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In memoriam Professor Luis Astudillo, Universidad de Talca, Chile

Traditional ethnobotanical knowledge and use of medicinal plants in a rural area of the metropolitan region of Chile: descriptive study

[Conocimiento etnobotánico tradicional y uso de plantas Medicinales en un área rural de la Región Metropolitana de Chile: estudio descriptivo]

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Abstract: In order to characterize and evaluate the botanical knowledge belonging to the population in rural area (little addressed by the ethnobotany) a study was conducted through surveys to learn about medicinal plants cultivated and used and a rural area of the Metropolitan Region (San Juan de Pirque). The conclusions are that users have a hybrid knowledge (product of traditional knowledge combined with information of various kinds) of medicinal plants. We found that most of the species cultivated in botanical gardens were species introduced and very few native ones. Also, they were known by their common names and new names were detected not described previously in the literature.

Keywords: Ethnobotany, traditional botanical knowledge, rural area, San Juan de Pirque

Resumen: Con el fin de caracterizar y evaluar el conocimiento botánico perteneciente a la población en el área rural (poco abordado por la etnobotánica) se realizó un estudio a través de encuestas para aprender sobre plantas medicinales cultivadas y utilizadas en una zona rural de la Región Metropolitana (San Juan de Pirque). Las conclusiones son que los usuarios tienen un conocimiento híbrido (producto de los conocimientos tradicionales en combinación con la información de diversos tipos) de plantas medicinales. Hemos encontrado que la mayoría de las especies cultivadas en los jardines botánicos fueron especies introducidas y muy pocas las nativas. También, se les conocía por sus nombres comunes y no se detectaron nuevos nombres no descrito previamente en la literatura.

Palabras clave: Etnobotánica, conocimiento botánico tradicional, zona rural, San Juan de Pirque

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In Memoriam Dr. Luis Astudillo: This work was done by a group of high school students from the Liceo de Aplicación in 2000 (Francisco Barraza, Carlos Calvo, Ivan Paez, Francisco Tamayo, Yat-Seng Yuen, Martín Lopehandia, José Garrido) directed by Jose L. Martinez in the general part and Elizabeth Barrera and Ines Meza part in Botany. This paper was presented at the First Meeting of the Scientific Students of Maule, organized between the 3rd and 4th of November of that year, by our dear friend Luis Astudillo at the University of Talca. Recently, upon learning the news of his death with Francisco Barraza and the rest of the group decided to make a tribute to his departure from our lives.

INTRODUCTION

Although it is difficult to estimate the number of people living on earth in the beginning of mankind, it is estimated that 10,000 years ago the population was reached about 5 million people, i.e., a similar number of the people who currently live in the city of Santiago (Chile). These inhabitants, by collecting between wildlife and vegetation could meet basic needs such as: food, clothing, protection from the weather and others (Errazuriz *et al.*, 1993). Nevertheless, there have been a loss of traditional knowledge as evidenced by the *Mapuche* people of Patagonia, whose communities could be at risk of losing the transfer of information from the use of plants to future generation (Estomba *et al.*, 2005). Fortunately, numerous studies have kept this knowledge alive (Houghton & Manby, 1985; Ladio & Lozada, 2000; Ladio, 2001; Ladio & Lozada, 2003; Ladio & Lozada, 2004a; Ladio & Lozada, 2004b; Estomba *et al.*, 2005; Ladio, 2005; Molares & Ladio, 2008; Ladio, 2011a; Ladio, 2011b).

With the advancement of time and cultural development of man, it is clear that still persists in social conglomerations the use of "plants" in order to "cure" diseases or conditions generally reflected directly in the attenuation or neutralization of symptomatic overall discomfort (Calvo *et al.*, 2000).

Studies indicate (Mellado *et al.*, 1997), that medicinal plants, both endemic and introduced, are used by the entire population of Chile. It has been known since colonial times that these plants have been and will remain a source of healing (Zin & Weiss, 1985; Martinez & Marinoff, 2008). Moreover, the world has developed in different areas; the existence of man during one of the fundamental requirements was to have a good quality of life, being healthy for

the mind, body and spirit (Joo, 1999). According to the World Health Organization (OMS, 1986), 80% of the world population uses traditional medicine to provide their primary health care needs. These therapies are based mainly on the direct consumption of plants, so that their study is a priority for both the World Health Organization to numerous international institutions (Pochettino *et al.*, 2008). That is why the need for identification and knowledge of the methodologies used in the application of these "plants".

Currently, ethnobotany has become a discipline with a starring role in the goals of several international organizations dedicated to biological and cultural conservation (Cunningham, 2001). The conservation *in situ* and *ex situ* of sustainable use of resources, food security and health of local communities are priorities and urgent (Albuquerque *et al.*, 2010; Lopez, 2011). It should be mentioned that ethnobotanical studies are leaving out the inventory work by questions arising in solutions for the above issues (Benz *et al.*, 1996; Lopez, 2011). It is also providing a greater understanding of the cultural and environmental factors that should be considered for use of plant resources, being in a rational and practical harmony with the material and spiritual needs of the people (Ladio & Lozada, 2003; Salik *et al.*, 2005).

Plant resources are used today by large and diverse sectors of society. This consumption can be attributed to several factors. All peoples have a medical system that basically consists of a cosmology that establish the causes, diagnosis and treatment of disease, and also a cultural context within which medical-therapeutic activities are developed along with a repertoire of pharmaceuticals (Balick & Cox, 1996). In some cases, such as the rural areas, where they have wide effect the traditional medical systems, and other remote or excluded zones from the formal health system, appeals to the plants as the main source of therapeutics (Martinez & Pochettino, 1992; Pochettino *et al.*, 1997).

The purpose of this work is to characterize the ethnobotanical knowledge underlying the herbal product consumption in urban centers in Chile. The information in this article is a valuable resource for the design and implementation of development projects in the area. It also highlights the need for studies in rural areas not only of Santiago, an issue that has not been fully evaluated.

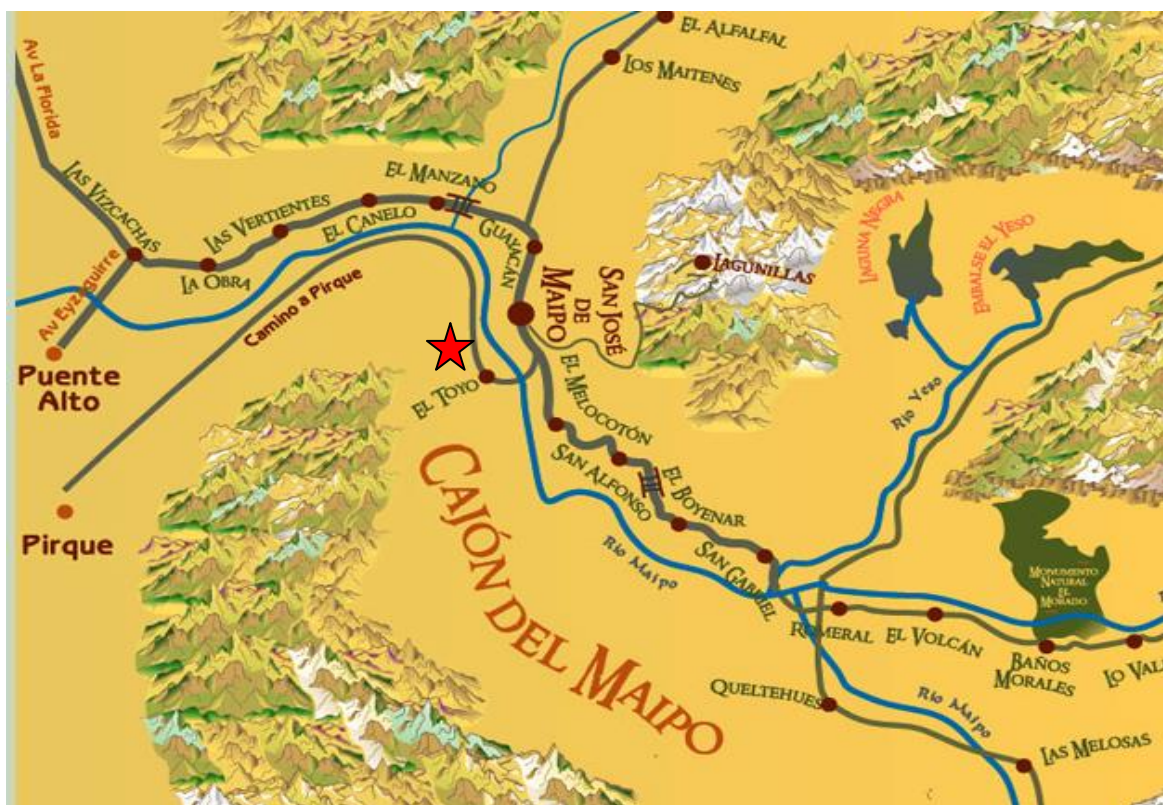
MATERIAL AND METHODS

Study area

A place that is attractive in the themes outlined above is the *Cañón del Maipo* area, which is divided by the *Maipo* river in two areas: one leading to the cities of *San José de Maipo* and *Pirque* (See below), both very rich in native vegetation (Navas, 1979) and a beautiful landscape.

Pirque is also a district of the Metropolitan Region of Santiago, Chile, which has about 10,000 inhabitants. His story begins after the conquest of Santiago by the Spanish, which dates back to the emergence of each of the farms that comprise the current sectors of the commune. At first, the lands that were intended for livestock were quickly being planted with cereals. With the construction of the "La Sirena" duct in 1834, commanded by Don Ramon Subercaseaux, *Pirque* transformed his initial desert

appearance. Later, wine business in *Pirque* was brought by Don Melchor de Concha y Toro, married with Emiliana Subercaseaux. In 1887 the Municipality of *Pirque*, responsible for managing local interests was created. Between 1892 and 1897, *Pirque* lost their administrative autonomy, depending on the Municipalidad of Puente Alto, but recovered later. The presence of numerous rural residential properties, that still characterize as an agro residential district, is long-standing. However, continued until 1970, *Pirque* soils preferentially were dedicated to agriculture, whose production was mainly sent to Santiago and other provinces. By 1982 the agricultural profile began to fade when they were parceled some land belonging to the "Concha y Toro" vineyard where homes rose with features made accessible to the middle class strata (Municipalidad de Pirque, 2014).



Experimental method

About 90% of housewives were interviewed, corresponding to about 25 homes, residents in rural areas of *San Juan de Pirque*, to which they conducted a survey to find out if the people self-medicate, if

consumed medicinal plants. Also, taking samples of medicinal plants that grew in gardens and if they were used for their own use. Medicinal plants once dissected, were identified in the botanical section of the National Museum of Natural History in Santiago

de Chile where samples were left in the respective collection.

RESULTS AND DISCUSSION

San Juan de Pirque, is a very mountainous area near Santiago, characterized, on one hand, by having small populations living in fruit trees cultivated on the hills, and on the rivers of the *Maipo* river. Secondly, by a population who lacks of minimum resources for food and development (Calvo *et al.*, 2000). Although the study area is characterized by being rich in native species (Navas, 1979). The people cultivate in their gardens only foreign medicinal plants, excepting one, *Fabiana imbricata*. The main problem why they plant medicinal plants in their gardens is to treat stomach ailments, respiratory disorders, hypotension and women problems. Although predominantly most of the

cultivated plants are used as a soothing stomach. It is striking that the only native plant used to increase urine production, the *Sen*, is characterized in the literature as a diuretic. The population uses commonly medicinal plants such as plantain, mint, pennyroyal, wormwood, matico, among others, and only one native. This study also describes for the first time a popular name, since 100% of the population called the wormwood by the name of "ayenco" a term not previously described in the area or in Chile. Table 1 shows the species identified, with its scientific name, common name given by the people of *San Juan de Pirque*, native or foreign origin and habitat of each species. Table 2 shows the medicinal use by the population as compared with the medicinal uses described in the literature.

Table 1

Scientific name, local name, popular name (literature), Plant habit and origin of species grown in home gardens in the town of *San Juan de Pirque*

Scientific name	Local name	Vernacular name	Plant habit	Origin
<i>Bauhinia candicans</i> Betham	Pata de vaca	Pata de vaca	Shrub	Foreign
<i>Buddleja globosa</i> Lam	Matico	matico, mático, pañil, Tallin, ballin, palguin, palquil, palquin, panguil.	Shrub	Foreign
<i>Capsella bursa-pastoris</i> (L) Medik	Mastuerzo	Bolsita del pastor, bolsita, cucharita, mastuerzo	Annual herb	Foreign
<i>Chrysanthemum vulgare</i> (L) Benth	Ayenco, ajenco	plumilla ajenjo chileno akenko.	Perennial herb	Foreign
<i>Fabiana imbricata</i> R. et P.	Romero	Romero, Peta, pichi, pichi romero	Perennial Arbust	Native
<i>Malva parviflora</i> L	Malva	Malva	Bianual herb	Foreign
<i>Matricaria chamomilla</i> L	Manzanilla	Manzanilla, manzanilla olorosa, manzanilla común	Annual herb	Foreign
<i>Melissa officinalis</i> L	Toronjil	Toronjil, toronjil de la pena, toronjil de olor, toronjil oloroso, totonjil pa'la pena, toronjil dulce	Perennial herb	Foreign
<i>Mentha acuatica</i> L	Menta	Menta	Perennial herb	Foreign
<i>Mentha citrata</i> L	Hierba moto	Menta, hierba moto, moto, yerba moto	Perennial herb	Foreign
<i>Mentha pulegium</i> L	Poleo	poleo, koleu, té del	Perennial	Foreign

		país, Menta	herb	
<i>Plantago major</i> L	Llantén	Llantén, 7 venas, huincallanten	Perennial herb	Foreign
<i>Ruta chalapensis</i> L	Ruda	Ruda	Perennial herb	Foreign
<i>Salvia officinalis</i> L	Salvia	Salvia, alwe lawen	Perennial herb	Foreign

Table 2

Scientific name, use made by the people of the town of *San Juan de Pirque*, medicinal use described in literature, references to tables 1 and 2

Scientific name	Medicinal uses of the plant reported by local people	Medicinal uses and experimental scientific studies in literature.	References
<i>Bauhinia candicans</i> Betham	Hypotensor	Hypoglycemic activity of an extract in experimental alloxan diabetes rats	Hoffman, 1978; San Martin, 1983; Lemus <i>et al.</i> , 1986; Lemus <i>et al.</i> , 1999
<i>Buddleja globosa</i> Lam	Soothing stomach, anticancer, accelerates wound healing, against liver attacks	Various compounds are isolated from this plant, new terpenoid compounds named dihydrobuddledin A, buddledone A and B, four known compounds-budeledins A, B and C and zerumbone; these compounds showed inhibitions of eicosanopid síntesis	Zin & Weiss, 1985; Hoffman, 1978; San Martin, 1983; Montecino & Conejero, 1985; Liao <i>et al.</i> , 1999; Houghton, 2003
<i>Capsella bursa-pastoris</i> (L) Medik	Soothing stomach	Diuretic, calm intestinal pains, good against bleeding	Zin & Weiss, 1985; Navas, 1979; San Martin, 1983
<i>Chysanthemum vulgare</i> (L) Benth	Soothing stomach		San Martin, 1983; Montecino & Conejero, 1985; Matthei, 1986
<i>Fabiana imbricata</i> R. et P.	Soothing stomach	Gastroprotective activity of oleanolic acid derivatives on experimentally induced gastric lesions in rats and mice. Gastroprotective activity of sesquiterpene	Schmeda-Hirschmann <i>et al.</i> , 1992; Razmilic <i>et al.</i> , 1994; Schmeda-Hirschmann <i>et al.</i> , 2004; Reyes <i>et al.</i> , 1992; Astudillo <i>et al.</i> , 2002
<i>Malva parviflora</i> L	Antifungal	Potent Heterologous Antifungal Proteins from Cheeseweed (<i>Malva parviflora</i>)	Wang & Bunkers, 2000; Godinho <i>et al.</i> , 2013

<i>Matricaria chamomilla</i> L	Soothing stomach and against cooling “enfriamiento”	Soothes the nerves, antispasmodic, tonic, digestive, aid in menstruation, febrifuge, anti stomachache, Sedative as well as spasmolytic effects. Have been used therapeutically for conditions in which oxidative stress is supposed to be demonstrated by the effect of chamazulene, the active substance of <i>Matricaria chamomilla</i> on free radical processes. A flavonoid isolated from this plants, apigenin showed in rats a pharmacological profile as GABA-benzodiazepine receptor but other neurotransmission systems	Zin & Weiss, 1985; San Martin, 1983; Muñoz <i>et al.</i> , 1981; Kossmann & Vicente, 1992; Rojas, 1999; Avallone <i>et al.</i> , 2000; Forster <i>et al.</i> , 1980; Cemek <i>et al.</i> , 2008; Singh <i>et al.</i> , 2011; Srivastava <i>et al.</i> , 2010
<i>Mentha acuatica</i> L	Soothing stomach	Free radical scavenging potential	Ahmad <i>et al.</i> , 2011
<i>Mentha citrata</i> L	Soothing stomach	Free radical scavenging potential	Ahmad <i>et al.</i> , 2011
<i>Mentha pulegium</i> L	Soothing stomach	Stimulant and digestive, toning.	Zin & Weiss, 1985; Navas, 1979; San Martín, 1983; Montecino & Conejeros, 1985; Montes & Wilkomirsky, 1985
<i>Plantago major</i> L	Soothing stomach	Anti inflammatory, antiulcer, diuretic, astringent, emollient, depurative, relieves earache. It has a hypotensor and diuretic effect. Present efficiency as antioxidant under conditions on the yield of photochemiluminescence of Gly-Trp solutions, this effect of plant extract and their concentration was	Zin & Weiss, 1985; Navas, 1979; San Martin, 1983; Kossmann & Vicente, 1992; Rojas, 1999; Montes & Wilkomirsky, 1985

		studied in human concentration	
<i>Ruta chalapensis</i> L	Analgesic	Effects of the chronic ingest in isolated rat aorta rings.	Cartas-Heredia et al., 2011,
<i>Salvia officinalis</i> L	GI disturbances	Antioxidant	Baricevic et al., 2001; Grzegorzczuk et al., 2007; Walch et al., 2011

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