

Wild food plants and fungi used by Ukrainians in the western part of the Maramureș region in Romania

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Abstract

Wild food and fungi use in the countryside has always been an important part of human-nature relationships. Due to social changes in most rural areas of Europe this part of traditional ecological knowledge is shrinking. The aim of our study was to record the use of wild foods and plants among the Ukrainian (Carpatho-Rusyns) minority in the western part of Romanian Maramureș. We carried out 64 interviews in two villages. Voucher specimens were collected and DNA barcoding was used to identify most fungi taxa. We recorded the use of 44 taxa of plants altogether (including 8 taxa used only for herbal teas) and 24 taxa of fungi. On average 7.7 species of plants and 9.7 species of fungi were listed per interview. Edible fungi are thus an important part of local cuisine and they are eagerly gathered by everyone. The use of a few woodland bracket fungi is worth pointing out. No signs of degeneration of this knowledge were observed. Wild fruits are less collected now and wild greens are rarely collected nowadays. This pattern is typical of many places in Central Europe.

Keywords: ethnobotany; ethnomycology; mycophilous; Romania; Ukraine

Introduction

South-Eastern Europe is, due to a combination of historical, political and biological factors, a hotspot of biocultural diversity in Europe [1]. This also applies to Romania, a country with sizable ethnic minorities and a well-preserved rural culture [2,3]. The particular position of Romania as a place where the relics of ancient customs and traditions abound was emphasized by the famous anthropologist Mircea Eliade [4].

Romania was the subject of several ethnographic studies concerning plant and fungi use in the 19th and 20th centuries, but these works only concerned the Romanian and Hungarian population (for summary see [5–7]). In the past few years, modern ethnobotanical studies have been carried out in Romania. They were focused on ethnic minorities such as Hungarians [7–11], Poles [12,13], Italians [14] and Tartars [15].

In this article we would like to look at an aspect of the ethnobotany of Ukrainians, who are the fourth largest ethnic group in Romania (after Romanians, Hungarians and Roma). No ethnobotanical research has yet been carried out among

the Ukrainians of Romania. What is more, to this date, only one ethnobotanical paper (using a modern approach with a large number of informants) has been published concerning any Ukrainian population in Europe [16].

Knowledge of wild food plants and fungi used to be an important part of rural culture in Europe. Although on an everyday basis these items constituted only a small part of calorie intake, they provided an important diversification of a diet based on a few staples, provided a source of vitamins, proteins and carbohydrates, and were crucial for the survival of people during times of famine or spring-time food shortages [17].

Several studies on wild food plants in Eastern and South-Eastern Europe have been published recently (e.g., [18–32]). They include reviews of older ethnographic literature and local field studies. However, no information is available concerning wild foods in the Maramureș region of Romania, hence the documentation of this domain was the aim of our study.

Material and methods

Ukrainians are the third largest ethnic minority in Romania (after Hungarians and Roma). According to the Romanian census of 2011 they number 51 703 people, making up

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0.3% of the total population of the country [33]. Ukrainians claim that the number is actually 250 000–300 000 [34]. Over 60% of all Romanian Ukrainians live in Maramureş County [34,35], where they constitute 6.8% of the population. This group of Ukrainians mainly inhabits an area directly adjacent to the Ukrainian border. They found themselves divided between two countries (Romania and Czechoslovakia) after the fall of the Austro-Hungarian Empire in which Maramureş was a Hungarian administrative region [36]. After World War II the Czechoslovakian part of Maramureş was taken over by the Soviet Ukrainian Republic and is now a part of the Republic of Ukraine. In Romania Ukrainians form a majority around the town of Sighetu Marmăției, although their villages are interspersed with Hungarian and Romanian settlements. The Ukrainian villages in Maramureş can be seen as the ragged southwestern edge of the whole Ukrainian speaking area. Some scholars, historians, ethnologists and local politicians distinguish a separate nation called Carpatho-Rusyns to differentiate the mountain Ukrainian populations in Slovakia, Poland, Romania and the Ukrainian Carpathians from the lowland Ukrainian nation [35,37]. This is a controversial point which we are not going to discuss in this article, hence we simply refer to the local population as “Ukrainian”. Most of the Ukrainian villages in Maramureş were settled around the 14th century, probably from various parts of the Carpathian Mountains range [38,39].

In this study we researched the two largest lowland Ukrainian villages from the Tisa valley – Remeți (with 2478 inhabitants, data from 2011 [40]) and Lunca la Tisa (1030 inhabitants [41]; Fig. 1). The real population number

is now much lower than that given in the statistics, due to the emigration to Western and Southern Europe. It is commonly believed that the origin of these two villages is different. Remeți people are locally called *Hajnali*, whereas some ethnographers classify the people from Lunca as belonging (with a few other villages further east) to the Hutsul ethnographic group, though this identity is not claimed by the actual population [35,42].

Most people make a living from agriculture, work in Sighetu, or work abroad. Small-scale agriculture is well developed here. Most people grow their own staples (maize, wheat, potatoes, etc.), vegetables and fruits, and produce their own fruit brandy. They regained private land collectivized in the Communist period. Private pastures are managed communally using hired shepherds. The pastures located above the villages create an intrinsic mosaic of grassland, orchards and small-scale woodland, in some places turning into woodland meadows. The area has a very high plant diversity represented by riparian, ruderal, meadow, pasture and ancient woodland vegetation within a short walk of the village. Most forests near the village are deciduous, mixed with oak (*Quercus* spp.) and hornbeam (*Carpinus betulus*), then, higher up, dominated by beech (*Fagus sylvatica*).

The research was carried out following the American Anthropological Association Code of Ethics [43] and the International Society of Ethnobiology Code of Ethics [44]. Data were collected mainly using the free listing method, accompanied by participant observation informal walks with selected key informants. The research took place in November 2012, October 2013, and May and August 2014.



Fig. 1 Study area. A – Lunca la Tisa, B – Remeți, S – Sighetu Marmăției, the nearest local town and market where mushrooms are sold.

Interviews were carried out in the local dialect of Ukrainian. The interviews were carried out in two villages: Remeţi (26 interviews) and Lunca la Tisa (40 interviews). Both villages are of nearly pure Ukrainian ethnicity. In Lunca people of the Orthodox denomination predominate, whereas Remeţi is divided between Orthodox and two Neo-Protestant groups.

Participants were approached outside, during their farm work, or were pre-selected from among the knowledgeable informants (facilitated by the fact that T.K. had previously spent a few months living in Remeţi, and K.S. had relatives living in Lunca). Altogether, 64 free listing questionnaires were obtained, mainly from middle-aged and elderly inhabitants. This included 52 single informants and 12 interviews with 2 or 3 people (altogether 74 people: 32 women, 41 men). Both the mean and median age of informants was 56.5, with the oldest informant aged 89 and the youngest 26.

The participants were asked their age and places of origin and habitation. Then they were asked the following questions:

1. What wild mushrooms have you collected?
2. What wild fruits have you collected?
3. What wild vegetables have you collected?
4. What wild roots have you collected?

Plants used as everyday infusions were also included if they were mentioned by the respondents, when used not with a strictly medical aim but drunk as so called “recreational tea” [45].

Voucher specimens were collected and deposited in the herbarium of the Faculty of Biology of Warsaw University (WA). Plant names used are consistent with The Plant List [46]. Most fungi specimens were successfully identified using the DNA barcoding technique [47,48]. Fungal DNA was extracted from a small part of each fruit body using Plant and Fungi DNA Purification Kit (Eurx), following standard protocol. The PCR cocktail consisted of 4 ml DNA extract, 0.5 ml each of the primers (ITS5 and ITS4 in 10 nmol concentration) and 5 ml Type-it Microsatellite PCR Kit (Qiagen). PCR was carried out using the following thermocycling conditions: an initial 15 min at 95°C, followed by 35 cycles

at 95°C for 30 s, 55°C for 30 s, 72°C for 1 min, and a final cycle of 10 min at 72°C. PCR products were estimated by running 5 ml DNA amplicon on 1.5% agarose gel for 30 min. The PCR products were sequenced using ITS4 primers at the Laboratory of Molecular Biology of Adam Mickiewicz University (Poznań). The obtained sequences were verified visually on chromatograms using BIOEDIT. Nuclear ITS sequences obtained in this study are deposited in GenBank [49], with the accession numbers listed in Tab. 1.

Results

Altogether, 44 species of wild food and herbal tea plants (36 species if herbal teas are excluded) and 24 mushroom taxa were recorded as used nowadays or in the recent past (since World War II) in the area (Tab. 2, Tab. 3). Among the listed species are 10 species whose leaves are used for raw salads or cooked dishes, 17 species with edible fruits, and 12 species whose leaves, shoots or flowers are used for everyday herbal teas. On average, 17.4 species (median = 17, minimum 6, maximum 36) were listed per interview: 9.7 species of fungi (maximum 18), 4.4 species of fruits (median 4.5, maximum 11), 1.7 species of wild vegetables (median 1, maximum 6), 0.7 species used as herbal teas (median 0), 0.5 species with edible flowers (median 0) and 0.4 species with edible roots (median 1).

Four of the most commonly used wild food plant species were fruits: *Rubus idaeus*, *Rubus* spp. (subgenus *Rubus*), *Vaccinium myrtillus* and *Fragaria vesca*. The next few places in the frequency rank were occupied by wild greens (*Chenopodium album*, *Rumex acetosa* and *Urtica dioica*) and fruits (*Rosa canina*, *Prunus avium* and *P. spinosa*) interchangeably.

The most often used wild foods in the studied villages are mushrooms. They are eagerly collected by nearly everyone and everyone mentioned mushrooms in their free list. They are eaten both fresh and preserved. The most common preparation technique is frying with onions. They are also added to soups and sauces. *Zakuska* is a popular sauce made of fried

Tab. 1 Molecular identification of mushroom samples analyzed in this study and GenBank accession numbers for nrITS sequences (see Tab. 3 for full names including authority).

Sample No.	Identification	Best match	E-value	Similarity (%)	Accession numbers
1	<i>Lactifluus glaucescens</i>	<i>Lactifluus glaucescens</i>	0.0	99	KP967537
2	<i>Ramaria flavesceus</i>	<i>Ramaria flavesceus</i>	0.0	99	KP967538
3	<i>Russula cyanoxantha</i>	<i>Russula cyanoxantha</i>	0.0	97	KP967539
4	<i>Russula heterophylla</i>	<i>Russula heterophylla</i>	0.0	99	KP967540
5	<i>Leccinum pseudoscabrum</i>	<i>Leccinum pseudoscabrum</i>	0.0	99	KP967541
6	<i>Ramaria</i> sp. (<i>Ramaria</i> cf <i>flavigelatinosa</i>)	<i>Ramaria flavigelatinosa</i>	0.0	96	KP967542
8	<i>Macrolepiota procera</i>	<i>Macrolepiota procera</i>	0.0	99	KP967543
10	<i>Russula virescens</i>	<i>Russula virescens</i>	0.0	99	KP967544
31	<i>Lactarius controversus</i>	<i>Lactarius controversus</i>	0.0	99	KP967545
32	<i>Russula medullata</i>	<i>Russula medullata</i>	0.0	99	KP967546
33	<i>Entoloma clypeatum</i>	<i>Entoloma clypeatum</i>	0.0	98	KP967547

Tab. 2 Plants used in food contexts in the study area.

Scientific name	Local name (LU – Lunca la Tisa; RE – Remeţi)	Part used	Use reports		Voucher number (starting from WA00000)
			N = 66	Use	
<i>Achillea millefolium</i> L.	мурашчуннік, мурашчунник	fl	7	tea	46934
<i>Allium</i> spp.	дикий часнок, дика цибуля	l	3	snack	-
<i>Armoracia rusticana</i> P. Gaertn., B.Mey. & Scherb.	хрін	rt	9	spice for a salad	46954
<i>Betula pendula</i> Roth	береза	sap	9	raw beverage	46943
<i>Carum carvi</i> L.	дикий кмін	fr	8	tea, cabbage dishes	46936
<i>Centaureum erythraea</i> Rafn.	цинторія	fl	2	tea	-
<i>Chenopodium album</i> L.	нати́на, лобода	l	18	boiled side-dish	46942
<i>Cornus mas</i> L.	корн, кизил	fr	2	raw snack	46929
<i>Corylus avellana</i> L.	горішки ліскові	fr	15	raw snack	46925
<i>Crataegus rhipidophylla</i> Gand.	глуг	fr	1	tea	46940
<i>Fagus sylvatica</i> L.	жир	fr, l	7	raw children's snack	46944
<i>Fallopia japonica</i> (Houtt.) Ronse Decr.	RE: бамбус, бамбусиня	l	4	sarma wrapping	46960
<i>Fragaria vesca</i> L.	ягоди	fr	30	raw	46948
<i>Helianthus tuberosus</i> L.	пічовані́е, пічовані́	t	13	raw snack, formerly also as emergency staple	46953
<i>Hypericum perforatum</i> L.	кровник, звіробій	fl	8	tea	46933
<i>Malus</i> sp.	ябука	fr	5	fruit brandy	-
<i>Matricaria suaveolens</i> Koch & <i>Matricaria chamomilla</i> L.	LU: романечка, RE: романиця	fl	6	tea	46935
<i>Origanum vulgare</i> L.	материнка	fl	3	tea	46932
<i>Oxalis stricta</i> L. and <i>O. acetosella</i> L.	капуста заєцова	l	1	raw snack	46941 (str)
<i>Picea abies</i> (L.) H. Karst.	ялина (tree), чатиня (young twigs)	l	14	young twigs covered in syrup – medicinal snack	46949
<i>Polypodium vulgare</i> L.	солодиш	rh	2	raw snack (obsolete)	-
<i>Prunus avium</i> L.	дикі черешні	l, p	17	fruits – raw, fruit brandy; fruit petiole – tea (believed to help kidneys)	46930
<i>Prunus spinosa</i> L.	тер, терень	fr	16	raw snack	46945
<i>Quercus robur</i> L., <i>Q. petraea</i> (Matt.) Liebl.	жолуді, горішки дубове	fr	5	formerly a famine admixture to staple foods	46946 (ro), 46959 (pe)
<i>Ranunculus ficaria</i> L.	LU: дикий салат, ліболабо	l	7	soups, boiled side-dish	-
<i>Robinia pseudoacacia</i> L.	LU: акація, акац	fl	5	raw snack	46957
<i>Rosa canina</i> L.	гечи-печи, гечи	fr	25	jam, tea	46938
<i>Rubus fruticosus</i> L. agg. & <i>R. caesius</i> L.	черниця	fr	48	raw snack, jam	46926, 46958 (fr) 46927 (cae)
<i>Rubus idaeus</i> L.	малина	fr	50	raw snack, jam	46947
<i>Rumex patientia</i> L.	щава	l	5	boiled side-dish, sarma wrapping	46950
<i>Rumex acetosa</i> L. & <i>R. acetosella</i> L.	LU: магіріш, квасок, RE: квасник	l	27	raw snack, soup	46937 (-osa), 46951 (-ella)
<i>Sambucus nigra</i> L.	бзина	fl	13	tea	46955
<i>Taraxacum</i> sect. <i>Ruderalia</i> sp. pl.	хрищатник, кульбаба	l	11	raw salad, boiled side- dish	-
<i>Thymus serpyllum</i> L. s.l.	чабрик	fl	4	tea, spice for home- made sausage	46939

Tab. 2 (continued)

Scientific name	Local name (LU – Lunca la Tisa; RE – Remeți)	Part used	Use reports N = 66	Use	Voucher number (starting from WA00000)
<i>Tilia cordata</i> Mill., <i>T. platyphyllos</i> Mill.	лепа, ліпа, липа	fl	7	tea	-
<i>Tussilago farfara</i> L.	подбіл	l	3	sarma wrapping (rarely)	46928
<i>Urtica dioica</i> L.	кропива, жалива	l	16	soup, boiled side-dish	46961
<i>Vaccinium myrtillus</i> L.	афини	fr, l	34	raw, jam, fruit brandy; twigs for tea	46931
<i>Vaccinium vitis-idaea</i> L.	афини черлене, мирішоре	fr, l	5	raw; twigs for tea	46952
<i>Viburnum opulus</i> L.	калина	fr	7	raw after frosts – collected straight from the bush or kept dried in a hay stack	46956

fl – flowers or flowering tops; fr – fruits; l – leaves or young shoots; p – fruit petioles; rh – rhizomes; rt – roots; t – tubers

Tab. 3 Wild food fungi used in the study area. Classification follows Species Fungorum (<http://www.speciesfungorum.org>).

Scientific name	Local name; LU – Lunca la Tisa, Re – Remeți	Use reports N = 66	Voucher No. (starting from WA00000)
<i>Agaricus</i> sp.	LU: шампінйони, шампйони, RE: печериця	10	-
<i>Armillaria ostoyae</i> (Romagn.) Herink	LU: геби, RE: пудпіки	47	51001
<i>Boletus edulis</i> Bull.	LU: товстокоренцібілухи, гриби [two kinds: дубові – “oak ones”, смерекові – “spruce ones”]; RE: білухи	66	51002
<i>Cantharellus cibarius</i> Fr.	лисички	52	-
<i>Entoloma clypeatum</i> (L.) P. Kumm.	LU: пудпіки; RE: пудсадники	28	51003
<i>Lactifluus glaucescens</i> (Crossl.) Verbeken & <i>Lactarius controversus</i> Pers.	LU: білі, RE: біляки, горкині	56	51004 (<i>L. glauc.</i>), 51021 (<i>L. contr.</i>)
<i>Lactarius volemus</i> (Fr.) Fr.	соловішка	7	-
<i>Laetiporus sulphureus</i> (Bull.) Murrill	RE: корбани	7	51005
<i>Leccinum scabrum</i> (Bull.) Gray	козарі	45	51006, 51007
<i>Leccinum aurantiacum</i> (Bull.) Gray & <i>L. versipelle</i> (Fr. & Hök) Snell	LU: тополяки, RE: черленюхи	56	51008 (<i>L. aur.</i>), 51009 (<i>L. ver.</i>)
<i>Leccinum pseudoscabrum</i> (Kallenb.) Šutara	пудлісники	20	51010
<i>Lycoperdon</i> , <i>Bovista</i> or/and <i>Calvatia</i>	поргавка, порчавка	8	-
<i>Macrolepiota procera</i> (Scop.) Singer	LU & RE: кучмо гомбо, LU: омбрели	38	51011, 51012
<i>Pleurotus</i> cf <i>ostreatus</i> (Jacq.) P. Kumm.	гливи	29	-
<i>Polyporus squamosus</i> (Huds.) Fr.	LU: пистряки, RE: пистрики	16	51013
<i>Ramaria flavesces</i> (Schaeff.) R.H. Petersen & <i>R. cf flavigelatiosa</i> Marr & D.E. Stuntz (?)	LU: ряска, RE: перстика	33	51014 (<i>R. flaves.</i>), 51015 (<i>R. flavig.</i>)
<i>Russula virescens</i> (Schaeff.) Fr., <i>R. cyanoxantha</i> (Schaeff.) Fr., <i>R. heterophylla</i> (Fr.) Fr., <i>R. medullata</i> Romagn.	mainly: голубінки, also: суроядка, сиріюжка	66	51016 (<i>R. vires.</i>), 51017 (<i>R. cyan.</i>), 51018 (<i>R. heter.</i>), 51016 (<i>R. med.</i>)
<i>Xerocomellus chrysenteron</i> (Bull.) Šutara	LU: пітух, RE: потячник, жултюх	8	51020

mushrooms, onions, tomatoes and paprika. It is a side-dish, which is often pasteurized for winter. Mushrooms are stored in a variety of ways. They are frozen (now a most common preparation technique), pasteurized after boiling, pickled in a brine of vinegar, salt, sugar, bay leaf and black pepper, or lactofermented. The most commonly used mushroom, and most highly regarded is bolete *Boletus edulis*, mentioned by all respondents. Another taxon mentioned by everyone was *Russula*. Other frequently used taxa include scabrous bolete *Leccinum* spp., milk-caps (*Lactifluus glaucescens* and *Lactarius controversus* as one folk taxon), chanterelle *Cantharellus cibarius*, honey fungus *Armillaria ostoyae*, parasol mushroom *Macrolepiota procera*, *Ramaria* spp., oyster mushroom *Pleurotus ostreatus* and *Entoloma clypeatum*.

Milk caps (*Lactifluus glaucescens* and *Lactarius controversus*) are treated as a delicacy due to their strongly peppery taste. This is also why they are not mixed with other species. The gills of these milk-caps are scraped off before use and only the remaining part of the cap is fried directly in the frying pan (with onions). Another species with an interesting use is *Lactarius volemus*, which is eaten raw.

Most edible fleshy fruits from trees and shrubs are collected in the area. Most commonly these are blackberry (*Rubus* spp.), bilberry (*Vaccinium myrtillus*), wild strawberry (*Fragaria vesca*), wild cherry (*Prunus avium*) and raspberry (*Rubus idaeus*). Fruits are usually eaten raw, made into jams or distilled into fruit brandy. Wild fruits have a secondary role as the villages and the land around them are full of cultivated fruit plants (mainly apples, pears, plums and grapevine).

Wild greens are rarely collected nowadays, they were more commonly eaten in the 1960s and earlier. Only a few species have been used, i.e., commonly lamb's quarters *Chenopodium album*, nettle *Urtica dioica*, sorrel *Rumex acetosa* and more rarely lesser celandine *Ranunculus ficaria*. The greens are boiled and/or fried to make a side-dish or soup.

There are only two wild plants whose underground organs are commonly collected. The tubers of Jerusalem artichoke (*Helianthus tuberosus*), now still widely eaten raw as a snack, but in the past also baked in the stove. The roots of horseradish (*Artemisia rusticana*) grows in a semi-domesticated state made into salad. The third species, mentioned only by two older informants from Lunca, are the sweet rhizomes of a woodland fern, polypody (*Polypodium vulgare*), which used to be eaten as a snack by children.

Discussion

The proportions of different categories of wild foods collected in the study area is very typical for Central Europe as a whole. The largest and most appreciated categories are mushrooms, followed by fruits. Wild green vegetables constitute a minor source of food. A nearly identical pattern can be observed in national-scale reviews for Poland [18,50], the Czech Republic [51], Hungary [20], Estonia [19], Slovakia [21] and Sweden [22]. Although the lists of wild greens are long, the use of most species is extinct or concerns small territories, whereas only a few species of wild fruits are gathered commonly and quoted in most local

studies listed in those reviews. The plant taxa eaten most commonly in the study area are nearly the same as the taxa eaten most commonly in other northern Slavic countries and other above-mentioned countries. For example seven of the wild food plants with the highest number of citations in our study were among the eight most commonly used wild food plants in Poland [18]. Local studies in a hilly area of Austria and in western Ukraine showed a similar pattern, with fruits and fungi the dominant kind of wild food gathered by locals [16,52].

The slight importance of wild greens recorded here is very characteristic of other northern Slavic territories and Eastern and Northern European countries [17–22], where the use of wild greens is mainly limited to *Rumex* spp., *Chenopodium album* and *Urtica dioica*, although in this area some more variety in the use of wild edible leaves can be observed (for instance the former use of *Ranunculus ficaria* for soups or wrapping sarma with the leaves of *Reynoutria japonica*). Interestingly, we did not record use of the fruits of elder (*Sambucus nigra*), which is practiced in neighboring countries (e.g., [16,18,44], though the flowers are used to make beverages in the study area.

The most often used mushroom taxa (Boletaceae, *Russula*, *Lactifluus*, *Lactarius*, *Cantharellus*) in the study area are identical to those used in other parts of the northern Slavic area [50,53–55]. The number of locally used taxa (16 folk genera containing 24 scientific species) is similar to other local ethnomycological studies from Central Europe compared for example to 17 folk taxa containing 28 scientific species used in three studied villages in SE Poland or 15 taxa recorded in the Roztochya region in western Ukraine. It is however surprising that locals do not gather *Suillus* spp. and *Lactarius* sect. *Deliciosi* – widely known and used in Poland, Ukraine, Belarus and Russia (e.g., [16,53–55]). This may stem from the fact that their host tree species, *Pinus sylvestris*, *Larix* spp. and *Abies alba* are hard to find in this area and *Picea abies* (a symbiotic tree for *Lactarius deterrimus*) is not so widespread either.

Out of the fifteen mushroom taxa used in the Roztochya region in western Ukraine, ten are used in our study area. The discrepancy probably stems from the different mycobiota found in the two places, or at least the differences in abundance of particular taxa. On the other hand cultural factors may also be partly responsible. For instance, a striking feature of the local repertoire of mushrooms used is a considerable list of taxa growing on tree trunks, such as *Polyporus squarrosus*, oyster mushrooms *Pleurotus* spp., and *Laetiporus sulphureus*. The knowledge of *Entoloma clypeatum* is also worth emphasizing. This is a species growing in grasslands among Rosaceae fruit trees (associated mainly with plums in the study area) rarely reported as traditionally used in Europe (but eaten for example by Croats [56], Hungarians [57]; and Ukrainians [53,58]) and easily confused with some highly toxic taxa.

An interesting feature of the local cuisine is the use of *Lactifluus glaucescens*, a species with a strong peppery taste, highly appreciated by the locals. Its use has not yet been recorded by ethnomycological works yet, but this probably stems from the fact that it was usually not distinguished from the similar *L. piperatus*. A clear difference between

the two species was confirmed by genetic studies [59]. The latter species is used for food in many parts of Poland [53,54], Hungary [57] and Russia [55]. This group of milk-caps is also commonly collected in other parts of Romania [6,57]. It is not unlikely that *L. piperatus* also occurs in the study area and is not distinguished from the former species. Another species not distinguished from *L. glaucescens* is *Lactarius controversus* gathered in the study area. Similarly to *L. glaucescens* it has not been reported in ethnomycological studies as being used for food. The collection of data on the gathering and consumptions of different species of *Lactarius* and *Lactifluus* can be one of the aims of European ethnomycology as in some countries a large number of species from

these related genera is used (e.g., in Spain, see [60,61]), but this phenomenon is little documented.

Conclusions

Fungi are culturally more important than wild food plants for the studied population. Due to the large number of frequently used fungi taxa, the Ukrainians of Maramureş can definitely be described as a mycophilous community.

The use of wild fruits and greens for consumption is decreasing, a similar trend to that observed in other rural areas of Eastern Europe.

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Authors' contributions

The following declarations about authors' contributions to the research have been made: interviews were performed by ŁŁ, KS and TK; morphological identification of fungi: AK; DNA analysis: MP; plant identification and writing the first draft: ŁŁ. All the authors took part in writing the final version.

Competing interests

The following declarations about authors' competing interests have been made: ŁŁ: I am an associate editor of the *Acta Societatis Botanicorum Poloniae* journal; other authors: no competing interests.

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