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[1]Laboratori de Botànica, Facultat de Farmàcia, Universitat de Barcelona, Barcelona, Catalonia, Spain

Ethnobotany of food plants in the Alt Empordà region (Catalonia, Iberian Peninsula)

M. Parada[1], E. Carrió[1], J. Vallès[1]

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Summary

This paper includes part of the ethnobotanical work carried out in the Alt Empordà region (Catalonia, Iberian Peninsula), in which the compilation of medicinal plants in popular therapeutics and folk food plants in traditional diets have been the outstanding objectives. We report here a total of 211 food plants, both wild and cultivated, used for human alimentation in the study area. From these species, there are 13 which have no previous references in the bibliography consulted. These species are mainly used to prepare a house-made drink very common among our informants called 'ratafia'. Several of these edible plants are also referred as medicinal for local people, so they could be classified as nutraceuticals or food medicines. A significant number of other most commonly reported species also have this double use, as food and medicinal. A great proportion of the alimentary plants reported are wild or minor crops. Some of these plants are used quite frequently, being normal in the diet, and they are prepared with the same variation of methods as common crops.

Introduction

Since the term 'ethnobotany' was coined by HARSHBERGER (1896), one of the most frequent ways in which ethnobotanical studies have been conducted and published is by geographic areas (SCHULTES and REIS, 1995). The present paper compiles a part of the findings of a wider ethnobotanical study carried out in the Alt Empordà region (Eastern Pyrenees, Catalonia, Iberian Peninsula), involving more than 10 years of research (first results in PARADA, 1997; latest results in PARADA, 2007). Aside from basic, descriptive ethnobotanical work of the particular area, our attention has been specially paid to medicinal plants in popular therapeutics as well as to the role of folk food plants in traditional diets, which has become a particularly important subject, interesting for the native people, the general public and the scientific community.

This article focuses the attention in several main points. First, the importance of collecting traditional knowledge about food plants with the purpose of contributing information and promoting research in this field, with particular emphasis on plants that may play a relevant role (including new domesticated plants and nutraceutical plant products). This kind of focus is particularly pertinent in Catalonia, where, following the ideas of high cuisine cooks (such as Ferran Adrià, officially considered in the last four years the best of the World, in 2010 occupying the second place, http://www.theworlds50best.com), but also based on the immemorial tradition, wild plants and new crops are frequently used (together with conventional crops) for cooking, at home as well as in restaurants (FÀBREGA, 2001; INSTITUT CATALÀ DE LA CUINA, 2006; SANS, 2007; BUSTOS, 2009). Secondly (but not less important) to stress the importance of autochthonous wild food plants and locally cultivated landraces, because its recording and conservation are basic for the conservation of food plant genetic diversity, which is fundamental to avoid or to face cases of genetic erosion in the currently cultivated materials, and may, in addition, contribute to find solutions for a progressively impoverished agriculture (according to data from *Idescat*, Statistical Institute of Catalonia, www.idescat.cat, referred to the year 2007, only the 2.2% of Catalan population lives on agriculture). Finally, this kind of applied botanical research is also relevant for the inventory and the preservation of the cultural heritage, confirming the multidisciplinary approach of the ethnobotany.

Numerous studies have been interested in cataloguing traditional food knowledge among Mediterranean areas (e.g., BASER, 1997; PIERONI, 2000; PIERONI et al., 2002, 2005; BONET and VALLÈS, 2002; TARDÍO et al., 2002, 2006; PARDO-DE-SANTAYANA et al., 2005, 2007; LEONTI et al., 2006; RIVERA et al., 2007; NEBEL and HEINRICH, 2009; VERDE et al., 2000, 2003; RIGAT et al., 2009) and there are some initiatives of further research on the subject (e.g. ESTANY et al., 2009, project "Arrels – Conreu de sabers" -www.fmr.cat-, in Catalonia, and BRUGAROLAS et al., 2009, The International Centre for Underutilised Crops -www.icuc-iwmi.org- at a wider level).

The general aim of the present work is to provide ethnobotanical data on edible plants of the Alt Empordà region, contributing to the Mediterranean traditional food knowledge. Specifically, a particular emphasis is put on plants not yet in the economic system (mostly non-crop food plants), since they show more challenging characters for being used in future researches and for the application of knowledge to commercials. Native races of cultivated crop plants used elsewhere in commercial agricultural production and wild relatives of the more commonly cultivated plants are differentiated (germplasm classification based on BALICK, 1995). These two last mentioned types of plants are reported when they also show, in addition to food uses, a particular interest in medicinal traditional knowledge (used as functional nourishment) or they are landraces with a special local management.

Study area

The area considered for the study is the whole Alt Empordà region (the territory forms an administrative unit called "comarca"), with around 138,000 inhabitants (shared in 68 municipalities) and comprising 1,358 km^2. It is the easternmost region of the north of Catalonia, opened to the Mediterranean Sea to the east, limited by the Pyrenees to the north and the Garrotxa region, with minor mountain ranges linking this area with the Pyrenees, to the west (Fig. 1).

The climate in Alt Empordà is mainly coastal Mediterranean, with an irregular distribution of rain (wet autumns *versus* dry summers) and a global mean rainfall of 550-750 mm per year. Winters are mild and summers hot, with an annual mean of 15.2°C (data from the Catalan Meteorological Service, www.meteo.cat). The most well-known and deep-rooted meteorological phenomenon is a north-west direction wind called "tramuntana", due to the canalization of the Pyrenees, responsible for some natural effects, such as some wind-adapted vegetation forms and the desiccation of the crop cultures (which is often traditionally avoided or minimized by planting *Arundo donax* L. or *Cupressus sempervirens* L. in rows).

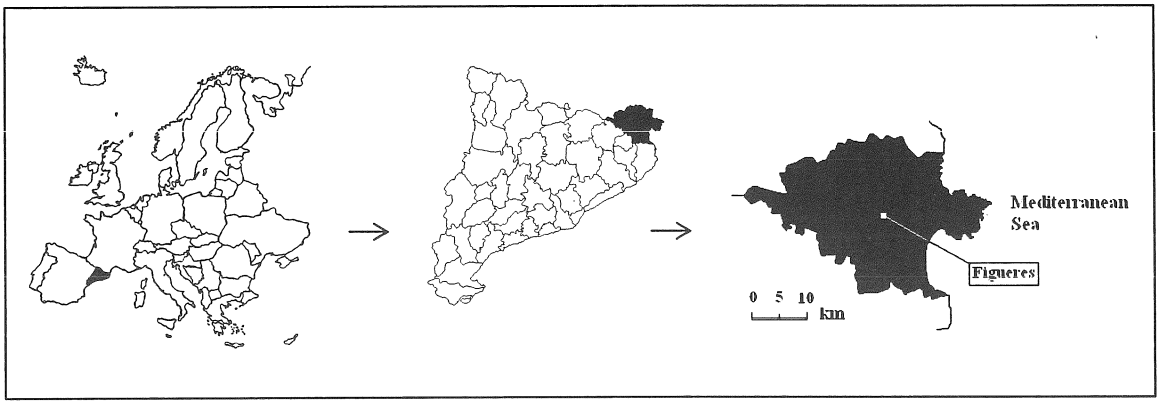

Fig. 1: Location of the studied region in Europe, the Iberian Peninsula, and Catalonia.

Alt Empordà vegetation landscape is asymmetrically distributed between two of the big biogeographical regions in Europe: Mediterranean -widely dominant- and Eurosiberian -just in some mountain areas-. According to the classification of FOLCH et al. (1984), the following vegetation dominions are found (1) central European middle mountain, limited to the highest altitudes in the district (up to 1,250 m), with beech tree (*Fagus sylvatica* L.) forests. (2) Mediterranean and submediterranean mountains and lowlands, at low altitudes and in the plain, with different *Quercus* species (*Q. ilex* L., *Q. petraea* (Matt.) Liebl., *Q. suber* L.) and their associated communities. (3) Littoral vegetation, with typical coastal (rocky and sandy), and salt-marsh communities. (4) Riparian vegetation, with *Alnus* Mill. and *Populus* L. populations near rivers. (5) Segetal, arvensic and ruderal areas, which are mainly found throughout the plain, and include gardens, farm fields, plots, paths, road edges and, in general, the proximities of human habitations, where plant-people interaction has been most studied.

Economically, this area has evolved through different historical periods: an initial agriculture and cattle growth, a later industrial forestry use (especially cork), and until few years a tourism and a real-state boom, concentrated on the seaside Costa Brava. In the present days, and as a consequence of the global economic crisis, one of the bases of the Alt Empordà economy (construction, often related to tourism) is decreasing, so it seems that people are willing to slow the rhythm of land destruction and become aware of environment and local biodiversity protection.

Methodology

Folk food plants information was collected at the same time as general ethnobotanical data (more details about general data are provided in PARADA et al., 2009). Methodology is based on anthropological, ethnographical and botanical research reviews (CENTRE D'INFORMATION ET DE RÉFLEXION SUR L'ENVIRONNEMENT VÉGÉTAL, 1979; JAIN, 1987; MARTIN, 1995; SCHULTES and REIS, 1995; ALEXIADES, 1996; PUJADAS et al., 2004; BERNAL and CORBALÁN, 2008). Interviews are semi-structured and focalized, avoiding closed questionnaires and direct questions that could have an implicit answer so as not to coerce informants' answers. During ethnobotanical surveys, medicinal and food uses were the ones to which more interest was paid. The common popular names of plants in Catalan, together with their pronunciation, are also collected. Interviews are recorded with the permission of the informants.

As a whole, 101 interviews were carried out to local people who work and live close to plants in order to acquire more reliable information. Frequently, more than one visit was necessary, and normally one-to-one interviews were performed, but also some of them group-sharing queries. Fieldwork took place from 1994 to 2007 intermittently (earlier results in PARADA 1997 and latest results in PARADA, 2007), and a total of 178 people were interviewed. Mean age of informants is 69 (minimum 23, maximum 95); 71% are women and the remaining 29% are men. More than half of the women are housewives, and most inquired men work as farmers.

Plant materials of all taxa mentioned were collected according to the advices and recommendations of the informants, and identified using the *Flora dels Països Catalans* (BOLÒS and VIGO, 1984 - 2001), the *Flora Manual dels Països Catalans* (BOLÒS et al., 2005), and counting, in some cases, on the help of specialists in floristic and systematic botany. For foreign or cultivated species classification we followed FOURNIER (1951-1953), JACKSON (1977), SÁNCHEZ-MONGE (1991) and LEMOINE (1999). Vouchers are deposited in the herbarium BCN (*Centre de Documentació de Biodiversitat Vegetal, Universitat de Barcelona*).

Collected data during fieldwork was introduced and analysed in a database produced with Microsoft Access v. 2007 (Microsoft Corporation) software, which is continuously updated. This database generates the plant catalogue and basic statistic results, which are the starting step to establish the discussion of the study (see final catalogue on PARADA, 2007, www.tdx.cat/TDX-0319109-085940).

With comparison intentions, we made an analysis of the coincidences and the degree of novelty between our own data and data from basic bibliography on food uses of plants in Catalonia and also other territories, mainly from Mediterranean regions but also from more separate areas (see RIGAT et al., 2009 and references therein plus KUNKEL, 1984, updated by RAPOPORT, 2009; TUKAN et al., 1998; ERTUG, 2004; RIVERA et al., 2005; NEBEL et al., 2006 and HADJICHAMBIS et al., 2008). This paper intends a new contribution to this global plants-for-consumption checklist.

Results and discussion

We recorded a total of 211 plant species used for human alimentation (mostly vascular plants), but we believe this list could be longer, since just in few occasions interviewees talked about major crop plants with the only purpose of being eaten (informants normally referred these common food plant species if they also had some medicinal properties). In fact, a distinction has been made in this article between widely cultivated and rarely cultivated plants, apart from wild ones. Limits are not well defined in literature (DUKE and DUCELLIER, 1993; ZOHARY and HOPF, 1994; LEFF et al., 2004; PATERSON, 2006 and MAXTED et al., 2006), so we have specifically

named 'major crops' plants which are world widely cultivated and also those broadly cultivated in the study area (Carlos Cantero, agronomist, pers. comm.). To assign each cultivated plant to one of the two categories (major or minor crops) (see Tab. 2 and 3) we have followed the advice of Josep M. Poch (pers. comm.), an agronomist with many years of field experience in the studied area, who has considered every plant in our list and proposed its inclusion in a category according to the cultivated area in southern Europe. Sometimes, 'major crops' have been named as 'cash crops' (DUKE and DUCELLIER, 1993; FOWLER and MOONEY, 1990). We have included in the definition the species found in markets. Nevertheless, interviewees did not report most of times classical cultivated vegetables when talking about plants (they probably believed that these are too obvious useful plants), and the same occurred with trees (for most informants plants are mainly herbs). Differently, wild food plants have been cited even if they only had an alimentary use.

The complete list of reported plants, their utilizations and information of parts used and manners of consumption are referred in Tab. 1 (for non-crop or grown wild species), Tab. 2 (for plants which are cultivated or acquired in markets excluding major crops) and Tab. 3 (for major crops, considered following the above-mentioned criteria). Besides, all the tables present the most characteristic medicinal reports for food plants when the same part of plant used has been referred. In addition, 74 plants have been reported as used in animal feeding, but these are not the object of the present paper.

Apart from the above-commented distinction between major and minor crops, it is important to remark that it is not easy to distinguish between wild and cultivated plants. The controversy appears when analyzing the different intermediate stages between the use of wild plants and genuine domestication (TARDÍO et al., 2006). To set the division line between crop and non-crop species we have considered every case individually. The concept of wild plant we adopted in this paper is 'the one which is just collected, so people have no direct role in its origin, growing and care'; so a plant is treated as wild, even if it is originally cultivated or naturalized after old cultivations, in case people do not manage it further than collecting one or several of its parts for food purposes.

Referring to cultivated plants, some particular species must be analysed apart. These are *Saccharum officinarum* L., *Olea europaea* L. and *Vitis vinifera* L. Sugar is widely used as a sweetener although just few informants know or specifically report that it comes from *Saccharum officinarum*. Besides, the olive tree (*Olea europaea*) is considered one of the pillars of the Mediterranean diet and everyone interviewed knew its origin, as well as the grapevines (*Vitis vinifera*). Both olives and grapes are mostly referred specifically in their forms of oil and wine, vinegar, alcohols and eau-de-vie, respectively. They are considered basic excipients for salads, *sofregits* (chopped onion, tomato and garlic fried in oil, which is the basis of a wide range of Catalan dishes) and most of the referred liquors.

Use categories and modes of consumption

According to the way food plants are consumed we have distinguished five general plant use categories: beverages, raw, cooked, condiments and other uses. Nevertheless, we intended to specify in detail the mode of consumption on the catalogue (Tab. 1, 2 and 3), giving between brackets the precise data to transmit a closer idea to the description done by the informants.

In the Alt Empordà food plants recorded are eaten raw (87 species), cooked (76 species), used as a condiment (49 species) or for liquor or other beverage preparation (104 species). As examples of non-crop plants eaten as raw vegetables, and because of their high rate of citation, we remark four species: *Chondrilla juncea* L., *Reichardia picroides* (L.) Roth, *Portulaca oleracea* L. and *Rorippa nasturtium-aquaticum* (L.) Hayek. They are all used in salads, and informants complain that nowadays herbicides and bad water quality have threatened these species, often found in home gardens, vineyards, olive groves and brooks, since they were really appreciated plants (they were not just eaten in scarcity periods). Some of them are frequently present in the regional agricultural markets, directly collected wild (*Portulaca oleracea* L.) or cultivated at small scale (*Rorippa nasturtium-aquaticum* (L.) Hayek).

House-made alcoholic drinks from plants are common in the studied territory. The most widespread one is commonly called *ratafia*, frequently used for digestive disorders, and made up on a basis of green walnuts (*Juglans regia* L.) with the addition of many other plants. For extension reasons, these plants for *ratafia* elaboration are not cited in the tables, except the ones that are new citations (they had not been mentioned for *ratafia* elaboration before). Next, we list the wild species which are not in the tables, but they have been counted for results and discussion in this paper. Aerial parts of *Agrimonia eupatoria* L., *Capsella bursa-pastoris* (L.) Medic., *Cynodon dactylon* (L.) Pers, *Malva sylvestris* L., *Marrubium vulgare* L., *Nepeta cataria* L., *Parietaria officinalis* L. subsp. *judaica* (L.) Béguinot, *Polygonum aviculare* L., *Prunella vulgaris* L., *Rosmarinus officinalis* L., *Ruta chalepensis* L., *Satureja calamintha* (L.) Scheele subsp. *glandulosa* (Req.) Gams, *Thymus* sp., *Thymus vulgaris* L., and *Urtica urens* L. are widely mentioned, as well as the inflorescences of *Anthemis cotula* L., *Artemisia absinthium* L., *Matricaria recutita* L., *Sambucus nigra* L., *Santolina chamaecyparissus* L. subsp. *chamaecyparissus* and *Tanacetum vulgare* L. Flowered stems of *Crataegus monogyna* Jacq. subsp. *monogyna, Lavandula angustifolia* Miller subsp. *angustifolia, Lavandula latifolia* Medic., *Lavandula stoechas* L. subsp. *stoechas, Lonicera implexa* Ait., *Hypericum perforatum* L., *Mentha pulegium* L., *Origanum vulgare* L., *Salvia officinalis* L. subsp. *lavandulifolia* (Vahl) Gams, *Salvia officinalis* L. subsp. *officinalis* are commonly used, and sterile stems of *Equisetum telmateia* Ehrh., roots of *Althaea officinalis* L., leaves of *Foeniculum vulgare* Mill. subsp. *piperitum, Plantago lanceolata* L., and *Plantago major* L. are relatively common in *ratafia* bottles. Also, fruits of *Juniperus communis* L. subsp. *communis* and *Prunus spinosa* L., stems of *Medicago sativa* L., *Mentha longifolia* (L.) Huds., *Mentha spicata* L., *Mentha suaveolens* Ehrh., and *Rubus ulmifolius* Schott, as well as flowers of *Spartium junceum* L. and flowers and unriped strobiles of *Pinus halepensis* Mill. and *Pinus pinea* L. have been cited by Alt Empordà informants.

Cultivated plants used in *ratafia* are represented by the inflorescences of *Artemisia abrotanum* L. and *Tanacetum balsamita* L., the leaves of *Camellia sinensis* L., *Laurus nobilis* L., *Lippia triphylla* (L'Hér.) O. Kuntze and *Mentha* x *gentilis* L., the fruits of *Carum carvi* L., *Citrus aurantium* L., *Coffea arabica* L. and *Pimpinella anisum* L., the bark of *Cinnamomum zeylanicum* Nees and the roots of *Inula helenium* L. Moreover, the stems of *Melissa officinalis* L. subsp. *officinalis, Mentha* sp. and *Mentha* x *piperita* L. are used for this purpose, as well as the seeds of *Myristica fragrans* Houtt., the aerial parts of *Ocimum basilicum* L., *Satureja hortensis* L. and *Thymus* x *citriodorus* (Pers.) Schreber, as well as the flowered stems of *Origanum majorana* L. and *Salvia microphylla* Humb., Bonpl. & Kunth, the flowers of *Rosa gallica* L. and *Rosa* sp., the flower buds of *Syzygium aromaticum* (L.) Merr. et Perry and the bracts and flowers of *Tilia cordata* Mill. and *Tilia platyphyllos* Scop. Finally, even some major crops are used in *ratafia*, such as the fruits of *Citrus limon* (L.) Burm., *Citrus sinensis* (L.) Osbeck and *Prunus avium* (L.) L., the flowers of *Citrus sinensis* (L.) Osbeck, the above-mentioned unripe fruits of *Juglans regia* L., and the styles and stigma of *Zea mays* L.

It is worth mentioning that the consumption of wild plants is not necessarily associated with simple modes of preparation (such as

Tab. 1: Non-crop or wild grown species reported by Alt Empordà informants. The species marked with an asterisk are newly cited for human alimentation (after revising some of the most outstanding bibliography in food plants commented in the text). Plants for *ratafia* elaboration are not referred in the table (see the text), except when cited as novelty (also marked with asterisk).

Scientific name (family, voucher specimen)	Most common local Catalan name	Parts used	Modes of consumption	Frequency of citation	Most reported medicinal use
Allium ampeloprasum L. (Liliaceae, BCN 39993)	porro bord	Stems	Cooked (boiled as a vegetable)	5	Intestinal emollient
Allium roseum L. (Liliaceae, BCN 31259)	calabruix	Stems	Raw in salads	1	_
Allium sphaerocephalon L. (Liliaceae, BCN 39999)	all silvestre	Stems	Raw in salads	1	_
Althaea officinalis L. (Malvaceae, BCN 29621)	malví	Roots	Boiled as a thickening agent for soups	1	For respiratory diseases
			Beverages (spirits) (quina wine)	1	
**Anemone hepatica* L. (Ranunculaceae, BCN 29834)	herba fetgera	Leaves	Beverages (spirits) (ratafia)	1	For liver diseases
Aphyllanthes monspeliensis L. (Liliaceae, BCN 29627)	llonses	Flowers	Raw	1	_
Apium nodiflorum (L.) Lag. (Apiaceae, BCN 31261)	api bord	Aerial parts	Raw in salads	3	_
			Cooked (boiled as a vegetable)	3	_
Arbutus unedo L. (Ericaceae, BCN 29836)	arboç	Fruits	Raw	6	Antiscorbutic
			Cooked to make jam	5	
Artemisia absinthium L. (Asteraceae, BCN 29837)	donzell	Inflorescences	Beverages (spirits) (absinthe)	3	Antihelmintic
Asparagus acutifolius L. (Liliaceae, BCN 29976)	espàrgols	Stems	Cooked (boiled or fried and in an omelette)	18	Diuretic
**Asperula cynanchica* L. (Rubiaceae, BCN 29634)	herba prima	Aerial parts	Beverages (spirits) (ratafia)	2	Diuretic
Borago officinalis L. (Boraginaceae, BCN 29840)	borratja	Flowers	Raw in salads	2	Anticatarrhal
		Leaves	Cooked (boiled or coated in batter; also in omelettes)	7	Depurative
**Brachypodium retusum* (Pers.) Beauv. (Poaceae, BCN 31265)	llistó	Stems	Cooked (in omelettes)	1	_
Campanula rapunculus L. (Campanulaceae, BCN 50763)	repunxons	Leaves	Raw in salads	1	_
		Subterranean parts	Raw in salads	1	_
Carlina acaulis L. (Asteraceae, BCN 32946)	carlina	Inflorescences	Condiment	1	Abortive
		Leaves	Raw in salads	1	_
Castanea sativa Mill. (Fagaceae, BCN 29844)	castanyer	Fruits	Cooked (boiled or roasted)	6	Antialopecic
Celtis australis L. (Umlaceae, BCN 29845)	lledons	Fruits	Raw	5	Hypolipemiant
**Ceterach officinarum* DC. in Lam. et DC. (Aspleniaceae, BCN 29850)	herba auradella	Aerial parts	Beverages (spirits) (ratafia)	2	Vasotonic
Chondrilla juncea L. (Asteraceae, BCN 29852)	mastegueres	Leaves	Raw in salads	40	Antihypertensive
Cichorium intybus L. (Asteraceae, BCN 29660)	xicoines	Leaves	Raw in salads	5	_
**Cirsium echinatum* (Desf.) DC. in Lam. et DC. (Asteraceae, BCN 39985)	cardó	Inflorescences	Condiment	1	_
**Cistus monspeliensis* L. (Cistaceae, BCN 36740)	estepa negra	Aerial parts	Condiment	1	Expectorant
Conopodium majus (Gouan) Loret in Loret et Barr. (Apiaceae, BCN 39992)	-	Subterranean parts	Raw	1	_
Crepis vesicaria L. (Asteraceae, BCN 29719)	màstecs	Leaves	Raw in salads	1	_
Crithmum maritimum L. (Apiaceae, BCN 29683)	fonoll marí	Leaves	Raw in salads	1	_
		Stems	Boiled and pickled in vinegar (pickled sea fennel)	1	_
Daucus carota L. subsp. *carota* (Apicaceae, BCN 48714)	carrota borda	Roots	Cooked (boiled as a vegetable)	1	_
**Dianthus seguieri* Vill. subsp. *requienii* (Godr.) Bernal, Laínz et Muñoz Garm. (Cariophyllaceae, BCN 29689)	clavells de bosc	Flowers	Beverages (spirits) (ratafia)	1	_
Diplotaxis erucoides (L.) DC. (Brassicaceae, BCN 29861)	ravenissa	Aerial parts	Raw in salads (when flowered)	1	Galactofuge
			Boiled as a vegetable (in fruit)	1	
Erodium malacoides (L.) L'Hér. (Geraniaceae, BCN 29984)	agulloles	Leaves	Raw in salads	1	_

Eryngium campestre L. (Apiaceae, BCN 31274)	card pinacal	Leaves	Raw in salads	1	Diuretic
Fagus sylvatica L. (Fagaceae, BCN 46845)	faig	Fruits	Raw	1	_
		Leaves	Beverages (spirits) (licor de faig)	1	_
Foeniculum vulgare Mill. subsp. *piperitum* (Ucria) Cout. (Apiaceae, BCN 29867)	fonoll	Fruits	Beverages (soft drink)	1	Carminative
			Beverages (spirit) (licor de fonoll)	1	
		Leaves	Raw in salads	1	
			Cooked (boiled and eated as a soup or added to salads or vegetables)	8	
			Condiment	5	
		Fruits and flowers	Beverages (spirits) (licor de fonoll)	1	
		Inflorescences	Condiment	1	
			Cooked (in omelette)	1	
		Aerial parts	Cooked (boiled)		
Fragaria vesca L. (Rosaceae, BCN 29697)	maduixetes de bosc	Infructescences	Cooked to make jam	2	For cutaneous fissures
			Raw	1	
Helianthus tuberosus L. (Asteraceae, BCN 46069)	trumfa nyama	Tuber	Cooked as potatoes	2	_
Humulus lupulus L. (Cannabinaceae, BCN 29988)	llúpol	Flowers	Beverages (spirits) (beer)	1	Anti-enuretic
Hyoscyamus albus L. (Solanaceae, BCN 31277)	herba queixalera	Leaves	Raw in salads	1	Resolutive
Hypericum perforatum L. (Clusiaceae, BCN 29874)	herba de sant Joan	Flowered stems	Beverages (spirits) (digestive liquor)	1	Anti-inflammatory/ antialgic/ antiecchymotic
Hyssopus officinalis L. subsp. *officinalis* (Lamiaceae, BCN 29709)	hisop	Flowered stems	Beverages (spirits) (liquors)	1	Anticatarrhal
Juniperus communis L. subsp. *communis* (Cupressaceae, BCN 29878)	ginebre	Fruits	Beverages (spirits) (gin)	1	Antihalitosic
**Knautia dipsacifolia* Kreutzer subsp. *arvernensis* (Briq.) O. Bolòs et J. Vigo (Dipsacaceae, BCN 29711)	escapiosa	Inflorescences	Beverages (spirits) (ratafia)	2	For measles
Lactuca perennis L. (Asteraceae, BCN 49191)	xicòria	Inflorescenses	Raw in salads	1	_
		Leaves	Raw in salads	3	_
**Lamium flexuosum* Ten. (Lamiaceae, BCN 26731)	ortiga blanca	Aerial parts	Beverages (spirits) (ratafia)	1	Antitussive
Lathyrus sativus L. (Fabaceae, BCN 50775)	cairetes	Seeds	Cooked (boiled as a legume)	3	_
Lavandula stoechas L. subsp. *stoechas* (Lamiaceae, BCN 29883)	timó	Leaves	Condiment	1	_
Lonicera implexa Ait. (Caprifoliaceae, BCN 31286)	xuclamel	Nectar	Raw (sucked from the flower)	3	_
Lonicera periclymenum L. (Caprifoliaceae, BCN 29888)	xuclamel	Nectar	Raw (sucked from the flower	2	_
Malva sylvestris L. (Malvaceae, BCN 29889)	malva	Fruits	Raw	1	_
		Leaves	Raw in salad	1	Laxative
			Cooked (boiled as a vegetable)	1	
Matricaria recutita L. (Asteraceae, BCN 29890)	camamilla	Inflorescences	Beverages (spirits) (digestive liquor)	1	For digestive diseases
Medicago sativa L. (Fabaceae, BCN 29891)	userda	Leaves	Raw in salads	1	Haemostatic
			Cooked (boiled or in omelettes)	3	
		Stems	Cooked (boiled as a vegetable)	1	
Mentha aquatica L. (Lamiaceae, BCN 29996)	menta	Leaves	Condiment	2	Gastric anti-inflammatory
			Cooked (boiled with bread as a soup)	1	
Mentha longifolia (L.) Huds. (Lamiaceae, BCN 29993)	menta de fer sopa	Leaves	Condiment	1	_
Mentha pulegium L. (Lamiaceae, BCN 29895)	poniol	Flowered stems	Beverages (spirits) (liquor)	1	For digestive diseases
			Beverages (spirits) (digestive liquor)	1	

Mentha spicata L. (Lamiaceae, BCN 29995)	menta	Stems	Beverages (soft drink)	7	For digestive diseases
		Leaves	Cooked (boiled with bread as a soup)	24	
			Condiment	8	
Molopospermum peloponnesiacum (L.) Koch (Apiaceae, BCN 29737)	coscolls	Stems	Raw in salads	1	Hematocathartic
Opuntia maxima A. Berger (Cactaceae, BCN 46078)	figues de moro (fruit)	Fruits	Raw	1	Anticatarrhal
Origanum vulgare L. (Lamiaceae, BCN 29742)	orenga	Flower heads	Condiment	26	Salutiferous
Papaver rhoeas L. (Papaveraceae, BCN 29903)	roelles	Leaves	Raw in salads	1	_
Pinus pinea L. (Pinaceae, BCN 26751)	pi pinyoner	Seeds	Raw	5	_
Plantago coronopus L. subsp. *coronopus* (Plantaginaceae, BCN 29908)	plantatge	Leaves	Raw in salads	1	Pharyngeal anti-inflammatory
Plantago lanceolata L. (Plantaginaceae, BCN 32138)	plantatge de fulla estreta	Leaves	Raw in salads	1	Pharingeal anti-inflammatory
Plantago major L. (Plantaginaceae, BCN 29910)	plantatge de fulla ample	Leaves	Raw in salads	1	Pharingeal anti-inflammatory
Portulaca oleracea L. (Portulacaceae, BCN 46835)	verdelaga	Stems	Raw in salads	32	For warts
		Aerial parts	Raw in salads	1	_
Prunus spinosa L. (Rosaceae, BCN 30005)	aranyons (fruits)	Fruits	Beverages (soft drink)	1	Antidiarrhoeal
			Raw	1	
			Cooked to make jam	2	
			Beverages (spirits) (refreshing liquor)	1	
			Beverages (spirits) (patxaran, liquor)	4	
**Pulmonaria affinis* Jord. in F. W. Schultz (Boraginaceae, BCN 29763)	pulmonària from the flower	Nectar	The nectar is sucked	1	Antibronchitic
Reichardia picroides (L.) Roth (Asteraceae, BCN 29933)	cosconilles	Leaves	Raw in salads	46	_
Rorippa nasturtium-aquaticum (L.) Hayek subsp. *nasturtium-aquaticum* (Brassicaceae, BCN 29771)	créixems	Leaves	Raw in salads	22	_
			Cooked (boiled and in omelettes)	2	
Rosa canina L. (Rosaceae, BCN 29772)	roser de pastor	Fruits	Cooked to make jam	1	For dysthymia
Rosmarinus officinalis L. (Lamiaceae, BCN 29937)	romaní	Leaves	Condiment	33	Hepatoprotective
		Aerial parts	Condiment	1	Anti-inflammatory/ antialgic
			Beverages (spirits) (digestive liquor)	1	
Rubus ulmifolius Schott (Rosaceae, BCN 29938)	mores (infructescence)	Infructescences	Beverages (spirits) (sweet berry wine)	1	Vitaminic
			Raw	15	
			Cooked to make jam	9	
Ruta chalepensis L. (Rutaceae, BCN 29940)	ruda	Aerial parts	Condiment	2	Abortive
Salvia officinalis L. subsp. *lavandulifolia* (Vahl) Gams (Lamiaceae, BCN 29780)	sàlvia	Leaves	Condiment	5	For menopause disorders
Salvia officinalis L. subsp. *officinalis* (Lamiaceae, BCN 29941)	sàlvia	Leaves	Condiment	4	Cardiotonic
					_
Sambucus nigra L. (Caprifoliaceae, BCN 29943)	sabuc	Infructescences	Beverages (soft drink)	1	For digestive diseases
			Beverages (spirits) (elder wine)	6	
			Cooked to make jam	2	
			Condiment	2	
		Inflorescences	Beverages (spirits) (wine)	1	For headache
			Cooked in fritters	1	
Satureja montana L. (Lamiaceae, BCN 29946)	sajolida de muntanya	Leaves	Condiment	1	For digestive diseases
**Scabiosa atropurpurea* L. (Dipsacaceae, BCN 29947)	escapiosa	Aerial parts	Beverages (spirits) (ratafia)	1	For measles

Silene vulgaris (Moench) Garcke (Caryophyllaceae, BCN 29948)	pets de llop	Nectar	Nectar sucked from the flower	5	_
		Leaves	Raw in salads	4	_
			Cooked (boiled or in omelettes)	4	
Silybum marianum (L.) Gaertn. (Asteraceae, BCN 29958)	card	Inflorescences	Condiment	5	Antidiarrhoeal
Sonchus oleraceus L. (Asteraceae, BCN 29953)	llipsons	Leaves	Raw in salads	1	_
Sonchus tenerrimus L. (Asteraceae, BCN 29954)	lletissons	Leaves	Raw in salads	1	_
Sorbus domestica L. (Rosaceae, BCN 46827)	serves (fruits)	Fruits	Raw after an out-of-tree ripening	4	Antidiarrhoeal
Taraxacum officinale Weber in Wiggers (Asteraceae, BCN 25948)	dent de lleó	Leaves	Raw in salads	10	For digestive diseases
Thymus serpyllum L. subsp. *chamaedrys* (Fries) Celak. (Lamiaceae, BCN 30337)	serpolet	Leaves	Condiment	1	Antiseptic
Thymus vulgaris L. (Lamiaceae, BCN 29961)	farigola	Flowered stems	Condiment	26	Antiseptic
		Leaves	Condiment	30	Antiseptic
		Aerial parts	Beverages (spirits) (digestive liquor)	1	
Tragopogon porrifolius L. subsp. *sativus* (Gaterau) Br.-Bl. (Asteraceae, BCN 49860)	salsifics	Subterranean parts	Stewed	1	_
Urtica dioica L.(Urticaceae, BCN 29814)	ortigues	Aerial parts	Raw in salads	2	Antihypertensive
			Cooked (boiled or in omelettes)	5	
Urtica urens L. (Urticaceae, BCN 29966)	ortigues	Aerial parts	Raw in salads	1	Antihypertensive
			Cooked (in omelettes)	3	
**Xanthium spinosum* L. (Asteraceae, BCN 29821)	espina-xoca	Fruits	Beverages (spirits) (ratafia)	1	Lithotripter

Tab. 2: Cultivated plants, or plants acquired in markets (excluding major crops), cited by the study informants. The species marked with an asterisk are newly cited for human alimentation (after revising some of the most outstanding bibliography in food plants commented in the text). Plants for *ratafia* elaboration are not referred in the table (see the text).

Scientific name (family, voucher specimen)	Most common local Catalan name	Parts used	Mode of consumption	Frequency of citation	Most reported medicinal use
Actinidia chinensis Planch (Actinidiaceae, BCN 507724)	kiwi	Fruits	Raw	1	Laxative
Ananas comosus (Stickm.) Merr. (Bromeliaceae, BCN 46084)	pinya	Fruits	Raw	1	For digestive diseases
Apium graveolens L. (Apiaceae, BCN 46859)	api	Aerial parts	Raw in salads	5	Diuretic
			Cooked (boiled as a vegetable)	3	
			Condiment	4	
**Artemisia arborescens* L. (Asteraceae, BCN 29630)	donzell	Inflorescences	Beverages (spirits) (absinthe)	1	Antihelmintic
			Beverages (spirits) (vermouth)	1	
Beta vulgaris L. subsp. *vulgaris* var, *vulgaris* (Chenopodiaceae, BCN 46075)	bledes	Leaves	Cooked (boiled)	1	Laxative
Beta vulgaris L. subsp. *vulgaris* var. *conditiva* Alef (Chenopodiaceae, BCN 52089)	bleda-rave roig	Roots	Raw in salads	1	Digestive
			As a thickening agent to make jam	1	
Beta vulgaris L. subsp. *vulgaris* var. *crassa* (Alef.) Helm (Chenopodiaceae, BCN 50761)	remolatxa	Roots	As sweetener for jams, spirits and soft drinks	52	Anticatarrhal
Brassica rapa L. (Brassicaceae, BCN 24729)	naps	Roots	Cooked (fried or roasted)	2	_
Calendula officinalis L. (Asteraceae, BCN 29977)	calèndula	Inflorescences	Raw in salads	1	Antipyrotic
		Leaves	Raw in salads	1	_
Ceratonia siliqua L. (Fabaceae, BCN 32177)	garrofa	Grains	Raw	3	Antidiarrhoeal
			Cooked	1	

Cinnamomum zeylanicum Nees (Lauraceae, BCN 47283)	canyella (bark)	Bark	Beverages (spirits) (Cointreau, curaçao and digestive liquor)	1	Intestinal anti-inflammatory
			Beverages (spirits) (codonyat)	1	
			Beverages (spirits) (patxaran)	2	
			Condiment	3	
Citrus aurantium L. (Rutaceae, BCN 46080)	taronges agres (fruit)	Fruits juice	Condiment	1	_
		Epicarpi	Cooked to make jam	3	
			Boiled (the whole fruit) and eaten as a salad (just the epicarp)	2	
			Condiment	1	
		Fruits	Beverages (spirits) (cointreau or curaçao)	1	
			Condiment	1	
			Cooked to make jam	2	
Coffea arabica L. (Rubiaceae, BCN 46852	cafè (grain)	Fruit	Beverages (spirits) (patxaran)	2	Tonic
Coriandrum sativum L. (Apiaceae, BCN 49859)	coriandre	Fruits	Condiment	1	_
			Beverages (spirits) (digestive liquor)	1	
Crocus sativus L. (Iridaceae, BCN 32170)	safrà (stigma)	Styles and stigma	Condiment	3	Abortive
Cucurbita ficifolia C.D. Bouché in Verh. (Cucurbitaceae, BCN 29980)	carabassa de cabell d'àngel	Fruits	Cooked to make jam	6	_
Cucurbita maxima Duch. in Lam. (Cucurbitaceae, BCN-S-1499)	rabequet (fruit)	Fruits	Cooked as a soup	10	Anti-inflammatory
Cucurbita pepo L. subsp. var. *pepo* (Cucurbitaceae, BCN 49858)	carbassa (fruit)	Fruits	Cooked for soup or to make jam	3	Antihaemorrhoidal
Cydonia oblonga Mill. (Rosaceae, BCN 46849)	codony (fruit)	Fruits	Beverages (spirits) (codonyat)	11	Antidiarrhoeal
			Cooked to make jam (membrillo) and jelly	12 1	
Cynara cardunculus L. (Asteraceae, BCN 29860)	praó	Flowers	Condiment	12	_
		Fruits	Condiment	1	_
Elettaria cardamomum Maton (Zingiberaceae, BCN-S 1511)	cardamomo	Fruits	Beverages (spirits) (digestive liquor)	1	_
Eriobotrya japonica (Thunb.) Lindl. (Rosaceae, BCN 29695)	nespres	Fruits	Raw	1	For hoarse
Eruca vesicaria (L.) Cav. subsp. *sativa* (Mill.) Thell. in Hegi (Brassicaceae, BCN 49862)	ruqueta	Leaves	Raw in salads	1	_
Ficus carica L. (Moraceae, BCN 24887)	figuera	Infructescences	Fresh or dried, eaten raw	4	Laxative
			Cooked to make jam	2	
Glycyrrhiza glabra L. (Fabaceae, BCN 47276)	regalèssia	Roots	Raw as a sweet	8	Anticatarrhal
Illicium verum Hook. f. (Illiciaceae, BCN 47282)	anís estrellat	Fruits	Beverages (spirits) (liquor)	3	Carminative
Lantana camara L. (Verbenaceae, BCN 40081)	caputxina	Flowers	Raw in salads	1	_
Laurus nobilis L. (Lauraceae, BCN 29880)	llor	Leaves	Condiment	57	For digestive diseases
Lens culinaris Medic. subsp. *culinaris* (Fabaceae, BCN 29990)	llenties	Grains	Cooked	2	To increase iron blood levels
Lippia triphylla (L'Hér.) O. Kuntze (Verbenaceae, BCN 29886)	marialluïsa	Leaves	Beverages (soft drink)	1	For digestive diseases
			Beverages (spirits) (digestive liquor)	2	
			Beverages (spirits) (vi de marialluïsa)	1	

Mentha x *gentilis* L. (Lamiaceae, BCN 29734)	menta de fer sopa	Leaves	Condiment	2	Digestive
Mentha x *piperita* L. (Lamiaceae, BCN 29997) diseases	menta	Leaves	Condiment	10	For digestive
			Cooked as a soup with bread	1	
		Stems	Beverages (spirits) (digestive liquor)	1	
			Beverages (spirits) (mentha liquor)	1	
Mespilus germanica L. (Rosaceae, BCN 50768)	nespres	Fruits	Raw after an out-of-tree ripening	2	_
Morus nigra L. (Moraceae, BCN 31289)	morera	Infructescences	Raw	1	_
Musa sp. (Musaceae, BCN 52093)	plàtan	Fruits	Raw	1	Antidiarrhoeal
Myristica fragrans Houtt. (Myristicaceae, BCN 50769)	nou moscada (seed)	Seeds	Condiment	1	For digestive diseases
			Beverages (spirits) (codonyat)	2	
			Beverages (spirits) (cointreau o curaçao)	1	
Ocimum basilicum L. (Lamiaceae, BCN 29897)	aufàbrega	Leaves	Condiment	14	_
Origanum majorana L. (Lamiaceae, BCN 29900)	marduix	Flower heads	Condiment	16	Antiotalgic
Petroselinum crispum (Mill.) Hill (Apiaceae, BCN 29905)	julivert	Leaves	Condiment	23	Abortive
			Cooked (in omelettes)	1	
Pimpinella anisum L. (Apiaceae, BCN 47278)	matafaluga	Fruits	Condiment	12	Carminative
			Beverages (spirits) (codonyat)	1	
			Beverages (spirits) (digestive liquor)	1	
			Beverages (spirits) (anisette)	1	
			Beverages (spirits) (patxaran)	1	
			Beverages (spirits) (cherries liquor)	1	
Piper nigrum L. (Piperaceae, BCN 47277)	pebre	Grains	Condiment	4	External haemostatic
Punica granatum L. (Punicaceae, BCN 29764)	magrana (fruit)	Fruits	Beverages (soft drink)	4	For digestive diseases
			Raw	4	
			Beverages (spirits) (pomegranate liquor)	2	
Pyrus communis L. subsp. *pyraster* (L.) Asch. et Graebn. (Rosaceae, BCN 30006)	perelloner	Fruits	Raw, completely ripen	1	_
Ribes rubrum L. (Saxifragaceae, BCN 31297)	grosella	Fruits	Raw	1	_
Rosa sp. (Rosaceae, not determined. Current cultivated varieties in gardening)	rosa	Flowers	Dried in fruit salads	1	External antiseptic
Rubus idaeus L. (Rosaceae, BCN 29774)	gerds	Infructescences	Raw	3	_
			Cooked to make jam	2	
Saccharum officinarum L. (Poaceae, BCN 50771)	canya de sucre	Stems	Beverages (spirits) (rum)	2	Anticatarrhal
Salvia microphylla Humb., Bonpl. & Kunth (Lamiaceae, BCN 29781)	menta romana	Nectar	Sucked from the flower	1	_
Satureja hortensis L. (Lamiaceae, BCN 29945)	sajolida	Leaves	Condiment	3	_
Schinus molle L. (Anacardiaceae, BCN 46086)	pebre	Seeds	Condiment	1	_
Secale cereale L. (Poaceae, BCN 46828)	secle	Grains	To make flour	1	_
Syzygium aromaticum (L.) Merr. et Perry (Myrtaceae, BCN 47279)	clau	Flower buds	Condiment	3	Antiodontalgic
			Beverages (spirits) (digestive liquor)	1	
Tetragonia tertragonoides (Pall.) Kuntze (Aizoaceae, BCN 29805)	capulaca	Leaves	Raw	1	Antineoplastic
			Cooked (boiled)	1	

Theobroma cacao L. (Sterculiaceae, BCN 30763)	cacau, xocolata (product)	Grains	Condiment	1	Antidiarrhoeal
			Cooked (melted in milk or water)	3	
			Beverages (spirits) (cacao liquor)	1	
Vanilla planifolia Andr. (Orchidaceae, BCN 50216)	vainilla	Fruits	Condiment	2	Tonic
Vigna unguiculata (L.) Walp. (Fabaceae, BCN 32119)	mongets (fruit)	Grains	Cooked (boiled)	3	–
		Fruits	Cooked (boiled)	1	
Ziziphus jujuba Mill. (Rhamnaceae, BCN 29822)	gínjol	Fruits	Raw	2	Vitamin

Tab. 3: Major crops mentioned by interviewees of the Alt Empordà study. Plants for *ratafia* elaboration are not referred in the table (see the text).

Scientific name (family, voucher specimen)	**Most used local Catalan name**	**Parts used**	**Mode of consumption**	**Frequency of citation**	**Most reported medicinal use**
Allium cepa L. (Liliaceae, BCN 28655)	ceba	Bulbs	Raw in salads	2	Antitussive
			Cooked (as a soup, stewed, chopped and fried)	4	
			Condiment	3	
			Beverages (spirits) (vi de ceba)	1	
		Stems	Raw	1	–
Allium porrum L. (Liliaceae, BCN 28791)	porro	Stems	Cooked (boiled as a vegetable)	1	Diuretic
Allium sativum L. (Liliaceae, BCN 29832)	all	Stems	Condiment	4	Antiotalgic
		Bulbs	Cooked	20	
Brassica oleracea L. subsp. *oleracea* (Brassicaceae, BCN 32181)	col, bròquil	Leaves	Cooked (boiled or stewed)	2	Anti-inflammatory, antialgic/ antiecchymotic
		Inflorescences	Cooked	1	–
			Raw, pickled in vinegar	1	
Capsicum annuum L. (Solanaceae, BCN 24737)	pebrot	Fruits	Condiment	4	Vasotonic
			Raw or pickled in vinegar	5	
			Cooked	3	
Cichorium endivia L. (Asteraceae, BCN 46854)	escarola	Leaves	Raw in salads	2	For hoarse or loss of voice
			Cooked (boiled as a vegetable or in omelettes)	2	
Citrullus lanatus (Thunb.) Matsumara et Nakai (Cucurbitaceae, BCN 29662)	síndria (fruit)	Fruits	Raw	1	–
			Cooked to make jam	7	
Citrus limon (L.) Burm. (Rutaceae, BCN 46853)	llimona (fruit)	Fruits juice	Condiment	1	Antidiarrhoeal
		Fruits	Condiment	6	
Citrus sinensis (L) Osbeck (Rutaceae, BCN 24752)	taronger	Fruits	Condiment	1	Laxative
			Beverages (spirits) (liquor)	1	
Corylus avellana L. (Betulaceae, BCN 29831)	avellanes (fruit)	Fruits	Raw	1	Antialopecic
			As a thickening agent for jams	1	
			Cooked (boiled with salty water and then toasted)	1	
Cucumis melo L. subsp. *melo* (Cucurbitaceae, BCN 46851)	meló	Fruits	Raw	1	–
			Cooked to make jam	6	
Cucumis sativus L. (Cucurbitaceae, BCN 46850)	cogombre	Fruits	Beverages (spirits)	5	Antihaemorrhoidal
Cucurbita pepo L. subsp. var. *oblonga* (Cucurbitaceae, BCN 29859)	flor de carabassó	Flowers	Coated in eggs and breadcrumbs or flour, (sometimes stuffed)	9	Antipyrotic

Cynara scolymus L. (Asteraceae, BCN 46848)	carxofa	Inflorescences	Condiment	2	For liver diseases
		Buds	Cooked	5	
Daucus carota L. subsp. *sativus* (Hoffm.) Arcang. (Apiaceae, BCN 46847)	carrota	Roots	Raw in salads	4	Antidiarrhoeal
			Cooked (boiled)	1	
Helianthus annuus L. (Asteraceae, BCN 29870)	gira-sol	Fruits	Raw or to make oil	3	Bone strengthening
Hordeum vulgare L. (Poaceae, BCN 46843)	ord	Grains	Cooked (boiled)	1	Diuretic
			Beverages (spirits) (beer)	1	
Juglans regia L. (Juglandaceae, BCN 29877)	nous	Fruits	Raw	1	Hipo-cholesterolaemic
			Cooked (toasted after boiled in salty water, and boiled as a thickening agent for jam)	2	
		Unriped fruits	Beverages (spirits) (bru de noix)	1	-
Lactuca sativa L. (Asteraceae, BCN 46842)	enciam	Leaves	Raw in salads	4	Sedative
			Cooked (boiled as a vegetable or in omelette)	3	
Olea europaea L. subsp. var. *europaea* (Oleaceae, BCN 29898)	olivera	Fruits	Raw (canned) or to make oil	6	–
Oryza sativa L. (Poaceae, BCN 30000)	arròs	Grains	Cooked	1	Antidiarrhoeal
			Beverages (spirits) (vi d'ametlles)	1	
Phaseolus vulgaris L. (Fabaceae, BCN 46837)	mongetera	Fruits	Cooked	1	To low glucose in blood
Prunus armeniaca L. (Rosaceae, BCN 48712)	abricoc	Fruits	Raw	1	Antidepressant
			Cooked to make jam	1	
Prunus avium (L.) L. (Rosaceae, BCN 29827)	cirerer	Fruits	Raw	1	Intestinal anti-inflammatory
			Beverages (spirits) (cherry liquor)	2	
Prunus domestica L. subsp. *domestica* (Rosaceae, BCN 46834)	pruna	Fruits	Cooked to make jam	2	Laxative
Prunus dulcis (Mill.) Weeb. (Rosaceae, BCN 46833)	ametlles (seed)	Seeds	Condiment	1	Galactogene
			Toasted	4	
			Beverages (spirits) (vi d'ametlles)	1	
Prunus persica (L.) Batsch (Rosaceae, BCN 46832)	préssec (fruit)	Fruits	Beverages (soft drink)	1	–
			Cooked to make jam or syrup	5	
			Beverages (spirits) (peach liquor)	1	
Pyrus communis L. subsp. *communis* (Rosaceae, BCN 46831)	pera (fruit)	Fruits	Cooked to make jam or syrups	3	Laxative
Pyrus malus L. subsp. *mitis* (Wallr.) O. Bolòs et J. Vigo (Rosaceae, BCN 46830)	poma (fruit)	Fruits	Cooked or to make jam	5	For digestive diseases
Solanum lycopersicum L. (Solanaceae, BCN 29952)	tomata (fruit)	Fruits	Raw (in salads or pre-served in vinegar or salt)	6	Resolutive
			Cooked (chopped or to make jam)	5	
Solanum melongena L. (Solanaceae, BCN 25004)	esbergínia	Fruits	Cooked and preserved in cans	2	For warts
Solanum tuberosum L. (Solanaceae, BCN 29797)	patata (tuber)	Tubers	Cooked	1	Antipyrotic
Spinacia oleracea L. (Chenopodiaceae, BCN 46077)	espinacs	Leaves	Raw in salads	1	Laxative
			Cooked (boiled alone or in omelette)	2	
Triticum aestivum L. (Poaceae, BCN 29963)	blat	Grains	To make flour (for bread or bread soup)	2	Antifungal

Valerianella locusta (L.) Laterrade (Valerianaceae, BCN 49861)	enciamets de la mare de Déu	Leaves	Raw in salads	1	_
Vicia faba L. (Fabaceae, BCN 46826)	favera	Grains	Cooked (stewed)	3	Galactofuge
		Stems	Cooked (boiled as a vegetable)	1	_
Vitis vinifera L. (Vitaceae, BCN 29972)	raïm (fruit)	Stalk	Beverages (spirits) (orujo)	1	_
		Fruits	Raw, fresh or dried	1	Laxative
			Beverages (spirits) (garnatxa)	6	
			Beverages (spirits) (licor moscat)	1	
			Beverages (spirits) (brandy)	1	
Zea mays L. (Poaceae, BCN 29830)	blat de moro	Rachis	Beverages (soft drink)	1	_
		Grains	To make flour for bread or soup	5	Anti-inflammatory/ antialgic/ antiecchymotic

consuming them raw or just boiled). In fact, all kinds of processes and ways of ingestion that apply for common cultivated plants can be found for wild ones, which are consumed in salads, soups, omelettes, stews, jams, battered and fried, as well as in several kinds of alcoholic and non-alcoholic drinks.

Botanical aspects and plant origins

According to the different use categories, the parts of plants used vary. For example, fruits and leaves are the most consumed in raw and cooked preparations, accounting respectively for 39% and 38% of the edible uses; the aerial part, the whole plant and the stem together make an 11%, the subterranean part being only used in the 6% of cases. Leaves (55%), flowers (26%) and fruits (9%) represent a big majority of condiment uses. The predominating use of aerial parts of the plant has also been reported in the other Catalan regions studied from this viewpoint (BONET and VALLÈS, 2002; RIGAT et al., 2009), although the percentages of the particular parts employed are slightly different. This predominance is also reported in other Iberian areas (TARDÍO et al., 2005), and reflects -through a set of plants in which wild species are largely the majority- approximately the same spectrum as for main crops, mostly consumed as fruits and vegetables.

The total number of autochthonous non-crop food species is 147, whereas the rest are cultivated or purchased at the market (an amount of 64 taxa, 47 and 17 respectively). Considering the 518 taxa that constitute the ethnoflora (i.e., the flora with folk plant uses, PARADA et al., 2009) of the region (PARADA, 2007) and the 211 alimentary species, the latter represent a very relevant 40.7%. Most allochthonous plants are cultivated and eaten, but also a high amount of exotic species are used as condiments or for liquor preparation. In other words, the 69.7% of alimentary species used in the Alt Empordà is autochthonous. The number of wild food plants in the region studied is to be considered high if we compare it with those reported for two other Catalan areas (Montseny, larger than Alt Empordà, 132 species; BONET and VALLÈS, 2002; Alt Ter, smaller than Alt Empordà, 100, RIGAT et al., 2009), for the whole island of Sicily (188, LENTINI and VENZA, 2007) and for all Spain (419; TARDÍO et al., 2006). These wild plants provide an ethnobotanicity index (PORTÈRES, 1970, percentage of useful plants in respect of the flora of a territory) referred to food plants of 8.9%, meaning that almost one out of 10 plants of the flora of the region (estimated in about 1,650 species, PARADA, 2007 and references therein) is used for food purposes.

The presence of wild food plants and the persistence of many of their uses are still relevant nowadays in the studied region. This, united to the significance in the zone of landraces or local crops, testifies for the relevance of popular knowledge.

Food and medicine plants

During ethnobotanical field work we collected mainly both food and medicine uses of plants, but there were also plants that had the two properties at the same time. These plants with both uses have been named in bibliography as nutraceuticals, functional foods, health foods or pharmafoods (ETKIN, 1996; ETKIN and JOHNS, 1998; VAUGHAN and JUDD, 2003; ESPÍN et al., 2007; LÓPEZ and MEDINA, 2009). The interactions between foods and medicine and the fuzzy borders between both activities are known from time immemorial. As the father of medicine, Hippocrates (ca. 460-377 BC), said, *your food shall be your remedy*, and today the concept of functional food (foods with biologically active products, which so have nutritional qualities and affect relevant functions of the organism, providing welfare and, in some cases, preventing from suffering some illnesses; LÓPEZ and MEDINA, 2009) is important both in pharmacy and in food science.

On the one side, in the society where our study occurs, many commercial food products have bioactive principles added (such as fitosterols, isoflavones, anthocyanins and probiotics) and they are considered trendy (ESPÍN et al., 2007; VIDAL, 2010). But on the other side, Alt Empordà informants show a stronger and older conception about healing food. In a recent paper dealing with this same subject in another Catalan area (RIGAT et al., 2009), we proposed the concept of folk functional food for the plants, mostly wild, which are claimed by the informants to be at the same time good as food and as medicine. On Tab. 1 to 3, traditional medicinal uses of plants cited by Alt Empordà informants are reported. One of the paradigmatic examples of this -highly reported by the Alt Empordà informants- is the so called "sopa de farigola" (thyme soup), which was ideated as a way of aromatizing a very simple soup that permitted to consume old bread but was soon understood as a both nutritive and medicinal (digestive) product and was especially prepared when someone in the family had stomach troubles. Another example recorded in the studied areas deals with a cultivated and relatively recently introduced plant, *Actinidia chinensis* Planch., which is consumed as a nutritive product that is laxative and, in addition, rich in vitamin C. The present study has reinforced this idea of folk functional foods, some of which

would deserve attention from plant chemists and pharmacologists in view of possible utilization beyond the popular level.

Comparison with other territories and grade of novelty

We have compared the food plants referred in the Alt Empordà region with other studies made in close Mediterranean territories and others from further areas (RIGAT et al., 2009 and references therein, and TARDÍO et. al., 2006 and references therein, plus KUNKEL, 1984; TUKAN et al., 1998; ERTUG, 2004; RIVERA et al., 2005; NEBEL et al., 2006; HADJICHAMBIS et al., 2008). The comparison corpus has been established taking first into account KUNKEL (1984). In fact, KUNKEL's (1984) checklist is continuously updated by Dr. Eduardo Rapoport and his collaborators (RAPOPORT, 2009 and pers. comm.), who termed "extra-Kunkel" every food plant added to this quite comprehensive catalogue. They calculated that 25% of the World flora (the fourth of 270,000 vascular plant species, this is 67,500 species) is edible or has other food uses. They conclude that as KUNKEL's (1984) checklist is being completed, proportions of food plants from different flora increase. Our comparison work followed with the emptying of the other references including some prominent books in this field (VAUGHAN and GEISSLER, 2009 and CHAMPBELL, 2009) and some reference online databases as Germplasm Resources Information Network (GRIN, http://www.ars-grin.gov) and Plants for a Future (PFAF, http://www.pfaf.org).

In the Alt Empordà area, 29 extra-KUNKEL (1984) species and 16 extra-TARDÍO (2006) plants have been cited by the informants. It means that 29 food plants known and used in the region studied are not considered in the world's scope literature and 16 are not previously referred in the Spanish specialized and very recently updated bibliographical review. Furthermore, after revising the whole reference literature cited, we have found that a total of 13 species are newly cited for human alimentation. These are the species marked with an asterisk on Tab. 1 (and 1 species on Tab. 2). Most of them are consumed in beverages (eight as an ingredient of 'ratafia' and one of 'absinthe'), but there are also two cases of condiments (the inflorescences of *Cirsium echinatum* (Desf.) DC. in Lam. et DC. and the aerial parts of *Cistus monspeliensis* L.) and other modes of consumption: the stems of *Brachypodium retusum* (Pers.) Beauv. are eaten in omelettes, and the nectar of *Pulmonaria affinis* Jord. in F. W. Schultz. is sucked as a candy. These new or at least rarely reported food plants indicate that ethnobotanical prospection even in industrialised societies may still reveal previously unknown data.

From folk to industrial uses

Some food plant uses recorded are very infrequent, several utilisations having been reported by only one informant or having been claimed as very rare by the informants, such as the flowers of *Aphyllanthes monspeliensis* L. (with sweet taste) and *Lantana camara* L. (with hot taste) added raw to salads, or the root of *Althaea officinalis* L. boiled as a thickening agent for soups. Conversely, other uses are very frequent and general in the territory considered, and are coincidental with those in other regions. Some of the latter are likely to reach another step and to be consumed not only at the popular level, but to enter the semi-industrial or industrial fields. As stated in the introduction, one of the strengths of studies such as the present one is the detection of plants that could become new crops or at least could have semi-industrial or industrial uses in the future. Some examples that we detected during our study may already be reported. One of the more generalized is the consumption of *Asparagus acutifolius* L. Cultivated races of asparagus are frequently eaten, but in the periods of time in which the mentioned wild species is available it is largely preferred. It is largely collected for personal uses, but it is also generally present in markets and in restaurants, where it is mostly served in omelette, representing a business for the restaurants and small revenue for some people who collects the plants for them. This is a very general situation, comparable, in Catalonia, with that of some mushrooms. Similarly, but much less common, salads with some flowers (such as *Borago officinalis* L.) or with wild or small-scale cultivated vegetables (such as *Rorippa nasturtium-aquaticum* (L.) Hayek) have reached hostel tables. Wild *Fragaria vesca* L. and *Rubus ulmifolius* L. fruits are in the same situation for desserts, jams and other sweet products. *Sambucus nigra* L. represents a case of a quite commonly used food plant at the popular level, which sporadically reaches the restaurants, mostly with their inflorescences fried in batter and consumed as a dessert or to accompany meat; this use is restricted to north-east Catalonia (PARADA et al., 2002; VALLÈS et al., 2004; RIGAT et al., 2009). As we recently reported in a work devoted to ethnobotany of medicinal plants in the region considered (PARADA et al., 2009), some aromatic species, in the border between medicinal and food use (*Matricaria recutita* L. *Mentha pulegium* L. and *Origanum vulgare* L.), have provided supplementary incomes in a case of minor cultivation for the commercialization of the harvest, which was bought by a bar, which was interested in serving fresh, non-industrial material for infusions. We will mention finally the case of *Cynara cardunculus* L. This species was cultivated at a familiar level (one or a very few individuals) near rural houses to elaborate curd or different kinds of cheese. From this tradition, a relatively extensive cultivation has been established in one of the municipalities of the region studied, with associated services such as desiccation of the flowers (used to coagulate the milk), preparation of the curding product and production of cheese, every step being commercialized. Some of these examples clearly account for the importance of folk plant uses for developing new market possibilities, in the frame of what DUKE and DUCELLIER (1993) called alternative cash crops.

Concluding remarks

The high number of plants claimed to have food uses by the informants as well as the novelties recorded prove that the popular knowledge on plants is still alive and that ethnobotanical approach is a fine tool to detect such uses, not only the commonest ones but also the rarest or more original ones. In addition, the results of the present prospection show a link from past to future: 71 out of the 211 wild or cultivated food plants reported by our informants were already known and used in the 17th century (AGUSTÍ, 1617), suggesting a tradition linking with at least medieval epochs, and 69 are cited in one of the most modern corpus of Catalan cuisine (INSTITUT CATALÀ DE LA CUINA, 2006), devoted to be one of the pillars of further development in this field (and this number would increase if we took into account other current days works on this subject); even if these figures are approximated (in the quoted works no scientific names appear, but in most cases they can be assigned without big problems), they are highly indicative.

The traditional knowledge of food plants may either remain at the popular level or reach a higher degree of generalisation. On the one hand, this knowledge, fruit of mostly vertical but also of some horizontal cultural transmission, links tradition and innovation and plays a relevant role in everyday's life (a great deal of the plants mentioned in the present paper are very commonly consumed) and also in the definition of a culture. Is generally assumed that cuisine is an important factor in the definition of a human group identity (CSERGO, 1995; MURCOTT, 1996; HOLTZMANN, 2006), this happens with Catalan culture (LUJAN, 1979; FÀBREGA, 2001; THIBAUT-COMALADA, 2001; INSTITUT CATALÀ DE LA CUINA, 2006) and plants are one of the principal factors of food, as we have shown in the present study for a particular region and reported earlier from other areas (BONET and VALLÈS, 2002; RIGAT et al., 2009). On the other hand, this knowledge

can spread and generate a use at a larger scale. Recording food plants and uses in different regions of the world -to what the present work is a contribution- is one of the steps, in which new or rare uses are particularly -but not the only- relevant, in the search for new sources of food, which is nowadays one of the most imperious challenges and commitments of the humankind.

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Address of the authors:

Dr. Montse Parada (montse.parada@gmail.com), Esperança Carrió (e.carrio@ub.edu), Prof. Joan Vallès (joanvalles@ub.edu). Laboratori de Botànica, Facultat de Farmàcia, Universitat de Barcelona, Av. Joan XXIII s/n, 08028 Barcelona, Catalonia, Spain.