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Ethnobotanical review of wild edible plants used in the Czech Republic

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Summary

This paper is the literature survey of wild food plants used within the present borders of the Czech Republic. Thirty-seven freely available publications documenting the culinary use of wild plants were examined. The use of 175 vascular plant species (approximately 5% of native and naturalized flora of the Czech Republic), 3 lichens and 1 bryophyte has been reported. For each species listed, plant parts used, use category and mode of consumption are given. Rosaceae, Asteraceae and Ericaceae were the most represented botanical families. The most frequently reported categories of plant uses include green vegetables (e.g. *Urtica dioica*, *Glechoma hederacea*, *Rumex* spp., *Taraxacum* sect. *Ruderalia*), seasonings (e.g. *Juniperus communis*, *Viola* spp.), wild fruits (e.g. *Rubus idaeus*, *Rosa canina*), and beverages (e.g. *Cornus mas*, *Sambucus nigra*). The structure of the most commonly used wild food taxa is similar to those used in other central European countries like Poland, Slovakia or Hungary. This review highlights the traditional knowledge of wild edible plants which were used in the Czech Republic since 16th century onwards with an attempt to document diversity of plant species and discuss the current potential of the forgotten plants used in the past.

Introduction

The Czech Republic is small landlocked country in Central Europe with area 78,866 km^2 and some 10.5 million inhabitants. Its boundaries 2,290 km in length are surrounded by very heterogeneous landscape. Bohemia, the western part, consists of a basin drained by the Labe (Elbe) and the Vltava (Moldau) rivers. Moravia, the eastern part of the country, is drained mainly by the Morava and Odra (Oder) Rivers. Both parts are largely surrounded by low mountains. The climate in the Czech Republic is mild and transient between oceanic and continental with continental character of the climate increasing to the east, due to prevailing western air flow and position towards the Atlantic Ocean. A characteristic feature of the climate is distinctly marked by regular alternation of four seasons. Czech territory belongs to the Central European region, the intersection of current spread of plant species, which implies a great diversity of nature. Because of the rugged topography, the country covers a variety of biotopes within relatively small area.

Wild plant species have been collected by people for various purposes such as food, medicine and social uses. It is a challenge for ethnobotanists who try to gather and record this knowledge. The collected data are important from a cultural perspective as they conserve traditional wisdom and also because of the increasing interest in the use of wild edible plants in our postmodern society.

During the last two decades, growing interest in wild edible plants has led to many local ethnobotanical studies carried out in European countries to preserve the traditions of wild food use. Such studies were performed for example in Poland (Łuczaj, 2008; Łuczaj, 2010a; Łuczaj and Szymański, 2007), Slovakia (Łuczaj, 2012), on the Iberian Peninsula (Tardío et al., 2006; Bonet and Vallès, 2002; Tardío et al., 2005; Pardo-de-Santayana et al., 2005; Tardío and Pardo-De-Santayana, 2008), in Italy (Guarrera et al., 2006; Nebel et al., 2006; Leonti et al., 2006; Pieroni et al., 2005), Estonia (Kalle and Sõukand, 2012), Bosnia and Herzegovina (Redzic, 2006), Hungary (Dénes et al., 2012), Sweden (Svanberg, 2009) and Cyprus (Della et al., 2006). These studies have shown that the continent has a rich and varied culture associated with the gastronomic use of wild plants. Although the Czech Republic is not poorer in traditional use of wild plants compared with other parts of Europe, no such comprehensive review has been undertaken yet. The authors believe that this review could extend the scientific knowledge on traditional use of wild food plants in Europe previously summarized in the paper of Łuczaj et al. (2012). This literature survey cover wild plant species used for food including beverages with the exception of plants used in the form of the herbal infusions or decoctions, which were drunk almost exclusively for medicinal purposes.

Materials and methods

Thirty-seven publications dealing with Czech food history, gastronomy, ethnography and botany were surveyed. All information summarized in this review refers to use of wild edible plants within the boundaries of recent Czech Republic, based on literature sources providing relevant information since the beginning of the modern period (16th century) onwards. For data collection and analysis we have used combination of methods applied in similar previous studies of Tardío et al. (2006), Łuczaj and Szymański, 2007, Łuczaj (2010a), and Kalle and Sõukand (2012).

Literature sources surveyed are listed in the Tab. 1. The same sources, indicated with a reference numbers (RN), are also referred in the Tab. 2. For each publication, main topic, geographical area, and number of plant species reported are given. Most of the sources cover the whole country, except for ten publications with regional focus. Among those, nine sources cover Bohemian regions (RN 8, 9, 10, 14, 18, 19, 33, 37, 23), and one source was focussed on east Moravia (26). Additionally, one book (7) includes whole European area.

All records of using any parts of plant species as food or drink were considered excluding species used for preparation of herbal teas having exclusively medicinal applications (Korbelář and Endris, 1985).

All data were grouped into alphabetically sorted botanical families (Tab. 2), where Latin name, standard Czech name, folk name(s), plant part(s) used, use category, number of reports, mode of use and reference number(s) are provided. Contrary to Tardío et al. (2006) information on collecting season were not included as it was rarely referred in the sources studied and the information obtained usually falls into 3 categories, i.e. green plant parts collected in spring (March - June), fruits collected in their ripening time (July - October), and underground parts collected mostly in both seasons mentioned (Łuczaj and Szymański, 2007).

In the present study one report was considered one mention of a species use in particular food category and literature source.

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Definition of "wild species" being considered in this study

In compliance with similar studies (TARDÍO et al., 2006; ŁUCZAJ and SZYMAŃSKI 2007; KALLE and SÕUKAND, 2012) the term "wild plants" in this review refers to non-cultivated species gathered in the field without intended cultivation, including alien spontaneously occurring taxa. In accordance with the methodical approach of TARDÍO et al. (2006) and KALLE and SÕUKAND (2012), plants which wild forms are sometimes cultivated (*Corylus avellana* L., *Rubus idaeus* L.), species which parts reported in the sources surveyed are usually not eaten (*Humulus lupulus* L.), as well as the species cultivated solely for non-food purposes (e.g. *Aesculus hippocastanum* L.) were considered because they are known to be feral and they could be gathered from the wild.

Use categories

Considering previous studies of TARDÍO et al. (2006) and ŁUCZAJ (2012), eight main categories of food uses were established to classify wild edible plants in this review.

Plant species whose aerial parts like leaves and shoots were con-

Tab. 1: References consulted, with their reference number (RN), main topic, and number of species from each source included in the database.

RN	Reference cited	Main topic	Research area	No. of species reported
1	Beranová (1997)	food history	Whole country	9
2	Beranová (2001)	cookbook	Whole country	24
3	Beranová (2005)	food history	Whole country	77
4	Fialová (1958)	food history	Whole country	5
5	Fialová (1989)	cookbook	Whole country	9
6	Fialová and Styblíková (1983)	cookbook	Whole country	14
7	Gumowska (1994)	cookbook	Europe	2
8	Hajný (1912)	ethnographic (food)	Nymburk	2
9	Jakouběová (2000)	cookbook	Central Bohemia	10
10	Jakouběová (2009)	ethnographic (folklore)	Central Bohemia	24
11	Janalík and Marhold (2003)	cookbook	Whole country	7
12	Janča and Zentrich (1994-1999)	herbarium (medical)	Whole country	11
13	Janků-Sandtnerová and Janků (2007)	cookbook	Whole country	10
14	Kaizl (1944)	ethnographic (food)	East Bohemia	19
15	Karlík (2007)	cookbook	Whole country	13
16	Kubátová (2003)	ethnographic (food)	Whole country	1
17	Lánská (1990)	edible plant guide	Whole country	35
18	Marhold (2008)	cookbook	East Bohemia	28
19	Novotná et al. (2005)	ethnographic (food)	South Bohemia	5
20	Polívka (1900-1904)	plant encyclopaedia	Whole country	59
21	Rettigová (2005)	cookbook	Whole country	8
22	Rodovský z Hustiřan (1975)	cookbook	Whole country	10
23	Roubal (1902)	ethnographic (plants)	West Bohemia	2
24	Rozmarová (1938)	cookbook	Whole country	18
25	Skopová (2009)	cookbook	Whole country	12
26	Štika (1980)	ethnographic (food)	East Moravia	18
27	Trachtová (1902)	cookbook	Whole country	14
28	Triwaldová (1909)	cookbook	Whole country	8
29	Úlehlová-Tilschová (1937)	healthy nutrition	Whole country	18
30	Úlehlová-Tilschová and Goldhammer (1970)	ethnographic (food)	Whole country	14
31	Úlehlová-Tilschová (2011)	ethnographic (food)	Whole country	66
32	Úlehlová-Tilschová (2000)	cookbook	Whole country	17
33	Vrabec and Smotlacha (1982)	cookbook	South Bohemia	5
34	Winter (1892)	food history	Whole country	79
35	Zíbrt (2000)	food history	Whole country	24
36	Zíbrt (2012)	food history	Whole country	26
37	Zuntová (2005)	ethographic (food)	South Bohemia	2

sumed raw, boiled or fried were placed in the category green vegetables (VEG). Fruits eaten raw or preserved in the form of jams and jellies were categorized as wild fruits (FRU). Plants whose bulbs, rhizomes, roots, and tubers, consumed raw as a snack or added to boiled dishes were placed into the category of subterranean parts (SUB). Seasoning (SEA) category covered plants added in small amounts to dishes. Flowers and their nectar used as a snack or added to dishes in larger quantities were placed in the category of flowers (FLO). Plants used for making non-alcoholic beverages (BEV), home-made liqueurs, beers and other alcoholic beverages (BEVliq) or used as a coffee and cacao substitutes (BEVoth) were also considered. Plants with use as preservative additives or rennet substitutes were included in preservatives (PRE). Finally, there were categories for other uses such as oils (OTHoil), flours (OTHflo) and non-specified use (OTH) considering making vinegar or honey.

Plant species identification

In the literature sources containing data on wild edible plants, the species were mostly reported under their folk names (only in 3 reference sources Latin names of plants were given). No herbarium specimens in the cited works were available to verify the proper taxonomic identification. Nevertheless, according to ŁUCZAJ and SZYMAŃSKI (2007), we tried to validate the identification using generally available floras and plant guides (POLÍVKA, 1900-1904; KUBÁT, 2002; SKALICKÁ et al., 2012, RYSTONOVÁ, 2007). Accordingly, a list of taxa was created using a modified code for credibility of identification previously defined by ŁUCZAJ (2010b). In case of plant record did not allow for taxonomic identification down to species level, even though it comprises two or more very common species, a taxon was identified down to genus level. In the consequence, only commonest species of such genus occurring in the Czech Republic, which we personally witnessed being collected, have been mentioned in the results.

In case when plant identification credibility was very low or the taxon was impossible to determine, according to KALLE and SÕUKAND (2012) such record was left aside and it was not included in the plant list provided in the Tab. 2. Latin plant names and authority were adjusted according to 'FLORA EUROPAEA' database (http://rbg-web2.rbge.org.uk/FE/fe.html.) and cross-checked in the 'TROPICOS' – botanical information system of the Missouri Botanical Garden (www.tropicos.org). Czech standard names were adopted from the current Checklist of vascular plants of the Czech Republic (KUBÁT, 2002; DANIHELKA et al., 2012) and the Flora of the Czech Republic.

Results

In total 179 wild edible plants used for various food purposes were documented in the Czech Lands since the 16th century (Tab. 2). They include 175 vascular plant species (approximately 5 % of native and naturalized flora of the Czech Republic), 3 lichens, and 1 bryophyte. Eighty-three per cent of the plants reported in this study were classified according to DANIHELKA et al. (2012) as autochthonous and seventeen per cent as allochthonous species. From the total number, 150 plants were identified down to species level. Twenty-nine plants could only be identified down to genus level.

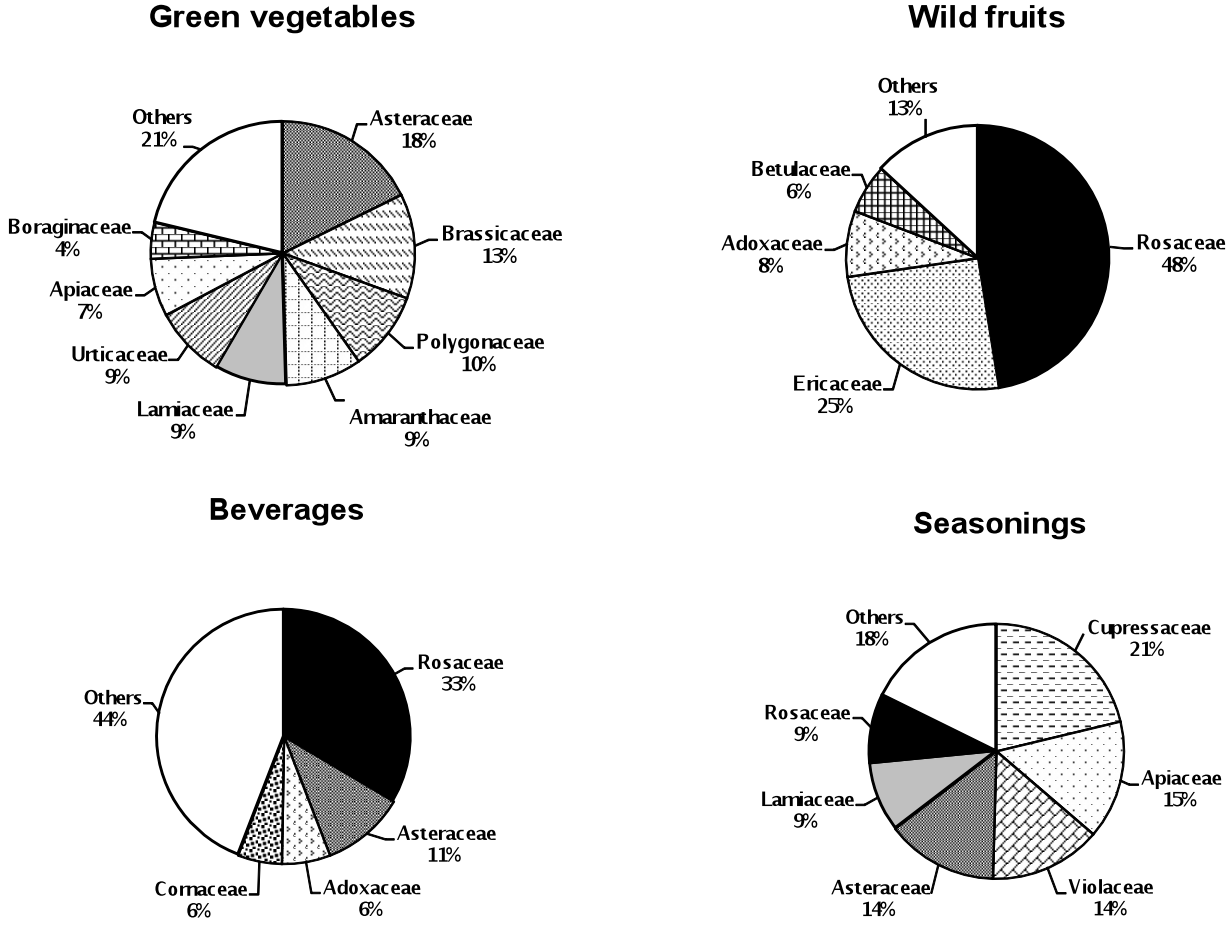

Fig. 1: Botanical families with the greater number of species cited for the major categories.

All species belong to 57 botanical families, most represented by Asteraceae (19 species), Rosaceae (14) and Brassicaceae (11). The Fig. 1 shows botanical families with the greater number of species cited for the major categories. The reported species are consumed in a variety of ways (eaten raw, cooked or fried, ground into flour or pressed into oil). Considering all food categories, the most important species according to the number of reports were: *Rubus idaeus* (52), *Sambucus nigra* L. (44), *Rosa canina* L. (38), *Junniperus communis* L. (33), *Vaccinium myrtillus* L. (30), *Viola* spp. (29), *Vaccinium vitis-idaea* L. (26), *Urtica dioica* L. (25), *Fragaria vesca* L. and *Rumex* spp. (22 each). Some species were included in more than one category such as *Sambucus nigra, Fragaria vesca* and *Viola* spp. which were classified in 5 categories. Therefore, the total number of plants and their related uses was 284, higher than the number of species (179).

Seven per cent of all plants across all food categories were reported as children's snacks, including mostly species already mentioned in the category of fruits. The use of some wild plants as children's snack food could be a relic of general use of these plants by adults when they were young. Additionally we would like to mention that 7 % of all use reports are considered as preparation during time of famine.

Green vegetables

Green vegetables including edible weeds constitute the largest category with 74 species recorded. It includes plants whose green parts such as leaves, stems and stolons are eaten raw or after special preparation (cooking, stewing and frying) excluding seasonings. Among species in this category *Urtica dioica* (Urticaceae) shows the highest number of reports (25), even though the most represented families were Asteraceae (12 species), Brassicaceae (10) and Polygonaceae (5). Beside *Urtica dioica*, also *Glechoma hederacea* L. (19 reports), *Rumex* spp. (16*), Taraxacum* sect. *Ruderalia* (10) and *Atriplex* spp. (10) were frequently reported species. *Glechoma hederacea*, known under the folk name *kundrlátek* was used for making soups, vegetable dishes or added to scrambled eggs. Plants of the genus *Rumex* were consumed raw or used as potherb or they were chewed frequently by children and shepherds against thirst. *Lepidium* spp. leaves were used occasionally as filling for traditional Czech doughnuts.

Wild fruits

Excluding species used solely as a seasoning, twenty-six species were recorded in this category. More than one third of these species belongs to the family Rosaceae (10 species) and Ericaceae (4 species). Most wild fruits of these families complete with species *Sambucus nigra* (16 reports) and *Rubus caesius* L. (14) were consumed as a snack or made into preserves (jams, jellies, compotes) and were consumed especially during the winter months. Fruits of *Corylus avellana* were added to pastry and confectionary. Sweet sauce called *žahúr* made of *Vaccinium myrtillus* fruits mixed with milk and honey (Stoličná, 1997) was used as topping for dumplings or crumpets.

Beverages

This category covers 3 subcategories, alcoholic beverages (13% of all use reports), non-alcoholic (8 %) and others (2 %). Most plants in this category are fruit species. The most remarkable species for making beverages are *Rubus idaeus* (16 reports), *Fragaria vesca* (10), *Cornus mas* (9) and *Rosa canina* (9), largely prepared as juices or alcoholic beverages. Flowers of *Taraxacum* sect. *Ruderalia* and *Bellis perennis* as well as rhizomes of *Acorus calamus* were used for making syrups.

Fruits of *Juniperus communis* were used to make the distillate *jalovcová* which taste resembles Slovak *borovička*. Brewing has been very popular in the Czech Republic since ancient times. For home-made beers, people occasionally used hop substitutes from wild plants such as rhizomes of *Acorus calamus* and *Geum urbanum* L., leaves of *Salvia pratensis* L. and *Tanaceum vulgare* L. and flowers of *Origanum vulgare* L.

Coffee or cocoa substitutes were used mostly in times of increasing prices of these exotic commodities during 18th and 19th centuries. Most popular species used for this purpose was *Cichorium intybus* L., whose roasted and ground roots were used as coffee substitute. Roots of *Scorzonera hispanica* L. were used in the same way as well as seeds of *Rosa canina* and *Astragalus glycyphyllos* L., fruits of *Quercus robur* and unspecified parts of *Vicia sativa* L. (most probably seeds).

Seasonings

Out of 31 wild plants used as seasoning *Juniperus communis* (24 reports) and *Viola odorata,* were the most frequently reported species. Berry-like cones of *J. communis* were mostly used for seasoning game. Very popular were seasoning spring soups made of the leaves of *Viola* spp., *Fragaria vesca, Achillea ptarmica* and *Vaccinium myrtillus*.

Flowers

This category was recorded for 11 species. *Sambucus nigra* (16 reports) was most frequently reported species. Its fried dough coated inflorescences was typical rural spring dish called *kosmatice*. Interestingly, flowers of *Robinia pseudoacacia* and *Trifolium* spp. were used in the same way but they were not as popular as *Sambucus nigra*. *Viola* and *Centaurea* genera were used for colouring foodstuffs in blue (e.g. pudding) or decorating Easter eggs. Candied flowers, usually of *Viola* and *Centaurea* species or *Bellis perennis*, were preserved by a coating with crystallised sugar. Flower receptacles or flower buds from *Carlina acaulis* L.*, Fagus sylvatica, Betula pendula, Tilia* spp., and *Populus* spp. (probably *P. alba* L. or *P. tremula* L.) were eaten raw or boiled in vegetable dishes.

Underground parts

The use of underground plant parts (roots, rhizomes, bulbs and tubers) was recorded for 30 species. However, the frequency of citation for individual species did not exceed 4 reports. *Acorus calamus* rhizomes were preserved with sugar. Roots of *Campanula rapunculoides* L., *Phyteuma spicatum* L. were eaten raw in fresh salads. Rhizomes of *Arum maculatum* L. and tubers of *Chaerophyllum bulbosum* were used in boiled dishes. Bulbs of *Galanthus nivalis* L. and *Leucojum vernum* L. were usually dried and ground into porridges. Underground parts of *Scorzonera hispanica, Cyperus esculentus* L.*, Onopordum acanthium* L.*, Chenopodium bonus-henricus* L.*, Sagittaria sagittifolia* L. and of several species of the genus *Arctium* (*A. tomentosum* Mill.*, A. lappa* L. and *A. minus* Bernh.) were used for preparation of salads and other vegetable dishes.

Preservatives

A few species were identified to be used in this category. Fruiting branches of *Juniperus communis* were used to preserve game. Except for *J. communis*, all other species in this category, i.e. *Fragaria vesca, Galium verum, Rumex* spp. and *Urtica dioica* (leaves), and fruits of *Corylus avellana* and *Quercus robur* were used as rennet substitute.

Other uses

This category includes oils, flours, vinegars and 'honey'. The term 'honey' in the present study refers to home-made boiled down herbal syrup. Honey was traditionally prepared from flowers of *Hypericum* spp. (most probably *Hypericum perforatum* L.) and *Taraxacum* sect. *Ruderalia*.

The oil was extracted from fruits of *Corylus avellana, Fagus sylvatica* and *Quercus robur* and from the seeds of *Alliaria petiolata* (M. Bieb.) Cavara et Grande, *Prunus spinosa* and *Sambucus nigra*.

The family of the Poaceae was best represented with 6 species. Seeds of *Digitaria sanguinalis* (L.) Scop, *Glyceria fluitans* (L.) R. Br., *Echinochloa crus-galli* (L.) P. B., *Setaria viridis* (L.) P. B. subsp. *viridis* and *Milium effusum* L., as well as rhizomes of *Elymus repens* (L.) Gould were ground into flours. Other species, whose many different parts as rhizomes (*Pteridium aquilinum* (L.) Kuhn, *Arum maculatum, Calla palustris* L.), bulbs (*Leucojum vernum, Galanthus nivalis*), leaves (*Urtica dioica*), inflorescences (narrow spikes of *Typha latifolia* L.) flowers (flower buds *of Quercus robur, Trifolium* spp.), fruits (*Quercus robur, Aesculus hippocastanum, Trapa natans*), seeds (*Amaranthus retroflexus, Persicaria spp., Fallopia convolvulus* (L.) Á. Löve) and even inner bark of *Betula pendula*, were used particularly in times of famine. They were mixed with cereal flour to make bread dough. Only exceptionally bread dough was prepared solely by using flours made from wild plant species. Sometimes for these purposes were also used non-vascular plants as lichens *Cladonia rangiferina* (L.) Weber ex F. H. Wigg., *Cetraria islandica* (L.) Ach. and *Evernia prunastri* (L.) Ach. and bryophyte *Sphagnum palustre* L.

Six species (*Artemisia vulgaris, Betula pendula, Prunus spinosa, Rubus idaeus, Viola* spp. and *Salix* spp.) were used to make a vinegar.

Discussion

Comparison with other countries

The presented list of wild edible plants includes 175 vascular species (5 % of the Czech flora). In comparison with Poland, which was classified as herbophobic country with 112 species recorded (3.7 % of Polish flora) (Łuczaj, 2008), or with 106 species documented in Slovakia (3 % of Slovak flora; Łuczaj, 2012), our study indicates that the Czech people could be considered herbophylic. Unfortunately, it was not possible to compare the use of wild food plants in the Czech Republic with other neighbouring countries, i.e. Austria and Germany, as they lack similar ethnobotanical reviews. Comparing our study with south European countries, Czech Republic should be classified as herbophobic. For example, only in Alt Empordà region (Catalonia, Spain) with the area of 1,358 km^2 Parada et al. (2011) found 211 wild food plants. Lentini and Venza (2007) recognized in Sicily, an island 3 times smaller than the Czech Republic, 188 wild edible species (6.2 % of the flora). In Bosnia-Herzegovina, smaller country than the Czech Republic was listed around 10% of flora (Redzic, 2006). Summarizing our results the Czech Republic should be classified as herbophobic.

According to Łuczaj and Szymański (2007) two reasons could be responsible for this contrast. One factor is that Czech flora is poorer than in Mediterranean countries, thus the choice of species is poorer as well. Czech flora has 3,557 species, compared to around 6,700 species in Italy (Conti et al., 2005) or 7,000 in Spain (Tardío et al., 2005). On the other hand in two small regions in Cyprus, with a flora around 2,000 species, the use of 78 species as wild food plants was recorded (Della et al., 2006). Therefore, this indicates higher significance of culinary habits, the other factor. In the Mediterranean Basin, people use wild plants mainly as appetizers, spices or ingredients of omelettes, salads and beverages. In countries as the Czech Republic, Slovakia or Poland people use wild plants more as staple food (Guarrera et al., 2006; Leonti et al., 2006; Tardío et al., 2005). Another explanation is that in Central European countries vegetable could be easily cultivated because of large proportion of arable land. The mountainous countries of the Mediterranean Basin are mostly covered by semi-arid pastures. Therefore, cultivation of field crops is more difficult and wild plants were used instead of cultivated vegetable (Łuczaj, 2008).

The use of wild fruits of Rosaceae and Ericaceae families is nearly identical in all European countries (Dénes et al., 2012; Kalle and Sõukand, 2012; Łuczaj, 2012; Łuczaj and Szymański, 2007; Svanberg, 2009; Tardío et al., 2006). With decreasing price of sugar in the early 20th century, European people have found enthusiasm in collecting wild fruits and turning them into jams or pasteurized compotes and it became a part of everyday cuisine (Łuczaj, 2012). The proportion of families in other food categories in the Czech Republic context it is the most similar to Slovakia, Poland and Spain (Łuczaj, 2012; Łuczaj and Szymański, 2007; Tardío et al., 2006).

If we focus on non-vascular plants as *Cetraria islandica* and *Cladonia* spp., both were used in Estonia and in Bosnia and Herzegovina. Analogous to this study, there was report of using them for making bread ingredient during times of famine (Kalle and Sõukand, 2012; Redzic et al., 2010).

Antinutritive properties and toxicity

Some of the wild plans consumed commonly in the Czech Republic might have some toxic effects as shown in the following examples. The most poisonous plants could be considered *Bryonia dioica* Jacq. as its roots contain bryodin, a ribosome-inactivating protein, which inhibits protein synthesis (Stirpe et al., 1986). Special attention is also paid to *Salix* spp., as it contains salicylates (Ruuhola et al., 2003), considered by many people as a natural source of aspirin. Therefore people with known aspirin allergy should not use any willow bark products (Vlachojannis et al., 2011). *Chenopodium* spp., *Rumex* spp. (Guil et al., 1996), *Polygonum* spp., *Oxalis acetosella* (Krčálová, 2009) and *Persicaria* spp. (Keshavarzi and Mosaferi, 2012) contains oxalic acid, which gives plants their acrid flavour. This chemical agent in large quantities can lock up some of the nutrients in the food. Cooking the plant will reduce its content of oxalic acid (Savage et al., 2000). In addition, people with kidney disease predisposition should be aware of including these plants in their diet (Palaniswamy et al., 2004). Pregnant women should avoid *Artemisia vulgaris*, *Levisticum officinale*, *Tanacetum vulgare*, *Berberis vulgaris*, *Capsella bursa-pastoris*, *Cichorium intybus, Mentha* spp. (Ernst, 2002), *Glechoma hederacea* (PFAF, 2013) and *Humulus lupulus* (Zanoli and Zavatti, 2008) as they may stimulate the uterus to contract and induce abortion. Problems with liver damage or liver cancer could be associated with consumption of *Borago officinalis* (Dodson and Stermitz, 1986), *Symphytum officinale* L. (Ernst, 2002), *Senecio vulgaris* L. (Cao et al., 2008) and *Echium vulgare* (El-Shazly et al., 1999) as they contain toxic pyrrolizidine alkaloids which can have a cumulative effect upon the liver (Prakash et al., 1999). In case of *Pteridium aquilinum*, there are a lot of reports connect with the possible health risks. The huge quantity of spores released by large areas is suggested to be implicated in stomach cancers (Rasmussen et al., 2013). Also substance (thermolabile thiaminase) in the leaves of bracken deprives the body of vitamin B1 (Vetter, 2009). On the other hand this substance could be damaged by cooking. Seeds of *Prunus spinosa* produce cyanogenic glycosides (Kumarasamy et al., 2003), which is readily detected by its bitter taste. However, when cyanogenic plants are eaten slowly or over a period of time there may be no harmful effect of cyanide poisoning (Jones, 1998). Furocoumarins in the most of the plants of the family Apiaceae as *Angelica* spp. (Skopalová, 2008), *Daucus carota*, *Pastinaca sativa*, *Heracleum sphondylium* L. and the genus *Hypericum* (Pathak et al., 1962) cause phytophoto-

dermatitis so their consumption increase skin sensitivity to sunlight. Among other poisonous species could be mentioned fresh roots of *Acorus calamus* (BJORNSTAD et al., 2009) because surface coats calcium oxalate crystals, microscopic double needles. When plants are eaten fresh, crystals cause unpleasant sensation like formication sense in mouth, tongue and throat (PAULL et al., 1999). *Solanum dulcamara* overdose may paralyse the central nervous system, slow heart, low temperate, dilated pupils, delirium and even death (SMITH et al., 2008). Bulbs of *Galanthus nivalis* (BERKOV et al., 2008) and *Leucojum vernum* (FORGO and HOHMANN, 2005) are source of toxic alkaloids. Must not be forgotten species which have edible parts but other parts of plant are poisonous as *Sambucus nigra* bark containing nigrin b, a two-chain ribosome-inactivating protein (BATTELLI et al., 1997), *Berberis vulgaris* with toxic bark, *Robinia pseudoacacia* which only wholesome parts are flowers or *Ribes uva-crispa* with toxic leaves (PFAF, 2013).

To sum up, a lot of more or less toxic species exist amongst the wild edibles. Fortunately, most of toxic agents could be destroyed by cooking or drying as mentioned above, nonetheless we must be careful about the quantities (TARDÍO et al., 2006). According to RIVERA-NÚÑEZ and OBÓN DE CASTRO (1993) wild food plants play a major role as the preventive medications through nutritional habit considered as healthful (rightly or not) and a significant part in the healing repertory.

Future perspective of wild food plants

In humankind history culinary habits were never static. During the communist era, Czech people were focused mostly on collecting wild fruits. Nowadays during the last few years we can observe a slow revival in the use of other wild plants. For example in many health food shops now we can find alternatives to coffee from *Cichorium intybus* or from acorns. Until today a few species remain as a common ingredient in household kitchens, mostly seasoning as seeds of *Carum carvi* and juniper 'berries' (*Juniperus communis*).

Interestingly, recently consumption of wild plants is being enlarged by people living in cities (BONET and VALLÈS, 2002). In Croatia, several respondents mentioned that there is a demand for vegetable mixtures of wild plants by young health-oriented people like vegetarians etc. (ŁUCZAJ et al., 2013).

Therefore, modern agriculture should turn profit and through agricultural and rural development policies encourage the conception of profit activities, such as the controlled harvesting of weedy herbs. Also they should start with re-introduction of old and archaic crops and start development of agro- and eco-tourism and farmer's market (TURNER et al., 2011). Recently, particular studies have been elaborated with the aim to use wild species as vegetable crops, i.e. *Silene vulgaris* (Moench) Garcke and *Sinapis arvensis* (SOJKA, 2012), *Taraxacum* sect. *Ruderalia* and *Urtica dioica* (PTÁČEK, 2011), all considered wild plants in this paper. This aspect has been seriously considered by FAO (2009) stating that "nutrition and biodiversity converge to a common path leading to food security and sustainable development" and "wild species and intraspecies biodiversity have key roles in global nutrition security." According to this report, around one billion people use wild foods (including wild animals) in their diet. It is obvious that wild foods form a significant part of the global food basket.

Conclusion

The study shows that there is an urgent need for conserving traditional knowledge on wild edible plants as in the Czech Republic many of wild plants were used. However, from the wide spectrum of wild plant products documented by our research, people still collect mainly wild fruit species, and especially mushrooms, which were not included in this study. Recently, the traditional wisdom only survives in the memories of the elderly, thus it is in danger of disappearing. Therefore, there is still need for further ethnobotanical research in the ethnographic archives as well as in the field to identify whole spectrum of wild gathered edible plants. This review attempts to analyze the information from literature sources to complete data on traditional use of wild food plants in Europe and thus promote further research on forgotten useful plants as potential new food sources.

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Tab. 2: List of wild plant species used for food purposes in the Czech Republic. Reference numbers are given in the Tab. 1.

Family and Species	Standard Czech name	Cr. *	Folk name	Parts used †	Use categories ‡ (no. of reports)	Mode of use	References
LICHENS							
CLADONIACEAE							
Cladonia rangiferina (L.) Weber ex F. H. Wigg.	dutohlávka sobí	O	sobí lišejník	thallus	OTHflo (1)	ground into flour during famine	[35]
PARMELIACEAE							
Cetraria islandica (L.) Ach.	pukléřka islandská	O	lišejník	thallus	OTHflo (3)	ground into flour during famine	[3, 14, 35]
Evernia prunastri (L.) Ach.	větvičník slívový	N	mech trnkový	thallus	OTHflo (1)	ground into flour during famine	[35]
BRYOPHYTES							
SPHAGNACEAE							
Sphagnum palustre L.	rašeliník člunkolistý	O		thallus	OTHflo (2)	ground into flour during famine	[3, 35]
VASCULAR PLANTS							
ADOXACEAE							
Sambucus nigra L.	bez černý	O	bezinky	inflorescence	FLO (16)	fried dought coated flowers or added to porridges	[1, 2, 3, 15, 17, 19, 22, 24, 25, 29, 30, 31, 32, 34, 35, 36]
				fruit	FRU (16)	soups, chutneys, for making jams/jellies	[4, 5, 6, 8, 10, 17, 20, 22, 24, 27, 28, 29, 30, 31, 32, 36]
					BEV (7)	juices	[2, 6, 14, 17, 24, 25, 32]
				seed	OTHoil (1)	pressed into oil	[3]
ACORACEAE							
Acorus calamus L.	puškvorec obecný	O	pišišvor	rhizome	SEA (4)	NS	[3, 9, 17, 36]
					SUB (3)	rhizomes preserved with sugar	[20, 31, 36]
					BEV (1)	syrups	[36]
					BEVliq (6)	used for making spirits or added into beers	[2, 10, 17, 20, 24, 36]
ALISMATACEAE							
Sagittaria sagittifolia L.	šípatka střelolistá	O	čapí capa	rhizome	SUB (1)	used in vegetable dishes	[20]
AMARANTHACEAE							
Amaranthus blitum L.	laskavec hrubozel	O	blít	leaf	VEG (2)	steamed leaves in vegetable dishes	[20, 31]
Amarathus retroflexus L.	laskavec ohnutý	O	amarant	seed	OTHflo (3)	ground into flour during famine	[3]
Atriplex patula L.	lebeda rozkladitá	O	špenát	leaf	VEG (2)	raw in salads	[20, 23]
Atriplex spp.	lebeda	O	špenát	leaf	VEG (10)	soups, steamed in vegetable dishes	[2, 3, 14, 15, 18, 24, 29, 31, 32, 36]
Chenopodium album L.	merlík bílý	O	lebedník	leaf	VEG (1)	raw in salads	[20]
Chenopodium bonus-henricus L.	merlík všedobr	O	chřestový špenát	leaf	VEG (3)	vegetable dishes	[12, 20, 35]

Family and Species	Standard Czech name	Cr. *	Folk name	Parts used †	Use categories ‡ (no. of reports)	Mode of use	References
AMARYLLIDACEAE							
Allium schoenoprasum L.	pažitka pobřežní	O	šnitlík	stem	SEA (1)	NS	[17]
Allium ursinum L.	česnek medvědí	O	divoký česnek	whole plant	SEA (3)	NS	[3, 17, 31]
Galanthus nivalis L.	sněženka podsněžník	O	sněhovka	bulb	OTHflo (1)	ground into flour during famine	[35]
					SUB (1)	dried and ground into porridges	[14]
Leucojum vernum L.	bledule jarní	O	blednivka	bulb	OTHflo (1)	dried and ground into flour during famine	[35]
					SUB (1)	dried and ground into porridges	[14]
APIACEAE							
Aegopodium podagraria L.	bršlice kozí noha	O, N	brzlice, jarous	leaf	VEG (5)	raw or steamed	[3, 12, 20, 31, 35]
Angelica archangelica L.	andělika lékařská	O	děhel andělika	leaf	SEA (1)	NS	[3]
Berula erecta (Huds.) Coville	potočník vzpřímený	N	berla úzkolistá	leaf	VEG (1)	raw	[20]
Bunium bulbocastanum L.	bulvuška hlíznatá	O	bulka, zemský kaštan	tuber	SUB (1)	eaten raw or roasted	[31]
Carum carvi L.	kmín kořenný	O	chlebové koření	leaf	SEA (1)	seasoning soups	[31]
				NS	SEA (6)	NS	[11, 17, 22, 34, 35, 36]
Daucus carota L. subs. Carota	mrkev obecná pravá	N	mrkvous	root	SUB (1)	roots, raw as a snack	[35]
Heracleum sphondylium L.	bolševník obecný	O	kmín sviňský	leaf	VEG (2)	used in soups	[3, 35]
Chaerophyllum bulbosum L.	krabilice hlíznat	O	krabilice bulvatá	tuber	SUB (2)	boiled or roasted	[31, 35]
Levisticum officinale W. D. J. Koch	libeček lékařský	O, N	magíčko, vopich	leaf	SEA (4)	NS	[10, 11, 18, 32]
					VEG (4)	used in soups	[14, 18, 31 33]
				rhizome	SEA (1)	dried as a seasoning	[18]
				NS	BEVliq (1)	for making spirits	[10]
Pastinaca sativa L.	pastinák setý	O	dřenka	root	SUB (1)	NS	[35]
Pimpinella spp.	bedrník	O	bedřinec	leaf	VEG (4)	used raw in salads	[3, 20, 31, 35]
					SEA (4)	NS	[3, 12, 17, 29]
ARACEAE							
Calla palustris L.	ďáblík bahenní	O	divoká kala	rhizome	OTHflo (1)	NS	[20]
Arum maculatum L.	áron plamatý	O	blázivec	rhizome	SUB (2)	boiled	[20, 35]
					OTHflo (2)	ground into flour during famine	[3, 20]
ASPARAGACEAE							
Asparagus officinalis L.	chřest lékařský	N	špargl	leaf	VEG (1)	young leaves used in vegetable dishes	[35]
Polygonum spp.	kokořík	O	ďáblík	NS	BEVliq (1)	for making spirits	[34]
ASPLENIACEAE							
Phyllitis scolopendrium (L.) Newman	jelení jazyk celolistý	O	bylina studnová	leaf	VEG (1)	used in soups	[36]
ASTERACEAE							
Achillea ptarmica L.	řebříček bertrám	O	persán	leaf	SEA (3)	seasoning in soups	[2, 3, 11]

Family and Species	Standard Czech name	Cr. *	Folk name	Parts used †	Use categories ‡ (no. of reports)	Mode of use	References
					VEG (7)	used in vegetable dishes	[2, 3, 17, 18, 25, 31, 36]
Anthemis arvensis L.	rmen rolní	O	hořká tráva	leaf	SEA (1)	NS	[3]
Arctium spp.	lopuch	O	babák, bejlí	root	SUB (1)	vegetable dishes	[3]
Artemisia vulgaris L.	pelyněk černobýl	O	černobýl	stem	SEA (4)	NS	[3, 9, 17, 18]
					BEVliq (2)	for making spirits	[24, 34]
					OTH (1)	vinegar	[2]
		O		leaf	VEG (2)	vegetable dishes	[3, 31]
		O		flower	SEA (3)	NS	[18, 20, 31]
Bellis perennis L.	sedmikráska obecná	O, N	chudobka	leaf	VEG (8)	young leaves used in salads or soups during spring	[2, 3, 10, 13, 17, 27, 31, 35]
				flower	FLO (3)	raw, preserved with sugar	[3, 17, 36]
					BEV (1)	for making syrups	[17]
Carduus acanthoides L.	bodlák obecný	O	chablák, ježatec	leaf	VEG (1)	raw leaves used in salads	[35]
Carlina acaulis L.	pupava bezlodyžná	O	bodláček	flower	FLO (4)	raw receptacles as a children's snack food, vegetable dishes	[12, 27, 26, 31]
Centaurea spp.	chrpa	O	chrpina, modráček	flower	BEV (1)	for making juices, syrups	[2]
					FLO (4)	preserved with sugar, colourings	[1, 3, 34, 36]
					SEA (1)	NS	[22]
Cichorium intybus L.	čekanka obecná	O, N	cikorie, štěrbák	leaf	VEG (4)	young leaves eaten raw or added to soups	[18, 21, 31, 35]
				root	SUB (1)	used raw in salads, preserved into sugar	[35]
					BEVoth (7)	ground into coffee substitutes	[2, 14, 15, 20, 26, 31, 35]
				NS	BEVliq (1)	NS	[34]
Matricaria chamomilla L.	heřmánek pravý	O	voňav rmen	flower	BEVliq (1)	flowers for making spirits	[34]
Onopordum acanthium L.	ostropes trubil	O	kostropes	leaf	VEG (1)	leave buds used in salads	[20]
				flower	VEG (1)	young receptacles used in salads	[20]
				root	SUB (1)	young roots used in salads	[20]
Petasites hybridus (L.) P. Gaertn., B. Mey. & Scherb.	devětsil lékařský	O	podběl	leaf	VEG (1)	used in soups, vegetable dishes	[35]
Picris hieracioides L.	hořčík jestřábníkovitý	O		leaf	VEG (1)	used in soups, vegetable dishes	[35]
Scorzonera hispanica L.	hadí mord španělský	O	černokořen	root	SUB (1)	raw in salads	[20]
					BEVoth (1)	ground into coffee substitutes	[20]
Senecio vulgaris L.	starček obecný	O	buřena, teranka	leaf	VEG (1)	soups, vegetable dishes	[35]
Silybum marianum (L.) Gaertner	ostropestřec mariánský	O	jaterní semínko	flower	SEA (1)	flowers as a seasoning	[20]
Sonchus oleraceus L.	mléč zelinný	O, N	mlíčí	leaf	VEG (2)	raw, soups	[18, 35]
Tanaceum vulgare L.	vratič obecný	O, N	cicvár, kopretina	leaf	SEA (3)	NS	[3, 22, 34]
					BEVliq (1)	substitute for hops in beer brewing	[20]

Family and Species	Standard Czech name	Cr. *	Folk name	Parts used †	Use categories ‡ (no. of reports)	Mode of use	References
Taraxacum sect. *Ruderalia* Kirschner, H. Ollgaard et Štěpánek	pampeliška	O, N	smetánka	leaf	VEG (10)	raw, soups, vegetable dishes	[3, 6, 10, 15, 17, 18, 20, 29, 31, 32]
				flower	OTH (3)	boiled flowers with sugar to make a honey	[10, 17, 18]
					BEV (1)	flowers for making syrups	[18]
					BEVliq (3)	wines	[10, 17, 18]
Tragopogon pratensis L.	kozí brada luční	O	kozibradka	leaf	VEG (1)	NS	[20]
				rhizome	SUB (3)	children's snack food	[26, 31, 35]
BERBERIDACEAE							
Berberis vulgaris L.	dřišťál obecný	O	berberka	leaf	VEG (2)	raw	[17, 35]
				fruit	FRU (6)	children's snack food, jams/jellies	[12, 17, 24, 29, 31, 32]
					BEV (2)	juices	[2, 3]
BETULACEAE							
Betula pendula Roth	bříza bělokorá	O	bříza bradavičnatá	trunk	BEV (3)	sap drunk fresh during spring	[1, 3, 20]
				bark	OTHflo (1)	inner bark ground into flour during famine	[14]
					OTH (1)	vinegar	[36]
				leaf	FLO (1)	leave buds	[35]
Corylus avellana L.	líska obecná	O		fruit	FRU (12)	used raw or added to pastry and confectionary	[2, 6, 13, 16, 18, 19, 24, 27, 29, 31, 32, 36]
					OTHoil (1)	fruits pressed into oil	[31]
					PRE (1)	rennet substitutes	[36]
BORAGINACEAE							
Anchusa officinalis L.	pilát lékařský	O	sláza	leaf	VEG (2)	raw young leaves	[31, 35]
Borago officinalis L.	brutnák lékařský	O, N	bareč	leaf	VEG (2)	used in soups, vegetable dishes, pickles	[12, 18]
Echium vulgare L.	hadinec obecný	O	koňský ocas	leaf	VEG (1)	young leaves in soups	[18]
Pulmonaria officinalis L.	plicník lékařský	O		leaf	VEG (3)	raw, vegetable dishes	[3, 17, 31]
Symphytum officinale L.	kostival lékařský	O	černý kořen	leaf	VEG (2)	vegetable dishes	[3, 35]
				rhizome	SUB (1)	NS	[35]
BRASSICACEAE							
Lepidium spp.	řeřicha	O		leaf	VEG (9)	raw, soups, confectionery (filling doughnuts)	[2, 18, 20, 21, 24, 27, 29, 31, 35]
					SEA (2)		[2, 5]
				tuber	SEA (1)	dried as a seasoning	[18]
Alliaria petiolata (M. Bieb.) Cavara et Grande	česnáček lékařský	O	česnačka	seed	OTHoil (1)	NS	[20]
Barbarea vulgaris W.T. Aiton	barborka obecná	O		leaf	VEG (3)	raw, vegetable dishes	[3, 18, 31]
Bunias spp.	rukevník	O		leaf	VEG (2)	soups, vegetable dishes	[3, 31]

Family and Species	Standard Czech name	Cr. *	Folk name	Parts used †	Use categories ‡ (no. of reports)	Mode of use	References
Capsella bursa-pastoris (L.) Med.	kokoška pastuší tobolka	O	babí kapsa	leaf	VEG (2)	steamed young leaves	[31, 35]
				stem	SEA (1)	NS	[3]
Cardamine pratensis L.	řeřišnice luční	O		leaf	VEG (2)	raw, soups	[3, 35]
Lepidium didymus L.	vranožka podvojná	N		leaf	VEG (2)	raw	[31, 35]
Nasturtium officinale W.T. Aiton	potočnice lékařská	O	černý pepř	leaf	VEG (2)	raw	[20, 31]
Raphanus raphanistrum L.	ředkev ohnice	O	blejskava	leaf	VEG (2)	basal leaves in vegetable dishes	[3, 31]
Sinapis arvensis L.	hořčice polní	O	blejskavice	leaf	VEG (3)	soups, vegetable dishes	[20, 31, 35]
Sisymbrium officinale (L.) Scop.	hulevník lékařský	O	klukovka	leaf	VEG (2)	raw stolons in salads	[31, 35]
CAMPANULACEAE							
Campanula rapunculoides L.	zvonek řepkovitý	O		root	SUB (2)	used raw in salads	[20, 35]
				leaf	VEG (1)	used raw in salads	[20]
Campanula rapunculus L.	zvonek řepka	O	rozponka	root	SUB (1)	NS	[35]
Phyteuma orbiculare L.	zvonečník hlavatý	N	řepka hlavatá	leaf	VEG (1)	used raw in salads	[20]
Phyteuma spicatum L.	zvonečník klasnatý	N	řepka klasnatá	leaf	VEG (1)	used raw in salads	[20]
				root	SUB (2)	used raw in salads	[20, 35]
CANNABACEAE							
Humulus lupulus L.	chmel otáčivý	O		leaf	VEG (1)	stolons used in soups, egg dishes	[17]
CARYOPHYLLACEAE							
Silene vulgaris (Moench) Garcke	silenka nadmutá	O	běhen	leaf	VEG (1)	used in soups, vegetable dishes	[35]
Stellaria spp.	ptačinec	O	hadí pusa	leaf	VEG (1)	raw	[35]
CORNACEAE							
Cornus mas L.	dřín jarní	O	dřínové jahůdky	fruit	FRU (4)	raw, jams/jellies	[3, 17, 29, 31]
					BEV (1)	juices	[17]
					BEVliq (9)	wines, spirits	[17]
Cornus sanguinea L.	svída krvavá	O	krvavý prut	fruit	FRU (1)	NS	[3]
CRASSULACEAE							
Hylotelephium maximum (L.) Holub	rozchodník velký	O	kozí zelí	leaf	VEG (1)	raw in salads	[20]
Sedum album L.	rozchodník bílý	O	bělorozchodník	leaf	VEG (1)	raw in salads	[35]
Sedum reflexum L.	rozchodník skalní	O	panetřesk	leaf	VEG (1)	soups	[20]
Sedum spp.	rozchodník			leaf	VEG (1)	raw in salads	[31]
Sempervivum tectorum L.	netřesk střešní	N	netřesk zední	leaf	VEG (1)	raw in salads	[17]
					BEV (1)	for making juices	[17]
CUCURBITACEAE							
Bryonia dioica Jacq.	posed dvoudomý	O	diblík, osech	root	SUB (1)	NS	[35]
CUPRESSACEAE							
Juniperus communis L.	jalovec obecný	O	boleráz, břín	branch	PRE (3)	fruiting leafy branches to preserve meat	[1, 3, 36]

Family and Species	Standard Czech name	Cr. *	Folk name	Parts used †	Use categories ‡ (no. of reports)	Mode of use	References
				fruit	SEA (24)	seasoning (mostly game)	[1, 2, 3, 4, 5, 6, 9, 10, 11, 13, 17, 18, 20, 21, 22, 24, 27, 28, 29, 30, 31, 33, 34, 36]
					BEVliq (6)	spirits	[2, 17, 20, 24, 29, 34]
CYPERACEAE							
Carex spp.	ostřice	O	psárka, tuřice	stem	VEG (1)	stalks as a children's snack food	[26]
Cyperus esculentus L.	šáchor jedlý	O	galgán planý	tuber	SUB (1)	used raw, fried or baked	[35]
DENNSTAEDTIACEAE							
Pteridium aquilinum (L.) Kuhn	hasivka orličí	O	hasina	rhizome	OTHflo (3)	ground into flour during famine	[3, 14, 35]
ERICACEAE							
Vaccinium myrtillus L.	brusnice borůvka	O	černá jahoda	leaf	SEA (1)	seasoning in soups during spring	[18]
				fruit	FRU (22)	fruits, raw as a children's snack food, soups, jams/jellies	[2, 3, 6, 7, 9, 10, 13, 14, 15, 17, 18, 19, 20, 24, 25, 26, 28, 29, 30, 31, 32, 36]
					BEV (4)	juices	[2, 6, 31, 32]
					BEVliq (3)	wines and spirits	[15, 18, 24]
Vaccinium oxycoccos L.	klikva bahenní	N	klikva žoravina	fruit	FRU (2)	for making chutneys	[17, 20]
Vaccinium uliginosum L.	vlochyně bahenní	O	bažinná borůvka	fruit	FRU (2)	NS	[20, 31]
Vaccinium vitis-idaea L.	brusnice brusinka	O	červená borůvka	fruit	FRU (24)	for making fruit soups, jams/jellies	[3, 4, 5, 6, 7, 9, 10, 11, 13, 17, 18, 19, 20, 21, 24, 25, 27, 28, 29, 30, 31, 32, 33, 36]
					BEV (1)	juices	[2]
					BEVliq (1)	spirits	[24]
FABACEAE							
Astragalus glycyphyllos L.	kozinec sladkolistý	O	dřezovec	seed	BEVoth (1)	ground into coffee substitutes	[14]
Lathyrus tuberosus L.	hrachor hlíznatý	O	halucha, ořeší	tuber	SUB (3)	children´s snack food	[26, 31, 35]
Lathyrus vernus (L.) Bernh.	hrachor jarní	O	hrachor lecha	tuber	SUB (1)	children´s snack food	[35]
Medicago sativa L.	tolice setá	N	vojtěška	leaf	VEG (1)	used in soups and vegetable dishes	[35]
Robinia pseudoacacia L.	trnovník akát	O	akát	flower	FLO (1)	fried flowers	[18]
Trifolium spp.	jetel	O	čudlek, dětel	flower	FLO (3)	boiled or fried; children's snack food	[24, 31, 35]
					BEVliq (1)	for making spirits	[24]
					OTHflo (3)	ground into flour during famine	[3, 14, 35]
Vicia sativa L.	vikev setá	O		leaf	VEG (1)	soups	[3]
					SEA (1)	NS	[3]
				NS	BEVoth (1)	ground into coffee substitutes	[14]

Family and Species	Standard Czech name	Cr. *	Folk name	Parts used †	Use categories ‡ (no. of reports)	Mode of use	References
FAGACEAE							
Fagus sylvatica L.	buk lesní	O	bučina	flower	FLO (1)	flower buds	[35]
				fruit	FRU (2)	fruits (beechnuts) raw or dried	[20, 31]
					OTHoil (4)	pressed into oil	[3, 20, 26, 31]
Quercus robur L.	dub letní	O	doubí	leaf	BEVliq (1)	spirits	[34]
				flower	OTHflo (1)	flower buds ground into flour during famine	[35]
				fruit	BEVoth (6)	ground into coffee or cacao substitutes	[2, 14, 20, 26, 31, 35]
					OTHoil (1)	pressed into oil	[3]
					OTHflo (4)	fruits (acorns) ground into flour during famine	[3, 14, 31, 35]
					PRE (1)	rennet substitutes	[36]
GENTIANACEAE							
Gentiana lutea L.	hořec žlutý	N	encián	NS	SEA (1)	NS	[3]
GROSSULARIACEAE							
Ribes uva-crispa L.	srstka angrešt	O		fruit	FRU (1)	raw in meat dishes	[31]
HYPERICACEAE							
Hypericum spp.	třezalka	O	zděšník	fruit	OTH (1)	boilled with sugar to make a honey	[10]
LAMIACEAE							
Glechoma hederacea L.	popenec obecný openec	O, N	kundrlátek,	leaf	VEG (19)	soups, vegetable dishes, egg dishes	[2, 3, 5, 6, 10, 13, 17, 18, 20, 21, 25, 27, 30, 31, 32, 33, 35, 36, 37]
Lamium spp.	hluchavka	O	cucáček	flower	SEA (1)	flowers as a seasoning	[3]
Mentha pulegium L.	polej obecná	O	bleší máta	NS	SEA (1)	NS	[3]
Mentha spp.	máta	N	balšán	leaf	SEA (1)	NS	[3]
Origanum vulgare L.	dobromysl obecná	O	oregáno	flower	BEVliq (1)	substitute for hops in beer brewing	[20]
Prunella vulgaris L.	černohlávek obecný	O	černohlávka	NS	VEG (1)	used in soups and vegetable dishes	[35]
Salvia pratensis L	šalvěj luční	O	babí bruch	leaf	BEVliq (2)	substitute for hops in beer brewing or for making spirits	[20, 34]
Thymus spp.	mateřídouška	O	démut	stem	SEA (7)	dried flowering shoots as a seasoning	[2, 3, 11, 17, 30, 31, 36]
					BEVliq (1)	added into spirits as flavor	[10]
LYTHRACEAE							
Trapa natans L.	kotvice plovoucí	O	vodní ořech	fruit	FRU (5)	raw	[3, 20, 31, 35, 36]
					OTHflo (2)	fruits ground into flour	[20, 31]
MALVACEAE							
Althaea officinalis L.	proskurník lékařský	O		leaf	VEG (1)	used in soups and vegetable dishes	[35]

Family and Species	Standard Czech name	Cr. *	Folk name	Parts used †	Use categories ‡ (no. of reports)	Mode of use	References
Malva alcea L.	sléz velkokvětý	O	sléz léčivý	leaf	VEG (1)	soups and vegetable dishes	[35]
Malva neglecta Wallr.	sléz přehlížený	N	bochníčky	fruit	FRU (4)	immature fruits raw as a children's snack food	[12, 26, 31, 35]
Malva spp.	sléz	O		NS	SEA (2)	NS	[3, 36]
Malva sylvestris L.	sléz lesní	O	boží koláčky	leaf	VEG (1)	soups and vegetable dishes	[35]
Tilia spp.	lípa	O		NS	BEVliq (2)	spirits	[10, 34]
				flower	FLO (1)	boiled flower buds	[35]
				fruit	FRU (1)	fruits as a children's snack food	[26]
ONAGRACEAE							
Epilobium angustifolium L.	vrbka úzkolistá	O	chmýří, pejří	root	SUB (1)	soups	[3]
Oenothera biennis L.	pupalka dvouletá	O	noční hvězda	root	SUB (4)	first year root eaten raw as a children's snack food	[12, 20, 31, 35]
ORCHIDACEAE							
Dactylorhiza majalis (Rchb.) P. F. Hunt et Summerh.	prstnatec májový	N	vstavač širolistý	tuber	SUB (1)	formerly used as food	[35]
Orchis spp.	vstavač	O	divoká orchidej	tuber	SUB (1)	formerly used as food	[35]
OXALIDACEAE							
Oxalis acetosella L.	šťavel kyselý	O	zaječí jetel	leaf	VEG (3)	raw, vegetable dishes, children's snack food	[3, 26, 31]
PAPAVERACEAE							
Papaver rhoeas L.	mák vlčí	O	ohníček	NS	BEVliq (1)	spirits	[34]
PLANTAGINACEAE							
Plantago spp.	jitrocel	O	babí ucho	leaf	VEG (2)	fried or used in salads, soups	[3, 17]
					SEA (1)	NS	[17]
					BEVliq (6)	spirits	[34]
POACEAE							
Digitaria sanguinalis (L.) Scop.	rosička krvavá	O	proso krvavé	seed	OTHflo (2)	ground into flour	[3, 35]
Echinochloa crus-galli (L.) P. B.	ježatka kuří noha	O	bér planý	seed	OTHflo (1)	ground into flour	[35]
Elymus repens (L.) Gould	pýr plazivý	O, N	pejř	rhizome	OTHflo (4)	ground into flour during famine	[3, 14, 26, 35]
Glyceria fluitans (L.) R. Br.	zblochan vzplývavý	O	vrabčí proso	seed	OTHflo (2)	ground into flour	[3, 35]
Milium effusum L.	pšeníčko rozkladité	O	prosíčko	seed	OTHflo (1)	ground into flour	[35]
Setaria viridis (L.) P. B. subsp. Viridis	bér zelený pravý	O	bár	seed	OTHflo (1)	ground into flour	[35]
POLYGONACEAE							
Bistorta officinalis Delarbre	rdesno hadí kořen	O	beraní ocas	leaf	VEG (2)	raw young leaves used in salads	[18, 20]
Fallopia convolvulus (L.) Á. Löve	opletka obecná	O	hruštička	seed	OTHflo (1)	ground into flour during famine	[3]
Persicaria spp.	rdesno	O	hořčák	seed	OTHflo (8)	ground into flour during famine	[3]
Rumex acetosa L.	šťovík kyselý	O, N	kyselanda	leaf	VEG (2)	used raw in salads, soups and vegetable dishes	[17, 20]

Family and Species	Standard Czech name	Cr. *	Folk name	Parts used †	Use categories ‡ (no. of reports)	Mode of use	References
Rumex aquaticus L.	šťovík vodní	O	sladký list	leaf	VEG (1)	raw in salads	[20]
Rumex crispus L.	šťovík kadeřavý	O	sladké listí	leaf	VEG (1)	raw in salads	[20]
Rumex spp.	šťovík	O		stem	VEG (2)	leafy stems chewed by children and shepherds against thirst	[23, 26]
				leaf	VEG (14)	used raw, in soups, vegetable dishes, egg dishes	[2, 3, 9, 10, 15, 18, 27, 28, 29, 30, 31, 32, 35, 36]
					BEV (3)	syrup	[1, 3, 36]
					BEVliq (2)	spirits	[10, 34]
					PRE (1)	rennet substitutes	[31]
				seed	OTHflo (1)	seeds ground into flour during famine	[35]
POLYPODIACEAE							
Polypodium vulgare L.	osladič obecný	O		rhizome	SUB (1)	raw as a children's snack food	[31]
PORTULACACEAE							
Montia fontana L.	zdrojovka potoční	O	kozlík červený	NS	VEG (2)	raw in salads	[31, 35]
Portulaca oleracea L.	šrucha zelná	O, N	kuří noha, portulák	leaf	VEG (5)	used in vegetable dishes	[3, 15, 20, 29, 35, 15]
					SEA (1)	NS	[29]
PRIMULACEAE							
Cyclamen purpurascens Mill.	brambořík nachový	O	brambořík evropský	tuber	SUB (1)	boiled	[20]
Primula veris L.	prvosenka jarní	N	petrklíč	flower	BEV (2)	for making syrups	[3, 36]
ROSACEAE							
Aronia melanocarpa (Michx.) Elliott	temnoplodec černoplodý	N	aronie černá	fruit	FRU (1)	for making jams/jellies	[12]
					BEVliq (1)	NS	[25]
Alchemilla vulgaris L.	kontryhel ostrolaločný	O	alchemilka	NS	SEA (1)	NS	[3]
Crataegus spp.	hloh	O	hlohoží	flower	BEVliq (1)	spirits	[10]
				fruit	FRU (1)	raw	[3]
					BEVliq (3)	spirits	[34]
Fragaria vesca L.	jahodník obecný	O	jahodníček	leaf	SEA (8)	seasoning in soups during spring	[6, 10, 15, 18, 25, 27, 31, 35]
					PRE (1)	rennet substitutes	[36]
				fruit	BEVliq (2)	spirits	[17, 24]
					BEV (1)	syrups	[17]
					FRU (10)	eaten raw as a children's snack food, jams/jellies	[5, 6, 9, 10, 17, 18, 24, 26, 31, 32]
Geum urbanum L.	kuklík městský	O	kuklice	rhizome	SEA (1)	dried as a seasoning	[17]
					BEVliq (2)	added to beers	[17, 20]
Potentilla anserina L.	mochna husí	O	husí kvítko	rhizome	SUB (1)	NS	[3]
Prunus spinosa L.	trnka obecná	O	slivoň	fruit	FRU (6)	eating raw after frosts, children's snack food, used in fruit soups	[9, 10, 17, 26, 31, 36]

Family and Species	Standard Czech name	Cr. *	Folk name	Parts used †	Use categories ‡ (no. of reports)	Mode of use	References
					BEVliq (3)	for making wines, spirits	[17, 24, 31]
					OTH (5)	vinegar	[2, 3, 22, 34, 36]
				seed	OTHoil (1)	oil from seeds	[31]
Rosa canina L.	růže šípková	O	merhelec	fruit	FRU (25)	fruits for making soups, chutneys, jams/jellies, preserved with sugar	21, 5, 6, 4, 18, 11, 31, 30, 29, 32, 1, 3, 35, 36, 14, 22, 19, 9, 28, 15, 24, 13, 27, 10, 17
					BEV (1)	NS	[17]
					BEVliq (9)	for making wines and spirits	[10, 14, 15, 17, 18, 24, 25, 31, 34]
				seed	BEVoth (3)	ground into coffee substitutes	[14, 31, 35]
Rubus caesius L.	ostružiník ježiník	O		fruit	FRU (14)	eaten raw as a children's snack, for making jams/jellies	[3, 6, 10, 12, 13, 17, 20, 22, 24, 26, 29, 31, 32, 34]
					BEV (3)	juices	[24, 29, 32]
					BEVliq (4)	wines	[10, 20 24, 31]
Rubus chamaemorus L.	ostružiník moruška	O	moruška krkonošská	fruit	FRU (1)	NS	[3]
Rubus idaeus L.	ostružiník maliník	O	malina	fruit	FRU (27)	fruits, eaten raw, for making soups	[1, 2, 3, 4, 5, 6, 9, 10, 12, 13, 15, 17, 18, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 34, 36]
					BEV (16)	juices	[2, 3, 4, 10, 14, 17, 20, 21, 24, 25, 27, 28, 29, 31, 32, 36]
					BEVliq (6)	wines and spirits	[2, 10, 17, 24, 28, 36]
					OTH (3)	vinegar	[2, 24, 28]
Rubus nemorosus Hayne et Willd.	ostružiník hajní	O		fruit	FRU (1)	NS	[20]
Sanguisorba officinalis L.	krvavec toten	O	krvavec	leaf	VEG (3)	used raw in salads	[20, 31, 35]
Sorbus spp.	jeřáb	O, N		fruit	FRU (8)	eaten raw, children´s snack food, making jams/jellies	[6, 17, 18, 24, 25, 30, 31, 32]
					BEV (1)	juices	[17]
					BEVliq (5)	wines and spirits	[10, 15, 17, 24, 31]
RUBIACEAE							
Galium odoratum (L.) Scop.	svízel vonný	N	mařinka vonná	stem	BEV (1)	NS	[17]
Galium verum L.	svízel syřišťový	O	mařena	leaf	PRE (1)	rennet substitutes	[20]
SALICACEAE							
Populus spp.	topol	O		leaf	FLO (1)	leave buds	[35]
Salix spp.	vrba	O		bark	OTH (1)	vinegar	[36]
SAPINDACEAE							
Acer pseudoplatanus L.	javor klen	O	klenka	trunk	BEV (1)	sap drunk fresh during spring	[20]
Acer platanoides L.	javor mléč	O	mléč	trunk	BEV (1)	sap drunk fresh during spring	[20]
Acer spp.	javor	O		trunk	BEV (1)	sap drunk fresh during spring	[3]
Aesculus hippocastanum L.	jírovec maďal	O	koňský kaštan	fruit	OTHflo (2)	dried fruits ground into flour	[14, 35]

Family and Species	Standard Czech name	Cr. *	Folk name	Parts used †	Use categories ‡ (no. of reports)	Mode of use	References
SCROPHULARIACEAE							
Verbascum spp.	divizna	O	babí knot	NS	BEVliq (2)	spirits	[10, 34]
Veronica beccabunga L.	rozrazil potoční	O	potočník	leaf	VEG (3)	used raw in salads, vegetable dishes	[3, 18, 31]
					BEVliq (1)	spirits	[34]
SOLANACEAE							
Physalis alkekengi L.	mochyně židovská	O	židovská třešeň	fruit	FRU (1)	NS	[3]
Solanum dulcamara L.	lilek potměchuť	O		fruit	FRU (1)	NS	[3]
TYPHACEAE							
Typha latifolia L.	orobinec širokolistý	O	cigára	inflorescence	OTHflo (1)	narrow spikes ground into flour during famine	[3]
ULMACEAE							
Ulmus glabra Huds.	jilm drsný	O	jímel	leaf	VEG (1)	NS	[35]
URTICACEAE							
Urtica dioica L.	kopřiva dvoudomá	O, N	žihavka	leaf	VEG (20)	young steamed leaves used in soups, vegetable dishes, egg dishes	[3, 5, 6, 8, 10, 13, 14, 17, 18, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 37]
					BEVliq (2)	spirits	[10, 34]
					OTHflo (1)	added to bread during famine	[14]
					PRE (2)	rennet substitutes	[28, 31]
VALERIANACEAE							
Valerianella locusta (L.) Betcke	kozlíček polníček	O, N	jarní salát	leaf	VEG (8)	raw used in salads, soups and vegetable dishes	[3, 17, 20, 27, 29, 30, 31, 35]
				NS	OTHflo (1)	ground into flour during famine	[35]
Valeriana officinalis L.	kozlík lékařský	N	baldrián	NS	SEA (1)	NS	[3]
VIOLACEAE							
Viola spp.	violka	O		leaf	SEA (13)	seasoning in soups during spring	[2, 3, 6, 10, 15, 17, 18, 25, 27, 30, 31, 32, 35]
				rhizome	SEA (2)	NS	[22, 36]
					BEVliq (1)	wines	[2]
				flower	BEV (6)	flowers for making syrups	[1, 2, 3, 24, 34, 36]
					FLO (5)	colourings, preserved with sugar	[2, 3, 22, 34, 36]
					OTH (1)	vinegar	[2]

† NS – non specified

* Botanical name identified using: O – obvious common name universally used in a large area; N – identified using comparative analysis of folk names.

‡ Used categories: VEG – green vegetable and edible weeds (aerial parts raw, boiled or fried); FRU – fruits (raw or in preserves); SUB – subterranean parts (rhizomes, roots, bulbs and tubers) as a snack or added to boiled dishes; SEA – seasoning; FLO – flowers (their nectar used as a snack or flowers added to dishes in larger quantities); BEV – non-alcoholic beverages; BEVliq – alcoholic beverages; BEVoth – other beverages (coffee and cacao substitutes); PRE – preservatives including rennet substitutes; OTHoil – oils; OTHflo – flours; OTH – other uses