



Pharmaceutical ethnobotany in the western part of Granada province (southern Spain): Ethnopharmacological synthesis

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ABSTRACT

Aim: The aim of this work is to catalogue, document, and make known the uses of plants for folk medicine in the western part of the province of Granada (southern Spain). An analysis was made of the species used, parts of the plant employed, preparation methods, administration means, and the ailments treated in relation to pathological groups.

Materials and methods: The work was performed in 16 municipalities within the study zone. The participants were located mainly by questionnaires distributed in public and private centres. The information, gathered through semi-structured open interviews of a total of 279 people, was included in a database for subsequent analysis. A floristic catalogue of the territory was compiled, enabling analyses of the relevance of certain botanical families in popular medicine.

Results and conclusions: Great diversity was established among medicinal species in the region. A total of 229 species of plants were catalogued for use in human medicine to prevent or treat 100 different health problems covering 14 different pathological groups. The number of references reached 1963. The popular pharmacopoeia of this area relies primarily on plants to treat digestive, respiratory, and circulatory problems, using mainly the soft parts of the plant (leaves and flowers) prepared in simple ways (decoction, infusion). An analysis of the medicinal ritual uses of 34 species and the different symptoms reflected a certain acculturation in relation to ethnobotanical knowledge in the last 20 years.

Ethnopharmacological relevance: The traditional knowledge of plants was shown in relation to medicinal use, reflecting a striking diversity of species and uses, as well as their importance in popular plant therapy in the study zone. These traditions could pave the way for future phytochemical and pharmacological studies and thereby give rise to new medicinal resources.

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1. Introduction

To delve into the use and handling of flora in Andalusia, we studied the ethnobotanical resources used by the local population in the western part of Granada province (Andalusia, southern Spain), a subject that has received little attention. Comprised of 16 municipalities, this zone is known as the “Comarca del Poniente Granadino” (Fig. 1) and lies in the Betic cordilleras, covering an area of c. 2041 km², with several mountain systems such as the Sierra de Tejada y Almijara (2065 m), Sierra de Loja (1671 m), and Sierra de Parapanda (1604 m), as well as a fertile zone in the Genil river basin.

The flora of the area has been thoroughly studied (Valle et al., 2001; Nieto, 1988; Cabezudo et al., 2005; Marín, 1978; Aroza, 1990) and has well-documented botanical interest (Davis et al.,

1994), having a high number of endemic species (Rivas-Martínez et al., 1991). In our study, part of the interest is owed to the altitudinal gradient (minimum of 340 m maximum of 2064 m a.s.l.) and for being a zone in the intersection of four biogeographical sectors within the Betic Province (hispalense, rondeño, subbético, and malacitano-almijareense, according to Rivas-Martínez et al., 1997). Bioclimatically, it has a pluviseasonal oceanic Mediterranean climate (Rivas-Martínez et al., 2004). The predominant natural vegetation is composed of woodlands of Holm oak (*Quercus ilex* L. subsp. *ballota* (Desf.) Samp.) and gall oak (*Quercus faginea* Lam.), remnants of deciduous trees such as Spanish maples (*Acer granatense* Boiss.), and patches of pine (*Pinus pinaster* Aiton, *Pinus sylvestris* L.).

Of the 77,532 inhabitants, a high percentage live in country houses (*cortijos* in Spanish), carrying on their traditional way of life closely linked to their surroundings, where the main economic sustenance has historically been, and continues to be, agriculture and livestock. The latest statistics (I.E.A.-S.I.M.A., 2007) reflect an ageing population with somewhat more than 20% over 65 years of age, and a relative increase in population decline in the last decade. Finally,

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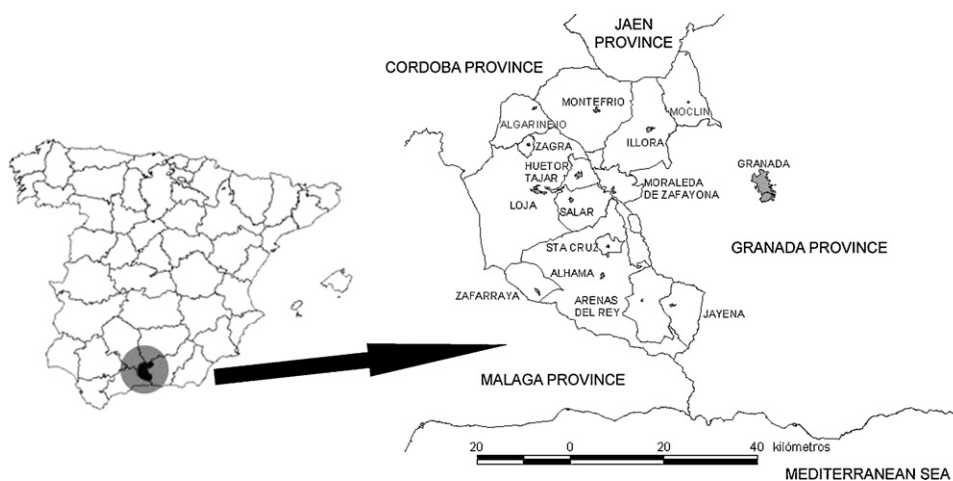


Fig. 1. Study area: western part of Granada province.

the level of education is far lower than in other areas of Andalusia and Spain as a whole (almost 7% of the population is illiterate and 28% have not finished secondary school).

In this study, we present the results of the ethnopharmacological information compiled. Some ethnobotanical data for one of the 16 municipalities included were previously published in a book for the general public (Benítez, 2007) without having been analysed.

2. Materials and methods

The field work, from 2003 to 2008, was conducted in general with the ethnobotanical methodology used in other works (Villar et al., 1992; González-Tejero et al., 1995; González-Tejero et al., 2008; Fajardo et al., 2000; Bonet and Vallés, 2007). Ethical guidelines of the International Society of Ethnobiology were followed. To locate people that could impart information, we used mainly questionnaires in primary schools, adult-education centres, and different pharmacies of the area, gaining orientation concerning persons and places for interviews. Another method involved deliberate encounters (and sometimes chance encounters) with interviewees who, either for age or work (farmers, shepherds, etc.), could provide information for our study.

The information was collected through open and semi-structured interviews (Cotton, 1996; Martin, 2004; Alexiades and Sheldon, 1996), generally with one person at a time and preferentially in the field, enabling us to locate the species with the help of the interviewee. Also, interviews were performed in other places, such as homes, public places, pensioners' centres, etc. In certain cases, we undertook group interviews, prompting conversations and debates over different uses that each interviewee made of different species. A total of 279 persons were interviewed, with ages ranging mainly from 50 to 60 years. In all cases, the cultural information associated with a taxon was complemented by a field identification of the species cited or by samples of plant material that we provided the interviewees. To publish the data, we gained prior informed verbal consent before undertaking the interviews.

With the material amassed, a collection was established, called "Exsiccata de Flora Etnobotánica del Poniente Granadino" (Exsiccata of Ethnobotanical Flora of Western Granada), on deposit in its entirety in the University of Granada Herbarium (GDA), containing 452 samples, of which 18 are fungi, 1 green algae, 2 bryophytes, 7 pteridophytes, and the rest phanerogams (first ethnobotanical exsiccata in the Iberian and Macaronesian sphere; Benítez et al., 2009). The plant material was identified following the criteria of *Flora Ibérica* (Castroviejo et al. (eds.), 1986–2005) and *Flora Europaea* (Tutin et al., 1964–1980), works on which we based the nomenclature used

in this study, in addition to *Flora de Andalucía Occidental* (Valdés et al., 1987).

With all the information compiled, we prepared a database in Microsoft Access® to relate information concerning taxa and their uses, bibliographic references, and the interviewees. In addition to the standard analyses made in the context of the ethnobotanical information gathered, we performed a series of quantitative analyses to establish ethnobotanical indices that would enable us to compare our information with that of nearby territories previously studied.

A floristic catalogue was prepared for the study area (Benítez, 2009), based on the aforementioned works by Valle et al. (2001), Nieto (1988), Cabezudo et al. (2005), Marín (1978), and Aroza (1990), as well as our own field experience. The number of catalogued species (vascular flora) reached 1345. This floristic catalogue served as a reference work for a botanical analysis, by the main botanical families, to compare the wild medicinal flora with respect to the total wild flora, as well as for the calculation of the ethnobotanical indices.

3. Results and discussion

A total of 380 plant species were catalogued, covering a broad spectrum of local ethnobotany. Most (244 species) had medicinal uses, resulting in an ethnofloral medicinal-use index (Verde, 2002) of 64.21%. This relatively high value indicates the extent of medicinal uses in the folk ethnobotany. Of these 244 plants, 229 were used in human medicine and 53 in veterinary medicine (15 exclusively and 38 in both categories). The present study concentrates on the first group of plants used in human medicine. The medicinal species and their use are detailed in Table 1.

3.1. Botanical analysis

The medicinal species belong to 68 different botanical families, those with the highest number of species being *Asteraceae* (11.8%), *Lamiaceae* (10.9%), *Apiaceae* (5.7%), *Rosaceae* (5.2%), *Fabaceae* (5.2%), *Liliaceae* (5.2%), and *Poaceae* (3.5%), the first four families constituting a third of the total. These families are well represented in the area as well as throughout the Iberian Peninsula, and also constitute the major groups of medicinal flora in most of the works that we consulted (Agelet and Vallés, 2001; Bonet et al., 1999; Martínez-Lirola et al., 1997; Novais et al., 2004).

In terms of only wild species, Fig. 2 presents the proportion of medicinal species of each family in relation to the total number of species represented in the area (allochthonous flora has been

Table 1

Medicinal taxa, diseases (number of references) in which they were used, parts used and preparation and administration method. Voucher number is given for non-cultivated plants (allochthonous ones in the study area are signed with +).

Plant name (Voucher No.)	Disease (references)	Part.	El.	Adm.
Adiantaceae				
<i>Adiantum capillus-veneris</i> L. (GDA54094)	Abortive (2); placenta Ret. (2)	AP	D	O
Agavaceae				
<i>Agave americana</i> L. (GDA53864) +	Lumbago (4); varicose veins (1)	L	NP	T
	Cold (3); cough (2)	L	D	O
	Pimples (2)	L	C	T
Anacardiaceae				
<i>Pistacia terebinthus</i> L. (GDA53848)	Odontalgia (1)	F	D	T
	Dislocated joint (1)	F&L	D	T
Apiaceae				
<i>Apium graveolens</i> L.	Undefined: digestive depurative (2); gastralgia (1); constipation (1)	L	I/D	O
	Digestive disorder (7)	L	D FI	O
	Obesity (1)	L	CK FI	O
<i>Apium nodiflorum</i> (L.) Lag. (GDA54102)	Eczema (1)	WH	D	T
<i>Bunium macuca</i> Boiss. (GDA54106)	Wart (1)	T	NP	T
<i>Bupleurum gibraltarium</i> Lam. (GDA54110)	Injury (7)	L	D	O&T
	Eczema (2)	L	I	T
<i>Cuminum cyminum</i> L. +	Tumours (1)	L	I/D	T
	Gases (1)	S	D	O
<i>Eryngium campestre</i> L. (GDA54112)	Circulation problems (2); Digestive disorder (1);	R	D	O
	Hypertension (1)	R	FI	O
	Oedema (1)	AP	D	O
	Eczema (2)	R	D	T
	Haemorrhoids (1)	R	–	T (M)
	Sores (6)	I	–	T (M)
	Gases (4); digestive disorder (2)	S	D	O
	Gastralgia (2)	L	D	O
	Cold (2)	WH	D	O
	Amenorrhoea (3); kidney stones (2); dysmenorrhoea (1); prostatism (1)	L	I	O
<i>Foeniculum vulgare</i> Miller (GDA54111)	Diabetes (4); halitosis (3)	L	FI	O
	Abortion (3)	L	NP	T
	Anaemia (2); undefined: calcium (2)	L	CK	O
	Hypertension (2)	L	I FI	O
	Hyperuricaemia (1)	L	D	O
	Constipation (1)	ST	NP	O
	Odontalgia (1)	L	NP	T
	Pain (1)	L&ST	C	T
	Baldness (1)*	WH	AM	T
	Gases (9); gastralgia (4)	FR AP	D	O
	Digestive disorder (3)	AP	I	O
	<i>Ridolfia segetum</i> Moris (GDA54104)	Gastralgia (3); digestive disorder (2)	AP	I
Gastralgia (1)		AP	FI	O
<i>Scandix australis</i> L. subsp. <i>Australis</i> (GDA54095)	Gastralgia (1)	AP	FI	O
<i>Thapsia villosa</i> L. (GDA54101)	Digestive disorder (1)	R	FI	O
<i>Torilis arvensis</i> (Hudson) Link irsut. <i>neglecta</i> (Sprengel) Thell (GDA54113)	Undefined: aphrodisiac (1)	FP	D	O
Aspleniaceae				
<i>Ceterach officinarum</i> Willd. (GDA54011)	Cold (2)	FD	D	O
Asteraceae				
<i>Anacyclus clavatus</i> (Desf.) Pers. (GDA54152)	Gastralgia (2); digestive disorder (1)	FP	I/D	O
<i>Andryala integrifolia</i> L. (GDA54198)	Diarrhoea with tenesmus (2); gastralgia (1)	FP	I/D	O
<i>Anthemis arvensis</i> L. (GDA54191)	Gastralgia (1); digestive disorder (1)	FP	I	O
<i>Artemisia campestris</i> L. irsut. <i>glutinosa</i> (Gay ex Besser) Batt. In Batt. & Trabut (GDA54140)	Baldness (4)	FP	D	T
<i>Bidens aurea</i> (Aiton) Sherff (GDA54144) +	Digestive disorder (3)	FP	I	O
	Obesity (1)	L	I	O
<i>Calendula officinalis</i> L. +	Skin problems (1)	F	MO	T
<i>Centaurea calcitrapa</i> L. (GDA54147; GDA54181)	Fever (3); kidney stones (2); kidney malfunction (2)	I	D	O
<i>Cichorium intybus</i> L. (GDA54174)	Digestive disorder (1)	TS	CK	O
	Undefined: diuretic (1)	TS	CK	O
	Undefined: invigorative (1)	TS	CK I	O

Table 1 (Continued)

Plant name (Voucher No.)	Disease (references)	Part.	El.	Adm.
<i>Crupina crupinastrum</i> (Moris) Vis. (GDA54194)	Conjunctivitis (1)	I	D	O
<i>Cynara cardunculus</i> L. (GDA54199)	Fever (1)	I	M	O
<i>Cynara scolymus</i> L. +	Kidney malfunction (2); gall-bladder infection (1)	L	D	O
	Hypercholesterolemia (2)	I	D	O
	Liver disease (1)*	F&L	D FI	O
<i>Chamaemelum mixtum</i> (L.) All. (GDA54179)	Gastralgia (1)	FP	I	O
<i>Chrysanthemum coronarium</i> L. (GDA54190)	Gastralgia (1)	FP	I	O
<i>Dittrichia viscosa</i> (L.) Greuter (GDA54164)	Contusion (5); bone fracture (2); calluses and skin hardness (1)	FP	D	T
	Injury (2)	FP	D MO	T
	Respiratory problems (1)	FP	D	O
<i>Helianthus annuus</i> L. +	Injury (2)	A	C	T
<i>Helichrysum italicum</i> (Roth) G. Don fil. <i>irsut. serotinum</i> (Boiss.) P. Fourn. (GDA54182)	Digestive disorder (5); Gastralgia (4)	I	I	O
	Cough (1); mouth ailments (1); liver disease (1)	FP	I	O
	Herpes (1)	FP	I	T (M)
<i>Helichrysum stoechas</i> (L.) Moench (GDA54183)	Cough (1); gastralgia (1); digestive disorders (1); liver disease (1)	FP	I	O
	Herpes (1)	FP	NP	T
<i>Jasonia glutinosa</i> (L.) DC. (GDA54139)	Digestive disorders (2)	FP	I	O
<i>Mantisalca salmantica</i> (L.) Briq. & Cavillier (GDA54188)	Hyperglucemias (4); cold (1)	I	I	O
<i>Matricaria chamomilla</i> L. (GDA54138)	Gastralgia (15); digestive disorder (7); conjunctivitis (6)*; dysmenorrhoea (4); cold (3); cough (2)*; gases (2); female genital infection (2); kidney stones (1); eye infection (1)	FP	I	O
	Headaches (1)	FP	NP	O
	Insomnia (1)	FP	I NP	O
<i>Pallenis spinosa</i> (L.) Cass. (GDA54155)	Gastralgia (2); circulatory problems (1)	FP	I/D	O
	Contusion (5)	FP	I/D	O&T
	Injury (7); inflammation (1)	FP	I/D	T
	Mouth infections (1); respiratory problems (1)	FP	I	T
	Pain (1)	F	I	O&T
<i>Santolina chamaecyparissus</i> L. Subsp. <i>Squarrosa</i> (DC.) Nyman (GDA54172)	Gastralgia (1); digestive disorders (1)	I	I	O
<i>Scolymus hispanicus</i> L. (GDA54170)	Gastralgia (6); diarrhoea (3); cold (1)	I	I/D	O
	Diarrhoea with tenesmus (2)	F	I/D	O
	Malta fever (3)	FP	D	O
	Eye infection (1)	I	D	T
<i>Silybum marianum</i> (L.) Gaertner (GDA54142)	Malta fever (2)	FP	D	O
	Liver disease (2)	I	I	O
	Gall-bladder infection (1)	S	D	O
<i>Sonchus oleraceus</i> L. (GDA54156; GDA54193)	Haemorrhoids (1)	WH	D	T
	Wart (1)	LT	NP	T
<i>Taraxacum vulgare</i> (Lam.) Schrank (GDA54189)	Liver disease (1); kidney malfunction (1)	L	FI	O
	Asthenia (2)	WH	I FI	O
<i>Xanthium spinosum</i> L. (GDA54148)	Kidney malfunction (1); hyperglucemia (1)	FR	D	O
Berberidaceae				
<i>Berberis vulgaris</i> L. subsp. <i>Australis</i> (Boiss.) Heywood (GDA53846)	Kidney malfunction (1)	FR	D	O
Boraginaceae				
<i>Alkanna tinctoria</i> (L.) Tausch (GDA53946)	Burns (5); pimples (4); injuries (3)	R	MO	T
<i>Anchusa azurea</i> Miller (GDA53948)	Gastralgia (1)	FP	I	O
	Cold (1)	R	D	O
	Kidney stones (1)	L&R	CK	O
	Pain (1)	R	MO	T
	Injury (1)	R	C	T
	Skin problems (4)	R	C D	T
	Sores (1)	L&R	C	T
<i>Borago officinalis</i> L. (GDA53953)+	Digestive disorder (2)	WH	I	O

Table 1 (Continued)

Plant name (Voucher No.)	Disease (references)	Part.	El.	Adm.
<i>Lithodora fruticosa</i> (L.) Griseb. (GDA53947)	Hypertension (4); prostatism (1)	FP	I	O
	Circulatory problems (9); varicose veins (1); eczema (1)	FP	I/D	O
	Injury (2)	FP	C D	T
	Pimples (2)	FP	D	O
Brassicaceae				
<i>Brassica oleracea</i> L. Var. <i>Capitata</i> L. +	Contusion (2); cutaneous ulcer (2)	L	C	T
	Dermatitis (1)*	PJ	NP	T
<i>Raphanus sativus</i> L. +	Cough (3); pertussis (1)*	T	D	O
	Undefined: diuretic (1)*	T	FI	O
<i>Rorippa nasturtium-aquaticum</i> (L.) Hayek (GDA54035)	Eczema (6); baldness (3)	AP	D	T
	Pain (1)	WH	C	T
<i>Sinapis alba</i> subsp. <i>Mairei</i> (H. Lindb.) Maire (GDA54039)	Liver disease (1)	FP	I/D	O
	Menorrhagia (1)	FP	I	O
Cactaceae				
<i>Opuntia maxima</i> Miller (GDA53854) +	Cold (14)*; gastralgia (1)	F	D	O
	Digestive disorder (2)	FR	FI	O
	Cough (2)*	L	D	O
	Pertussis (2)	PJ	NP	O
	Haemorrhoids (1)	ST	MO	T
	Pimples (1)	ST	NP	T
Cannabaceae				
<i>Cannabis sativa</i> L.+	Nervousness (2)	FP	I/D	O
Caprifoliaceae				
<i>Sambucus nigra</i> L. (GDA53818)	Gout (1)	BA	D	O
	Cold (1); asthma (1)	F	I	O
	Cold (1)	F	M	O
	Insect bites (1)	L	C	T
	Erysipelas (1)	L	C I	T
	Haemorrhoids (1)	BR	-	T (M)
Cariophyllaceae				
<i>Honiara cinera</i> DC. (GDA54023)	Kidney stones (14)*; Pain (2)	WH	I/D	O
	<i>Paronychia argentea</i> Lam. (GDA54028)	Circulatory problems (17)*; blood pressure alterations (7); varicose veins (2); dermatitis (3)	AP	I/D
Food poisoning (1)		WH	D	O
<i>Paronychia sufruticosa</i> (L.) DC. <i>irsute</i> <i>irsute</i> Chaudhri (GDA53865)	Hypertension (2); circulatory problems (2); varicose veins (1)	FP	I	O
	<i>Vaccaria hispanica</i> (Miller) Rauschert (GDA54029)	FP	I	O
Cistaceae				
<i>Cistus clusii</i> Dunal in DC. (GDA54042)	Inflammation (1)	FR	D	O
	Pain (1)	AP	D	O
<i>Helianthemum hirtum</i> (L.) Miller (GDA54047)	Diarrhoea (1)	AP	D	O
Convolvulaceae				
<i>Ipomoea batatas</i> (L.) Lam. +	Chilblains (1)	R	D	T
Crassulaceae				
<i>Hylotelephium telephium</i> (L.) H. Ohba (GDA53802) +	Skin problems (16); calluses and skin hardness (2); injury (1)	L	NP	T
	<i>Sedum sediforme</i> (Jacq) Pau. (GDA53819)	L	C	T
<i>Umbilicus rupestris</i> (Salisb.) Dandy (GDA53975)	Pimples (1)*	L	C	T
	Otalgia (1)	L	FJ	T
Cucurbitaceae				
<i>Citrullus lanatus</i> (Thunb.) Matsum. & Nakai +	Diarrhoea (1)	FR	FI	O
	<i>Cucumis melo</i> L. +	FR	D	O
<i>Cucumis sativus</i> L. +	Digestive disorder (6); dysmenorrhoea (3)	FR	ML	O
	Hypercholesterolemia (1)	FR	FI	O
<i>Cucurbita</i> sp. Pl. +	Helminthiasis (1)*	L&FRR	D	O
Cupressaceae				
<i>Cupressus sempervirens</i> L. (GDA54016)	Haemorrhoids (4)*	FR	D/NP	T (M)
	Baldness (2)	FR	MO	T
	Otalgia (1)	FR	-	T (M)
	<i>Juniperus oxycedrus</i> L. (GDA54020)	RS	NP	T
<i>Juniperus oxycedrus</i> L. (GDA54020)	Odontalgia (7)	FR	NP	T
	Pain (4)	FR	D MO AM	T

Table 1 (Continued)

Plant name (Voucher No.)	Disease (references)	Part.	El.	Adm.
	Eczema (1)	RS	C NP	T
	Undefined: appetizer (2)	FR	MW	O
Chenopodiaceae				
<i>Beta vulgaris</i> L. + <i>Spinacia oleracea</i> L. +	Anaemia (1)	L	D	O
	Anaemia (1)	L	D	O
Equisetaceae				
<i>Equisetum ramosissimum</i> Desf. (GDA54012)	Kidney stones (14); hypertension (4); pain (4); liver disease (2); kidney malfunction (2)	AP	D	O
	Hypotension (1); gastralgia (1); varicose veins (1); hypercholesterolemia (1)	AP	I	O
	Urinary infection (4)	WH	D	O
	Anaemia (1)	AP	S	O
	Injury (1)	AP	M	T
	Luxation (2)	AP	D	T
	Inflammation (2)	AP	I/D	T
	Haemorrhoids (1)	WH	D	T
<i>Equisetum telmateia</i> Ehrh. (GDA54013)	Kidney stones (12); pain (4); hypertension (2); urinary infection (2); pain (2); hypotension (1); herpes (1); undefined: diuretic (5); prostatism (1)	WH	D	O
	Inflammation (1)	WH	D	T
Ericaceae				
<i>Erica terminalis</i> Salisb. (GDA53855)	Urinary infection (1)	FP	D	O
Euphorbiaceae				
<i>Chamaesyce canescens</i> (L.) Prokh. (GDA54116)	Warts (1)	LT	NP	T
<i>Euphorbia nicaeensis</i> All. (GDA54115)	Warts (3)	LT	NP	T
<i>Euphorbia peplus</i> L. (GDA54118)	Warts (2); skin problems (1)	LT	NP	T
<i>Euphorbia serrata</i> L. (GDA54117)	Warts (3)	LT	NP	T
<i>Ricinus communis</i> L. (GDA54114)+	Digestive disorder (4)	FO	FI	O
	Cold (1)	FO	NP	T
Fabaceae				
<i>Bituminaria bituminosa</i> (L.) C.H.Stirt (GDA53927)	Injury (2); calluses and skin hardness (1)	L	C	T
	Haemorrhoids (1)	L	–	T (M)
<i>Ceratonia siliqua</i> L. +	Haemorrhoids (1)	FR	MO	O
	Diarrhoea (1)	FR	FI	O
<i>Cicer arietinum</i> L. +	Heartburn (2)	FR	NP	O
<i>Glycyrrhiza glabra</i> L. +	Constipation (1)	RZ	I/D	O
	Cold (3)	RZ	D	O
<i>Medicago sativa</i> L. (GDA53919) +	Hypercholesterolemia (7); Hyperglucemias (2)	FP	I/D	O
	Liver disease (1)	AP	D	O
	Kidney malfunction (2); hypertension (1)	AP	I	O
<i>Ononis spinosa</i> L. (GDA53921)	Odontalgia (5)	R	D NP	O
	Undefined: diuretic (1)	F&L	D	O
<i>Phaseolus vulgaris</i> L. +	Undefined: birth adjuvant (1)	WH	–	T (M)
	Diabetes (2)	FR	D	O
<i>Retama sphaerocarpa</i> (L.) Boiss. (GDA53934)	Diarrhoea (1)	FR	FI	O
	Liver disease (1)	FP	I	O
	Fever (1)	AP	I/D	O
	Contusion (5); pain (2)	FP	C	T
	Luxation (3)	BR	NP	T
<i>Trifolium repens</i> L. (GDA53928)	Kidney malfunction (1)*; Undefined: diuretic (1)*	L	I	O
<i>Ulex parviflorus</i> Pourret (GDA53918)	Liver disease (1)	F	I/D	O
<i>Vicia ervilia</i> (L.) Willd.+	Haemorrhoids (1)	WH	D	T
	Undefined: birth adjuvant (1)	WH	–	T (M)
<i>Vicia faba</i> L. +	Burns (2); pimples (1); nail infections (1)	L	NP	T
Fagaceae				
<i>Castanea sativa</i> Miller (GDA53838) +	Odontalgia (2); haemorrhoids (1); erysipelas (1)	FR	–	T (M)
	Nervousness (1)*	FR	FI	O
<i>Quercus rotundifolia</i> Lam. (GDA53814)	Diarrhoea (3); colic (1)	FR	D	O
	Diarrhoea with tenesmus (3); gastralgia (1)	FR	FI	O
	Cold (3)	BA	D	O

Table 1 (Continued)

Plant name (Voucher No.)	Disease (references)	Part.	El.	Adm.	
<i>Quercus suber</i> L.	Pain (2); rheumatism (1)	BA	D	T	
	Odontalgia (1)	BA	ML	T	
	Odontalgia (2); muscle pain (2)	BA	–	T (M)	
	Muscle pain (1)	BA	D	T	
Gentianaceae					
<i>Centaurium erythraea</i> Rafn (GDA54005)	Fever (6); malta fever (6); undefined: appetizer (1)	FP	I	O	
	Gall-bladder infection (1); gout (1)	FP	I/D	O	
Geraniaceae					
<i>Pelargonium</i> sp.pl. +	Constipation (7)*	L	NP	T	
Guttiferae					
<i>Hypericum perforatum</i> L. (GDA53799)	Burns (2)	FP	I MO	O&T	
	Skin problems (1); insect bites (1)	FP	MO	T	
Hederaceae					
<i>Hedera helix</i> L. (GDA53868)	Warts (1)	L	C	T	
Hippocastanaceae					
<i>Aesculus hippocastanum</i> L. (GDA53842) +	Haemorrhoids (2); odontalgia (1)	S	–	T (M)	
IRIDACEAE					
<i>Crocus sativus</i> L. +	Odontalgia (1)	SG	MO	O	
	dysmenorrhoea (2)	SG	ML	O	
<i>Iris planifolia</i> (Miller) Fiori & Paol. (GDA54091)	Skin problems (1)	R	MO	T	
	Nervousness (1)	F	I	O	
Juglandaceae					
<i>Juglans regia</i> L. +	Haemorrhoids (1)	L	I	T	
	Ulcer (1); obesity (1); prostatism (2)	L	D	O	
	Depression (1)	L	M	O	
	Hypercholesterolemia (2); diabetes (1); undefined: calcium (1)	FR	FI	O	
	Odontalgia (3)	F	D	O&T (M)	
	Baldness (1); dermatitis (1)*	L	D	T	
	Warts (1)	FR	NP	T	
Lamiaceae					
<i>Acinos alpinus</i> subsp. <i>meridionalis</i> (Nyman) Greuter & Burdet (GDA53891)	Digestive disorder (2); Dysmenorrhoea (1)	FP	I	O	
	<i>Ajuga iva</i> (L.) Schreber (GDA53903) <i>Ballota hirsuta</i> Benth (GDA53893)	Injury (2); contusion (2)	FP	D	T
Hypercholesterolemia (3)		FP	I	O	
<i>Lavandula lanata</i> Boiss. (GDA53906)	Erysipelas (2)	FP	–	T (M)	
	Digestive disorder (2); diarrhoea with tenesmus (1); circulatory problems (1)	FP	I	O	
	Cold (5)	EO	NP	O	
	Pain (1)	FP	NP	O	
	Injury (1)	EO	NP	T	
	Headache (1)	FP	NP	T	
	<i>Lavandula latifolia</i> Medicus (GDA54312)	Pain (1)	FP	AM	T
Undefined: aphrodisiac (1)		FP	I	O	
<i>Lavandula stoechas</i> L. (GDA53886)	Diabetes (3); digestive disorder (2)*; ulcer (1); cough (1); kidney stones (1); hypercholesterolemia (1)	FP	I	O	
	Cold (2)	F&L	D	O	
	Circulatory problems (1)	I	I/D	O	
	Rheumatism (1)	FP	D	T	
	Injury (1)	FP	I	T	
	<i>Marrubium supinum</i> L. (GDA53899) <i>Marrubium vulgare</i> L. (GDA53900)	Gastralgia (2)	I	I	O
		Hypercholesterolemia (4); cough (2); gastralgia (1)	FP	I	O
<i>Melissa officinalis</i> L. (GDA53883) +	Herpes (4)	AP	NP	T	
	Erysipelas (6)	L	NP	T (M)	
	Circulatory problems (1); Nervousness (1)	FP	I	O	
<i>Mentha pulegium</i> L. (GDA53895)	Diarrhoea (1)*	L	I	O	
	Digestive disorder (10)*; gastralgia (7); dysmenorrhoea (6); circulatory problems (2); cough (2); kidney stones (2); hyperglucemia (1)	FP	I	O	
	Helminthiasis (1)	L	I	O	
	Abortive (1)	FP	D	O	
	Postpartum infections (4)	FP	I	O&T	

Table 1 (Continued)

Plant name (Voucher No.)	Disease (references)	Part.	El.	Adm.
<i>Mentha spicata</i> L. (GDA53882) +	Helminthiasis (2)	AP	D	O
	Digestive disorder (3); headache (1); undefined: aphrodisiac (1)	AP	I	O
<i>Mentha suaveolens</i> Ehrh. (GDA53894)	Herpes (4)	AP	NP	T (M)
	Erysipelas (1)	L	NP	T (M)
<i>Mentha x piperita</i> L. +	Headache (1)	FP	I	O
	Undefined: aphrodisiac (1)	FP	CK	O
<i>Origanum vulgare</i> L. subsp. <i>virens</i> (Hoffmanns & Link) Letswaart (GDA53884)	Cold (14)	FP	I/D	O
	Cough (8)*; odontalgia (5); digestive disorder (2)*; food poisoning (1)	FP	I	O
<i>Phlomis purpurea</i> L. (GDA53901)	Haemorrhoids (1)	FP	I	T
	Liver disease (1); gastralgia (1)	FP	D	O
	Gases (1)	F&L	I	O
	Placenta ret. (1)	AP	D	O
<i>Rosmarinus officinalis</i> L. (GDA54003)	Injury (4); chilblains(1)	FP	D	T
	Cold (6); cough (3); circulatory problems (2); gastritis (2); bronchitis (2); hypercholesterolemia (1); hyperglucemia (1); gout (1); obesity (1)	FP	I	O
	Varicose veins (2)	FP	D	O
	Prostatism (1)	L	D	O
	Pain (14)	FP	D MO AM	T
	Rheumatism (16)	FP	D AM	T
	Injury (1)	EO	NP	T
	Baldness (2)	FP	D	T
	Hoarseness (1)	FP	NP	T
	Mouth infections (3)	BR	NP	T
	Herpes (2)	A	NP	T (M)
	Digestive disorder (3); circulatory problems (2); cold (2)	FP	I	O
<i>Salvia lavandulifolia</i> subsp. <i>vellerea</i> (Cuatrecasas) Rivas Goday & Rivas-Martínez (GDA53896)	Mouth infections (1)	L	NP	O
	Undefined: blood depurative (1)	F&L	I	O
	Baldness (2); skin problems (1)	FP	D	T
	Injury (1)	EO	NP	T
	Injury (3)	FP	I/D	T
	Contusion (1)	AP	D	T
<i>Salvia verbenaca</i> L. (GDA54314)	Injury (1)	WH	D	T
	Ulcer (26)	FP	I/D	O
<i>Sideritis hirsuta</i> L. (GDA54007)	Gastralgia (6); digestive disorder (5); gastritis (2); hypercholesterolemia (1); liver disease (1)	FP	I	O
	Odontalgia (2)	FP	I	O&T
	Eczema (3)*; herpes (1)	FP	I	T
	Sores (2); contusion (1)	FP	I/D	T
	Injury (22)*; burns (1); calluses and skin hardness (1)	FP	D	T
	Ulcer (2)	FP	I	O
<i>Sideritis incana</i> L. (GDA54321)	Injury (1)	FP	D	T
	Malta fever (2)	FP	D	O
<i>Teucrium lusitanicum</i> Schreber. (GDA53898)	Fever (1); undefined: appetizer (1)	FP	I	O
	Cold (3)	FP	I	O
<i>Thymbra capitata</i> (L.) Cav. (GDA53904)	Inflammation (3)	FP	I/D	O&T
	Gingivitis (1)	FP	I	T
	Cold (14); digestive disorder (7)*; gastralgia (5); bronchitis (4); ulcer (1) amenorrhoea (1); dysmenorrhoea (1); nervousness (1)	FP	I	O
<i>Thymus mastichina</i> (L.) L. (GDA53890)	Respiratory problems (1)*	FP	D	O
	Urinary infection (2)	FP	D	T
	Contusion (1)	FP	AM	T
	Injury (1)	EO	NP	T
	Injury (3)	FP	D	T
<i>Thymus serpyllum</i> L. + <i>Thymus zygis</i> Loeff. ex L. subsp. <i>gracilis</i> (Boiss.) R. Morales (GDA53878)	Digestive disorder (1); eczema (1)	FP	I	O
	Cold (17); digestive disorder (2); infection (2); cough (2); hypercholesterolemia (2); undefined: depurative (2); asthma (1); gases (1)	FP	I	O

Table 1 (Continued)

Plant name (Voucher No.)	Disease (references)	Part.	El.	Adm.
	Pertussis (1)*	FP	D	O
	Urinary infection (2); Rheumatism (1)	FP	D	T
	Injury (1)	EO	NP	T
	Dermatitis (3)*; eczema (1)	FP	I	T
	Mouth infections (1)*	FP	S	T
	Halitosis (1)*	FP	D	O&T
Lauraceae				
<i>Cinnamomum zeylanicum</i> (Breyn) Nees +	Abortive (2); undefined: postpartum depurative (1)	BA	D	O
<i>Laurus nobilis</i> L.+	Gases (3); cough (1)*	L	I	O
Liliaceae				
<i>Aloe vera</i> (L.) Burm.	Skin problems (3); burns (2); injury (1); baldness (1)	PP	NP	T
<i>Allium ampeloprasum</i> L. (GDA54088)	Haemorrhoids (1)	WH	–	T (M)
	Digestive disorder (3)	B	CK	O
<i>Allium cepa</i> L. +	Cold (9); hypertension (2); inflammation (2); kidney malfunction (4); obesity (3); undefined: depurative (2); hypercholesterolemia (2); circulatory problems (1); ulcer (1); helminthiasis (1); digestive disorder (1)*; bladder infection (1)	B	D	O
	Diarrhoea (2)	ST	I	O
	Undefined: diuretic (2)	B	D MW	O
	Cough (5)	B	D NP	O&T
	Pain (2); burns (1)*	B	NP	T
<i>Allium roseum</i> L. (GDA54090)	Haemorrhoids (1)	WH	–	O (M)
	Digestive disorder (3)	B	CK	O
<i>Allium sativum</i> L. +	Retention of liquids (1); undefined: heart-attack prevention (1)	B	FI	O
	Helminthiasis (2)	B	D	O
	Cold (4)	B	D AM	O
	Bone pain (3)*	B	ML	O
	Rheumatism (4)	B	D NP	O&T
	Warts (7); undefined: vesicant (1)	B	NP	T
	Mouth infections (1)	B	D	T
	Muscle pain (1); circulatory problems (1)	B	–	T (M)
<i>Asphodelus albus</i> Miller (GDA44168)	Haemorrhoids (1)	FR	–	T (M)
	Injury (1)	R	D	T
	Eczema (2); acne (1); baldness (1); sores (1)	R	NP	T
<i>Asparagus albus</i> L. (GDA54302)	Undefined: diuretic (1)	TS	CK	O
<i>Asparagus acutifolius</i> L. (GDA54078)	Kidney malfunction (2); undefined: diuretic (2)	TS	CK	O
<i>Asparagus officinalis</i> L. +	Kidney malfunction (3); undefined: diuretic (3)	TS	CK	O
<i>Lilium candidum</i> L. +	Muscle pain (1)	B	I	O
<i>Smilax aspera</i> L. (GDA53853)	Circulatory problems (8); gastralgia (2); constipation (1); pain (1)	R	D	O
	Pain (2); cough (1)	WH	D	O
	Injury (2)	WH	D	T
	Skin problems (5)	R	D	O&T
<i>Urginea maritima</i> (L.) Baker (GDA54075)	Haemorrhoids (12)	B	–	T (M)
	Warts (1); skin problems (1)	B	NP	T
Punicaceae				
<i>Punica granatum</i> L. (GDA53857) +	Cough (1)	FRR	D	O
	Pain (1)	FR	D	O
Magnoliaceae				
<i>Illicium verum</i> Hook. +	Gases (2)	FR	I	O
Malvaceae				
<i>Althaea officinalis</i> L.	Circulatory problems (1)*	R	I/D	O
	Dermatitis (1)*	R	I/D	T
<i>Lavatera arborea</i> L. (GDA54121)	Gastralgia (3); cold (1); digestive disorder (1)	F	I	O
	Female genital infection (1)	FP	D	O
<i>Malva cretica</i> Cav. subsp. <i>althaeoides</i> (Cav.) Dalby (GDA54119)	Gastralgia (3)	FP	I	O
<i>Malva sylvestris</i> L. (GDA54120)	Gastralgia (14); dysmenorrhoea (1); kidney malfunction (1)	F	I	O
	Cold (7)	FP	I	O

Table 1 (Continued)

Plant name (Voucher No.)	Disease (references)	Part.	El.	Adm.
	Hypercholesterolemia (1)*; nervousness (1)*	F&L	I	O
	Female genital infection (13); constipation (4)*	FP	I/D	O&T
	Muscle pain (1)	L	C	T
	Erysipelas (1)	F&L	I	T
	Hives (1)	L	NP	T
	Haemorrhoids (3)	F	I	T
Moraceae				
<i>Ficus carica</i> L. (GDA53804)	Cold (14)	FR	D MW	O
	Cough (3)	FR	D	O
	Constipation (3)	FR	FI	O
	Warts (8)*	LT	NP	T
	Dermatitis (1)*	L	NP	T
Musaceae				
<i>Musa</i> sp.pl. +	Cough (1)	FRRP	D	O
	Muscle pain (1)	FR	FI	O
Myrtaceae				
<i>Eucalyptus camaldulensis</i> Dehnh. (GDA53861) +	Cold (12); respiratory problems (7); mouth infections (1); inflammation (1); hyperglucemia (1)	L	I	O
	Prostatism (1)	L	D	O
	Fever (2)	L	I NP	O&T
	Female genital infection (2)	L	I	T
	Insomnia (2); headache (1)	L	NP	T
	Hoarseness (2)	L	I	T
	Acne (1)*	L	I/D	T
<i>Eugenia caryophyllata</i> Thumb. +	Odontalgia (2)	F	MO NP	O
	Cold (1)	F	MW	O
Oleaceae				
<i>Fraxinus angustifolia</i> Vahl (GDA53823)	Gastralgia (1)	L	D	O
	Kidney stones (1)	L	I	O
	Rheumatism (3)	L	D	O&T
<i>Jasminum officinale</i> L. (GDA53795) +	Insomnia (1)*	F	I	O
	Eye infection (3)	F	M	T
<i>Olea europaea</i> L. var. <i>europaea</i> (GDA53845)	Hypertension (21); hyperglucemia (1)	L	I	O
	Constipation (4); hernia (2); food poisoning (2)	FO	FI	O
	Haemorrhoids (1); cough (1)	FO	NP	O
	Heartburn (1)	FR	NP	O
	Warts (2)	FR	NP	T
	Erysipelas (2)	L	-	T (M)
	Digestive disorder (1)	FO	NP	T (M)
	Sores (5)	FO	C	T
	Psoriasis (3); burns (3); hoarseness (2); otalgia (1); baldness (1); rheumatism (1)	FO	NP	T
<i>Olea europaea</i> L. var. <i>sylvestris</i> Brot. (GDA53836)	Hypertension (13)	L	I	O
Orobanchaceae				
<i>Orobancha crenata</i> Forsskal (GDA54322)	Diarrhoea (6); diarrhoea with tenesmus (1)	WH	I/D	O
Paeoniaceae				
<i>Paeonia broteroi</i> Boiss & Reuter (GDA54006)	Haemorrhoids (2)	T	NP	T
Papaveraceae				
<i>Chelidonium majus</i> L. (GDA53873)	Warts (3)	LT	NP	T
<i>Fumaria rupestris</i> Boiss. & Reuter (GDA53988)	Gall-bladder infection (1)	FP	I	O
<i>Papaver rhoas</i> L. (GDA53791)	Nervousness (4)*	P	I	O
	Baldness (1)	P	D	T
	Eye infection (1)	F	D	T
<i>Papaver somniferum</i> L. subsp. <i>setigerum</i> (DC.) Arcangeli (GDA53790)	Insomnia (2)	AP	NP	T
<i>Papaver somniferum</i> L. subsp. <i>somniferum</i> (GDA53789)+	Nervousness (2)	AP	I	O
	Insomnia (7)	FR	D	O&T
	Nervousness (6)	FR	D	O
	Odontalgia (2)	FR	D	T
Pinaceae				
<i>Pinus halepensis</i> Miller (GDA54017)	Asthma (1)	I	D	O
	Cold (3)	L	I/D	O

Table 1 (Continued)

Plant name (Voucher No.)	Disease (references)	Part.	El.	Adm.
<i>Pinus nigra</i> Arnold + <i>Pinus pinaster</i> Aiton (GDA54015)	Pain (1)	BR	D	O
	Baldness (1)	FR	MO	T
	Haemorrhoids (1)	FR	–	T (M)
	Cold (2)	L	D	O
	Injury (1)	RS	NP	T
Piperaceae				
<i>Piper nigrum</i> L. +	Odontalgia (1)*	S	ML	T
Plantaginaceae				
<i>Plantago albicans</i> L. (GDA54033)	Diarrhoea (3); indigestion (2); digestive disorder (1)	I	D	O
<i>Plantago coronopus</i> L. (GDA54031)	Haemorrhoids (18)	WH	I	O&T (M)
	Diarrhoea (1); gastralgia (1)	FR	D	O
<i>Plantago lanceolata</i> L. (GDA54032)	Respiratory problems (1)	L	I	O
	Insect bites (1); pimples (1)	L	C	T
Plumbaginaceae				
<i>Plumbago europaea</i> L. (GDA53860)	Warts (3); injury (1); calluses and skin hardness (1)	L	C	T
Poaceae				
<i>Avena barbata</i> Pott ex Link subsp. <i>barbata</i> (GDA54056)	Gout (1); undefined: diuretic (1)	AP	D	O
<i>Avena sativa</i> L. + <i>Cynodon dactylon</i> (L.) Pers. (GDA54092)	Nervousness (2)	AP	I	O
	Cold (4); lumbago (4); blood pressure alterations (2); kidney stones (2); urinary infection (1); albuminuria (1)	R	D	O
<i>Oryza sativa</i> L. + <i>Phalaris canariensis</i> L.	Kidney malfunction (4)	WH	D	O
	Rheumatism (4)	R	AM	T
	Warts (2)	WH	–	T (M)
	Diarrhoea (6)	FR	D	O
<i>Stipa tenacissima</i> L. (GDA54052)	Hypercholesterolemia (6); hypertension (2); hyperglucemia (1)	FR	I	O
	Arteriosclerosis (1)*	S	D	O
	Abortive (2)	L	D	O
	Warts (2)	L	–	T (M)
<i>Triticum sp. pl.</i> +	Injury (1)	L	NP	T
	Cold (7)	S	D	O
	Diarrhoea (1)	S	M	O
	Respiratory problems (1)	S	D	T
	Luxation (1)	SP	D	T
	Baldness (1)	ST	MO	T
	Dermatitis (1)	PJ	NP	T
	Hepatitis (1)	SP	–	T (M)
	Kidney stones (6); undefined: diuretic (5); urinary infection (2); prostatism (1)	SG	I	O
	Kidney malfunction (6); albuminuria (1)	SG	D	O
Cough (1)	I	D	O	
Polygonaceae				
<i>Polygonum bellardii</i> All. (GDA53837)	Hyperglucemia (4)	AP	I	O
<i>Rumex conglomeratus</i> Murray (GDA53839)	Diarrhoea (2)	FP	D	O
Ranunculaceae				
<i>Nigella damascena</i> L. (GDA53828)	Gall-bladder infection (1)	FP	I	O
ROSACEAE				
<i>Crataegus monogyna</i> Jacq. (GDA53965)	Circulatory problems (8)*; hypertension (2); bronchitis (1)	F	I	O
<i>Cydonia oblonga</i> Miller + <i>Eriobotrya japonica</i> (Thunb.) Lindl. (GDA53961)	Cold (2)	FR	FI	O
	Nervousness (2)*	F&L	I	O
	Respiratory problems (1)	S	D	O
	Constipation (1)	L	D	O
<i>Fragaria vesca</i> L. + <i>Prunus avium</i> L. (GDA53971)	Respiratory problems (1); hyperglucemia (1); aphonia (1)	L	I	O
	Gout (1)	L	I	O
	Dysmenorrhoea (1)	FR	ML	O
	Hives (1)	FRP	D	O
<i>Prunus cerasus</i> L. + <i>Prunus domestica</i> L. + <i>Prunus dulcis</i> (Miller) D. A. Webb (GDA53969) +	Dysmenorrhoea (2)	FR	ML	O
	Constipation (2)*	FR	FI	O
	Diarrhoea (1); hypercholesterolemia (1)	FR	FI	O
	Constipation (1)	FR	D	O
Hyperglucemia (1)	R	D	O	

Table 1 (Continued)

Plant name (Voucher No.)	Disease (references)	Part.	El.	Adm.
<i>Prunus spinosa</i> L. (GDA53968) <i>Rosa canina</i> L. (GDA53954)	Dysmenorrhoea (1)	FRR	D	O
	Kidney stones (1)	FR	D	T
	Calluses and skin hardness (1)	RS	D	T
	Odontalgia (2)	FR	–	T (M)
	Hyperglucemia (2)	L&FRR	D	O
	Diarrhoea (5); cold (5); kidney malfunction (1); Gout (1)	FR	D	O
	Circulatory problems (1); undefined: diuretic (1)	FR	I	O
	Asthenia (2)	FR	D FI	O
	Insomnia (1)	P	NP	T
	Eye infection (3)	P	M	T
<i>Rosa sp. pl. +</i>	Warts (2)	WH	–	T (M)
	Insomnia (1)	P	NP	T
	Eye infection (3)	P	M	T
<i>Sanguisorba minor</i> Scop. (GDA53979)	Injury (1)	WH	S	T
<i>Sorbus domestica</i> L.(GDA53959)+	Diarrhoea (2)	FR	FI	O
Rubiaceae				
<i>Coffea arabica</i> L. + <i>Rubia peregrina</i> L. (GDA53858)	Halitosis (1)	S	NP	O
	Circulatory problems (2); rheumatism (1); hoarseness (1); undefined: diuretic (1)	AP	D	O
	Anxiety (2)	WH	D	O
	Kidney malfunction (2)	R	D	O
	Pain (2)	AP	D	O&T
	Rutaceae			
<i>Citrus limon</i> (L.) Burm. Fil. +	Cold (7)*; cough (3); hypertension (2)*	FJ	FI	O
	Rheumatism (2); calluses and skin hardness (2); herpes (1); burns (1); sores (1); aphonia (1)	FJ	NP	T
<i>Citrus sinensis</i> (L.) Osbeck +	Eczema (3)	FJ	C	T
	Baldness (1)	FR	MO	T
	Haemorrhoids (1)	FR	–	T (M)
<i>Ruta angustifolia</i> Pers. (GDA53815)	Nervousness (3); hypertension (2); circulatory problems (1)	F	I	O
	Constipation (1); cough (1)	FR	FI	O
<i>Ruta montana</i> (L.) L. (GDA53867)	Abortive (3)	FP	D	O
	Pain (3)	FP	AM	T
	Digestive disorder (2); helminthiasis (1)	FP	I	O
	Ulcer (1)	AP	D	O
	Odontalgia (1)	FP	I	T
	Chilblains (1)	FP	D	T
	Abortive (5)	FP	D	O&T (M)
	Salicaceae			
<i>Salix alba</i> L. (GDA54000)	Hernia (6)	BR	–	T (M)
Scirpaeae				
<i>Scirpoides holoschoenus</i> (L.) Sojak (GDA54074)	Odontalgia (1)	I	D	O
	Cold (4)*	F&L	D	O
	Cough (2)*	ST	D	O
	Fever (2)	S	D	O
	Warts (7)	I	–	T (M)
Scrophulariaceae				
<i>Digitalis obscura</i> L. (GDA53945)	Ulcer (2)	L	I	O
	Gastralgia (1)	L	D	O
	Odontalgia (2)*	FP	D	T
	Varicose veins (1)	AP	D	T
	Contusion (8)*; injury (3); eczema (2); pain (1); dermatitis (1)	AP	D	T
<i>Scrophularia lyrata</i> Willd. (GDA53987)	Injury (1)	WH	MO	T
<i>Verbascum thapsus</i> L. (GDA53944)	Cold (2); cough (2)	L	I/D	O
<i>Verbascum sinuatum</i> L. (GDA53950)	Haemorrhoids (2)	R	–	T (M)
Solanaceae				
<i>Capsicum frutescens</i> L.+ <i>Hyoscyamus albus</i> L. (GDA54123)	Rheumatism (1)	FR	M	T
	Odontalgia (8)	L&FRR	D	T
<i>Lycopersicon esculentum</i> Mill. +	Rheumatism (1)	L	I	T
	Contusion (1)*; injury (1)*	L	I/D	T
	Constipation (1)	FR	FI	O
	Asthenia (1)	FJ	FI	O
	Calluses and skin hardness (4); pimples (2); burns (1)	FR	NP	T

Table 1 (Continued)

Plant name (Voucher No.)	Disease (references)	Part.	El.	Adm.	
<i>Solanum melongena</i> L. +	Hypercholesterolemia (4)	FR	D	O	
	Haemorrhoids (4)	FR	MO	T	
	Warts (1)	FR	NP	T	
	Odontalgia (1)	FJ	NP	T	
<i>Solanum nigrum</i> L. (GDA54127)	Odontalgia (1)	FP	D	T	
<i>Solanum tuberosum</i> L. +	Contusion (1); burns (1)	T	NP	T	
<i>Solanum villosum</i> Miller (GDA54126)	Mouth infections (1)	WH	D	T	
Thymelaceae					
<i>Daphne gnidium</i> L. (GDA53805; GDA53806)	Odontalgia (2)	AP	D	O (M)	
	Placenta Ret. (1)	BA	–	T (M)	
	Warts (1)	WH	–	T (M)	
Tiliaceae					
<i>Tilia platyphyllos</i> Scop. (GDA53798) +	Nervousness (6)	F&L	I	O	
Typhaceae					
<i>Typha domingensis</i> (Pers.) Steudel (GDA54171)	Baldness (1)	R	M	T	
Ulmaceae					
<i>Celtis australis</i> L. (GDA53812)	Hypercholesterolemia (1)	L	D	O	
Urticaceae					
<i>Parietaria judaica</i> L. (GDA53809)	Circulatory problems (1); Kidney stones (1)	WH	I	O	
	Undefined: diuretic (1)*	L	I	O	
	Gout (1)	WH	I/D	O	
	Headache (1)	FP	I	O	
	<i>Urtica dioica</i> L. (GDA54315)	Undefined: diuretic (2); obesity (1); circulatory problems (1); liver disease (1); cold (1); hyperglucemia (1)	AP	I/D	O
		Circulatory problems (4)	AP	NP	O
		Prostatism (1)	L	D	O
		Rheumatism (3)	AP	NP	O&T
		Hypercholesterolemia (1)	WH	D	O
	<i>Urtica urens</i> L. (GDA54315)	Undefined: calcium (1)	WH	I	O
Undefined: invigorative (1)		AP	CK	O	
Baldness (8)*; sores (2)		AP	D	T	
Varicose veins (2)		AP	NP	T	
Undefined: diuretic (2); hypercholesterolemia (1); obesity (1)		AP	D	O	
Circulatory problems (1); liver disease (1); cold (1); hyperglucemia (1)		AP	I/D	O	
Prostatism (1)		L	D	O	
Undefined: invigorative (1)		AP	CK	O	
Rheumatism (2)		AP	NP	O&T	
Baldness (6); sores (2)		AP	D	T	
Circulatory problems (4); varicose veins (2)	AP	NP	T		
Valerianaceae					
<i>Valeriana officinalis</i> L. +	Insomnia (2); nervousness (2)	R	I	O	
Verbenaceae					
<i>Aloysia citriodora</i> (Cav.) Ort. (GDA53850) +	Gastralgia (2); digestive disorder (2); headache (2); insomnia (2); ulcer (1); muscle pain (1)	FP	I	O	
	<i>Verbena officinalis</i> L. (GDA53831)	Injury (1)	FP	D	T
Vitaceae					
<i>Vitis vinifera</i> L. (GDA54313)	Helminthiasis (3); mouth infections (1)	FFJ	NP	O	
	Cold (3)	ST	D	O	
	Baldness (1)	FFJ	NP	T	
Zygnemataceae					
<i>Spirogyra</i> sp. pl. (GDA54299)	Gastralgia (1)	WH	NP	T	

Part: A= ash; AP= aerial part; B= bulbs; BA= bark; BR= branches; EO= essential oil; F&L= flowers and leaves; F= flowers; FD= fronds; FFJ= fermented fruit juice; FJ= fruit juice; FO= fruit oil; FP= flowery plant; FR= fruits; FRP= fruit peduncle; FRR= fruit rind; I= inflorescence; L&FR= leaves and fruits; L&R= leaves and roots; L&ST= leaves and stem; L= leaves; LT= latex; P= petals; PJ= plant juice; PP= pulp; R= roots; RS= resin; RZ= rhizome; S= seeds; SG= stigma; SP= spike; ST= stem; T= tuber; TS= tender shoots; WP= whole plant. El.: elaboration process—AM= alcohol macerate; C= cataplasm; CK= cooked; D= decoction; FI= fresh ingested; FJ= fresh juice; I/D= infusion or decoction; I= infusion; M= macerate; ML= medicinal liquor; MO= medicinal oil; MW= medicinal wine; NP= no preparation; S= spray. Adm.: administration—O= oral; T= topic; O&T= oral and topic. M= magical-religious. (*) Previously reported uses (González-Tejero, 1989).

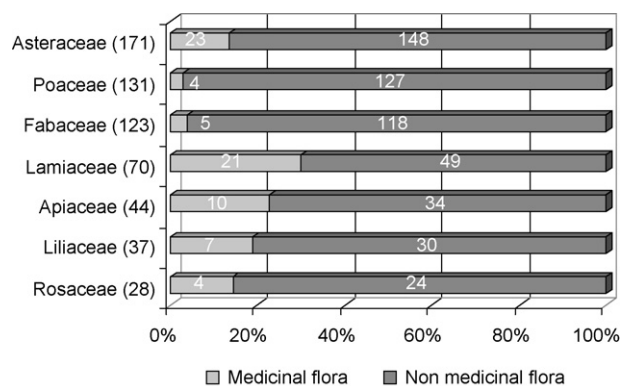


Fig. 2. Proportion of medicinal and non-medicinal flora in each botanical family. Numbers between parentheses indicate the total native species.

excluded from this analysis and marked in Table 1). Obviously, the higher the proportion of medicinal species in one family, the more locally important it is for medicinal purposes. This “relative importance” was noteworthy in the *Lamiaceae*: 30% of the species of this family have a folk medicinal use in the area.

For example, the floristic richness of the family *Asteraceae*, a majority group in the study area, is manifested in the great number of species used in popular phytotherapy (the most important family, with 27 medicinal species and 23 native ones). However, its relative importance (13.5% medicinal use) is lower than for families *Apiaceae* (22.7%), *Liliaceae* (18.9%) and *Rosaceae* (14.3%), with fewer species in the floristic catalogue.

Therefore, the high use of the *Asteraceae* species is undoubtedly due to their great abundance in the area, since, as different authors have pointed out (Johns et al., 1990; Agelet and Vallés, 2001), the more common a plant is, the more probable it is that it will acquire local use.

Although medicinal use of *Poaceae* species is very low (only 4 wild species, plus another 4 allocthonous ones), the total number of species of this family in the ethnobotanical catalogue amount to 29. Most of them are not included in this work (they are used for other ethnobotanical purposes like animal feeds, handicrafts, agricultural, cultural manifestations, etc.).

However, given the relatively low representation of the *Lamiaceae* in relation to the number of species, the high relative importance of this family, must have other reasons: their plant communities (rosemary thickets, thyme patches, etc.) are widely extended in the area, and their flowering and fragrance (due to their high concentration of essential oils) are arresting qualities that have made these species attractive to humans since ancient times. In this sense, as reflected in Table 2, 5 species of this family are found among the 10 most cited species, with chamomile (*Matricaria chamomilla* L.) being the only species of *Asteraceae* included in this group.

Table 2
Most frequently cited medicinal species.

Species	References
<i>Sideritis hirsuta</i> L.	74
<i>Rosmarinus officinalis</i> L.	61
<i>Olea europaea</i> L. var. <i>europaea</i>	54
<i>Malva sylvestris</i> L.	48
<i>Matricaria chamomilla</i> L.	45
<i>Thymus mastichina</i> (L.) L.	42
<i>Allium cepa</i> L.	41
<i>Equisetum ramosissimum</i> Desf.	41
<i>Thymus zygis</i> Loefl. ex L. subsp. <i>gracilis</i> (Boiss.) R.Morales.	40
<i>Mentha pulegium</i> L.	36

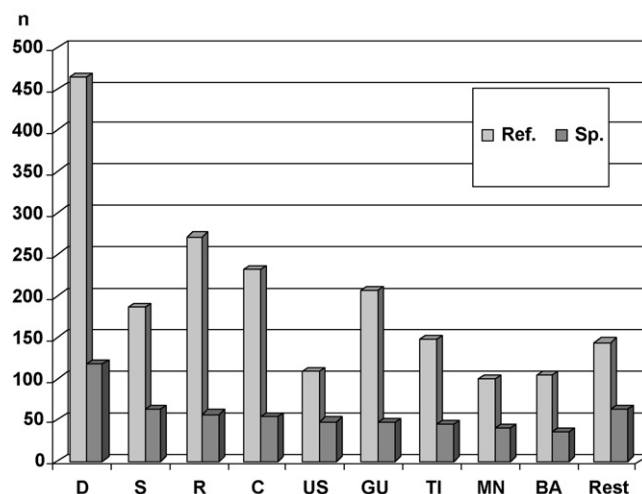


Fig. 3. Number of references and total species in the treatment of diseases of the same pathologic group. D: digestive; S: skin and subcutaneous tissues; R: respiratory; C: cardio-vascular; US: undefined symptoms; GU: genitor-urinary; TI: traumatic injuries; MN: metabolism and nutrition; BA: bones and articulations.

3.2. Medicinal uses

The 229 medicinal species are used in relation to 100 different illnesses. These maladies were structured into 14 different pathological groups according to the criteria of Adjanohoun et al. (1989). The species were given 833 different medicinal uses, taking “medicinal use” to mean the application of a plant in the treatment of a specific illness included in a certain pathological group. A total of 1963 references have been taken for those medicinal uses.

The pathological groups with the greatest number of records (Fig. 3) were the digestive tract (24%), respiratory system (14%) and circulatory system (12%), followed by the genital-urinary group (10.5%) and skin problems (9.5%). Also the number of species used was greatest in the treatment of the digestive system, followed by skin problems and the respiratory and circulatory systems.

The greatest number of maladies cited were digestive complaints and gastralgia (205 references, 10.45%), colds (190, 9.6%), injuries (84, 4.3%), and circulatory problems (74, 3.8%). In general, these are mild illnesses that, according to the interviewees, respond well to treatment with plants. The number of species and references for each ailment considered, organized by pathological groups, can be seen in Table 3.

The plant most cited for medicinal uses was *Sideritis hirsuta* L., which registered the highest number of references to its use against gastric ulcers (26 references) and to mend cuts (22 references), followed by *Olea europaea* L. var. *europaea* as a remedy against hypertension (21 references). The folk uses of these plants are commonly extended in Andalusia, as mentioned by many authors (Casana, 1993; Galán, 1993; Triano, 1998; Martínez-Lirola et al., 1997).

The genus *Sideritis* constitutes a complex taxonomic group, with some species endemic to Andalusia (Obón and Ribera, 1994). Their long tradition dates to Dioscorides, also described by the Andalusian Ibn al-Baytar as wound healing (Laguna, 1991; Leclerc, 1881). The olive tree is a ubiquitous crop in the area, with many medicinal uses (Table 1). The wild olive tree, *Olea europaea* L. var. *sylvestris* (Miller) Lehr., was preferred by some interviewees over the cultivated varieties. As noted below, the magical and ritualistic uses of plants are also frequent in the area, with the use of *Plantago coronopus* L. as an anti-haemorrhoidal treatment, the plant being the one most cited in this context (18 references).

Table 3

Ailments included in each pathologic group (following Adjanohoun et al., 1989) and number of species and references for each. Alt: alteration.

Ailment	Sp.	Ref.
Circulatory system		
Alt. of blood pressure	2	9
Arteriosclerosis	1	1
Haemorrhoids	25	64
Hypertension	14	60
Hypotension	2	2
Inflammation	4	6
Undefined symptom	2	2
Circulatory problems	22	74
Varicose veins	9	13
Total	53	231
Digestive system		
Mouth infections	9	11
Liver disease	1	1
Gall-bladder infection	4	4
Colic	1	1
Diarrhoea	17	40
Diarrhoea with tenesmus	5	9
Liver disease	13	15
Constipation	13	28
Gases	8	23
Gastralgia	35	100
Gastritis	2	4
Gingivitis	1	1
Halitosis	3	5
Helminthiasis	7	11
Hepatitis	1	1
Hernia	2	8
Indigestion	1	2
Odontalgia	23	54
Heartburn	2	3
Undefined symptom	1	2
Digestive disorder	38	105
Gall-bladder infection	1	1
Ulcer	9	36
Total	118	465
Respiratory system		
Respiratory problems	8	14
Asthma	3	3
Bronchitis	3	7
Infection	1	2
Inflammation	1	1
Cold	40	190
Cough	24	51
Pertussis	3	4
Total	57	272
Complications in pregnancy and giving birth		
Pregnancy (abortive)	7	18
Postpartum infections	1	4
Placental retention	3	4
Undefined symptom	3	3
Total	11	29
Infectious and parasitic diseases		
Malta fever	5	14
Herpes	8	15
Food poisoning	3	4
Warts	20	52
Total	35	85
Mental illness		
Anxiety	1	2
Depression	1	1
Total	2	3

Table 3 (Continued)

Ailment	Sp.	Ref.
Genital-urinary		
Kidney malfunction	2	4
Amenorrhoea	2	4
Dysmenorrhoea	11	23
Pain	3	10
Bladder infection	1	1
Kidney malfunction	14	31
Female genital infection	4	18
Urinary infection	7	14
Kidney stones	14	60
Menorrhagia	1	1
Prostatism	9	10
Undefined symptom	16	30
Total	47	206
Bones, joints, etc.		
Muscle pain	6	8
Pain	17	41
Inflammation	1	3
Lumbago	2	8
Rheumatism	14	41
Undefined Symptom	2	3
Total	35	104
Traumatic injuries and poisoning		
Contusion	11	32
Bone fracture	1	2
Injury	32	84
Luxation	4	7
Insect bites	3	3
Burns	10	19
Total	45	147
Metabolism, nutrition, etc.		
Anaemia	4	5
Diabetes	4	10
Hypercholesterolemia	19	42
Hyperglucemia	14	22
Gout	8	8
Obesity	7	9
Retention of liquids	1	1
Undefined Symptom	2	2
Total	40	99
Skin and subcutaneous tissues		
Acne	2	2
Skin problems	10	34
Baldness	18	38
Calluses and skin hardness	9	14
Calluses and skin dermatitis	8	12
Eczema	12	25
Oedema	1	1
Erysipelas	7	14
Sores	8	20
Pimples	8	14
Chilblain	3	3
Undefined symptom	1	1
Psoriasis	1	3
Cutaneous ulcer	1	2
Nail infections	1	1
Hives	2	2
Total	63	186
Symptoms, signs and poorly defined morbid states		
Aphonia	2	2
Albuminuria	2	2
Asthenia	3	5
Headache	7	8
Pain	1	2
Fever	7	16
Inflammation	1	1
Insomnia	9	19

Table 3 (Continued)

Ailment	Sp.	Ref.
Nervousness	14	34
Hoarseness	4	6
Undefined symptom	11	14
Total	48	109
Nervous system and sensory organs		
Eye infection	6	12
Conjunctivitis	2	7
Otalgia	3	3
Total	10	22
Tumours		
Pain	3	4
Undefined symptom	1	1
Total	4	5
Totals	229	1963

Although most of the species had more than one medicinal use (69.5%, of which 43 species were used in the treatment or prevention of more than 5 afflictions) some had only one application (30.5%, 70 species). Grouping the afflictions treated in pathological groups we can analyse the specificity in the use of the taxa. In this sense, on many occasions, the interviewees showed a tendency to use a certain species to treat one or more illnesses of the same pathological group (93 species are used to treat illnesses of a single pathological group while 53 served to treat different illnesses of 2 pathological groups).

On the contrary, with other species, a great number of medicinal remedies were described for diverse health problems, showing a clear polyvalence in their use, with the most significant cases being those of *Olea europaea* L. var. *europaea*, *Rosmarinus officinalis* L., *Allium cepa* L., and *Thymus zygis* Loefl. ex L. subsp. *gracilis* (Boiss.) R.Morales. At least the first two, olive and rosemary, could be considered panaceas due to their application in 10 different groups of pathologies.

3.3. Parts of the plant used: preparation and administration

The parts of the plant used were primarily the shoot with flowers (25%) and leaves (15%), while the entire plant was also frequently used (16%). Other parts frequently used included: fruits (10%), roots, rhizomes, and other underground parts (10%); some flower parts such as petals, stamens, and stigmas (9%); and occasionally seeds, bark, fruit peel, latex, etc. (15%). Most remedies were for internal application (63%).

The preparation methods were generally simple, such as decoction (31%) and infusions (28%), often either way (6%). In a small percentage of cases, macerates were prepared in water (1%), alcohol (1%) or oil (2.5%, generally olive oil). Also prevalent were remedies applied directly, without any preparation (13%), including in this category such plant products as oil, juice, or essential oils, together with plant fragments which had not been cut up or ground. For external use, there was also notable use of cataplasms with ground plants or plant parts (3%), and occasionally plasters when some type of fat was added to the preparation. In a rather high number of medicinal uses (4%), we did not define the manner of preparation because they had magical-medicinal use, which will be discussed in another section.

Finally, in a notable percentage of medicinal uses the plants were ingested in the diet, whether fresh (5%), cooked (2%), juiced, or in alcoholic preparations (e.g. wine-based elixirs) and medicinal liquors (1.5%). A total of 48 species could be considered nutraceutical for being ingested as food for medicinal virtues (see Table 1).

In general, most medicinal items (96%) were prepared in only one way, although in some cases (25 medicinal uses) two different ways were described. Only two cases (osteoarticular analgesic use of *Rosmarinus officinalis* L. and fruits of *Juniperus oxycedrus* L., sometimes mixed) were prepared three different ways: decoction, steeped in alcohol, or macerated in olive oil.

3.4. Quantitative analyses: ethnobotanical indices

As commented above, we made different quantitative analyses to formulate indices that would enable comparisons of our data with those of other zones. In this sense, perhaps one of the most widely used ethnobotanical indices is the one proposed by Portéres (1970), as it expresses the ethnobotanical richness of a territory and of the level of knowledge that a society has of its flora and landscape. This index is calculated by relating the useful flora with the total flora present of an area. Using a floristic catalogue with 1345 species from 96 families of vascular plants and comparing these data with 377 species of vascular plants registered with some popular use (the floristic catalogue does not include bryophytes or algae), we found an ethnobotanical index value of 28.02%. Comparisons of these results with other works in the Iberian Peninsula showed similar values in Andalusian works for nearby areas. For example, 29.53% in Cazorla (Fernández, 2000) and 25.3% in Cabo de Gata (Martínez-Lirola et al., 1997) were reported, figures which in general indicate high use of flora in those territories, being higher than values found in other zones nearby in Portugal (16% for Tras-os-Montes and 8.28% for the national park of Arrabida; Neves et al., 2009; Novais et al., 2004). The works focusing on larger areas, for example at the province level, showed lower values, as the number of total flora was substantially higher (Córdoba 8.8%, Huesca 22%, Castellón 17.2%; Casana, 1993; Galán, 1993; Villar et al., 1992; Mulet, 1991).

Considering only the medicinal species of ethnoflora, 229, we calculated the pharmacoethnobotanical index (Verde, 2002), which expresses the relation between the medicinal plants used and the plants present in the study area. This index reached 17%, a value similar to that of other areas of the Iberian Peninsula where the index was also calculated, e.g. Sierras de Albacete (16.07%), Cuenca (14.61%) and Montes de Toledo (18.06%), according to Verde (2002), reflecting the importance of plants in folk medicine.

To evaluate the different plant uses of the local population, Mesa (1996) introduced the “use spectrum of ethnoflora”, which is indicative not only of the ethnobotanical richness but also to the capacity of self-management of the population and of its integration in the environment. In our study, 58 species were cited more than 10 times as medicinal, of which the 10 most recorded are included in Table 2. Scoring the different medicinal uses applied, we found that in 16 cases, the plants served more than 10 different uses, showing a clear polyvalence in their medicinal use. Notable among these were, again, *Olea europaea* L. var. *europaea* (18 medicinal uses and 54 references) and *Rosmarinus officinalis* L. (61 references for its 18 medicinal uses). Comparing the results to those of other Andalusian zones, we see that the olive has up to 32 different uses in Jaén, including non-medicinal uses (Guzmán, 1997) and 26 in Cabo de Gata (Martínez-Lirola et al., 1997). Rosemary showed the highest number of different uses in Cazorla (Fernández, 2000) and is highly important throughout the province of Jaén (with 26 total uses; Guzmán, 1997) as well as in the Almerian region of Cabo de Gata (32 uses, Martínez-Lirola et al., 1997). It is not surprising, then, that both are territorially widespread species that were well known in antiquity. In third place there is a cultivated species, the onion *Allium cepa* L., with 17 different uses and a total of 41 references. It bears noting that 6 of the most cited plants (37.5%) are cultivated, apart from the onion: *Petroselinum*

Table 4
Comparison with other Andalusian and Iberian ethnobotanical works.

Region	Area (km ²)	Population (hab.)	Flora	Ethnoflora	EF/km ²	MP	MP/km ²	Int.	MP/Int	EI	PEBI	IMUA	EPI
Andalusia													
Cabo Gata ^a	800	20,000	1000	–	–	253	0.316	153	1.65	–	25.3	–	–
Cazorla ^b	2,143	72,423	1933	545	0.254	344	0.161	183	3.12	28.19	17.79	63.11	–
S ^a Mágina ^c	1,990	35,069	1256	380	0.19	–	1.191	50	7.6	30.35	–	–	–
Villares ^d	270.5	9,508	–	463	0.158	157	0.58	92	1.7	–	–	33.90	–
W. Granada ^e	2,041	77,532	1345	377	0.186	229	0.112	279	0.82	28.02	17.02	60.26	0.33
Granada ^f	12,531	761,734	–	–	–	241	0.019	–	–	–	–	–	–
Córdoba ^g	13,718	724,000	1641	–	–	145	0.01	106	1.37	–	8.8	–	–
Jaén ^h	13,498	637,633	–	320	0.023	283	0.021	–	–	–	–	–	–
Other Iberian regions													
S ^a Albacete ⁱ	–	–	2034	660	–	327	–	–	–	32.44	16.07	49.54	–
S ^a Cuenca ⁱ	–	–	1451	490	–	212	–	–	–	33.76	14.61	43.26	–
S ^a Toledo ⁱ	–	–	1002	497	–	181	–	–	–	49.6	18.06	36.41	–
Caure ^j	260	2,400	800	–	–	223	0.86	45	4.9	–	27.9	–	–
A. Empordà ^k	178	41,300	1650	–	–	149	0.837	46	3.24	–	11	93	0.11
Guilleries ^k	594	18,880	1100	–	–	158	0.266	27	5.85	–	20	87	0.19
Montserrat ^l	826	79,373	1500	584	0.707	351	0.425	172	2.05	38.93	25	43.4	0.28
Navarra Pyr. ^m	2,200	7,800	1822	–	–	92	0.042	88	1.04	–	5.05	–	–
Castellón ⁿ	6,679	385,823	2400	–	–	365	0.055	150	2.234	15.2	15.2	–	–
Huesca ^o	15,671	222,000	2500	–	–	553	0.035	–	–	–	22	–	–

EF/km²: ethnoflora per km²; MP: medicinal plants; MP/km²: medicinal plants per km²; Int.: interviewees; MP/Int.: medicinal plants per interviewee; EI: ethnobotanical index (Portéres, 1970); PEBI: pharmacoethnobotanical index; IMUE: index of medicinal use of ethnoflora (%); EPI: ethnophytonymy index (Bonet et al., 1999).

^a Martínez-Lirola et al. (1997).

^b Fernández (2000).

^c Carazo et al. in Fernández (2000).

^d Ortuño (2003).

^e Present study.

^f González-Tejero (1989).

^g Galán (1993) and Casana (1993).

^h Guzmán (1997).

ⁱ Verde (2002).

^j Blanco et al. (1999).

^k Bonet et al. (1999).

^l Bonet and Vallés (2007).

^m Akerreta et al. (2007).

ⁿ Mulet (1991).

^o Villar et al. (1992).

crispum (Miller) A.W.Hill., *Juglans regia* L., *Eucalyptus camaldulensis* Dehnh., *Citrus limon* (L.) Burm., and *Allium sativum* L. These species are frequent in the home, easily prepared with readily available resources, and their effectiveness has been confirmed over long use. In fourth place is thyme, *Thymus zygis* Loefl. ex L. subsp. *gracilis* (Boiss.) R.Morales, with 16 medicinal uses and 40 references.

The total number of species in the study area for which at least one common name was recorded reached 449 taxa, and 377 of these appeared in our ethnobotanical catalogue. With these species, a dictionary of common names was compiled for local flora (Benítez, 2009). The ethnophytonymy index used was proposed by Bonet et al. (1999), which displays a relation between the total flora of an area and the portion that receives a popular name, without considering the diversity of the common names for a given taxon. The index reached a value of 0.33 in this area, the highest of those recorded to date in the Iberian Peninsula, manifesting a high degree of knowledge of flora by a population regardless of the traditional uses of the plants.

Our results were compared with those of recent studies in the Iberian Peninsula, and especially with the results of other ethnobotanical studies in Andalusia (Table 4). For a base, we used the comparisons made by Bonet et al. (1999) in a study on the regions of L'Alt Empordà and Les Guilleries, augmented by Fernández (2000), Agelet and Vallés (2001), Parada et al. (2002), and Akerreta et al. (2007), revised according to our criteria in relation to the differences between ethnoflora and medicinal ethnoflora, terms frequently confused or used as synonyms in exclusively pharmaceutical ethnobotanical studies.

3.5. Plants with magical-religious medicinal uses

A total of 34 species represent a total of 45 uses assigned to this category (Table 1). These include, according to our interpretation, remedies not explained on the basis of pharmaceutical properties of the plant but rather on an intense faith in the fulfilment of its mission. In many cases, there was no ingestion of the plant or even topical contact. Many of these species are used in what we call "health rituals", whether with religious or non-religious overtones. These remedies are used to treat 15 different maladies, including: haemorrhoids (with 14 species with magical use), odontalgia (6 species), erysipelas and warts (5 species each), herpes (3 plants), muscle aches, undefined symptoms of pregnancy and birth (2 species), and another 8 afflictions for which treatment involves a single species (abortion, sores, hepatitis, hernia, otalgia, placental retention, digestive disorders, and circulatory ailments).

In this type of magical or religious ritual, the use of antihæmorrhoidal *Plantago coronopus* L. was cited most often (18 references), this being furthermore, as commented above, the fourth medicinal remedy by number of references. The freshly collected plant is kept in a bag in the belief that as it dries it cures the hæmorrhoids. With 12 references, the bulb of *Urginea maritima* (L.) Baker is also used against hæmorrhoids while the rush *Scirpoides holoschoenus* (L.) Sojak is used against varicose veins (7 references).

The use of *Salix alba* L. is frequently cited in relation to rituals to cure infantile hernias, well referenced in Iberian literature (Verde, 2002; Kuschick, 1995). The ritual is performed on the early morning of 24 June, the night of San Juan, before the sun shines on a chosen willow; a branch of that willow is split lengthwise, and the

child is passed under the willow branch as many times as possible from person to person, all of whom must have the name Juan or María.

Surely in relation to the ancient theory of signs, on two occasions the interviewees referred to a “theory of the colours of flowers”, according to which white flowers are beneficial to the heart, purple ones for the lungs, and yellow ones for the liver. The interviewee that referred to this theory used *Paronychia argentea* Lam. for circulatory problems, *Malva sylvestris* L. for respiratory illness, and *Ulex parviflorus* Pourret or *Sinapis alba* L. subsp. *mairei* (H. Lindb.) Maire for hepatic ailments.

Other beliefs concerning remedies refer to the treatment period, which often consisted of an odd number of days, often 9, as reported by Agelet and Vallés (2001). Periods of 7 days were also frequent, with intervals of a week without taking the remedy in cases of plants considered “strong”.

3.6. Acculturation index

In this study, we also detected some indications of the loss of ethnobotanical knowledge. The catalogue includes 61 medicinal uses that were compiled for this area in the unpublished province-wide study by González-Tejero (1989, indicated in Table 1 with an asterisk), representing 7.3% of the total recorded. Of these, 31 were incorporated on the basis of this literature review and were not mentioned again in the interviews. These were included to make an ethnopharmacological synthesis of the territory (only one reference in the table). On the contrary, 30 of these uses have again been indicated by the interviewees, in some cases on numerous occasions. This means that only 50.8% of the uses were mentioned again in this survey 20 years after the first one, denoting a high index of information loss in a short time period.

In addition, we have recorded some incomplete ethnobotanical information. For 15 plants, we recorded the popular use and common name, but we were unable to locate the taxon in the field with the interviewees, usually because they had forgotten the plant. In other instances, people knew the plant and the common name, and they recognized it as medicinal but without remembering the remedy. Such information and plants could not be included in the ethnobotanical catalogue.

Moreover, following the reliability criterion of Le Grand and Wondergem (1987), we have calculated what Verde (2002) called the “index of consensus”, calculated as the percentage of plants or uses cited by a minimum of three interviewees related to the total number of plants. This index indicates both the general extent of the plants and treatments recorded in an area as well as the greater or lesser reliability of the information. In our case, its value indicates good knowledge of the medicinal species by the human population (65% cited by at least three different interviewees), but not for medicinal remedies (24%). This can be interpreted as a symptom of loss of ethnobotanical knowledge, that is, in many cases the plants were known but their use had been forgotten.

4. Conclusions

The present study adds to the Andalusian ethnobotanical map, recording a high number of species and medicinal uses for a territory that, though having been the object of some cursory and unpublished ethnobotanical studies, had received little attention.

The pathologies treated were not serious, involving mainly the digestive, respiratory, and circulatory systems. The plant families that added the highest number of medicinal species to the ethnobotanical catalogue were *Lamiaceae* and *Asteraceae*. We analysed the factors underlying the high use of plants from these two families. The species with the greatest number of references was *Sideritis*

hirsuta L. and *Olea europaea* L., both with a long tradition of use in Andalusia.

Also, we confirmed the high prevalence of medicinal rituals in this part of Andalusia, in which a large number of plant species were used to treat certain maladies, generally treated exclusively in this way.

The quantitative analysis provided indices that showed good knowledge of plants and a high use in relation to their medicinal properties, as in other areas of Spain, although higher than in other zones of the Iberian Peninsula. Nevertheless, the risk of losing this knowledge was reflected both by the consensus index as well as by the results compared with previous works. This indicates the urgency of performing these kinds of studies to conserve such knowledge, which forms part of the cultural heritage of different regions.

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