

Review

Medicinal plants from the “Sierra de Comechingones”, Argentina

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Abstract

Argentina is a country with both rich floral biodiversity and cultural diversity. Traditional herbal medicines are important in the health care of most people, and rely heavily on the use of indigenous plants. An ethnobotanical survey of the “Sierra de Comechingones” made over a 26-year period (1979–2005), indicated that 65 families and 149 different genera were used in traditional medicines. The use of these medicines was observed to be widespread and prevalent over orthodox medicine. Medicinal native plants from this mountain range make up 31% of the total Argentina medicinal native flora. In addition, there are 15 endemic species that grow only in the region. The botanical name, popular uses, parts utilized, as well as the distribution of these medicinal plants from the “Sierra de Comechingones”, Argentina, were summarized. Previous reports on phytochemical and biological activities in relation to cancer, antimicrobials and pesticides were also included.

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Keywords: Native plants; “Sierra de Comechingones”; Traditional medicinal plants; Endemic medicinal plants; Biological activities

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1. Introduction

Despite the number of clinical agents developed by the pharmaceutical industry, traditional indigenous phytotherapy is still practiced in many rural areas, using treatments handed down from generation to generation. The World Health Organization (WHO) has emphasized the importance of the traditional indigenous medicine, since a large majority of rural people in the developing country still use these medicines as the first defense in health care. Medicinal plants have a long-standing history in many indigenous communities, and continue to provide useful tools for treating diseases. Nowadays more information is being gathered about the plants used by indigenous communities. The “Comechingones” is one of the few remaining folk cultures that persists in Central Argentina. Unfortunately, knowledge of therapeutic medicinal plants can be lost as traditional societies are supplanted by development or switch to other medicinal practices.

In Argentina, 602 plant species are known to possess therapeutic properties (Ratera and Ratera, 1980; Alonso, 2004). Its members traditionally practice a particular type of medicine characteristic of shamanic cultures, involving a rich medicinal herbarium, which coexists with other medicinal systems found in modern society, such as popular medicine (e.g. naturism, home-medicinal recipes) and allopathic medicine (Magrassi, 1982).

The aim of this paper is to document information about the present status of traditional medicine knowledge in “Sierra de Comechingones”. Information on folk medicine has been collected in various villages over the last 26 years and the medicinal plant species and their distribution is reported and discussed.

1.1. “Comechingones” culture

The “Comechingones”, an extinct indigenous group, originally lived in the Argentina Provinces of Córdoba and San Luis (Ibarra Grasso, 1986). They had been completely displaced by the Spanish conquerors by the end of the 17th century (Montes, 1958). However, it is interesting that even today, isolated descendants can be found in this mountain range, usually working as farmhands (Casamiquela, 1990).

The expression “Comechingones” is a distortion of the derogatory term “kamichingan” meaning “Cave inhabitants”, which was used by another neighboring indigenous group called the “Sanavirones”. Although the “Comechingones” had their own language, it was lost due to Spanish impositions that favored both the “Runa Sini” and also the “Quechua” languages (Stuckert, 1941).

Their culture was heavily influenced by the Incas and as result “Comechingones” were sedentary; hunting and breeding animals to obtain wool, meat and eggs (De Aparicio, 1939). They usually collected fruits from different dicot species principally, “tuna”, “chañar”, “tala”, “molle” and “coco”, from which they made “arope”, and also invigorating alcoholic drinks. The most important fruit was the “algarrobo” and by grinding it they made a sweet bread called “patay”. They also practiced horticulture

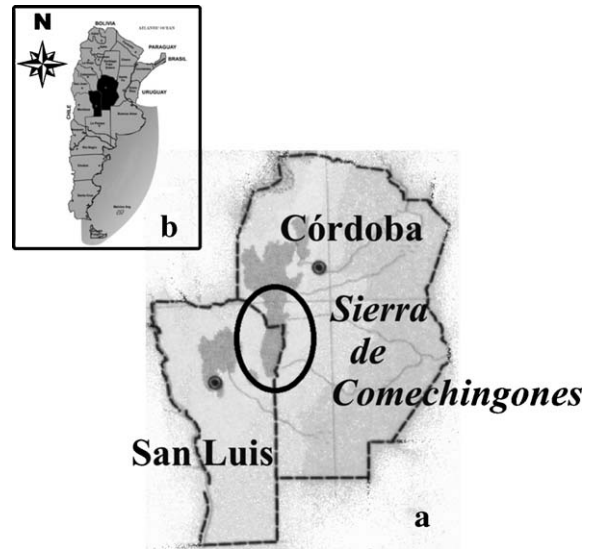


Fig. 1. (a) The oval includes the “Sierra de Comechingones” region and (b) Argentina map (Córdoba and San Luis provinces are in black).

(mainly potatoes) and had primitive cattle and poultry farming (Beckett, 1998).

There was a religious-philosophical meaning to medicine, known as “Chamanismo” with, an indigenous institution existing called the “Payé” (the Shaman), which reflected cosmological concepts, psychological processes and social norms. This concentrated on the Shamán person, and because thought to be part God and part human, he was qualified to heal among many other functions. The Shaman was generally a priest, who held magical power and medical knowledge in *sensu stricto*. Their learning process by means of oral transmission through preparatory ascetic practices, or by initiation as a consequence of a significant event or accident (Stuckert, 1941).

2. Materials and methods

2.1. Study site

The “Sierras Pampeanas of Córdoba” are the eastern group of the geologic “Sierras Pampeanas” (Argentina). They are a small group of mountain ranges located ca. 400 km east of the Andes in Córdoba and San Luis provinces in central Argentina. Their extension is approximately 500 km long and 150 km wide and they lie, between 29°00′–33°30′ SL and 64°00′–65°30′ WL. They are formed by four main hill ranges (“Sierras de Guasapampa, Pocho and Altautina”; “Sierras Grandes” and “Sierras de Comechingones”; “Sierras Chicas” and “Sierra de Las Peñas” and “Elevación Pampeana”) and two secondary and smaller ones (“Sierra de Coro” and “Sierra de Tigre”) (Fig. 1). Their early development can be traced back to the pre-Cambrian and early Paleozoic periods, with eroded cretaceous sedimentary cover of conglomerates and sandstones being found (Gordillo and Lencinas, 1969). “Sierra de Comechingones” is a truly geomorphologic-ethnographic island located in the southern range of the “Sierras Grandes” from the “Champaqui” peak – being the highest point of the “Sierras Pampeanas de Córdoba”

– 2884 meters over sea level (m.o.s.l.) – up to the town of “Achiras” (33°–32° SL).

The climate in the region is humid, with short cool summers and long, cold dry winters. The annual average temperature is 10 °C at 1500 m.o.s.l. and rainfall ranges from 890 to 1400 mm. From September to December, the north and northeast winds are predominant. They blow with increasing force since a center of cyclonic depression is defined in the polar front. During the summer months, storms with strong winds, torrential rainstorms and great thunderstorms are common, as well as hail with sometimes destructive effects.

Vegetation belongs to the mountain or highland zone of the phytogeographic Chaquenian province (Cabrera, 1976), in which four vegetation zones are known. In dry sunny areas up to 1800 m, it is mainly *Schinopsis haenkeana* (“horco-quebracho”), usually mixed with a scrubland of *Heterothalamus alienus* (“romerillo”). On shady cooler slopes there is a *Lithrea ternifolia* forest, with *Fagara coco* and other species; and above 1800 m on shallow soils there is grassland dominated by *Festuca hieronymi* and diverse species of *Stipa*. The regional pool comprises approximately 1400 species (Cantero and Bianco, 1986a). Human intervention and forest fragmentation probably started around 8000 years ago, when the first Amerindians colonized the area and used fire, as a tool for hunting (Cabido, 1985; Cabido and Zak, 1999). Europeans settled in the area around 400 years ago, and forests declined even more due to burning, livestock grazing and utilization of the trees for timber and fuel (Cabido et al., 1990).

2.2. Field interview methods

2.2.1. Ethnobotanical data

Periodic field trips were undertaken during 1979–2005 in the September–November period, with a follow-up collection trip in March–April to 24 rural and distant areas of the “Sierras de Comechingones”: Achiras, Alpa Corral, Carpintería, Cortaderas, La Cruz, La Población, Las Albahacas, Los Molles, Luti, Luyaba, Merlo, Papagayos, Pueblito, Punilla, Río de los Sauces, San Javier, San Miguel, Villa de Las Rosas, Villa del Carmen, Villa Elena, Villa El Chacay, Villa Larca, Yacanto and Yacanto de Calamuchita.

The interview had two parts, a semi-structured first section was conducted with both individuals known to possess knowledge about medicinal plants (such as healers and herbalists) and also with members of the general community. One hundred well-informed people were interviewed in the area’s towns and villages. Interviewees were aged from 47 to 93, and they mainly belonged to families that had strong links with the traditional activities of the region. For each interview, information was recorded concerning name, age, gender, occupation and educational level. Most of the interviewed persons (95) were aged over 50, 36 were between 50 and 59, 31 between 60 and 69, 25 between 70 and 79, 2 between 80 and 89, and 1 over 90 years old. Only 5 informants were aged less than 50.

Questions focused mainly on the most common names, folk use in human therapy, preparation and parts used, collecting period, and related recipes. After the interview was over respon-

dents would be asked about where plants were collected. The recorded information was later crosschecked.

During the visits, the information was registered on file and then was incorporated as information in Table 1. A manual about medicinal plant uses has been published and also presented to the people interviewed (Nuñez and Cantero, 2000).

In the second part, we documented an unrestricted list of known species and their alleged therapeutic effects. Interviews were carried out with the help of fresh plant specimens and a field herbarium was utilized in the interviews to check the plant taxonomic identities. Specimens were not required when talking about well-known plants or mono-specific genera, known by their common names.

The data, extrapolated by rigorous botanical studies, are located in the Herbarium at National University of Río Cuarto (RIO) (Table 1). Plant nomenclature (scientific names) is largely according to Cabrera and Zardini (1978), Hunziker (1984), Bianco and Cantero (1985a,b,c, 1989), Bianco et al. (1987), Cantero and Bianco (1986a,b), Zuloaga et al. (1994), Zuloaga and Morrone (1996, 1999) and Cantero et al. (2001). Disease names were verified by asking for descriptions of symptoms, as well as by using the extensive ethnobotanical data, found in the following pharmaco-botanical texts: Saggese (1959), Font Quer (1962), Ratera and Ratera (1980), Pagliarone et al. (1994), Marzocca (1997), Lahite et al. (1998), Volkman and Von Müller (1999) and Alonso (2004) (Table 2).

Abundance and distribution were extracted from different phytosociological studies already carried out (Bianco and Cantero, 1985a,b,c, 1989; Cantero and Bianco, 1986a,b; Bianco et al., 1987; Cantero and Nuñez, 1994a,b; Cantero et al., 1996, 1999, 2000, 2001, 2003, 2004; Nuñez et al., 1998, 2002; González et al., 1998, 1999, 2002a,b; Petryna et al., 1999, 2002; Amuchastegui et al., 2003). In order to express the relative abundance of the different species, the Braun-Blanquet scale (BB) (1979) was converted into the following qualitative combined scale for this work (Table 1): r or + from BB is very rare; 1 from BB is rare; 2 from BB is fairly abundant; 3 from BB is abundant; and 4–5 from BB is very common. Communities of dominant types were forests, scrublands and grasslands (Whittaker, 1980).

3. Results and discussion

3.1. Plant species

Of the 602 medicinal plant species documented on folk medicinal practice in Argentina (Marzocca, 1997; Nuñez and Cantero, 2000; Alonso, 2004), 186 of them correspond to “Sierra de Comechingones” (Tables 1 and 2). Comparison with data in this folk botanical literature confirmed the preponderance of dicotyledons (Tables 1 and 2) with Asteraceae being the most numerous family (Tables 1 and 3). The Asteraceae, Fabaceae, Verbenaceae and Solanaceae families alone account for 42% of the total Argentina medicinal flora.

Table 3 lists medicinal plant species used in traditional medicine according to their botanical families, scientific name, and vernacular names as recorded during the fieldwork, and voucher specimens are also shown. For each species, the groups

Table 1
Medicinal plants from "Sierra de Comechingones"

Species	Vernacular name	Medicinal uses	Utilized parts	Characteristic of growth.	Distribution
Amaranthaceae					
<i>Gomphrena perennis</i> L. (RIOC 862)	Uña de gato	Antidiarrheic, febrifuge and against rheumatic pains	Flowers	Perennial shrub. Spring–summer	Fairly abundant
<i>Iresine diffusa</i> Humb. & Bonpl. ex Willd. var <i>diffusa</i> (RIOC 674)	Peludilla	Against hepatic affections	Flowers and leaves	Annual herb. Spring–summer	Abundant
Anacardiaceae					
<i>Lithrea molleoides</i> (Vell.) Engl. (RIOC 1313)	Molle de beber	Sweetener, diuretic and digestive	Leaves	Tree. Spring–summer	Fairly abundant
<i>Schinus areira</i> L. (RIOC 5295)	Aguaribay	Against hepatic affections, laxative, aromatizant, against rheumatic pains and anti-inflammatory	Leaves	Tree. Spring–summer	Fairly abundant
<i>Schinus fasciculata</i> (Griseb.) I.M. Johnst. var. <i>arenicola</i> (Hauman) F.A. Barkley (RIOC 267)	Moradillo	Curative of cough, vulnerary, purgative and analgesic	Leaves	Tree. Spring–summer	Fairly abundant
Apiaceae					
<i>Cyclospermum leptophyllum</i> (Pers.) Sprague (RIOC 492)	Apio silvestre	Carminative and vulnerary	Fruits, leaves and stems	Herb. Autumn–winter	Very common
<i>Eryngium elegans</i> Cham. & Schldtl. (RIOC 566)	Cardilla	Diuretic	Roots	Perennial shrub. Autumn–winter	Abundant
<i>Hydrocotyle bonariensis</i> Lam. (RIOC 1445)	Paragüita	Emetic and against hepatic affections	Leaves	Perennial shrub. Autumn–winter	Very common
<i>Hydrocotyle ranunculoides</i> L.f. (RIOC 5109)	Paragüita	Emetic and against hepatic affections	Leaves	Perennial shrub. Autumn–winter	Very common
Apocynaceae					
<i>Aspidosperma quebracho-blanco</i> Schldtl. (RIOC 1956)	Quebracho blanco	Antidisneic, antiasthmatic, cicatrizant and febrifuge	Bark	Tree. Spring–summer	Very rare
Aristolochiaceae					
<i>Aristolochia stuckertii</i> Speg. (RIOC 2077)	Charrúa	Disinfectant, diuretic, diaphoretic, against hepatic affections and against rheumatic pains	Roots	Perennial shrub. Spring–summer	Very rare
Asclepiadaceae					
<i>Araujia hortorum</i> E. Fourn. (RIOC 529)	Tasi	Galactogoge	Fruits and roots	Perennial shrub. Spring–summer	Poor common
<i>Asclepias mellodora</i> A. St-Hill. (RIOC 2054)	Yerba de la vida	Emetic	Leaves	Shrub Perennial. Spring–summer	Fairly abundant
<i>Morrenia brachystephana</i> Griseb. (RIOC 837)	Tasi	Galactogoge and odontalgic	Roots	Perennial shrub. Spring–summer	Abundant
<i>Morrenia odorata</i> (Hook. et Arn.) Lindl. (RIOC 1248)	Tasi	Galactogoge and odontalgic	Roots	Perennial shrub. Spring–summer	Abundant
Asteraceae					
<i>Acanthospermum australe</i> (Loefl.) Kuntze (RIOC 652)	Torito	Diaphoretic, depurative of blood and astringent	Leaves and stems	Annual herb. Spring–summer	Fairly abundant
<i>Acanthospermum hispidum</i> DC. (RIOC 2352)	Cuajilla	Diaphoretic, depurative of blood and astringent	Leaves and stems	Annual herb. Spring–summer	Very common
<i>Achyrocline satureioides</i> (Lam.) DC. (RIOC 4658)	Marcela hembra	Digestive and eupeptic.	Flowers	Perennial shrub. Spring–summer	Abundant
<i>Achyrocline tomentosa</i> Rusby (RIOC 693)	Marcela	Digestive and eupeptic	Flowers	Perennial shrub. Spring–summer	Abundant
<i>Acmella decumbens</i> (Sm.) R. K. Jansen var. <i>decumbens</i> (RIOC 1618)	Ñil-ñil	Odontalgic and pectoral	Roots	Perennial shrub. Spring–summer	Fairly abundant
<i>Ambrosia elatior</i> L. (RIOC 2251)	Altamisa	Against headache, expectorant and contraceptive	Leaves and stems	Annual herb. Spring–summer	Abundant
<i>Ambrosia tenuifolia</i> Spreng. (RIOC 3780)	Altamisa	Digestive, against headache, antineuralgic, against rheumatic pains, lithiasis and myorrelaxing	Leaves and stems	Perennial shrub. Spring–summer	Very common

Table 1 (Continued)

Species	Vernacular name	Medicinal uses	Utilized parts	Characteristic of growth.	Distribution
<i>Baccharis articulata</i> (Lam.) Pers. (RIOCI 1801)	Carquejilla	Against hepatic affections and diuretic	Leaves and stems	Shrub. Spring–summer	Very common
<i>Baccharis coridifolia</i> DC. (RIOCI 634)	Nío	Pesticide	Leaves and stems	Perennial shrub. Spring–summer	Very common
<i>Baccharis pingraea</i> DC. f. <i>pingraea</i> (RIOCI 1285)	Chilca	Antirheumatic, anti-inflammatory, anticancer and antisyphilitic	Leaves and stems	Perennial shrub. Spring–summer	Very common
<i>Baccharis salicifolia</i> (Ruiz. & Pav.) Pers. (RIOCI 3782)	Chilca amarga	Against rheumatic pains, anti-inflammatory, anticancer and antisyphilitic	Leaves and stems	Shrub. Spring–summer	Very common
<i>Chaptalia sinuata</i> (Less.) Baker (RIOCI 1177)	Yerba de San Juan	Expectorant, febrifuge, sedative, diuretic and expectorant	Leaves, roots and stems	Perennial shrub. Spring–summer	Abundant
<i>Conyza bonariensis</i> (L.) Cronquist var. <i>bonariensis</i> (RIOCI 387)	Rama negra	Antiacid, pectoral and curative of cough	Leaves	Annual herb. Spring–summer	Very common
<i>Erechthites hieracifolia</i> (L.) Raf. ex DC. var. <i>cacalioides</i> (Fisch. ex Spreng.) Griseb. (RIOCI 1888)	Erechtites	Antimicrobial	Leaves and stems	Annual herb. Spring–summer	Abundant
<i>Eupatorium artemisiifolium</i> Griseb. (RIOCI 981)	Artemisia	Aperitive tonic	Leaves and stems	Perennial shrub. Spring–summer	Fairly abundant
<i>Eupatorium buniifolium</i> Hook. & Arn. var. <i>buniifolium</i> (RIOCI 1265)	Romerillo	Aperitive tonic	Leaves and stems	Shrub. Spring–summer	Abundant
<i>Eupatorium macrocephalum</i> Less. (RIOCI 2357)		Curative of cough and against hepatic affections	Leaves and stems	Perennial shrub. Spring–summer	Fairly abundant
<i>Eupatorium subhastatum</i> Hook. & Arn. (RIOCI 680)	Pilarcito	Against hepatic affections, anti-inflammatory, vulnerary and antipruritus	Leaves and stems	Perennial shrub. Spring–summer	Fairly abundant
<i>Gaillardia megapotamica</i> (Spreng.) Baker var. <i>megapotamica</i> (RIOCI 4089)	Topasaire	Antineuralgic, against headache, antiallopecic and antiseborrheic	Flowers and leaves	Perennial shrub. Spring–summer	Abundant
<i>Gaillardia megapotamica</i> (Spreng.) Baker var. <i>radiata</i> (Griseb.) Baker (RIOCI 3524)	Gaillardia	Antineuralgic, against headache, antiallopecic and antiseborrheic	Flowers and leaves	Perennial shrub. Spring–summer	Abundant
<i>Gamochaeta coartata</i> (Willd.) Kerguelén (RIOCI 1184)	Vira	Curative of cough and pectoral	Leaves and stems	Perennial shrub. Autumn–winter	Very common
<i>Gnaphalium cheiranthifolium</i> Lam. (RIOCI 4433)	Marcela macho	Digestive and depurative of blood	Flowers, leaves and stems	Annual herb. Spring–summer	Very common
<i>Gnaphalium gaudichaudianum</i> DC. (RIOCI 4604)	Marcela macho	Digestive and depurative of blood	Flowers, leaves and stems	Annual herb. Spring–summer	Very common
<i>Grindelia pulchella</i> Dunal (RIOCI 1909)	Melosa	Antipoison, febrifuge and against rheumatic pains	Leaves and stems	Perennial shrub Spring–summer	Fairly abundant
<i>Heterothalamus alienus</i> (Spreng.) Kuntze (RIOCI 1773)	Romerillo	Renal affections	Leaves	Shrub. Spring–summer	Abundant
<i>Jungia polita</i> Griseb. (RIOCI 2085)	Zarzaparrilla	Depurative of blood and antisclera	Leaves and stems	Shrub. Spring–summer	Very rare
<i>Mikania periplocifolia</i> Hook. et Arn. (RIOCI 2091)	Enredadera del campo	Alexipharmac	Flowers and leaves	Perennial shrub. Spring–summer	Abundant
<i>Ophryosporus axilliflorus</i> (Griseb.) Hieron. (RIOCI 1260)	Charrúa	Antisyphilitic and against dermic affections	Leaves	Shrub. Spring–summer	Fairly abundant
<i>Parthenium hysterophorus</i> L. (RIOCI 3784)	Vira-vira	Aperitive tonic, febrifuge, depurative of blood and analgesic	Flowers and leaves	Annual herb. Spring–summer	Fairly abundant
<i>Perezia multiflora</i> (Humb. & Bonpl.) Less. subsp. <i>multiflora</i> (RIOCI 2636)	Escorzonera	Emollient, diuretic and digestive	Roots	Annual herb. Spring–summer	Fairly abundant
<i>Picrosia longifolia</i> D. Don. (RIOCI 1145)	Picrosia	Deodorant, diuretic and weak laxative	Leaves and stems	Perennial shrub. Spring–summer	Fairly abundant
<i>Pluchea sagittalis</i> (Lam.) Cabrera (RIOCI 4250)	Lucera	Aromatizant, aperitive tonic, pectoral and antisyphilitic	Leaves and stems	Perennial shrub. Spring–summer	Abundant

<i>Porophyllum obscurum</i> Spreng. (RIOC 782)	Yerba del venado	Diaphoretic and antispasmodic	Leaves and stems	Perennial shrub. Spring–summer	Rare
<i>Porophyllum ruderale</i> (Jacq.) Cass. (RIOC 4236)	Yerba del ciervo	Diaphoretic, hemostatic and cicatrizant	Leaves and stems	Perennial shrub. Spring–summer	Rare
<i>Proustia cuneifolia</i> D. Don. var. <i>mendocina</i> (Phil.) Ariza (RIOC 1635)	Charcoma	Against rheumatic pains and antiamaurosis	Leaves and roots	Shrub. Spring–summer	Fairly abundant
<i>Pterocaulon alopecuroides</i> (Lam.) DC. (RIOC 697)	Toto-caamorotí	Digestive and against hepatic affections	Leaves and stems	Perennial shrub. Spring–summer	Abundant
<i>Pterocaulon cordobense</i> Kuntze (RIOC 585)		Against hepatic affections and pesticide	Leaves and stems	Perennial shrub. Spring–summer	Abundant
<i>Pterocaulon virgatum</i> (L.) DC. (RIOC 1507)	Yaguareté caá	Against hepatic affections and pesticide	Leaves and stems	Perennial shrub. Spring–summer	Abundant
<i>Schkuhria pinnata</i> (Lam.) Kuntze ex Thell. (RIOC 552)	Matapulga	Depurative of blood, slimming and pesticide	Leaves	Annual herb. Spring–summer	Abundant
<i>Solidago chilensis</i> Meyen var. <i>chilensis</i> (RIOC 3234)	Vara de oro	Against headache and sedative	Roots	Perennial shrub. Spring–summer	Very common
<i>Tagetes argentina</i> Cabrera (RIOC 2995)	Chilchil del campo	Diuretic and digestive	Leaves and stems	Annual herb. Spring–summer	Abundant
<i>Tagetes filifolia</i> Lag. (RIOC 733)	Anisillo	Carminative and eupeptic	Leaves and stems	Annual herb. Spring–summer	Abundant
<i>Tagetes minuta</i> L. (RIOC 1258)	Suico	Aromatizant, digestive, aperitive tonic and pesticide	Leaves and stems	Annual herb. Spring–summer	Very common
<i>Thelesperma megapotamicum</i> (Spreng.) Kuntze (RIOC 420)	Té pampa	Digestive and antispasmodic	Leaves	Perennial shrub. Spring–summer	Abundant
<i>Trichocline plicata</i> D. Don ex Hook. & Arn. (RIOC 2580)	Topasaire plateado	Analgesic, gastrointestinal	Roots	Perennial shrub. Spring–summer	Fairly abundant
<i>Trichocline reptans</i> (Wedd.) Rob. (RIOC 2445)	Árnica	Digestive, aromatizant and diaphoretic	Roots	Perennial shrub. Spring–summer	Fairly abundant
<i>Trichocline sinuata</i> (D. Don.) Cabrera (RIOC 826)	Árnica	Digestive, aromatizant and diaphoretic	Roots	Perennial shrub. Spring–summer	Fairly abundant
<i>Trixis divaricata</i> (Kunth) Spreng. subsp. <i>discolor</i> (D. Don.) Katinas (RIOC 2381)	Contra yerba	Diaphoretic and rubefacient	Leaves	Perennial shrub. Spring–summer	Fairly abundant
<i>Vernonia mollissima</i> D. Don ex Hook. & Arn. (RIOC 454)		Diaphoretic	Leaves	Perennial shrub. Spring–summer	Abundant
<i>Xanthium ambrosioides</i> Hook. & Arn. (RIOC 1824)	Abrojo de vizcacheras	Respiratory affections, against hepatic affections or renal affections, depurative of blood, antispasmodic and vulnerary	Leaves and stems	Annual herb. Spring–summer	Fairly abundant
<i>Zinnia peruviana</i> (L.) L. (RIOC 484)	Chinita del campo	Against Malaria	Leaves	Annual herb. Spring–summer	Abundant
Berberidaceae					
<i>Berberis ruscifolia</i> Lam. (RIOC 960)	Quebrachillo	Against Malaria, eupeptic, against hepatic affections and anti-inflammatory	Leaves and stems	Shrub. Spring–summer	Fairly abundant
Bignoniaceae					
<i>Dolichandra cynanchoides</i> Cham. (RIOC 718)	Sacha huasca	Antidiarrheic and antiemetic	Leaves	Shrub. Spring–summer	Fairly abundant
Boraginaceae					
<i>Heliotropium amplexicaule</i> Vahl (RIOC 828)	Heliotropo cimarrón	Diuretic, depurative of blood and diaphoretic	Flowers and leaves	Perennial shrub. Spring–summer	Fairly abundant
Brassicaceae					
<i>Lepidium bonariensis</i> L. var. <i>bonariensis</i> (RIOC 1365)	Mastuerzo	Digestive	Leaves	Annual herb. Autumn–winter	Very common

Table 1 (Continued)

Species	Vernacular name	Medicinal uses	Utilized parts	Characteristic of growth.	Distribution
Buddlejaceae					
<i>Buddleja cordobensis</i> Griseb. (RIOCI 1361)	Salvia blanca	Astringent and vulnerary	Leaves	Shrub. Spring–summer	Fairly abundant
<i>Buddleja mendozensis</i> Benth. (RIOCI 4389)	Salvia blanca	Antiparalytic and muscular tonic (parturition)	Leaves	Perennial shrub. Spring–summer	Poor abundant
Cannaceae					
<i>Canna glauca</i> L. (RIOCI 1027)	Achira	Diuretic, diaphoretic, against rheumatic pains and antitotalgic	Roots	Perennial shrub. Spring–summer	Rare
Capparaceae					
<i>Capparis atamisquea</i> Kuntze (RIOCI 1955)	Atamisqui	Against rheumatic pains, digestive and antiacid	Fruits and leaves	Shrub. Spring–summer	Fairly abundant
Caprifoliaceae					
<i>Sambucus australis</i> Cham. & Schldtl. (RIOCI 114)	Sauco	Digestive, diuretic and diaphoretic	Flowers	Tree. Spring–summer	Fairly abundant
Caryophyllaceae					
<i>Arenaria lanuginosa</i> (Michx.) Rohrb. var. <i>lanuginosa</i> (RIOCI 1798)	Arenaria	Astringent	Leaves and stems	Annual herb. Spring–summer	Fairly abundant
<i>Cardionema ramosissima</i> (Weinm.) A. Nelson & J.F. Macbr. (RIOCI 310)	Dicha	Against hepatic affections	Leaves	Perennial herb. Spring–summer	Fairly abundant
Celastraceae					
<i>Maytenus boaria</i> Molina (RIOCI 1314)	Maitén	Catartic and febrifuge	Leaves	Tree. Spring–summer	Very rare
Celtidaceae					
<i>Celtis tala</i> Planchon (RIOCI 550)	Tala	Digestive, disinfectant and respiratory affections	Leaves	Tree. Spring–summer	Abundant
Chenopodiaceae					
<i>Chenopodium ambrosioides</i> L. (RIOCI 4608)	Paico macho	Digestive, stimulative, diaphoretic and vermifuge	Leaves	Annual herb. Spring–summer	Very common
<i>Chenopodium multifidum</i> L. (RIOCI 281)	Paico hembra	Digestive, diaphoretic, carminative, against hepatic affections and stimulative	Leaves	Perennial shrub. Spring–summer	Fairly abundant
Clusiaceae					
<i>Hypericum campestre</i> Cham. & Schldtl. subsp. <i>campestre</i> (RIOCI 540)	Cabo toril	Cardiotonic, vulnerary and against respiratory affections	Leaves	Perennial shrub. Spring–summer	Rare
<i>Hypericum connatum</i> Lam. (RIOCI 482)	Cabo toril	Cardiotonic, vulnerary and against respiratory affections	Leaves	Perennial shrub. Spring–summer.	Rare
Commelinaceae					
<i>Commelina erecta</i> L. (RIOCI 1942)	Flor de Santa Lucía	Ophtalmic, antiviral and antihemorrhagic	Flowers	Perennial shrub. Spring–summer.	Abundant
Convolvulaceae					
<i>Dichondra microcalix</i> (Hallier F.) Fabris (RIOCI 5174)	Oreja de ratón	Digestive	Leaves and stems	Perennial shrub. Spring–summer	Abundant
<i>Dichondra sericea</i> Sw. var. <i>holosericea</i> (O' Donell) Fabris (RIOCI 579)	Oreja de ratón	Cicatrizant	Leaves and stems	Perennial shrub Spring–summer	Abundant
<i>Ipomoea hieronymi</i> (Kuntze) O'Donell. var. <i>hieronymi</i> O'Don (RIOCI 1635)	Campanilla	Drastic	Leaves and tuber	Perennial shrub. Spring–summer	Fairly abundant
Cyperaceae					
<i>Bulbostylis capillaris</i> (L.) Clarke (RIOCI 3617)	Bulbostylis	Contraceptive	Stems and leaves	Annual herb. Spring–summer	Abundant
<i>Killingia odorata</i> Vahl (RIOCI 3525)	Capií-catí	Diaphoretic, diuretic and antispasmodic	Leaves and rhizome	Perennial shrub Spring–summer	Very rare

Ephedraceae	<i>Ephedra americana</i> Humb. et Bonpl. ex Willd. (RIOCI 1598)	Tramontana	Diuretic	Stems	Spring–summer	Fairly abundant
Equisetaceae	<i>Equisetum giganteum</i> L. (RIOCI 795)	Cola de caballo	Diuretic, against hepatic, renal and splenic affections	Stems	Perennial shrub Spring–summer	Fairly abundant
Euphorbiaceae	<i>Croton parvifolius</i> Müll. Arg. (RIOCI 294)	Yerba del venado	Digestive	Leaves	Perennial shrub. Spring–summer	Fairly abundant
	<i>Julocroton subapannosus</i> Müll var. <i>subapannosus</i> (RIOCI 578)	Pulmonaria	Expectorant	Leaves	Annual herb. Spring–summer	Abundant
	<i>Sapium haematospermum</i> Müll. Arg. (RIOCI 716)	Curupí	Odontalgic and toxic	Seeds	Tree. Spring–summer	Fairly abundant
	<i>Tragia geraniifolia</i> Klotzsch ex Baill. (RIOCI 2361)	Raspáculo	Emollient and urticant	Roots	Perennial shrub. Spring–summer	Abundant
Fabaceae	<i>Acacia caven</i> (Molina). Molina var. <i>caven</i> (RIOCI 1376)	Espinillo	Astringent, disinfectant, antiasthmatic and curative of cough	Seeds and leaves	Tree. Spring–summer	Abundant
	<i>Caesalpinia gilliesii</i> (Wall. ex Hook.) D. Dietr. (RIOCI 1120)	Lagaña de perro	Toxic	Seeds	Shrub. Spring–summer	Fairly abundant
	<i>Otholobium higuierilla</i> (Gillies ex Hook.) Grimes. (RIOCI 544)	Higuierilla	Digestive and vulnerary	Leaves	Perennial shrub. Spring–summer	Abundant
	<i>Prosopis alba</i> Griseb. var. <i>alba</i> (RIOCI 3113)	Algarrobo blanco	Astringent, opthalmic and lithiasis	Fruits	Tree. Spring–summer	Fairly abundant
	<i>Prosopis nigra</i> (Griseb.) Hieron. var. <i>nigra</i> (RIOCI 1564)	Algarrobo negro	Opthalmic and digestive	Fruits	Tree. Spring–summer	Fairly abundant
	<i>Rhynchosia diversifolia</i> Micheli. (RIOCI 4195)	Porotillo	Against hepatic affections, drastic, purgative and emollient	Leaves	Perennial shrub. Spring–summer	Abundant
	<i>Senna corymbosa</i> (Lam.) H.S. Irwin & Barneby (RIOCI 772)	Sen del campo	Strong purgative	Fruits and leaves	Tree. Spring–summer	Fairly abundant
	<i>Senna morongii</i> (Britton) H.S. Irwin & Barneby (RIOCI 4224)	Sen del campo	Drastic	Fruits and leaves	Shrub. Spring–summer	Abundant
Gentianaceae	<i>Gentianella achalensis</i> (Hieron. ex Gilg.) T.N. Ho & S.W. Liu (RIOCI 1273)	Amargón	Digestive and febrifuge	Roots	Annual herb. Spring–summer	Abundant
Hydrophyllaceae	<i>Nama undulatum</i> Kunth. var. <i>undulatum</i> (RIOCI 1133)	Yerba del zorro	Pesticide	Leaves	Annual herb. Spring–summer	Fairly abundant
Iridaceae	<i>Sisyrinchium chilense</i> Hook. (RIOCI 1526)	Marancel	Curative of cough, pectoral and against hepatic affections	Leaves	Perennial shrub. Spring–summer	Very common
Lamiaceae	<i>Hedeoma multiflora</i> Benth. (RIOCI 456)	Tomillo de la sierra	Aromatizant and digestive	Flowers, leaves and stems	Perennial shrub Spring	Very rare
	<i>Hyptis mutabilis</i> (Rich.) Briq. (RIOCI 1559)	Verbena negra	Diaphoretic, carminative, and vulnerary	Leaves	Perennial herb. Spring–summer	Abundant
	<i>Minthostachys mollis</i> Griseb. (RIOCI 509)	Peperina	Digestive, antispasmodic, antidiarrheic and against rheumatic pains	Flowers, leaves and stems	Perennial shrub Spring–summer	Fairly abundant
	<i>Salvia gilliesii</i> Benth. (RIOCI 2071)	Salvia morada	Febrifuge and against palpitations	Leaves	Shrub. Spring–summer	Abundant

Table 1 (Continued)

Species	Vernacular name	Medicinal uses	Utilized parts	Characteristic of growth.	Distribution
<i>Satureja odora</i> (Griseb.) Epling. (RIOCI 1797)	Salvilori	Digestive and antiacid	Leaves and stems	Shrub. Spring–summer	Fairly abundant
<i>Teucrium grisebachii</i> Hieron. ex Epling. (RIOCI 1136)	Ajenjo	Hypocholesterolemic	Leaves	Perennial shrub. Spring–summer	Fairly abundant
Linaceae					
<i>Cliococca sellaginooides</i> (Lam.) C.M. Rogers & Mildner (RIOCI 2504)	Merú-laguen	Aperitive tonic and appetizer	Leaves and stems	Perennial shrub Autumn–winter	Abundant
Lomariopsidaceae					
<i>Elaphoglossum gayanum</i> (Fée) T. Moore (RIOCI 1266)	Calaguala	Against hepatic affections	Leaves	Perennial herb. Autumn–winter	Fairly abundant
Loranthaceae					
<i>Ligaria cuneifolia</i> (Ruiz ex Pavon) Thiegh. (RIOCI 576)	Liga roja	Antihypertensive	Leaves and stems	Shrub. Spring–summer	Abundant
<i>Tripodanthus flagellaris</i> Cham. & Schtdl. (RIOCI 5239)	Liga blanca	Antihypertensive	Leaves and stems	Shrub. Spring–summer	Fairly abundant
Lycopodiaceae					
<i>Huperzia saururus</i> (Lam.) Trevis. (RIOCI 1946)	Cola de quirquincho	Aphrodisiac and antiallopecic	Leaves and stems	Perennial shrub. Spring–veral	Very rare
<i>Lycopodium clavatum</i> L. (RIOCI 2181)	Pillijan	Carminative, expectorant and diuretic	Leaves and stems	Perennial shrub Spring–summer	Very rare
Lythraceae					
<i>Cuphea glutinosa</i> Cham. & Schtdl. (RIOCI 1157)	Siete sangrías	Against Malaria, diuretic, depurative of blood and antihypertensive	Leaves and stems	Perennial shrub. Spring–veral	Abundant
<i>Heimia salicifolia</i> (Kunth) Link. (RIOCI 520)	Quiebra arado	Diuretic, purgative, vulnerary and pesticide	Roots	Perennial shrub Spring–summer	Abundant
Malpighiaceae					
<i>Janusia guaranitica</i> (A. St-Hil.) A. Juss. (RIOCI 520)	Yerba de la vida	Digestive	Leaves and stems	Perennial shrub. Spring–veral	Fairly abundant
Malvaceae					
<i>Abutilon pauciflorum</i> A. St-Hill. (RIOCI 635)	Farolito	Curative of cough	Leaves and stems	Shrub. Spring–verareno	Fairly abundant
<i>Malvastrum coromadelianum</i> (L.) Garcke. subsp. <i>capitato-spicatum</i> (Kuntze) S.R. Hill. (RIOCI 632)	Escoba dura macho	Diuretic and emollient	Leaves and stems	Perennial shrub. Spring–summer	Very common
<i>Modiola caroliniana</i> (L.) G. Don (RIOCI 1962)	Sanalotodo	Refreshment, sedative and emollient	Leaves and stems	Spring–summer	Very common
Myrtaceae					
<i>Psidium luridum</i> (Spreng.) Burret (RIOCI 1170)	Alpamato	Aromatizant and digestive	Flowers	Perennial shrub. Spring–summer	Abundant
Nyctaginaceae					
<i>Boerhavia diffusa</i> L. var. <i>diffusa</i> (RIOCI 1159)	Yerba tostada	Purgative, emetic and diuretic	Bark	Perennial shrub Spring–summer	Fairly abundant
<i>Mirabilis jalapa</i> L. (RIOCI 998)	Dondiego de noche	Purgative and emetic	Leaves	Perennial shrub. Spring–summer	Abundant
Olacaceae					
<i>Ximenia americana</i> L. var. <i>argentinensis</i> De Filippis (RIOCI 1651)	Albaricoque	Depurative of blood	Leaves	Shrub. Spring–summer	Abundant
Onagraceae					
<i>Ludwigia peploides</i> (Kunth.) P.H. Raven subsp. <i>peploides</i> (RIOCI 653)	Duraznillo de agua	Emollient	Leaves	Perennial shrub. Spring–summer	Abundant
<i>Oenothera affinis</i> Cambess (RIOCI 1488)	Suspiros	Disinfectant and vulnerary	Leaves and flowers	Herb bienal. Spring	Abundant
Passifloraceae					
<i>Passiflora caerulea</i> L. (RIOCI 1886)	Pasionaria	Sedative	Leaves	Herb. Spring–summer	Fairly abundant
<i>Passiflora foetida</i> L. (RIOCI 2251)	Pasionaria	Sedative	Leaves	Herb. Spring–summer	Fairly abundant

Phytolacaceae						
<i>Rivina humilis</i> L. (RIOCI 611)	Hierba del cáncer	Against hepatic affections and expectorant	Leaves	Perennial shrub	Spring–summer	Fairly abundant
Poaceae						
<i>Cortaderia selloana</i> (Schultes) Asch. & Graeb. (RIOCI 77)	Cortadera	Against hepatic affections, renal affections and capillary tonic	Roots	Perennial shrub.	Spring–summer	Very common
<i>Cynodon dactylon</i> (L.) Pers. (RIOCI 1287)	Gramón	Diuretic, laxative and antibleorrhagic	Rhizome and roots	Perennial shrub.	Spring–summer	Very common
<i>Paspalum notatum</i> Flueg. var. <i>notatum</i> (RIOCI 119)	Pasto horqueta	Antigonorrhoeic and diuretic	Roots	Perennial shrub.	Spring–summer	Very common
<i>Schyzachirium microstachyum</i> (Desv.) Ros. Arech. et Izag. (RIOCI 947)	Paja colorada	Antiasthmatic	Roots	Perennial shrub.	Spring–summer	Very common
<i>Sorghastrum pellitum</i> (Hack.) Parodi (RIOCI 262)	Pasto vaca	Antidysenteric	Roots	Perennial shrub.	Spring–summer	Very common
<i>Sporobolus indicus</i> (L.) Brong. (RIOCI 125)	Esporobolo	Contraceptive	Leaves	Perennial shrub.	Spring–summer	Very common
Polygalaceae						
<i>Monnina dictyocarpa</i> Griseb. (RIOCI 1023)	Monina	Antidiarrheic and digestive	Leaves and stems	Perennial shrub.	Spring–summer	Fairly abundant
Polygonaceae						
<i>Polygonum acuminatum</i> Kunth. (RIOCI 1018)	Durazno del agua	Vulnerary, diuretic and antisiphilitic	Leaves	Perennial shrub.	Spring–summer	Abundant
<i>Polygonum punctatum</i> Elliott (RIOCI 3402)	Ajicillo	Antidiarrheic, caustic and disinfectant	Leaves	Perennial shrub.	Spring–summer	Abundant
<i>Rumex cuneifolius</i> Campd. (RIOCI 4143)	Lengua de vaca	Emollient, stimulative, vulnerary and purgative	Leaves and roots	Perennial shrub.	Spring–summer	Fairly abundant
<i>Ruprechtia apetala</i> Wedd. (RIOCI 1542)	Manzano del campo	Diuretic	Bark	Perennial shrub.	Spring–summer	Fairly abundant
Portulacaceae						
<i>Talinum paniculatum</i> (Jacq.) Gaertn. (RIOCI 1573)	Carne gorda	Refreshment	Leaves	Perennial shrub.	Spring–summer	Fairly abundant
Primulaceae						
<i>Samolus valerandi</i> L. (RIOCI 1147)	Arambola blanca	Antiscorbutic	Leaves	Perennial herb.	Autumn–winter	Fairly abundant
Pteridaceae						
<i>Adiantum orbygnianum</i> Mett. ex Kuhn. (RIOCI 2119)	Culandrillo	Against hepatic affections and expectorant	Leaves	Perennial shrub	Spring–summer	Fairly abundant
<i>Adiantum raddianum</i> Presl. (RIOCI 1307)	Culandrillo	Expectorant, curative of cough and pectoral	Leaves	Perennial shrub.	Spring–summer	Abundant
<i>Adiantum thalictroides</i> Willd. ex Schtdl. (RIOCI 2294)	Culantrillo	Expectorant, curative of cough and pectoral	Leaves	Perennial shrub.	Spring–summer	Fairly abundant
Ranunculaceae						
<i>Anemone decapetala</i> Ard. var. <i>decapetala</i> . (RIOCI 2200)	Centella	Rubefacient, caustic and narcotic	Leaves and stems	Perennial shrub.	Autumn–winter	Abundant
<i>Thalictrum decipiens</i> Boivin (RIOCI 821)	Albaquilla del campo	Purgative, diuretic, anti-icterus and against hepatic affections	Roots	Perennial shrub.	Spring–summer	Fairly abundant
Rhamnaceae						
<i>Colletia spinosissima</i> J.F. Gmel. (RIOCI 1464)	Tola	Astringent and febrifuge	Leaves and stems	Shrub.	Spring–summer	Abundant
<i>Condalia microphylla</i> Cav. (RIOCI 895)	Piquillín	Laxative	Flowers	Tree.	Spring–summer	Fairly abundant
<i>Discaria americana</i> Gillies. & Hook. (RIOCI 1965)	Brusquilla	Febrifuge, stimulative and dermic affections	Bark and roots	Shrub.	Spring–summer	Fairly abundant
Rosaceae						
<i>Kageneckia lanceolata</i> Ruiz & Pavon. (RIOCI 1179)	Sacha durazno	Febrifuge and emetic	Leaves and stems	Tree.	Spring–summer	Fairly abundant
<i>Margyricarpus pimatus</i> (Lam.) Kuntze. (RIOCI 363)	Yerba de la perdiz	Diuretic and astringent	Leaves and stems	Perennial shrub.	Autumn–winter	Abundant

Table 1 (Continued)

Species	Vernacular name	Medicinal uses	Utilized parts	Characteristic of growth.	Distribution
<i>Polylepis australis</i> Bitter. (RIOC 1729)	Tabaquillo	Astringent	Leaves	Tree. Spring–summer	Fairly abundant
Rubiaceae					
<i>Mitracarpus megapotamicus</i> (Spreng.) Kuntze (RIOC 642)	Peladilla	Against Malaria	Leaves and stems	Perennial shrub. Spring–summer	Abundant
Rutaceae					
<i>Fagara coco</i> (Gillies) Engl. (RIOC 293)	Coco	Diaphoretic and astringent	Bark	Tree. Spring–summer	Fairly abundant
Santalaceae					
<i>Jodina rhombifolia</i> (Hook. & Arn.) Reisseck (RIOC 673)	Peje	Antidiarrheic, anti-inflammatory, cordial and curative of cough	Fruits, leaves and bark	Tree. Spring–summer	Abundant
Sapindaceae					
<i>Cardiospermum halicacabum</i> L. var. <i>halicacabum</i> (RIOC 3233)	Globito	Diuretic and deodorant	Roots	Annual herb. Spring–summer	Fairly abundant
Schizaceae					
<i>Anemia tomentosa</i> (Savigny) Sw. var. <i>australis</i> Mickel. (RIOC 2123)	Doradilla	Depurative of blood	Leaves	Perennial shrub. Spring–summer	Fairly abundant
Schrophulariaceae					
<i>Agalinis genistifolia</i> (Cham. & Schldl.) D'Arcy. (RIOC 2676)	Conejito silvestre	Diuretic and purgative	Leaves and stems	Annual herb. Autumn–winter	Rare
<i>Mimulus glabratus</i> Kunth. (RIOC 860)	Berro	Against hepatic affections	Leaves and stems	Perennial shrub. Autumn–summer	Rare
<i>Scoparia montevidensis</i> (Spreng.) R.E. Fr. (RIOC 1138)	Canchalagua	Emenagogue, vulnerary and against hepatic affections	Leaves	Annual herb. Spring–winter	Abundant
Solanaceae					
<i>Capsicum chacoense</i> Hunz. (RIOC 1652)	Ají del monte	Against hepatic affections, rubefacient and against rheumatic pains	Fruits	Perennial shrub. Spring–summer	Very rare
<i>Cestrum parqui</i> L'Hér. (RIOC 647)	Duraznillo negro	Antihemorroidal, anticancer, diaphoretic, antispasmodic and carminative	Leaves	Shrub. Spring–summer	Very common
<i>Petunia axillaris</i> (Lam.) Britton, Stern & Poggenb. subsp. <i>parodii</i> (Steere) Cabrera (RIOC 409)	Tabaco de indio	Narcotic and toxic	Leaves	Annual herb. Spring–summer	Abundant
<i>Solanum sisymbriifolium</i> Lam. var. <i>sisymbriifolium</i> (RIOC 469)	Espina colorada	Analgesic, anti-inflammatory, against hepatic affections and sedative	Leaves and stems	Perennial shrub. Spring–summer	Very common
Urticaceae					
<i>Urtica dioica</i> L. var. <i>mollis</i> (Steud.) Wedd. (RIOC 696)	Ortiga	Astringent, diuretic and against hepatic affections	Leaves	Perennial shrub. Autumn–summer	Abundant
<i>Urtica spatulata</i> Sm. (RIOC 5317)	Ortiga crespá	Astringent, diuretic and against hepatic affections	Leaves	Annual Herb. Autumn–summer	Fairly abundant
Valerianaceae					
<i>Valeriana polybotrya</i> (Griseb.) Höck. (RIOC 788)	Valeriana	Sedative	Roots	Perennial shrub. Spring–summer	Fairly abundant
Verbenaceae					
<i>Aloysia gratissima</i> (Gillies. & Hook.) Tronc. (RIOC 1039)	Palo amarillo	Cardiotonic, sedative, carminative, diaphoretic and digestive	Flowers and leaves	Shrub. Spring–summer	Very common
<i>Glandularia peruviana</i> (L.) Small. (RIOC 4454)	Margarita punzó	Antispasmodic	Leaves	Perennial shrub. Spring–summer	Very common
<i>Glandularia platensis</i> (Spreng.) Schnack & Covas (RIOC 855)	Verbena blanca	Contraceptive and antihysterical	Leaves and flowers	Perennial shrub. Spring–summer	Abundant

<i>Lantana balansae</i> Briq. f. <i>balansae</i> (RIOC 513)	Lantana de la sierra	Febrifuge	Leaves and stems	Shrub. Spring–summer	Abundant
<i>Lantana fucata</i> Lindl. (RIOC 1637)	Lantana de la sierra	Febrifuge	Leaves and stems	Shrub. Spring–summer	Abundant
<i>Lantana grisebachii</i> Seckt. var. <i>grisebachii</i> (RIOC 1128)	Lantana de la sierra	Febrifuge	Leaves and stems	Shrub. Spring–summer	Abundant
<i>Lantana megapotamica</i> (Spreng.) Tronc. (RIOC 2100)	Lantana de la sierra	Febrifuge	Leaves and stems	Shrub. Spring–summer	Abundant
<i>Lippia turbinata</i> Griseb. (RIOC 546)	Poleo	Digestive and aromatizant	Leaves	Shrub. Spring–summer	Very common
<i>Verbena bonariensis</i> L. (RIOC 1989)	Verbena	Antispasmodic	Leaves	Perennial shrub. Autumn–winter	Very common
<i>Verbena intermedia</i> Gillies & Hook. f. <i>intermedia</i> . (RIOC 1798)	Verbena	Against hepatic affections	Leaves and stems	Perennial shrub. Spring	Very common
Violaceae					
<i>Hybanthus parviflorus</i> (Mutis et L.f) Baill. (RIOC 956)	Mautecillo	Emetic and purgative	Leaves and stems	Perennial shrub. Spring–summer	Abundant
<i>Hybanthus serratus</i> (Phil.) Hassl. (RIOC 2375)	Mautecillo	Emetic and purgative	Leaves and stems	Perennial shrub. Spring–summer	Rare
Zygophyllaceae					
<i>Porlieria microphylla</i> (Baill.) Descole, O'Donnell & Lourteig (RIOC 612)	Guayacán	Against rheumatic pains and vulnery	Leaves and stems	Shrub. Spring–summer	Abundant
<i>Larrea divaricata</i> Cav. (RIOC 501)	Jarilla	Rubefacient, pedic deodorant and anti-inflammatory	Fruits and leaves	Shrub. Spring–summer	Fairly abundant

Table 2

Comparison between Argentine and “Sierras de Comechingones” flora

	Medicinal flora of Argentina	Medicinal flora of “Sierra de Comechingones”	Percentage with respect to total Argentine flora (%)
No. de families	102	64	63
No. de species	602	186	31
Dicotyledoneous	520	166	32
Monocotyledoneous	59	10	17
Gymnosperms	4	1	25
Pteridophytes	19	8	42

The data shown in the column 2 were taken from Saggese (1959), Font Quer (1962), Ratera and Ratera (1980), Pagliarone et al. (1994), Marzocca (1997), Lahite et al. (1998), Volkman and Von Müller (1999) and Alonso (2004). The data in column 3 compiles the information obtained during 26 years of study.

of illnesses, used parts, distribution and season of collection were reported.

3.2. Ethnomedicinal uses

The complaints most commonly treated concerned the digestive, hepatic and urinary illnesses (Table 4). However, the plants are less frequently used to deal with diseases of other types (i.e. circulatory), since it is not easy to relate these to specific symptomatology (Nuñez and Cantero, 2000).

The majority of remedies were prepared from fresh material in the form of a decoction (56%) or an infusion (25.3%). The most widely used remedies are derived from leaves or stems. Leaves (86.6%) and stems (36.6%) were the most frequently used parts of the plant, followed by roots (15.1%) and flowers (10.8%). Other plant parts were also sometimes used, such as fruits (5.4%), bark (3.2%), seeds (1.6%), rhizomes (1.1%) and tubercles (0.5%) (Table 1).

The most frequently used mode of remedy administration is oral ingestion, followed by baths, and cataplasms. Other ways of administration include direct application, such as inhalation, rubbing, or by drops.

Table 3

The most representative families of medicinal plants of Argentine and “Sierras de Comechingones”

Families	Species of medicinal plants of Argentine	Species of medicinal plants of Comechingones’ Sierras
Asteraceae	81	52
Fabaceae	45	8
Verbenaceae	23	10
Solanaceae	23	4
Euphorbiaceae	14	4
Poaceae	14	6
Lamiaceae	14	6
Rubiaceae	13	1
Malvaceae	10	3
Amaranthaceae	9	2
Apiaceae	7	4

Table 4
Percentage of plants used for different illness categories

Medicinal uses	Medicinal plants (%)
Digestive	17.2
Hepatic affections	17.2
Diuretic	15.6
Diaphoretic	9.7
Antimicrobial	8.1
Febrifugo	8.1
Vulnerary	8.1
Against rheumatic pain	7.0
Astringent	6.4
Depurative of blood	6.4
Purgative	5.9
Curative of cough	5.4
Emetic	4.8
Expectorant	4.8
Pesticide	4.8
Anticancer	4.3
Anti-inflammatory	4.3
Antispasmodic	4.3
Aromatizant	4.3
Sedative	4.3
Carminative	3.8
Pectoral	3.8
Antidiarrheic	3.2
Aperitive tonic	3.2
Against headache	2.15
Against malaria	2.15
Analgesic	2.15
Antisymphilitic	2.15
Contraceptive	2.15
Disinfectant	2.15
Eupeptic	2.15
Laxative	2.15
Odontalgic	2.15
Renal affections	2.15
Rubefacient	2.15
Stimulative	2.15
Antiacid	1.6
Antialopepic	1.6
Antiasthmatic	1.6
Anticatarral	1.6
Antihypertensive	1.6
Cardiotonic	1.6
Cicatrizant	1.6
Deodorant	1.6
Drastic	1.6
Galactagogue	1.6
Muscular tonic	1.6
Ophthalmic	1.6
Toxic	1.6
Antiseborrhoeic	1.1
Caustic	1.1
Dermic affection	1.1
Lithiasis	1.1
Narcotic	1.1
Refreshment	1.1
Against palpitations	0.5
Alexipharmac	0.5
Antiamaurosis	0.5
Antidisenteric	0.5
Antidisneic	0.5
Antigonorrhoeic	0.5
Antihemorroida	0.5
Antihysteria	0.5
Antiparalitic	0.5

Table 4 (Continued)

Medicinal uses	Medicinal plants (%)
Antipoison	0.5
Antipruritus	0.5
Antisclera	0.5
Antiscorbutic	0.5
Antiviral	0.5
Aphrodisiac	0.5
Appetizer	0.5
Capillary tonic	0.5
Catartic	0.5
Cordial	0.5
Emennagogue	0.5
Hemostatic	0.5
Hypocholesterolemic	0.5
Miorelaxing	0.5
Pedic deodorant	0.5
Sliming	0.5
Sweetener	0.5
Urticant	0.5
Vermifuge	0.5

Data express percentage of medicinal plants from “Sierras de Comechingones” used for each illness categories with respect to total plants from this region. To note that one species may have different uses (see Table 1).

Table 5
Medicinal plants species in “Sierras de Comechingones” with rare and very rare distribution

Botanic name	Vernaculate name
<i>Aristolochia stuckertii</i>	Charrúa
<i>Aspidosperma quebracho-blanco</i>	Quebracho blanco
<i>Canna glauca</i>	Achira
<i>Capsicum chacoense</i>	Ají del monte
<i>Hedeoma multiflorum</i>	Tomillo de la sierra
<i>Huperzia saururus</i>	Cola de quirquincho
<i>Jungia polita</i>	Zarzaparrilla
<i>Killingia odorata</i>	Capií-catí
<i>Lycopodium clavatum</i>	Pilliján
<i>Maytenus boaria</i>	Maitén
<i>Porophyllum obscurum</i>	Yerba del venado
<i>Porophyllum ruderale</i>	Yerba del ciervo

3.3. Distribution of the medicinal species

Twenty-one species of the Córdoba medicinal flora have a rare or very rare distribution, with 12 of them belonging the “Comechingones” area (Table 5), while the remaining ones have a wide range of distribution. The groups of species termed, rare and very rare, are very important because uncontrolled collecting could result in local extinction. In addition, there are 20 endemic species that grow in the Córdoba Province (Zuloaga and Morrone, 1999), of which 15 are only found in the “Sierra de Comechingones” (Table 6). This area forms the most important geographical space with respect to conservation.

4. Biological activities of medicinal plants

The initial introduction of new medicinal agents into health care systems sometimes requires information beyond that recorded in libraries, relying instead on information available

Table 6
Endemic medicinal species in “Sierras de Comechingones”

Botanic name	Vernaculate name
<i>Adiantum thalictroides</i>	Culantrillo
<i>Aloysia gratissima</i>	Palo amarillo
<i>Buddleja cordobensis</i>	Salvia blanca
<i>Condalia microphylla</i>	Piquillín
<i>Croton parvifolius</i>	Yerba del venado
<i>Eupatorium artemisiifolium</i>	Artemisia
<i>Gaillardia megapotamica</i> var. <i>radiata</i>	Gaillardia
<i>Ipomoea hieronymi</i>	Campanilla
<i>Lantana balansae</i>	Lantana de la sierra
<i>Oprhyosporus axilliflorus</i>	Charrúa
<i>Polylepis australis</i>	Tabaquito
<i>Proustia cuneifolia</i> var. <i>mendocina</i>	Charcoma
<i>Tagetes argentina</i>	Chilchil del campo
<i>Trichocline plicata</i>	Topasaire plateado
<i>Trichocline sinuate</i>	Arnica

through word of mouth from the local population and healers within a society. Thus, traditional medicine practices, conserved over many years in civilizations, can serve as an effective basis for the discovery and development of modern therapeutic drugs.

Initiation of drugs product discovery programs involves a number of different phases, which includes selection and collection, extraction and biological evaluation, isolation and elucidation (Cordell, 2002).

In this review is described biological evaluation of extracts from plants occurring in the “Sierra de Comechingones” which were obtained by previous at-random screening programs (Table 7).

Extracts of Anacardiaceae: *Lithrea molleoides* (Vell.) Engl.; Asteraceae: *Achyrocline satureioides* (Lam.) DC., *Pterocaulon alopecuroides* (Lam.) DC., *Solidago chilensis* Meyen var. *chilensis*, *Tagetes minuta* L., *Eupatorium buniifolium* Hook. & Arn. var. *buniifolium*, *Baccharis articulata* (Lam.) Pers.; Celastraceae: *Maytenus boaria* Molina; Chenopodiaceae: *Chenopodium ambrosioides* L., *Chenopodium multifidum* L.; Euphorbiaceae: *Sapium haematospermum* Müll. Arg.; Lamiaceae: *Minthostachys mollis* Griseb.; Polygonaceae: *Polygonum punctatum* Elliott; Verbenaceae: *Lippia turbinata* Griseb., *Lantana grisebachii* Seckt. var. *grisebachii*, *Lantana balansae* Briq. f. *balansae*, *Aloysia gratissima* (Gillies. & Hook.) Tronc.; Zygophyllaceae: *Larrea divaricata* Cav., some of them have resulted in some new natural substances being isolated.

Table 7
Biological activities

Species	Vernacular name	Bioactivities
Anacardiaceae		
<i>Lithrea molleoides</i> (Vell.) Engl. (RIOC 1313)	Molle de beber	Anticancer “in vitro” (Fernandez et al., 2002; Ruffa et al., 2002); antimicrobial (Penna et al., 2001)
Asteraceae		
<i>Achyrocline satureioides</i> (Lam.) DC. (RIOC 4658)	Marcela hembra	Anticancer “in vitro” (Ruffa et al., 2002); antimicrobial (García et al., 1990; Zanon et al., 1999)
<i>Baccharis articulata</i> (Lam.) Pers. (RIOC 1801)	Carquejilla	Antimicrobial (Zanon et al., 1999)
<i>Conyza bonariensis</i> (L.) Cronquist var. <i>bonariensis</i> (RIOC 387)	Rama negra	Antifungic (Dubey et al., 1982)
<i>Eupatorium buniifolium</i> Hook. & Arn. var. <i>buniifolium</i> (RIOC 1265)	Romerillo	Anticancer “in vitro” (Fernandez et al., 2002); antimicrobial (Zanon et al., 1999)
<i>Pluchea sagittalis</i> (Lam.) Cabrera (RIOC 4250)	Lucera	Against hepatic affection (Udaondo et al., 1937; Martino et al., 1989)
<i>Pterocaulon alopecuroides</i> (Lam.) DC. (RIOC 697)	Toto-caamorotí	Antimicrobial (Stein et al., 2005)
<i>Solidago chilensis</i> Meyen var. <i>chilensis</i> (RIOC 3234)	Vara de oro	Analgesic (Jacker et al., 1982); anti-inflammatory (Klein-Galczinsky, 1999); antimicrobial (Vila et al., 2002)
<i>Tagetes minuta</i> L. (RIOC 1258)	Suico	Antimicrobial (Tereschuk et al., 1997)
<i>Maytenus boaria</i> Molina (RIOC 1314)	Maitén	Pesticide (Cespedes et al., 2001)
<i>Chenopodium ambrosioides</i> L. (RIOC 4608)	Paico macho	Anticancer “in vitro” (Ruffa et al., 2002)
<i>Chenopodium multifidum</i> L. (RIOC 281)	Paico hembra	Pesticide (Broussalis et al., 1999)
<i>Sapium haematospermum</i> Müll. Arg. (RIOC 716)	Curupí	Antimicrobial (Woldemichael et al., 2004)
<i>Minthostachys mollis</i> Griseb. (RIOC 509)	Peperina	Antimicrobial (Zanon et al., 1999)
<i>Polygonum acuminatum</i> Kunth. (RIOC 1018)	Durazno del agua	Antimicrobial (Penna et al., 2001)
<i>Aloysia gratissima</i> (Gillies. & Hook.) Tronc. (RIOC 1039)	Palo amarillo	Antimicrobial (García et al., 2003)
<i>Lantana balansae</i> Briq. f. <i>balansae</i> (RIOC 513)	Lantana de la sierra	Antimicrobial (Anesini and Perez, 1993; Salvat et al., 2004)
<i>Lantana grisebachii</i> Seckt. var. <i>grisebachii</i> (RIOC 1128)	Lantana de la sierra	Antimicrobial (Feresin et al., 2001)
<i>Lippia turbinata</i> Griseb. (RIOC 546)	Poleo	Antimicrobial (Hernandez et al., 2000; Wachter et al., 2001; Garcia et al., 2003)
<i>Larrea divaricata</i> Cav. (RIOC 501)	Jarilla	Anticancer “in vivo” and “in vitro” (Anesini et al., 1996, 1997, 1999); antimicrobial (Anesini et al., 1993; Quiroga et al., 2001; Salvat et al., 2004; Konigheim et al., 2004)

These reported biological activities attributed to this species are in smaller numbers, in comparison with all other ethnobotanical uses listed in Table 7.

4.1. Plants with anticancer activity

Chemoprevention by medicinal plants has received growing attention in recent years as a promising approach in controlling the incidence of cancer (Metflin, 1997). However, ethnomedicinal reports of specific anticancer uses of plants are rarely found, mainly because cancer is a disease that involves a complex set of signs and symptoms (Suoza Brito and Souza Brito, 1993).

Some survey on “Sierras de Comechingones” plants used in antitumoral activity can be found in literature based on screening studies. For example: the methanolic and/or aqueous extracts of the aerial parts of *Eupatorium buniifolium* Hook. & Arn. var. *buniifolium* (Asteraceae) and the leaves of *Lithrea molleoides* (Vell.) Engl.; (Anacardiaceae) exerted inhibitory effects on tumors as well as on mitogen activated normal spleen cell growth (Fernandez et al., 2002). Cytotoxic activity against the human hepatocellular carcinoma cell line Hep G2 was observed for methanolic extracts from *Achyrocline satureioides* (Lam.) DC. (Asteraceae), *Lithrea molleoides* (Vell.) Engl.; (Anacardiaceae), but not for *Chenopodium ambrosioides* L. (Chenopodiaceae) (Ruffa et al., 2002). It has been demonstrated that an aqueous extract of *Larrea divaricata* Cav. (Zygophyllaceae) had antiproliferative activity on a murine lymphoma (BW 5147) and in vivo antitumoural action on mammary tumours induced by NMU (N-nitrosomethylurea) (Anesini et al., 1996, 1997, 1999). Of the five species cataloged as anticancer in this report, only *Eupatorium buniifolium* has been previously recognized for its ethnobotanical uses (Table 7).

4.2. Plants with antifungal activities

Fungal infections are types of diseases regarded to be highly responsive to traditional treatment. The screening of crude extracts made of medicinal plants of this area has shown that some of the screened plants are potentially rich sources of antifungal agents. This supports observations made by other investigators on pathogenic fungi, with ethanolic of *Larrea divaricata* Cav. (Zygophyllaceae) displaying remarkable activity in the assays against yeasts, microfungi and wood-rot (Quiroga et al., 2001).

On the other hand, inhibitory activity by the crude methanolic extracts and fractions from the aerial parts of three species of *Pterocaulon alopecuroides* (Lam.) DC. (Asteraceae) was found in a group of standardized and clinical opportunistic pathogenic yeasts and filamentous fungi, including dermatophytes (Stein et al., 2005).

Pumiloxide, a phytochemical constituent of *Solidago chilensis* Meyen var. *chilensis* (Asteraceae) was reported to be an unusual volatile labdane diterpene constituent, being active against filamentous fungi and also a yeast (Vila et al., 2002).

However, the ethnobotanical uses attributed to this species are principally digestive or diuretic, with antifungal activity not being mentioned.

4.3. Plants with antimicrobial activity

Plants have long been used, before the time of the colonizations, by the Indian population of Argentina as antimicrobial remedies.

An in vitro screening has demonstrated a reproducible inhibitory activity against *Mycobacterium tuberculosis* in an extract of *Lippia turbinata* Griseb. (Verbenaceae). Four novel triterpenoids were isolated from this plant and shown to inhibit grow of this bacterium (Wachter et al., 2001).

Lecheronol A and lecheronol B, acylated cycloartanes and highly oxygenated novel chalconoid from *Sapium haematospermum* Müll. Arg. (Euphorbiaceae) also showed growth-inhibiting activity against *Mycobacterium tuberculosis* (Woldemichael et al., 2004).

Studies with extracts from *Lantana grisebachii* Seckt. Var. *grisebachii* (Verbenaceae) have shown activity against *Trichophyton rubrum* and *Cryptococcus neoformans* (Feresin et al., 2001).

Flavonoids of *Lippia turbinata* Griseb. (Verbenaceae) showed antimicrobial activity against Gram positive and Gram negative microorganisms (Hernandez et al., 2000). A similar response was obtained with different extracts of *Polygonum punctatum* Elliott (Polygonaceae) and *Lithrea molleoides* (Vell.) Engl. (Anacardiaceae), traditionally used as antiseptics (Penna et al., 2001).

In another study, on a total extract and fractions with different solvents, obtained from leaves of *Tagetes minuta* L. (Asteraceae), showed several degrees of antimicrobial activity against Gram positive and Gram negative microorganisms. The major component of the extract: quercetageitin-7-arabinosylgalactoside, showed significant antimicrobial activity on the pathogen microorganisms tested (Tereschuk et al., 1997).

The extracts of *Lantana balansae* Briq. F. *balansae* (Verbenaceae) and *Larrea divaricata* Cav. (Zygophyllaceae) showed inhibitory activity against some penicillin G resistant strains (Anesini and Perez, 1993; Salvat et al., 2004). On the other hand, inhibition of microbial growth via microplate assay, in some of these microbial species, was produced by the extracts of *Lantana balansae* Briq. F. *balansae* (Salvat et al., 2004).

Viral infections are an important health problem all over world, both in developed and developing countries, due to their morbidity and mortality.

With respect to antiviral activity, the alcoholic extracts from *Achyrocline satureioides* (Lam.) DC., *Baccharis articulata* (Lam.) Pers., *Eupatorium buniifolium* Hook. & Arn. var. *buniifolium* (Asteraceae) and *Minthostachys mollis* Griseb. (Lamiaceae) were able to inhibit the viral infectiousness (Zanon et al., 1999; García et al., 1990).

Extracts of plant from one interesting genera *Larrea divaricata* Cav. (Zygophyllaceae) and the essential oils of *Lippia turbinata* Griseb. and *Aloysia gratissima* (Gillies. & Hook.) Tronc. (Verbenaceae) have been demonstrated to possess an inhibitory activity against Junin virus (Garcia et al., 2003; Konigheim et al., 2004). These species are not known for their ethnobotanical use as antivirals (Table 7).

4.4. Plants with insecticide activity

Numerous plants have been demonstrated to produce pesticide compounds as chemical defense mechanisms against predators or infections. However very little botanical information has been found in Argentina on insecticide activity. The methanolic and hexane extracts from *Maytenus boaria* Molina (Celastraceae), have been reported to have insecticidal activity. The furoyloxy agarofuran (9 beta-benzoyloxy-1 alpha, 2 alpha, 6 beta, 8 alpha, 15 penta-acetoxydihydro-beta-agarofuran and 9 beta-furoyloxy-1 alpha, 6 beta, 8 alpha-triacetoxy-dihydro-beta-agarofuran) may all be responsible for the insecticide activity of these plants (Cespedes et al., 2001).

Some efforts to control the growth of *Sitophilus oryzae* (Rice weevil) have been carried out with extracts of *Chenopodium multifidum* L. (Chenopodiaceae) (Broussalis et al., 1999).

Of these species, only *Chenopodium multifidum* has been mentioned to be a vermifuge an activity comparable to that of inhibition of the larvae grown in insects (Su, 1991).

5. Conclusion

In Argentina, there is an urgent need to systematically document the traditional knowledge on the use of medicinal plants in all autonomous areas or communities, many of which are still largely unexplored. Such documentation is necessary because old people are usually the only custodians of such information, and the fast disappearance of traditional culture and natural resources arising from urbanization and industrialization of such areas suggests that unrecorded information may be lost forever. In “Sierra de Comechingones” relevant knowledge and use of native plants can still be found, in spite of the strong influence of surrounding urbanization such as the cities of Córdoba and Río Cuarto.

This study has demonstrated that within this society, traditional medicine has a long history and wide acceptability.

Traditional medicine is widely accepted among the people and the plant materials, sometimes preferred to the pure pharmacologically active constituents for reasons of safety and cost, are freely found in the locality, thus the medicines inexpensive.

Among 186 medicinal plants species that grow in the “Sierra de Comenchingones”, 15 species only are found in this region. A more in-depth study of the endemic species that grow in this region is necessary, since it has been demonstrated that areas possessing a high percentage of endemic species, should become high-priority centers of diversity, which are essential in order to preserve present benefits for the future.

In relation to plant use, digestive problems are among the most important ones in the zone, and that this category has the highest application of species. The frequency use per species of the native medicinal plants increases with age, i.e. older people use more medicinal species than younger ones.

Although some of these studies report the biological activity (18 of 186 medicinal species in “Sierra de Comechingones”), very few have used activity-guided fractionation to isolate the compounds have been a specific ethnobotanical use.

Further research on the bioactivities of plants utilized by the settlers of the “Sierras de Comechingones” could provide new data on the therapeutic potential of these medicinal species.

Indeed, a majority of people use traditional medications at sometime supporting the presumption of efficacy and safety of the plant materials used in the medicines. No particular toxic plant species has been encountered, although abortive and nephrotoxic activity could be associated with species of *Aristolochia* (Pio Correa, 1931; Hu et al., 2004).

In spite of this, *Aristolochia stuckertii* Speg. occurring in “Sierra de Comechingones”, is still used as an antiseptic, a diuretic, a diaphoretic, an emmenagogue and against rheumatic pains in the center of Argentina.

With the documentation of plant material used in traditional medicine, these medicinal plants now have an increasing market, with demand at national and international level. Local pharmaceutical, food and cosmetic industries, mainly use tomillo (*Hedeoma multiflorum*), and peperina (*Minthostachys mollis* Griseb.), for the production of juices, sour beverages (“amargos”) and in “yerbas” and natural medicines (Forlani, 1999). There is also an increasing demand of “alternative therapies,” such as phytotherapy and aromatherapy. Consequently, the response to this demand requires a rational exploitation of natural resources. Otherwise, the loss of medicinal genetic diversity will increase due to overexploitation of these species (Roig, 2001). The preservation of the native flora species appears to be crucial for the maintenance of both biological and cultural biodiversity of the ancient settlements of “Sierra de Comechingones”. A domestication program for the native medicinal plants, should be produced directly from the local vegetation. Scarce knowledge is not adequately transferred between people who live from the exploitation of these species. This is a drawback that is also common in other countries (FAO, 1993).

The use and conservation of such species must be accompanied by scientific and technological research in order to achieve this sustainability resource.

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