently in the department of Chuquisaca there are no specific studies carried out on the management, use, conservation, distribution of cacti, since the disappearance of a large number of species and their habitats can have serious consequences in the conservation of genetic and biological resources. this group of plants.

According to Wood (2005), apparently 80 species are recorded for the inter-Andean dry valleys that only grow in Bolivia. According to López (2003) the floristic richness of the cacti family for the inter-Andean dry valleys of Bolivia is distributed from 1,500 to 3,200 m of altitude, represented in 25 genera and 121 species; The preliminary results obtained present 12 species belonging to 11 genera, which also demonstrates that the Serranía del Iñao NP-ANMI located within the Bolivian-Tucuman Forest presents a wealth of genera.

Conclusions

All the cacti species reported have one or several uses, although the most important species according to the perception of the interviewees are those that satisfy primary needs such as: food and miscellaneous. However, in some species the populations are being intervened by the extraction of species for their own use and by the expansion of the agricultural frontier.

There are species in the communities where men know and use these plants than women. This acquisition of knowledge is related to direct and indirect contact, interaction in the field or mountain and the practices of some non-agricultural activities such as: natural medicine, fruit harvest, utensil making and others, this makes knowledge about these species remain and pass from generation to generation.

ISSN-On Line: 2524-2083

Over time the use of these plants (cacti) would have to begin to be cultivated to avoid the reduction of their natural populations. For this reason, this research project was important to publicize the importance of use and some management alternatives for these species, since it is essential for the well-being of the current and future inhabitants of the area.

Management Alternatives

- Conservation of the areas where the species were found, carrying out more specific investigations such as: population studies and monitoring to evaluate their populations.
- Select mature plants as seed generators for species propagation.
- Cultivate in situ the different species of cacti.

Acknowledgments

The researchers thank the Science and Technology Research Department (DICYT) of the San Francisco Xavier University of Chuquisaca for the support provided in the development of this work.

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