



## Ethnopharmacological communication

## Natural pharmacopoeia used in traditional Toba medicine for the treatment of parasitosis and skin disorders (Central Chaco, Argentina)

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## ABSTRACT

**Aim of the study:** To assess the knowledge and use of natural pharmacopoeia for the treatment of parasitosis and skin disorders, as well as for the control of their etiological agents or vectors, of a Toba community in Central Chaco, Argentina.

**Materials and methods:** Information was obtained by open, extensive and recurrent interviews and semi-structured surveys. Plant and animal pharmacopoeia was documented by collecting material in field assays carried out in the company of informers. The list of applications with the greatest consensus of uses, the list of species with most medicinal applications and the list of species with the highest reputation (according to the level of fidelity) for the aforementioned disorders were obtained using quantitative methods.

**Results:** A total of 178 medicinal uses were documented corresponding to 87 species (72 plant and 15 animal species) belonging to 51 different families (39 plant and 12 animal families). The most represented families according to the number of species were Solanaceae (7 species), Asteraceae (6 species) and Fabaceae (5 species) for plants, and Bovidae (3 species) for animals.

**Conclusions:** Although the list of medicinal species includes some symbolical applications, others are supported by phytochemical information. In other cases the applications coincide with other pharmacopoeias of the Gran Chaco region indicating the presence of an active exchange of knowledge through interethnic contacts.

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## 1. Introduction

The environmental degradation suffered over the last decades has encouraged the emergence or revival of tropical diseases in Latin America, including the region of the Gran Chaco, Argentina, together with a greater prevalence for chronic or endemic pathologies such as parasitosis and infectious diseases (Palma, 1985; Epstein, 1995; Pignatti, 2004). Identified as significant health problems, the etiology of parasitosis and skin disorders clearly evidence the close relationship that exists between an individual's health and his natural and sociocultural environment. Studies on the prevalence of diseases, especially those concerning infant populations in underdeveloped countries, show high rates of parasitosis and skin disorders, like pyoderma, scabies and superficial mycosis, the latter being one of the most common medical consultations in primary

health care centres (Mahé et al., 1995; Mahé et al., 2005). Likewise, and due to their highly visible symptomatology, skin disorders have, together with digestive, gynaecological and obstetric disorders, the greatest number of medicinal treatments in many of the native pharmacopoeias around the world (Cox, 1994). As proposed in other countries (Inngjerdingen et al., 2004), deep knowledge on natural remedies allows selecting a collection of species of external use with proven pharmacological efficacy to be implemented in primary health care attention, thus encouraging the incorporation of traditional medicines to the local health system according to the criteria recommended by the WHO (2002).

Traditional ethnobiological knowledge has provided answers for the treatment of these disorders and the elimination of vectors using a rich herbalist medicine, as well as the use of repellent or insectifuge substances that in many cases have provided natural products and drugs with diverse applications (anti-malarial drugs, insecticides, and others). Among the ethnobiological investigations regarding issues related to parasitosis and vector-borne diseases we can mention the work by Karunamoorthia et al. (2009), who documented plant insect repellents in Africa, and that of Pochettino et al. (2003), who studied the ethnobiology of parasitosis of the Mbyá-Guaraníes in Argentina. On the other hand, Inngjerdingen

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et al. (2004), Ram et al. (2004), Geber-Miriam et al. (2006), Saikia et al. (2006), Njoroge and Bussmann (2007) and Martínez (2008a) showed the relevance and versatility of medicinal plants in the treatment of skin disorders.

The Tobas, also known as *qom* or *qoml'ek*, are an indigenous group belonging to the Guaycurú linguistic family that comprises a population of allied bands with about 60,000 members and whose current habitat is mostly confined to the area of Central and Southern Chaco (in the provinces of Chaco and Formosa, Argentina) and a small nucleus in the Northern Chaco area in Paraguay (ENDEPA, 1986; Arenas, 1997; Censabella, 2000). Previous information on the ethnobotany of different Toba groups can be found in Franzé (1925), Martínez Crovetto (1964), Martínez Crovetto (1968), Vuoto (1981), Vuoto (1999b), Arenas (2000), Martínez (2007a), Martínez (2008b), Hecht et al. (2008), in addition to other ethnozoological studies (Zacarías, 1993; Martínez Crovetto, 1995; Vuoto, 1999a; Arenas, 2003). Together, these studies evidence the extensive use these natives make of natural resources and show that their vast natural pharmacopoeia is one of the features that greatly enriches their culture.

Within the framework of a project regarding the relationship between ethnoecology and environmental health in the Tobas of Central Chaco, the object of the present study was to evaluate the knowledge and use of natural pharmacopoeia for the treatment of parasitosis, skin disorders and for the control of their etiological agents or vectors.

## 2. Materials and methods

### 2.1. Ethnobotanical survey area

The study area belongs to the Gran Chaco region in the province of Chaco (Northeast Argentina), in the surroundings of the river Bermejito (Fig. 1). According to its phytogeographical features, the area corresponds to the Neotropical region in the Chaco Domain, Chaco Province, with species belonging to the Central Chaco forests according to Prado (1993), or to the transition between the Oriental or humid Chaco and the Occidental or semiarid Chaco according to Cabrera (1994). The landscape vegetation pattern is characterized by marked fluvial modelling (Morello and Adámoli, 1974) and the vegetation consists of a xerophytic deciduous forest together with savannas, halophytic steppes, cardonal montes, grasslands and shrublands.

From an economical point of view, the Tobas subsist on a combination of hunting, fishing and gathering, together with an incipient agriculture, management of goat herds, apiculture and paid handwork for cotton harvesting, selling resources from the forest, the participation in non-governmental organisms, as well as the aid of government help plans.

The local health system is characterized by a multiple sanitary context that includes shamanism (carried out by specialists known as *pi'oxonac*), domestic or homemade medicine and the official medicine (biomedicine) of health care centres run by doctors and Toba sanitary agents. Despite this pluralism, traditional Toba medicine is still not incorporated to the official medicine even though the use of natural remedies and the shamanic cures are one of the main therapeutic options to which local inhabitants appeal (Martínez, 2007b). The morbidity of this region is characterized by a diversity of clinical cases and disorders. There is no official or statistical information on the prevalence of these disorders among the Toba population; however, the health care staff highlights the incidence of skin disorders (like pyoderma, impetigo and scabies) and the high rates of parasitosis (oxyuriasis, amoebiasis, ascariasis and, to a lesser degree, taeniasis). Cases of Chagas disease are also very frequent due to the presence of the “vinchuca” (*Triatoma infestans*)

associated not only to the cultural housing and lifestyle ways of this people but also to the lack of attention given to this issue by public health authorities.

### 2.2. Study methods and techniques

Between the years 2004 and 2008, information on the medical use of medicinal plants and animals was collected in the study area as part of a general survey on Toba medical ethnobotany. Open, extensive and recurrent interviews as well as semi-structured surveys were carried out with members of the community of different sex and age, and health care professionals. For this, a survey was prepared on the subject based on the ethnobotanical guide proposed by Arenas (1995). This information was complemented with participative observations. All the plant material was collected in field assays in the company of local informers. Information was documented in field logbooks, magneto-phonetic tapes and photographs. Reference samples were deposited in the herbarium of the Botanical Museum (CORD) of the Instituto Multidisciplinario de Biología Vegetal at the Universidad Nacional de Córdoba (IMBIV, UNC). Plant materials were mainly identified by the authors with the help of specialists in cases of taxa difficult to ascertain, and the nomenclature was verified in the catalogue of Argentine Vascular Plants (Zuloaga and Morrone, 1996; Zuloaga and Morrone, 1999) and its electronic on-line update for the Southern Cones (Zuloaga et al., 2008). The invertebrate zoological material was identified by specialists and is part of the first author's particular collection (housed at the Museo de Antropología, Córdoba). Vertebrates were identified with local informers using photographs and images from field guides, and were then corroborated with ethnobiological references on the Gran Chaco region (Martínez Crovetto, 1995; Arenas, 2003).

Six field assays were carried out which involved staying for more than 100 days at different Toba settlements located in the surroundings of the river Bermejito belonging to the Río Bermejito intendency (Department of General Güemes, Province of Chaco). Most interviews were carried out at the community of El Colchón (Fig. 1) and the majority of the plant material was also collected at this site. Before being interviewed the members of the communities were briefed on the research project and its academic objectives; financial compensation was provided to informants for the field trips. Conversations with specialists and inhabitants were based on a common objective: to improve the local health situation, increase knowledge regarding natural remedies and develop educational materials of local interest, as suggested in the guidelines of the International Society of Ethnobiology Code of Ethics (ISECE, 2008).

Qualitative, quantitative and participative methods were used alternately in different recurring instances throughout the entire period of the investigation, trying to improve each new instance with previous results and following the basic scheme of an ethnobotanical study: field work and laboratory work.

*Qualitative methods:* The symptomatology and etiology of disorders were interpreted by open, extensive interviews. Additional information on the lexicon of skin diseases was obtained using a collection of photographs on skin disorders taken from a dermatology Atlas (Cohen and Lehmann, 2009) to attain a more specific translation into occidental medical categories.

*Quantitative methods:* Sixty informers comprised of specialists (shamans, midwives and elderly people) and community members (youngsters and adults of both sexes) were subjected to a previously designed semi-structured thematic questionnaire. Quantitative assessments were based on the number of uses reported for each species (categorised according to the frequency of mention) and the proportion they represented in the total number of reports. The medicinal use of species was validated when

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