

Provided for non-commercial research and education use.
Not for reproduction, distribution or commercial use.



This article appeared in a journal published by Elsevier. The attached copy is furnished to the author for internal non-commercial research and education use, including for instruction at the authors institution and sharing with colleagues.

Other uses, including reproduction and distribution, or selling or licensing copies, or posting to personal, institutional or third party websites are prohibited.

In most cases authors are permitted to post their version of the article (e.g. in Word or Tex form) to their personal website or institutional repository. Authors requiring further information regarding Elsevier's archiving and manuscript policies are encouraged to visit:

<http://www.elsevier.com/copyright>



Contents lists available at ScienceDirect

Journal of Ethnopharmacology

journal homepage: www.elsevier.com/locate/jethpharm

Changes in the utilization of wild green vegetables in Poland since the 19th century: A comparison of four ethnobotanical surveys

Łukasz Łuczaj*

Academy of Humanities and Economics in Łódź, Department of Humanities, ul. Rewolucji 1905 r, nr 64, 90-222 Łódź, Poland

ARTICLE INFO

Article history:

Received 9 October 2009
 Received in revised form 17 January 2010
 Accepted 17 January 2010
 Available online 25 January 2010

Keywords:

Wild food plants
 Wild edible plants
 Historical ethnobotany
 Leaves in nutrition

ABSTRACT

Aims of study: The aim of this paper is to compare the presence of wild green vegetables in four ethnobotanical questionnaires. This range of surveys offers a rich diachronic perspective, possibly unique in ethnobotany.

Materials and methods: Four archival questionnaires (by other researchers), whose results have been only partly published, were analyzed. They are Rostafiński's questionnaire of 1883–1909, the Gajek team's questionnaires of 1948–1949 and 1964–1969, and Stoličná and Kłodnicki's questionnaire of 2000–2003. **Results:** Green shoots or leaves of at least 58 species (belonging to 43 genera) of wild plants have been used as green vegetables or culinary herbs for nutritional purposes since the 19th century. The disappearance of wild green vegetables from the Polish diet was a gradual process, in which the sequence of disappearance of the species from diet was as follows: (1) *Aegopodium* & *Heracleum*, (2) *Cirsium*, *Sinapis* & *Raphanus*, (3) *Urtica*, (4) *Chenopodium*, (5) *Oxalis*, (6) *Rumex*. In Poland, within the studied time scale, there was no tradition of incorporating more than a few species of wild greens in one dish. Local people usually utilized a small number of taxa, but in large quantities, resorting to some other available species only in times of famine.

Conclusions: The relatively low number of wild green vegetables utilized has gradually decreased to practically none, mainly due to replacement by a few cultivated vegetables. This process must have started well before the 19th century, but became most dramatic throughout the 20th century.

© 2010 Elsevier Ireland Ltd. All rights reserved.

1. Introduction

Extensive ethnobotanical research on wild food plants has been carried out for a few decades in several European countries, mainly in the Mediterranean. In some regions of southern Europe the use of numerous species of wild leafy vegetables and wild culinary herbs has survived in rural areas, whether in green soups, omelettes, pastries, or fried and eaten on bread. These species are perceived as important and healthy food (Picchi and Pieroni, 2005; Pieroni et al., 2005; Leonti et al., 2006; Rivera et al., 2006). In eastern Asia leafy vegetables hold a similarly high health status (Pemberton and Lee, 1996; Price, 2006).

According to modern nutritional studies the consumption of leafy vegetables brings numerous health benefits, and their everyday consumption in diet is highly recommended (Block, 1991). Leafy vegetables are a source of vitamin C, folic acid, antioxidants, carotenoids and many other valuable chemicals (e.g. Hasler, 2002; Ogle et al., 2001; Pieroni et al., 2002; Tapsell et al., 2006). Wild leafy vegetables may be a particularly rich source of these compounds

and are more likely to be free of agricultural pollutants. Some of the particular leafy vegetable uses in rural areas of Europe are still little known in terms of their chemical content and effects on health.

Older ethnographic literature also abounds in notes on the use of the green parts of plants of certain species in times of famine, which has occurred in most European countries throughout the century (Maurizio, 1927). However, a low cultural significance of wild greens can be observed in some cultures. Poland is a good example of this, and was recently classified by the author of this article as an *aherbous* or even *herbophobic* nation, i.e. a culinary culture suspicious of the green parts of wild plants, using them mainly in times of food scarcity (Łuczaj, 2008a,b). The first person to observe the relatively low cultural value of both wild greens and wild starch-containing plants in Poland and western Ukraine was the Polish ethnographer Moszyński (1962), who attributed this to the high dependency of local populations on agriculture, and to good farming conditions, which decreased the frequency of famine (compared to other countries), thereby reducing their knowledge of wild plants to just a few of the most common taxa, e.g. *Urtica* or *Chenopodium*. In the same publication he pointed out a high level of importance of wild greens to the fishermen of Herzegovina, which was exceptional amongst Slavs. He quoted Čurčić

* Tel.: +48 602497483.

E-mail addresses: lukasz.luczaj@interia.pl, zielna@luczaj.com.

Table 1
Characteristics of studied questionnaires.

Title (creation year) [English translation]	Odezwa do nie-botaników o zbieranie ludowych nazw roślin (1883) [An appeal to non-botanists to collect folk plant names]	Polski Atlas Etnograficzny. Kwestionariusz nr 1, K. nr 2 (1948) [Polish Ethnographic Atlas. Questionnaire no. 1 and 2]	Polski Atlas Etnograficzny. Kwestionariusz nr 6 "Kultura materialna" (1964) [Polish Ethnographic Atlas. Questionnaire no. 6 "Material culture"]	Tradycyjne pożywienie ludowe (1998) [Traditional folk food]
Author of the questionnaire	Józef Rostański	Józef Gajek	Józef Gajek	Rastislava Stoličná and Zygmunt Kłodnicki 2000–2003
Dates when data was collected	1883–1909 (mainly 1883)	1948–1949	1964–1969	
Frame of reference	The whole 19th century	End of the 19th century and the first half of the 20th century	End of the 19th century and the first half of the 20th century	Second half of the 20th century
Results published in:	Łuczaj (2008c)	Partly Łuczaj (2008b) (around half the set) and PAE maps	Unpublished apart from a short article by Bohdanowicz (1996) and PAE maps	Jędrusik (2004)
Geographic range	Southern, central and western Poland, and not included in this study 31 letters from western Ukraine and western Belarus	Whole Poland, southern and eastern Poland best represented	Whole Poland	Whole Poland
Sampling method	Haphazard	Haphazard	Systematic	Haphazard-systematic
Number of localities	101	193	333	82

(1913), who reported that he had not seen any other country where so many wild plants are used in nutrition. Moszyński emphasized that the list Čurčić made is exclusively composed of species (nearly thirty) whose young shoots are boiled, salted, greased and eaten with bread.

Wild greens have also been reported to have a low cultural value in extremely different socioeconomic and geographic circumstances, for example in Amazonia (Dufour and Wilson, 1994). A member of the Amazonian Pirahã tribe responded: "Pirahã do not eat leaves" on seeing the anthropologist eating lettuce (Everett, 2008).

It is certain that attitudes towards greens have changed over time, they must have been more important in times of food scarcity. However, due to the difference in the quality of older, accidental data and newer quantitative results it is difficult to compare changes that have taken place in the use patterns of wild plants over the last couple of centuries, in any particularly defined region (De Natale et al., 2009). Various approaches involving the use of diachronic data in ethnopharmacology, with some examples, were outlined by Heinrich et al. (2006). One of these examples was a comparative study of the traditional medicinal knowledge of the Ch'orti' Maya of Eastern Guatemala, in which an unpublished MS thesis from the 1930s was compared with modern ethnobotanical data in the same ethnic group (Kufer et al., 2005). Poland seems to be one of the very few places, in which a similar diachronic semi-quantitative comparison stretching over a longer period of time is possible, due to the existence of a few sets of ethnobotanical surveys, which cover a large part of the country. These four surveys were carried out in 1883–1909, 1948–1949, 1964–1969 and 2000–2003.

The aim of this paper is to compare these datasets in order to study the changes in the use of wild green vegetables and culinary herbs in Poland from the 19th century up until the present time, in order to check if the rejection of green vegetables is a new phenomenon or one, which started earlier.

2. Materials and methods

2.1. Presentation of surveys

Data on the use of wild greens within the present (post-World War II) territory of Poland were compared using data from four

ethnobotanical surveys between 1883 and 2004 (Table 1). Their characteristics are presented below.

2.1.1. Rostański's survey of 1883

The oldest survey was initiated by professor Józef Rostański (1850–1928), a botanist from Kraków (Jagiellonian University) who composed a 70 question questionnaire concerning all aspects of ethnobotany (traditional cultivated and wild foods, medicine, rituals, dyes, etc.). The survey was called "Odezwa do nie botaników o zbieranie ludowych nazw roślin", which translates as "An appeal to non-botanists to collect folk plant names". It included several questions concerning the use of food plants, a few of these (questions no. 23–35) in the third section of the questionnaire called *Zieleniny*, i.e. "green vegetables", referring to the green parts of plants (Köhler, 1986, 1993). The data concerning wild food plants were briefly characterized by Łuczaj (2008c). Rostański received a few hundred responses, which have been partly preserved up to the present. One hundred and twenty-one of these replies were discovered a few decades ago (Köhler, 1993). The available letters come from years 1883 to 1909 (mainly 1883–1884), from southern, western and central Poland, as well as from the present territory of Ukraine and Belarus. In this study only letters from Polish territories were included to make sure that all the compared questionnaires concerned a similar study area. The letters are stored in the museum of the Botanic Garden of the Jagiellonian University in Cracow. Another set of letters was recently discovered but they are not accessible as they are undergoing initial historical examination (Köhler, pers. commun.).

The survey was published in numerous Polish newspapers and magazines in 1883 and 1884 (according to Köhler (1993) at least in 60 issues), in all the countries occupying Poland at that time, i.e. Russia, Austria and Prussia. The respondents were people of various professions. Some of them were professional botanists or apothecaries, using Latin names of plants with expertise. A large proportion of letters came from landowners, who described which plants were used by 'their' peasant. Another group of respondents were students and school teachers. In several cases an exchange of letters developed between Rostański and his respondents, for instance when Rostański was not sure of the identification of a species and requested a herbarium specimen. A few such specimens can be found among the correspondence.

Question 23 of the survey was: “Do local people gather herbs in spring to be used in soups, particularly in famine years, and these herbs are?”. This is followed by questions 24–33 where he asks if people know the names of particular plants. These seem like continuations of question 23 as most of the listed plants are green vegetables: *Urtica* (as *pokrzywa*, *żegawka*) and *Glechoma* (as *kurdybanek*, *bluszcz*) – no. 25, *Rumex* (as *szczaw*, *zajęcza kapusta*) – no. 26, *Heracleum* (as *barszcz* “plant” – to differentiate from the soup called *barszcz*) – no. 27 and *Aegopodium podagraria* L. (as *gir*, *girz* in no. 28, and *śnitka* in no. 32). In the responses to these names people usually reported not only local names but also the way these species were eaten. Question 34 was: “Salads and herbs eaten raw, which [plants]?”

2.1.2. Gajek's questionnaires of 1948

Professor Józef Gajek (1907–1987) was an ethnographer who led the team of the Polish Ethnographic Atlas (PAE). The Atlas encompassed all aspects of folk culture but the first questionnaires, used in 1948–1949, concerned ethnobotany. Two kinds of questionnaire were used: one was a table for a freelist of local names and parts of plants used in nutrition, the other was a booklet where more detailed information on each species could be given, with space for a herbarium specimen to be attached. Copies of both questionnaires were distributed among members of the Polish Folklore Society (PTL) and people who cooperated with it (including some youth organizations). Village teachers and educated farmers formed the dominant group among respondents. They predominantly wrote about places in which they had spent most of their life, and often supplied lists of their informants with birth dates going back to the mid-19th century. Some respondents returned both Q1 and Q2, and some only Q1 or only Q2, so the depth of information concerning particular places varies, but in all cases it is based on freelists and the questions do not mention any particular species. Recently a detailed description of this study was published, based on the material from 95 localities (Łuczaj, 2008b). However, last year another set of forgotten questionnaires from 98 localities was found and the data contained were included in this study as well. The study encompassed all major regions of Poland. Most of the questionnaires belong to the Polish Folklore Society (PTL) and are stored in the University of Silesia in Cieszyn. A small subset is stored in the archive of the Ethnology Department of the Jagiellonian University in Cracow.

2.1.3. Gajek's questionnaire of 1964–1969

Further studies of PAE were confined to a grid of over 330 villages throughout the country (the distance between studied villages was usually about 30–40 km). Questions about the use of wild edible greens were included in Questionnaire Six. However, the questionnaire was very long (over a hundred pages), as it included various aspects of material culture. This meant that the answers were short and not deep. Data was collected by a small group of young ethnographers. Each of them traveled individually from one grid point to another. Answers may have been biased by the fact that, apart from a general question about the use of wild greens, it suggested the names of a few most commonly used taxa (i.e. *Rumex* and *Chenopodium*) or rarely used taxa, which ethnographers wanted to collect information about (*Aegopodium*, *Heracleum*, *Polygonum*) (Kłodnicki and Drożdż, 2008). The questionnaires belong to the Polish Folklore Society and are stored in the University of Silesia in Cieszyn. Maps showing distribution of the use of a few of the wild greens (*Chenopodium*, *Oxalis* and thistles) based on the studies from 1948 to 1949 and 1964 to 1969 were prepared by the late professor Janusz Bohdanowicz (1933–1998) for the 7th volume of PAE, but they still remain as manuscripts stored in the University of Silesia in Cieszyn.

2.1.4. Stoličná and Kłodnicki's questionnaire

Between 2000 and 2003 a questionnaire designed in 1998 by Prof. Rastislava Stoličná and supplemented by Prof. Zygmunt Kłodnicki (both from the University of Silesia in Cieszyn), which covered various aspects of food customs, was used to gather data in a few dozen villages across Poland, mainly in villages studied previously in the 1960s. One of the co-authors of the questionnaire (Kłodnicki, the present Head of the Polish Ethnographic Atlas team) actually was a part of the group, which gathered data from 1964 to 1969. The 21st century data were collected mainly by anthropology students during training camps. The questionnaire, like its predecessor in 1964, contained a question about the use of wild greens with similar taxa mentioned as examples. A large proportion of these questionnaires (data from 82 localities) was analyzed in a MA thesis from the University of Silesia (Jędrusik, 2004), and this set of data was used for comparison with the older questionnaires. In contrast to earlier studies, Jędrusik included only the part of data, which reported the present use of plants (she did not take into account extinct use). The questionnaires and the thesis are stored in the University of Silesia in Cieszyn.

2.2. Data analysis

All records of using leaves, immature green fruits or stalks of plants for nutrition were included, apart from use for herbal teas. In the analysis incidences of using horsetail strobils as children's snacks were also included, but the gathering of pine shoots for use as cough syrup was not taken into account. Flora Europaea nomenclature was used (Tutin et al., 1964–1980).

Occurrence of particular species was compared for the four studied sets of data. In quantitative analyses of Rostafiński's questionnaire, letters from each person was treated as one locality (sometimes a few villages were mentioned in one letter). In other studies each locality was represented by one village.

In order to quantify the temporal change in plant use the mean number of taxa used per locality for each of four studies was calculated, as well as the Pearson correlation coefficient between the percentage of localities where it was used and the year of study.

It must be borne in mind that the quantitative results must be taken with some caution as the sets of data differ in a few aspects: the kind of people who collected them and the kind of questions used. The study from 1883 to 1884 was done partly by people with a very good knowledge of plants and the Latin names given there are usually correct and highly reliable. The study from 1948 to 1949 was done both by people with no botanical knowledge and some ethnographers with deep botanical interests. Fortunately, it is very richly documented by herbarium specimens, which allow for the identification of most local names. Most of the studies of 1964–1969 and 2000–2003 were done by young ethnographers and students with a varying degree of botanical knowledge, without documenting herbarium specimens. Thus the reliability of these archives can be ordered as follows: 1948 > 1883 > 1960s and 2000s. Another issue is the way the questions were formulated. The study of 1948–1949 was a pure freelist of wild food plants used, whereas the remaining studies contained a separate question concerning the use of wild greens for soups or salads, with additional questions about a few species. In order to estimate the effect of pre-suggesting certain species in the 1883 and 1960s questionnaires, the following procedure was performed (the recent questionnaire was not taken into account due to null values for most species). For the eleven most commonly recorded species the percentage of localities where each species was used was calculated separately for the 1883, 1948 and 1960s studies (variables called S_{1883} , S_{1948} and S_{1964}). Then the shift between 1883 and 1948 (D_1), and between 1948 and the 1960s (D_2) was calculated for each of the species ($D_1 = S_{1948} - S_{1883}$ and $D_2 = S_{1964} - S_{1948}$). The difference in mean D_1 and D_2 for the

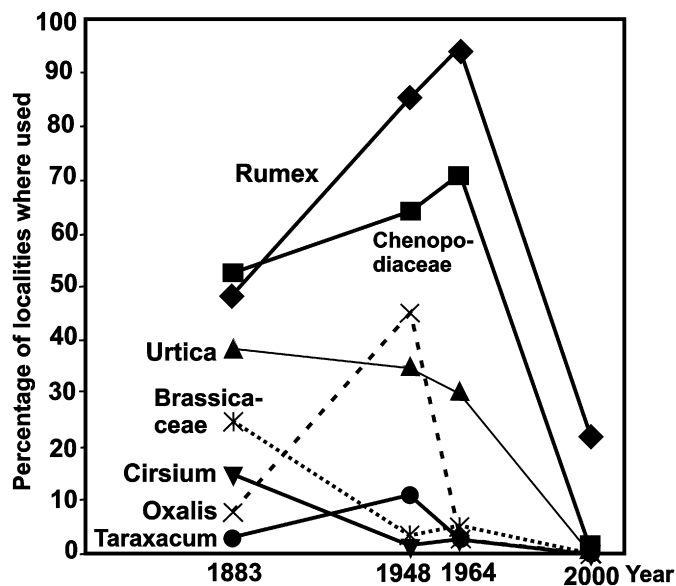


Fig. 1. Changes in the use of the commonest green vegetables. Note that for the questionnaires of 1883, 1948 and the 1960s the year of study may not indicate that the plant was used at that time, but only that it remains in memory (e.g. *Sinapis* and *Raphanus* were used only until the beginning of the 20th century).

pre-suggested species (three in 1883 and four in the 1960s) and not pre-suggested species (eight in 1883 and seven in the 1960s) was tested using Mann–Whitney *U*-test.

Statistical tests were carried out using the PAST statistical package (Hammer et al., 2001).

3. Results

3.1. Most commonly used taxa

Altogether the use of 58 taxa (belonging to forty-three genera) of green vegetables has been recorded. However, out of those, 19 species were reported only from one locality. At least half of the taxa were used solely in the context of food scarcity, and did not constitute food on a year to year basis.

The older questionnaires – from 1883 to 1948 – record a much larger number of species than those of the 1960s and 2000s, both expressed as the total number of taxa present and as the mean number of taxa per locality (Fig. 1, Table 2).

The mean number of taxa used per locality gradually decreased from 3.2 (SD=2.2) in 1883, 3.0 (SD=2.1) in 1948, 2.2 (SD=1.3) in the 1960s to 0.2 (SD=0.5) in the 2000s. There was no statistical difference between the number of species per locality in 1883 and 1948 (Mann–Whitney *U*-test, $p=0.9$) whereas the differences between 1948 and 1960, as well as the 1960s and the 2000s were both highly significant (Mann–Whitney *U*-test, $p<0.0001$). The presented means for the older three questionnaires include both the species used at the time of the study and species remembered having been used. For example, in the 1960s (this questionnaire has the most detailed time reference for each species) 47% records (species \times locality) concerned the present use, 17% – disappearing use, and 34% – extinct use.

Among the formerly most commonly used species, the sharpest decline in use (measured by the correlation between the percentage of localities where it was used and the date of study) occurred with wild *Brassicaceae* ($r=-0.96$, one-sided $p<0.05$) and *Glechoma hederacea* L. ($r=-0.94$, $p<0.05$) and *Cirsium* spp. ($r=-0.94$, $p<0.05$). The correlations for all other species, apart from one, were also negative but weaker and insignificant (Table 3).

The shift in the percentage of localities for the commonest pre-suggested and not-pre-suggested species between 1883 and 1948 was nearly identical ($D_1=6.2\pm 14.3$ and 6.0 ± 6.2 , respectively, Mann–Whitney *U*-test, $p=0.92$). There was a larger difference in the shift between the percentage of localities for the pre-suggested and not pre-suggested species between 1948 and the 1960s ($D_2=2.0\pm 4.8$ and -9.3 ± 5.7 , respectively), though it was also insignificant ($p=0.39$).

For all the three older questionnaires the maximum numbers of wild greens recorded in one locality are similar (1883 – 11 species, 1948 – 11 species, 1960s – 13 species, 2000s – 2 species). Altogether only in eight localities was the use of more than nine species ever recorded. These longest lists were always dominated by famine plants.

The most commonly recorded wild green is sorrel (mainly *Rumex acetosa* L.), usually named *szczaw*. Its collection is mentioned in the majority of 1883, 1948 and 1960s questionnaires yet only in nearly a quarter of questionnaires from the 2000s (Table 2). Even in the second half of the 20th century sorrel soup was a common and frequent component of the diet. Children were often sent to a meadow to collect some sorrel for soup. From numerous interviews done with school children in 2008 I observed a decline in the use of sorrel in SE Poland in the last decade (as the majority of children do not even know what sorrel looks like), which confirms Jędrusik's (2004) findings (she reported a decline in its use). Sorrel was collected mainly in spring (April–July), later in the year it was regarded as less tasty. In the 1948 study many respondents reported that local people preserved the leaves for winter use. Leaves were tightly packed in bottles and salted. Sorrel preservation was not mentioned in Rostafiński's study and it may have been a novelty, which appeared later with the popularization of glass.

The second plant in frequency is *lebioda/toboda/komosa* – a collective name for *Chenopodium album* L., other *Chenopodium* species and *Atriplex* species. These plants were usually fried, after initial blanching, or boiled. They were served as a side-dish or mixed with boiled potatoes and/or dairy products. In Rostafiński's questionnaire informants usually write about *Chenopodium* as an ordinary food for poorer peasants. In the 1948 and 1964 questionnaires it is usually mentioned as the food of older people or war-time food. The questionnaire from the 2000s records the near complete extinction of its use, apart from the Lublin area, where it is eaten, although very rarely, up until today (older questionnaires also record a strong tradition of eating this plant there).

The third plant in frequency was *pokrzywa* – *Urtica dioica* L. and *Urtica urens* L. Again, in a similar way to *Chenopodium*, these species were treated as normal, regular food for the poor in the 19th century, and in the 20th century they were eaten only as war-time food or very locally in remote areas. Their use for food was not recorded in the 2000s survey.

The fourth plant in frequency is wood-sorrel: *Oxalis acetosella* L. and *Oxalis stricta* L., usually named as *zajęczy szczaw* or *zajęcza kapusta*. Puzzlingly, it is very frequently mentioned in the 1948 questionnaire. However, this particular questionnaire describes children's snacks in special detail, and *Oxalis* is usually recorded in this context, more rarely as an ingredient of soup. However, in some regions such a soup was a part of ordinary non-famine nutrition.

The fifth folk taxon – two similar yellow-flowering *Brassicaceae* species, *Sinapis arvensis* L. and *Raphanus raphanistrum* L., not distinguished by local people and given the same name, *pszonak*, *psconak* and the like – is an example of a famine plant eaten in southern Poland extensively in the 19th century (many records in Rostafiński's questionnaire) and quickly forgotten later. Their leaves were eaten in the form of soup or potherb. Another taxon frequently used in southern Poland in times of scarcity was the genus *Cirsium* (names *oset*, *szczerbak*, *scyrbok*, *szczerbacz* and the like), the commonest, soft-leaved *Cirsium rivulare* (Jacq.) All., was

Table 2
Plants whose green parts have been used for nutritional purposes in the territory of Poland since the mid-19th century. Note that the year of study may not indicate that the plant was used at that time, but only that it remains in memory.

Species	Family	Main folk names reported	Preparation method	Types of use	Date and number of localities (N)					Altogether (N = 704)
					1883–1884 N = 101	1948–49 N = 193	1964–69 N = 333	2000–2003 N = 82		
<i>Rumex acetosa</i> L. ^c , <i>Rumex acetosella</i> L. ^c , <i>Rumex thyrsiflorus</i> Fingerh. ^c <i>Chenopodium album</i> L. ^c (mainly), <i>Chenopodium polyspermum</i> L., <i>Chenopodium bonus-henricus</i> L., <i>Chenopodium hybridum</i> L., <i>Chenopodium urbicum</i> L., <i>Atriplex patula</i> L.	Polygonaceae	szczaw, scow	RC	pc	49 ^a	160	315 ^a	18 ^a	542	
<i>Urtica dioica</i> L. ^c , <i>Urtica urens</i> L. ^c	Urticaceae	pokrzywa, żegawka	C	p	39 ^a	67	102 ^a	Presumably	208	
<i>Oxalis acetosella</i> L. ^c , <i>Oxalis stricta</i> L. ^c	Oxalidaceae	szczawik zajęczy, zajęcza kapusta	RC	cp	8	85	12	0 ^{a,b}	105	
<i>Sinapis arvensis</i> L. ^c , <i>Raphanus raphanistrum</i> L. ^c <i>Taraxacum</i> spp. ^c	Brassicaceae	psonak, psconak, hodrych	C	p	25	8	17		50	
<i>Acorus calamus</i> L. ^c <i>Cirsium rivulare</i> (Jacq.) All. ^c , <i>Cirsium oleraceum</i> (L.) Scop. ^c , <i>Cirsium arvense</i> (L.) Scop. ^c	Asteraceae	mlecz, maj tatarak, lepiech oset, szczyrbac, szczyrbak, scyrbok	RC	sp	3	21	9 ^a		33	
<i>Glechoma hederacea</i> L. s.l. ^c	Lamiaceae	kudrón, kurdýbanek, kondratek	C	p	15	3	9	a	33	
<i>Malva sylvestris</i> L. ^c , <i>Malva neglecta</i> Wallr. ^c	Malvaceae	ślaz	RC	pc	14 ^a	4	3		21	
<i>Mentha longifolia</i> (L.) Huds. ^c , <i>Mentha arvensis</i> L. ^c	Lamiaceae	mięta, dzika mięta, końska mięta	C	h	1	8	8	>0 ^{a,b}	17	
<i>Equisetum arvense</i> L. ^c <i>Tilia</i> sp. (probably mainly <i>Tilia cordata</i> Mill.)	Equisetaceae Tiliaceae	mięta sypułki lipa	RC RC	cp pc	5	1	2		9 8	
<i>Lamium</i> spp. (mainly <i>Lamium album</i> L. ^c)	Lamiaceae	głucha pokrzywa, medunika	C	p	1	2	4		7	
<i>Heracleum sphondylium</i> L. ^c <i>Symphytum officinale</i> L. ^c	Apiaceae Boraginaceae	barszcz żywokost, koszyfaf	C C	p p	1 ^a 3	2 1	1 ^a		4 4	
<i>Cardamine</i> spp. <i>Carum carvi</i> L. ^c <i>Aegopodium podagraria</i> L. <i>Achillea millefolium</i> L. <i>Serratia aloides</i> L. ^c	Brassicaceae Apiaceae Apiaceae Asteraceae Hydrocharitaceae	rzeżucha kminek, kmin gier, barszczyk krwawnik	R C C C C	s p p h p	3 3 ^a	1	4		4 4 3 3 3	
<i>Polygonum tomentosum</i> Schrank ^c and other weedy <i>Polygonum</i> spp. from arable fields excluding <i>Polygonum hydropiper</i> L.	Polygonaceae	rdst	C	p		3	3		3	
<i>Anchusa arvensis</i> (L.) M.Bieb. <i>Fallopia convolvulus</i> (L.) A.Löve <i>Ranunculus ficaria</i> L. <i>Thymus</i> sp. ^c <i>Silene vulgaris</i> (Moench) Garcke Veronica sp.	Boraginaceae Polygonaceae Ranunculaceae Lamiaceae Caryophyllaceae	tlusty kiepek krętołek	C C C C C	p p p h p	2 2 2 1 1				2 2 2 2 2	
<i>Plantago</i> sp.	Plantaginaceae	macierzanka skrzypek bobownik babka	R? C	s p	1 1	1			1 1	

Table 2 (Continued)

Species	Family	Main folk names reported	Preparation method	Types of use	Date and number of localities (N)				
					1883–1884 N = 101	1948–49 N = 193	1964–69 N = 333	2000–2003 N = 82	Altogether (N = 704)
<i>Arctium</i> spp.	Asteraceae	-	R	I	1				1
<i>Berberis vulgaris</i> L.	Berberidaceae	berberys	RC	pc	1				1
<i>Convolvulus arvensis</i> L. ^c	Convolvulaceae	-	C	p	1				1
<i>Prunella vulgaris</i> L.	Lamiaceae	suchowierzch	C	p	1				1
<i>Scirpus sylvaticus</i> L. (?)	Cyperaceae	sicina	R	c	1				1
<i>Stellaria media</i> (L.) Vill. (?)	Caryophyllaceae	musec, muszcz	C	p	1				1
<i>Ulmus</i> sp.	Ulmaceae	wiąz	?	c?	1				1
<i>Galeopsis</i> sp.	Lamiaceae	ziomber	C	p		1			1
<i>Cichorium intybus</i> L.	Asteraceae	podróznik, twardestoj	C	p		1			1
<i>Origanum vulgare</i> L. or <i>Clinopodium vulgare</i> L. (bad quality herbarium specimen) ^c	Lamiaceae	lebioda	C	p		1			1
<i>Polygonum aviculare</i> L. ^c	Polygonaceae	spozyc	C	p	1				1
<i>Bellis perennis</i> L.	Asteraceae	stokrótka, gęsie półpki	?	?	1				1
<i>Ranunculus</i> sp. (?)	Ranunculaceae	jaskier	?	?	1				1
<i>Galium odoratum</i> (L.) Scop.	Rubiaceae	mistrz leśny, waldmeister	C	h	1				1

Preparation method: R – raw, C – cooked or fried. Types of Use: p – potherb or soup, c – children's snack, s – salad, I – lactofermented stalks.

^a Indicates that the species was pre-suggested in a given questionnaire (e.g. "Do people use nettles?").

^b Medicinal and food data mixed.

^c Identification confirmed by at least one herbarium specimen from the 1948–1949 study.

Table 3

Correlation between the year of study and percentage of localities where the plant was used. Highly negative values indicate a sharp decline in use.

Species	Pearson correlation coefficient (r)
<i>Sinapis arvensis</i> L. and <i>Raphanus raphanistrum</i> L.	-0.96*
<i>Glechoma hederacea</i> L. s.l.	-0.94*
<i>Cirsium</i> spp.	-0.94*
<i>Urtica</i> spp.	-0.80
<i>Chenopodium</i> spp.	-0.50
<i>Taraxacum</i> spp.	-0.23
<i>Oxalis</i> spp.	-0.16
<i>Rumex</i> spp.	-0.14
<i>Acorus calamus</i> L.	-0.01

* p (one-sided) < 0.05.

most often used, sometimes *Cirsium oleraceum* (L.) Scop., and more rarely *Cirsium arvense* (L.) Scop. According to the questionnaires their use stopped definitively along with World War II. *Cirsium* leaves were usually boiled or fried and eaten with milk/cream and/or potatoes, depending on the availability of these products. Both wild *Brassicaceae* and *Cirsium* were not eaten in the years of good harvest.

Inner parts of young sweet flag (*Acorus calamus* L.) shoots were, after *Oxalis*, the second commonest children's snack recorded frequently in the 1948 questionnaire.

Glechoma hederacea leaves (folk names: *kurdybanek*, *kudroń*, *kondratek*) were used as a flavoring herb added to broth and potato soup. This use was mentioned in several of the 1883, 1948 and 1964 questionnaires, but decreased gradually. In the 19th century this plant was still quite frequently used in some parts of Poland, not only by peasants but, as one of Rostafiński's respondents wrote, "even in good homes". Apart from *Glechoma*, only *Mentha arvensis* L. and *Mentha longifolia* (L.) Huds. leaves were relatively frequently used as culinary herbs, mainly for the stuffing of *pierogi ruskie* (cheese-and-potato dumplings) and for soups.

Other green vegetables (used only as famine food) mentioned a few times in the questionnaires were *Tilia* (probably mainly *Tilia cordata* Mill.), *Lamium* (mainly *Lamium album* L.), *Malva sylvestris* L., *Malva neglecta* Wallr., *Heracleum sphondylium* L., *Aegopodium podagraria* L., *Symphytum officinale* L., *Polygonum* spp. and *Stratiotes aloides* L.

3.2. Regional variation

Apart from taxa used throughout Poland (e.g. *Chenopodium*, *Rumex*, *Urtica* and *Oxalis*), some were used only regionally. *Cirsium*, *Sinapis*, *Raphanus*, *Symphytum* and *Tilia* were used nearly exclusively in southern Poland. *Stratiotes aloides* shoots were recovered from lakes and eaten only in central Poland. Poland also differed in the choice of green vegetables compared to Belarus and Ukraine. According to Rostafiński's correspondents the use of *Heracleum* and *Aegopodium* shoots for soups was very common east of the present territories of Poland. At that time (19th century) the use of these species in Poland was already a curiosity. Making food parcels wrapped in *Tussilago farfara* L. leaves, still practiced in some parts of SW Ukraine, had already been reported by Rostafiński's respondents from the same area, but this practice is otherwise unknown in Poland.

4. Discussion

4.1. Cultivated versus wild green vegetables

The studied questionnaires clearly show a decline in the use of wild green vegetables. Rostafiński's study showed that most Poles used few wild greens in the 19th century. The total number

of species reported, eaten throughout the whole country, both in 1883 and in 1948–1949, was around thirty, similar to the number of species used in one small region of Italy for one kind of soup! This makes us think that a negative attitude towards using green vegetables and herbs in cooking has a longer tradition and is not only restricted to the use of wild species, but to the cultivated taxa as well. In the Renaissance (16th century) an Italian princess, Bona Sforza, who became the queen of Poland, marrying the king Zygmunt Jagiellończyk, is known to have complained about the lack of vegetables in Poland and introduced many garden vegetables to this country, missing the garden greens served in her home, Italy. Since then the term *włoszczyzna* (meaning *something Italian*) is applied to vegetables such as carrot, parsley, celery, leek and cabbage used as an ingredient of soups and sauces. The term can be used both for leaves and roots. However, the claim that she caused a “revolution” in Polish vegetable gardens and the Polish approach to vegetables in cooking is probably exaggerated (Dembińska and Weaver, 1999). In the 20th century the amount of vegetables was steadily increasing and in the 1990s Poland's per capita vegetable consumption rate was fifth in Europe, lower only than a few Mediterranean countries (Italy, Greece, Spain and Portugal) and slightly higher than France (Adamczyk, 2002). In general vegetable consumption in Europe displays a strong north-south pattern with the lowest vegetable consumption in the north (Agudo et al., 2002). Cabbage is the vegetable consumed in Poland in the highest quantities. Another commonly consumed green vegetable is cucumber. Other green vegetables, e.g. lettuce or spinach, constitute only a small fraction in consumption figures (Adamczyk, 2002). Also in traditional 19th and 20th century Polish folk cuisine cabbage was the main green (Kowalska-Lewicka, 1973). Other cultivated green vegetables have occurred in Polish cuisine since medieval times but mainly as a part of town and manor gardens (Dembińska and Weaver, 1999). It should be noted that no bitter tasting green vegetables have ever been commonly used in Polish cuisine. Cichory has been known but rarely used and is perceived as a foreign ingredient. On the other hand some pungent tasting (but not bitter!) root vegetables from the *Brassicaceae* have been used for centuries (mainly radish *Raphanus sativus* L. and horseradish *Armoracia rusticana* P.Gaertn., B.Mey. & Scherb.).

Lacto-fermented cabbage has been one of the staples of Polish rural cuisine for centuries and in the 20th century lacto-fermented green cucumbers also became very popular. Unfortunately, apart from a reference on lacto-fermenting *Arctium* leaf stalks in NE Poland the questionnaires do not contain information on the use of other wild plants for this purpose. The regular consumption of these products throughout the winter may have diminished people's ‘craving’ for green vegetables in spring. Thus the large production and consumption of cabbage may be one of the main factors responsible for the present state of Polish culinary habits, and the fact that they do not gather any green food plants from the wild. Within the last few centuries the use of cultivated vegetables has increased and the use of wild vegetables decreased. In some instances functional pairs of one or few wild vegetables replaced by a single cultivated vegetable can be singled out. The first to describe such replacement was Rostafiński (1916), who wrote a separate work in which he analyzed how the use of *Heracleum sphondylium* L. in soups up until the Renaissance period was later gradually, but eventually completely, replaced by the cultivated beet *Beta vulgaris* L. Moreover *barszcz*, now the Polish name for a beetroot soup, is actually the name for *Heracleum*. An identical process happened in other Central and Eastern European countries, where the use of *Heracleum* is nearly extinct and the same shift of names appeared.

But this is not the only pair. Many respondents of the 1883 and 1948 questionnaires refer to the use of *Glechoma hederacea* L. leaves in soups as “instead of parsley”, “in place of parsley” or “like parsley” suggesting that a similar replacement of *Glechoma* by parsley

(*Petroselinum crispum* (Mill.) A.W.Hill) could have taken place. The third pair is cultivated cabbage (*Brassica oleracea* L.) and spinach (*Spinacia oleracea* L.) versus *Chenopodium* and *Urtica*. The use of goosefoot and nettle is often described by the respondents as “like cabbage”, “like spinach”, “in place of cabbage”, i.e. served as a boiled or fried side dish with potatoes and meat. Of course not all the newly introduced vegetables replaced old ones. For example lettuce (*Lactuca sativa* L.), has not got a wild ‘counterpart’ as it is eaten raw, whereas in traditional Polish cuisine plants were usually boiled or fried and only children ate them raw as snacks. The present relatively low number of green vegetables in Polish cuisine, dominated by cabbage may be a mirror reflection of an older Slavic food system where a few wild green vegetables such as *Chenopodium*, *Urtica*, *Rumex* and *Heracleum* were consumed in larger quantities simultaneously neglecting other available species. This pattern may have been passed from generation to generation as other food plants may have been feared and/or not adequately recognized by people. Whereas in the Mediterranean old habits of consuming species-rich herbal dishes have given way to a large choice of green vegetables and culinary herbs available in the market.

4.2. Comparison with other countries

The presented list of species is also very short when compared to the list of wild plants eaten during World War I in Germany, where authorities launched a campaign to include them in the nutrition of both civilians and soldiers (Maurizio, 1927).

The low cultural value of wild plants in the Polish diet, except for fruits, has already been mentioned in previous papers (Łuczaj and Szymański, 2007; Łuczaj, 2008b) and the comparison in this study confirms it. There seems to be a pattern of avoidance of using the green parts of wild plants, particularly strong tasting ones, as either vegetables or flavouring, during periods when food is not scarce. It is a matter of discussion whether this pattern could be referred to as ‘herbophobia’, a term analogous to Wasson's ‘mycophobia’ which commonly refers to the relatively limited presence of fungi in traditional English and German cuisine (Łuczaj, 2008b). In the list of twenty culturally most significant wild plants and fungi in Garfagnana, Italy, even a few decades after 1948, as many as seventeen taxa were green vegetables or aromatic herbs (Pieroni, 2001). In a similar study done in Poland such a list would encompass mainly fruits and fungi. In the study of the traditional soup *minestrilla* in the Gallicano area in Central Italy Pieroni (1999) found that the green parts of around thirty species of plants are used in one small region. In another region of Italy Paoletti et al. (1995) recorded the use of 56 species to make a traditional local spring soup called *pistic*. The term ‘herbophilia’ was applied by the author to such traditions (Łuczaj, 2008b). We must bear in mind that Italy is not the best example of *herbophilia*, just the closest to Poland. Even stronger and still extant traditions of the use of wild greens are present in eastern Asia, in such countries as China (Hu, 2005), Japan (Tanaka, 1976), Korea (Pemberton and Lee, 1996), Thailand (Price, 2006) or Vietnam (Ogle et al., 2001). Presumably utilization of a large number of species of green vegetables is a characteristic feature of agricultural communities, particularly those in which food shortages are frequent. In such societies the utilization of weeds as food provided extra calories and made space for the growth of main crops. Once the danger of famine is removed, some societies reject green food as a symbol of famine, others preserve at least some of the “famine” vegetables as traditional foods or food additives.

Another argument for the smaller presence of wild greens in Central Europe than in the Mediterranean is a shorter growth season in the former. On the other hand in the Mediterranean wild greens are also collected only in certain periods (winter, early spring), mainly when the new shoots emerge (e.g. Pieroni et al., 2005).

Unfortunately, we do not have quantitative data on the use of wild vegetables in central and northern Europe, which could indicate whether the Polish use of wild green vegetables presents the bottom end of a spectrum, at the opposite end of which are the Mediterranean countries, or should rather be placed somewhere above the middle of it, in a similar position to the contemporary Polish consumption of cultivated vegetables (fifth in Europe).

In some other Central European countries the tradition of using wild greens is similarly low, although probably slightly stronger than in Poland. In Slovakia, as in Poland, mainly *Urtica*, *Chenopodium* and *Rumex* were used, although in contrast to Poland, the use of *Cardamine amara* L. and *Ranunculus ficaria* L. was common (e.g. Markuš, 1961). Also the classic Romanian ethnobotanical dictionary by Butură (1979) does not devote much space to wild greens, quoting the use of just a few taxa, e.g. *Chenopodium*, *Ranunculus ficaria* L. and *Bunias orientalis* L. A relatively strong tradition of making soup with wild greens has survived in Ukraine (the soup is known there as 'green borsch'). Locally *Chenopodium* and *Urtica* are still sold in markets, *Rumex* is omnipresent, and some other wild food plants are still used for soup (e.g. *Ranunculus ficaria*). However, the number of species used for these green soups is markedly lower than in southern Europe (Kuzemko, 2008). Some parts of the former Yugoslavia (particularly Bosnia-Herzegovina) seem to be the only Slavic areas in which there is a rich tradition of using wild greens (Ćurčić, 1913; Redzic, 2006). Even in the adjacent Bulgaria the set of wild vegetables used in rural areas is similar to those consumed by northern Slavs, and is restricted mainly to *Rumex*, *Urtica* and *Chenopodiaceae* (Vakarelski, 1965).

4.3. The process of gradual disappearance of wild greens from diet

At the end of the 18th century Krzysztof Kluk, one of the fathers of Polish economic botany, wrote a plant dictionary, often containing information about the palatability of a species. However, the examples of use usually come from other countries. As we know from his writings he wanted to popularize the culinary use of local wild foods, seeing that knowledge among local populations was relatively low, already in the 18th century (Pirożnikow, 2008).

In 1934 school authorities in a part of SE Poland issued an ethnographic questionnaire, which contained a question about the use of wild greens in spring. The questionnaires were filled in by teachers from around 300 Ukrainian (Rusyn) and Polish villages in the Carpathians. In many questionnaires the respondents stated that they have not used them for generations, because 'there is no famine' (Łuczaj, 2008d).

Historic data, prior to the 19th century, indicate that a few species of wild greens were commonly used, which are hardly mentioned even in Rostański's questionnaire. These are, in particular, goutweed *Aegopodium podagraria* L. and hogweed *Heracleum sphondylium* L. Goutweed used to be sold as a vegetable in Cracow markets in medieval times (Moszyński, 1962). The use of hogweed is even more frequently documented and a sour hogweed soup is mentioned by a few 16th–early 19th century sources (for the full list of sources see Łuczaj and Szymański, 2007). It was such an important component of the spring diet that in the 17th century it was even served to the professors of Jagiellonian University in Cracow, as one of the main soups in springtime (Łuczaj and Szymański, 2007).

The presented data indicate that the disappearance of wild green vegetables from the Polish diet was a gradual process, in which the sequence of disappearance of the species from diet was as follows: (1) *Aegopodium* & *Heracleum*, (2) *Cirsium*, *Sinapis* & *Raphanus*, (3) *Urtica*, (4) *Chenopodium*, (5) *Oxalis*, (6) *Rumex*. In the 1960s the gathering of wild *Rumex* leaves and shoots was very common in Poland and practiced across at least half of the area of Poland (Table 2). At the beginning of the 21st century this tradition drastically dimin-

ished. A comparative study on the use of wild food plants in three villages in SE Poland among children and older people shows that sorrel leaves are not only eaten there no longer, but nowadays many school children do not even know how to recognize them in a meadow, whereas the majority of older people used sorrel in their diet up until recently (Nieroda, 2009). Although *Rumex* was always commonly used, its consumption is more frequently reported in the 20th century than in Rostański's questionnaire. Perhaps, as it became the only commonly used wild green, it was used more often than in the past?

Time will tell if the disappearance of wild vegetables from people's diet can be reversed, which is not impossible considering some modern interest in gathering *Urtica dioica* L. and *Allium ursinum* L. from the wild (Łuczaj, 2008a).

One might argue that there is insufficient documentation in the field of wild edible plants in Poland and that the reviewed works only scratch the surface, leaving much knowledge undocumented. However it seems to me that compared to other countries, ethnobotanical knowledge has been extremely well documented in Poland. For example in the 1948 study the majority of respondents were people originating from the studied villages, and they took care to provide every possible detail of local traditions, including even rare children's snacks and famine plants eaten 80 years before.

4.4. Bitter dandelions

A taxon whose use does not show a simple pattern of decline is dandelion (*Taraxacum* spp.). Dandelion leaves were used in soups during times of scarcity in some parts of the Polish Carpathians, but this kind of use disappeared at the beginning of the 20th century. However, they were used raw in salads by richer people, following the French tradition. This phenomenon was reported in 19th century manor houses and mentioned by some of Rostański's respondents (Łuczaj, 2008c), then later revived in the mid-20th century by thousands of people coming back from work in French mines (data from the 1948 questionnaire). However, the consumption of *Taraxacum* leaves never became common in Poland, probably due to the fact that the Polish culinary system avoids bitter tastes. This is probably the main feature of cuisine that has reduced the number of species of wild greens used in Slavic countries. Slavs did not have to resort to bitter tasting vegetables, as they mainly occupy cold temperate climates with sufficient rainfall. Thus large amounts of non-bitter green vegetables are readily available in spring, whereas in southern Europe, where rainfall is lower, herbaceous plants tend to be more bitter and harder. Additionally southern Europe has diverse topography and high local variability in flora, so larger expertise in distinguishing the species is needed, whereas Central and Eastern Europe, composed mainly of lowlands and hills, has more uniform floras where the knowledge of a few taxa such as *Urtica*, *Rumex*, *Heracleum*, *Aegopodium* and *Chenopodium* could be used across the whole area between Germany and Siberia.

4.5. Taste and medicinal value

A low cultural value seems to be reflected in the answers to the questionnaires. Apart from the previously mentioned association with famine, there are hardly any cases in which respondents of the questionnaires talk about them as tasty, desirable or healthy. More often one can find descriptions, such as, "some people like it", "used only by older people", or "used only by the poor". Thus significant differences may be noted between countries which use a relatively small amount of wild greens (e.g. Poland) and *herbophilious* countries, and these differences concern not only the quantity of species used, but also perception of the benefits of their use. In Poland they were only seen as an inferior, low-calorie part of

the diet. In *herbophilous* cultures they had been perceived healthy well before the numerous health benefits of eating green vegetables were discovered by modern medicine. Pieroni (2001) reported that the older generation in an Italian region he studied regarded eating wild greens as particularly healthy. In Eastern Asia wild produce is deeply incorporated in traditional medicine and wild plants in the diet are generally seen as very beneficial for people's health as they contain more of the *chi* (life energy) of the land than their cultivated counterparts (Anderson, 1988; Hu, 2005). This ancient Chinese explanation of the superiority of wild products can nowadays be interpreted as a higher concentration of microelements and bioactive compounds than in cultivated vegetables, in which they are diluted by selection and growing conditions (Anderson, 1988). Another argument for the promotion of the use of wild green vegetables is the fact that they can be easily harvested from unpolluted and unfertilized locations, hence they are less likely to be contaminated by heavy metals, nitrates, herbicides, pesticides and the like.

It is interesting that Polish folk medicine almost entirely rejects the application of leaves ingested directly as medicine, in contrast to East Asian traditional medicine (e.g. Hu, 2005). A large percentage of taxa eaten in Poland (Table 2) has been used in ethnomedicine orally, but only in infusions or decoctions (particularly *Mentha*, *Urtica*, *Thymus* and *Equisetum*). Even *Cichorium intybus* L. and *Taraxacum* sp. have been applied as infusions rather than consumed (Paluch, 1984). The only exceptions to this rule are plants used against respiratory infections: *Pinus sylvestris* L., *Abies alba* Mill. and *Picea abies* (L.) H. Karst. shoots. In contrast, fruits, which are gathered both for everyday consumption and as medicine, are often eaten whole, or in the form of jams or sauces e.g. *Vaccinium* spp. or *Rubus* spp. (Paluch, 1984).

4.6. Possible toxicity

Wild vegetables compared to cultivated ones have some obvious advantages, mentioned above, however some of the wild greens consumed commonly in Poland might have had some toxic effects, so the cessation of their consumption in favor of cultivated vegetables could also be explained by avoidance of toxins. *Heracleum* species contain furanocoumarins (Zobel and Brown, 1990; Panter, 2004), which cause photosensitivity and have carcinogenic properties, although the health hazards of eating *Heracleum sphondylium* are probably much lower than in the case of giant hogweeds (e.g. *Heracleum mantegazzianum* Sommer & Levier). *Aegopodium podagraria* L. contains small amounts of cicutoxin-like compounds (Panter, 2004). *Oxalis* and *Rumex* are rich in oxalic acid, whose consumption can lead to hypocalcaemia and the formation of calcium oxalate crystals (Panter, 2004), whereas *Symphytum officinale* contains hepatotoxic pyrrolizidine alkaloids (Panter, 2004). On the other hand direct cases of toxic effect from wild vegetable dishes are hardly reported not only in the studied questionnaires, but in the whole Polish literature concerning famine plants.

5. Conclusions

In Poland, within the studied time scale, there was no tradition of incorporating many species of wild greens into dishes in a given locality, as was the case in the Mediterranean. Local people usually utilized a small number of taxa, but in large quantities, resorting to some other available species only in times of famine. The relatively low number of wild green vegetables utilized has gradually decreased to practically none, mainly due to replacement by a few cultivated vegetables. This process must have started well before the 19th century, but became most dramatic throughout the 20th century. Comparisons of cultural differences in the

use of green vegetables (both cultivated and wild) across the globe are an intriguing project worth carrying out in more depth. These cross-cultural differences should take into account the quantity of consumed vegetables, the number of species used per locality, the level of taste appreciation and their place in medical systems.

The results of this study should be an encouragement for more quantitative comparisons of European ethnobotanical data from a diachronic perspective, even if some methodological problems arise.

Acknowledgment

I would like to thank Prof. Michael Heinrich for interesting comments, which enriched the Discussion section.

References

- Adamczyk, G., 2002. Wybrane aspekty zachowań konsumpcyjnych i wzorców spożycia żywności w polskich gospodarstwach domowych w latach dziewięćdziesiątych. Roczniki Akademii Rolniczej w Poznaniu–Ekonomia 343, 31–41.
- Agudo, A., Slimani, N., Ocké, M.C., Naska, A., Miller, A.B., Kroke, A., Bamia, C., Karalis, D., Vineis, P., Palli, D., Bueno-de-Mesquita, H.B., Peeters, P.H.M., Engeset, D., Hjartaker, A., Navarro, C., Martínez Garcia, C., Wallström, P., Zhang, J.X., Welch, A.A., Spencer, E., Stripp, C., Overvad, K., Clavel-Chapelon, F., Casagrande, C., Riboli, E., 2002. Consumption of vegetables, fruit and other plant foods in the European Prospective Investigation into Cancer and Nutrition (EPIC) cohorts from 10 European countries. Public Health Nutrition 5, 1179–1196.
- Anderson, E.N., 1988. The Food of China. Yale University Press, New Haven and London.
- Block, G., 1991. Dietary guidelines and the results of food consumption surveys. American Journal of Clinical Nutrition 53, 356S–357S.
- Bohdanowicz, J., 1996. Pożywienie. Zbiernictwo—pożywienie głodowe. Komentarze do Polskiego Atlasu Etnograficznego t. III. Pożywienie i sprzęty z nim związane. Polskie Towarzystwo Ludoznawcze, Wrocław, pp. 10–21.
- Butură, V., 1979. Enciclopedie de etnobotanică românească. Editura Științifică și Enciclopedică, Bukareszt.
- Ćurčić, V., 1913. Narodne ribarstvo u Bosni i Hercegovini. Part 2. Glasnik Zemaljskog Muzeja u Bosni i Hercegovini 25, 464–465.
- Dembińska, M., Weaver, W.W., 1999. Food and Drink in Medieval Poland: Rediscovering a Cuisine of the Past. University of Pennsylvania Press, Philadelphia.
- De Natale, A., Pezzatti, G.B., Pollio, A., 2009. Extending the temporal context of ethnobotanical databases: the case study of the Campania region (southern Italy). Journal of Ethnobiology and Ethnomedicine 5, 9.
- Dufour, D.L., Wilson, W.M., 1994. Characteristics of “Wild” plant foods used by indigenous populations in Amazonia. In: Etkin, N. (Ed.), Eating on the Wild Side: the Pharmacologic, Ecologic and Social Implications of Using Noncultigens. University of Arizona Press, Tucson.
- Everett, D., 2008. Don't Sleep There are Snakes: Life and Language in the Amazonian Jungle. Profile Books, London.
- Hammer, R., Harper, D.A.T., Ryan, P.D., 2001. PAST: Paleontological Statistics Software Package for Education and Data Analysis. Palaeontologia Electronica 4(1), 9. http://palaeo-electronica.org/2001_1/past/issue1_01.htm.
- Hasler, C.M., 2002. Functional foods: benefits, concerns and challenges—a position paper from the American council on science and health. Journal of Nutrition 132, 3772–3781.
- Heinrich, M., Kufer, J., Leonti, M., Pardo-de-Santayana, M., 2006. Ethnobotany and ethnopharmacology—interdisciplinary links with the historical sciences. Journal of Ethnopharmacology 107, 157–160.
- Hu, S.Y., 2005. Food Plants of China. The Chinese University Press, Hongkong.
- Jedrusek, M., 2004. Grzyby i rośliny dzikorosnące w żywieniu ludności wsi (na przykładzie badań osiemdziesięciu dwóch miejscowości z obszaru Polski). MA thesis. Silesian University, Ethnology, Cieszyn.
- Kłodnicki, Z., Drożdż, A., 2008. Dzikie rośliny jadalne—materiały, mapy i opracowania tekstowe Pracowni Polskiego Atlasu Etnograficznego, In: Ł. Łuczaj (Ed.), Dzikie rośliny jadalne: zapomniany potencjał przyrody. Mat. konf. Przemysłu—Bolestraszyce 13 września 2007. Arboretum i Zakład Fizjografii, Bolestraszyce, pp. 109–124.
- Köhler, P., 1986. Józefa Rostafińskiego “Odezwa do nie botaników o zbieranie ludowych nazw roślin”. Wszechświat 87, 13–16.
- Köhler, P., 1993. Ankieta Józefa Rostafińskiego z 1883 roku dotycząca ludowego nazewnictwa roślin w Polsce. Analecta 2, 89–119.
- Kowalska-Lewicka, A. (Ed.), 1973. Pożywienie ludności wiejskiej. Muzeum Etnograficzne w Krakowie, Kraków.
- Kufer, J., Förther, H., Pöll, E., Heinrich, M., 2005. Ethnobotany of the Ch'orti'. Journal of Pharmacy and Pharmacology 57, 1127–1152.
- Kuzemko, A., 2008. Wild food plants in the meadow communities of Ukraine. In: Łuczaj Ł. (Ed.), Dzikie rośliny jadalne: zapomniany potencjał przyrody. Mat. kof. Przemysłu—Bolestraszyce 13 września 2007. Arboretum i Zakład Fizjografii w Bolestraszycach, Bolestraszyce, pp. 243–251.

- Leonti, M., Nebel, S., Rivera, D., Heinrich, M., 2006. Wild gathered food plants in the European Mediterranean: a comparison analysis. *Economic Botany* 60, 130–142.
- Łuczaj, Ł., Szymański, W., 2007. Wild vascular plants gathered for consumption in the Polish countryside: a review. *Journal of Ethnobiology and Ethnomedicine* 3, 17.
- Łuczaj, Ł., 2008a. Polacy, Włosi, Japończycy i Indianie, czyli kilka kulturowych porównań dotyczących użytkowania kulinarnego dzikich roślin. In: Łuczaj, Ł. (Ed.), *Dzikie rośliny jadalne: zapomniany potencjał przyrody*. Mat. konf. Przemysł–Bolestraszyce 13 września 2007. Arboretum i Zakład Fizjografii w Bolestraszcach, Bolestraszyce, pp. 5–12.
- Łuczaj, Ł., 2008b. Archival data on wild food plants eaten in Poland in 1948. *Journal of Ethnobiology and Ethnomedicine* 4, 4.
- Łuczaj, Ł., 2008c. Dzikie rosnące rośliny jadalne w ankiecie Jozefa Rostańskiego z roku 1883. *Wiadomości Botaniczne* 52, 39–50.
- Łuczaj, Ł., 2008d. Dzikie rośliny jadalne używane w okresach niedoboru żywności we wschodniej części Karpat (powiaty Krosno, Sanok, Lesko, Nadwórna, Kosów i Kołomyja) według ankiety szkolnej z 1934 roku. In: Łuczaj, Ł. (Ed.), *Dzikie rośliny jadalne: zapomniany potencjał przyrody*. Mat. konf. Przemysł–Bolestraszyce 13 września 2007. Arboretum i Zakład Fizjografii w Bolestraszcach, Bolestraszyce, pp. 161–181.
- Markuš, M., 1961. Zberné hospodárstvo na Horehroní. *Slovenský Národopis* 9, 190–242.
- Maurizio, A., 1927. *Geschichte unserer Pflanzennahrung, von den Urzeiten bis zur Gegenwart*. Paul Parey, Berlin.
- Moszyński, K., 1962. O sposobach badania kultury materialnej Prasłowian. *Ossolineum*, Wrocław.
- Nieroda, Z., 2009. Międzygeneracyjne różnice w używaniu jadalnych dziko rosnących roślin i grzybów we wsiach Pstrągowa, Czudec i Nowa Wieś. MA Thesis (Paedagogics). Academy of Humanities and Economics in Łódź. Department of Humanities, Łódź.
- Ogle, B.M., Dao, H.T.A., Mulokozi, G., Hambraeus, L., 2001. Micronutrient composition and nutritional importance of gathered vegetables in Vietnam. *International Journal of Food Sciences and Nutrition* 52, 485–499.
- Pałuch, A., 1984. Świat roślin w tradycyjnych praktykach leczniczych wsi polskiej. Wydawnictwo Uniwersytetu Wrocławskiego, Wrocław.
- Panter, K.E., 2004. Natural toxins of plant origin. In: Dąbrowski, W.M., Sikorski, Z.E. (Eds.), *Toxins in Food*. CRC Press, Boca Raton, FL, pp. 11–64.
- Paoletti, M.G., Dreon, A.L., Lorenzoni, G.G., 1995. Pistic, traditional food from Western Friuli, N.E. Italy. *Economic Botany* 49, 26–30.
- Pemberton, R.W., Lee, N.S., 1996. Wild food plants in South Korea; market presence, new crops, and exports to the United States. *Economic Botany* 50, 57–70.
- Picchi, G., Pieroni, A., 2005. *Atlante dei prodotti tipici. Le erbe. Rai – Agra, Rome*.
- Pieroni, A., 1999. Gathered wild food plants in the upper valley of the Serchio River (Garfagnana), Central Italy. *Economic Botany* 53, 327–341.
- Pieroni, A., 2001. Evaluation of the cultural significance of wild food botanicals traditionally consumed in Northwestern Tuscany, Italy. *Journal of Ethnobiology* 21, 89–104.
- Pieroni, A., Janiak, V., Dürr, C.M., Lüdeke, S., Trachsel, E., Heinrich, M., 2002. In vitro antioxidant activity of non-cultivated vegetables of ethnic Albanians in southern Italy. *Phytotherapy Research* 16, 467–473.
- Pieroni, A., Nebel, S., Santoro, R.F., Heinrich, M., 2005. Food for two seasons: culinary uses of non-cultivated local vegetables and mushrooms in a south Italian village. *International Journal of Food Sciences and Nutrition* 56, 245–272.
- Pirożnikow, E., 2008. Postulowany przez księdza Kluka program zdrowotnego użytkowania pokarmowego dziko rosnących roślin jako lekarstwo na nędzę jednych oraz na nadmiar zbytków innych. In: Łuczaj, Ł. (Ed.), *Dzikie rośliny jadalne: zapomniany potencjał przyrody*. Mat. konf. Przemysł–Bolestraszyce 13 września 2007. Arboretum i Zakład Fizjografii w Bolestraszcach, Bolestraszyce, pp. 67–81.
- Price, L.L., 2006. Wild food plants in farming environments with special reference to Northeastern Thailand, food as functional and medicinal, and the social roles of women. In: Pieroni, A., Price, L.L. (Eds.), *Eating and Healing: Traditional Food as Medicine*. Food Products Press, New York/London/Oxford, pp. 65–100.
- Redžić, S., 2006. Wild edible plants and their traditional use in the human nutrition in Bosnia-Herzegovina. *Ecology of Food and Nutrition* 45, 189–232.
- Rivera, D., Obón, C., Heinrich, M., Inocencio, C., Verde, A., Fajardo, J., 2006. Gathered mediterranean food plants—ethnobotanical investigations and historical development. In: Heinrich, M., Müller, W.E., Galli, C. (Eds.), *Local Mediterranean Food Plants and Nutraceuticals*, 59. Forum of Nutrition, Karger, Basel, pp. 18–74.
- Rostański, J., 1916. O nazwach oraz użytkach ćwikły, buraków i barszczu. *Akademia Umiejętności, Kraków*.
- Tanaka, T., 1976. *Cyclopaedia of Edible Plants of the World*. Keigaku Publishing, Tokyo.
- Tapsell, L.C., Hemphill, I., Cobiac, L., Patch, C.S., Sullivan, D.R., Fenech, M., Roodenrys, S., Keogh, J.B., Clifton, P.M., Williams, P.G., Fazio, V.A., Inge, K.E., 2006. Health benefits of herbs and spices: the past, the present, the future. *The Medical Journal of Australia* 185, S4–24.
- Tutin, T.G., Heywood, V.H., Burgess, D.M., Moore, D.H., Valentine, S.M., Walters, S.M., Webb, D.A., 1964–1980. *Flora Europaea*, vol. 1–5. The University Press, Cambridge and London.
- Vakarelski, H., 1965. *Etnografia Bułgarii*. Polskie Towarzystwo Ludoznawcze, Wrocław.
- Zobel, A.M., Brown, S.A., 1990. Dermatitis-inducing furanocoumarins on leaf surfaces of eight species of Rutaceous and Umbelliferous plants. *Journal of Chemical Ecology* 16, 693–700.