Forest as Stronghold of Local Ecological Practice: Currently Used Wild Food Plants in Polesia, Northern Ukraine

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Local ecological practice (LEP, e.g., the everyday practice of collecting and using plants, including wild food plants) is shaped by nature (available local resources) and culture (local perceptions and knowledge on their usability), including a multitude of factors, among which language and geographical or cultural separation have been found to play crucial roles in affecting biocultural diversity. Also, proximity to the forest has been shown to increase the use of plants. We conducted ethnobotanical fieldwork within eastern and western regions of Ukrainian Polesia, during which we interviewed 118 people. Through semi-structured interviews, we recorded the distribution of the current uses of 70 wild food taxa. The analysis of use records revealed homogeneous distribution of use despite the geographical distance and different spoken dialects; however, we were able to single out the highly sylvan region of eastern Polesia as the area with highest biocultural diversity for the use of wild food plants. The results suggest that in the context of the overall homogenization of local ecological knowledge, the continued existence of unintended contact with nature through living and working in the forest may be the primary factor maintaining the broader LEP in the sylvan area of eastern Polesia.

М сцева еколог чна практика (МЕП, що включа повсякденну практику збору та використання дикорослих рослин у жу) форму ться природою (м сцевими ресурсами) та культурою (м сцев знання про х використання), що включа безл ч чинник в, серед яких мова та географ чне або культурне в докремлення в д грають вир шальну роль у вплив на б окультурне р зноман ття. Також показано, що близьк сть до л су зб льшу використання рослин. Ми проводили етноботан чн польов роботи у двох областях Укра нського Пол сся, в ход яких ми провели нтерв'ю з 118 людьми. За допомогою нап встуктурованих нтерв'ю ми задокументували поточне використання 70 таксон в дикорослих рослин у жу. Анал з запис в про вживання св дчить про однор дний розпод л використання, незважаючи на географ чне розташування та р зн розмовн д алекти; однак, ми змогли вид лити л систий рег он Сх дного Пол сся як територ ю з найвищим б окультурним р зноман ттям використання дикорослих рослин у жу. Результати св дчать, що в контекст загально гомоген зац м сцевих еколог чних знань, продовження снування контакту з природою живучи та працюючи в л с може бути основним чинником, який п дтриму ширшу МЕПу в л сов й зон Сх дного Пол сся.

Key Words: Local ecological practice, wild food plants, Ukraine, Polesia, ethnobotany, forest.

Introduction

The world's biocultural diversity ("the diversity of life in all its manifestations [biological, cultural, and linguistic] which are interrelated within a complex socio-ecological adaptive system" [Maffi and Woodley 2012]) is rapidly declining due to disappearing plant and animal species and the homogenization of cultures and languages. In order to mitigate this process, it is important to understand the possible strongholds for biocultural diversity. The use of wild food plants (e.g., plants growing without the direct human intention of cultivating

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them for food purposes) is a good example of biocultural diversity in action and a definable part of Local Ecological Practice (LEP). While Local Ecological Knowledge (LEK) is also dynamic (Gómez-Baggethun and Reyes-García 2013), we want to underline the fact that LEK can be passive (cf. Reyes-García et al. 2007), and that the term "knowledge" itself is often perceived as something passive. We thus decided to use the term LEP instead of LEK. Although the term LEP was defined in the 1990s (Ravi Rajan 1998) and, of late, it has occasionally been used in the context of social-ecological memory (Barthel et al. 2014) or food safety governance (McMahon 2013), it has not yet found its way into the ethnobiology literature.

The local use of wild food plants is now a popular research subject as it represents nutrition diversification, a so-called functional food option (Blades 2000) in times of abundance, as well as a security reserve during times of crop failure or human-induced famine (Redžić and Ferrier 2014; Vorstenbosch et al. 2017). The use of wild food plants is shaped by numerous factors, among which language has been found to play a crucial role in affecting biocultural diversity by limiting knowledge diffusion (Maffi 2005; Pieroni and Quave 2005).

Among other factors, geopolitics (i.e., changes to state borders, Sõukand and Pieroni 2016), ethnicity (Pieroni and Quave 2005), religion (Bellia and Pieroni 2015; Pieroni et al. 2011), socioeconomic conditions (Stryamets et al. 2015), and remoteness (Bussmann et al. 2016) were found to have a strong influence on the use of wild food plants. The use of wild food plants, compared with the use of medicinal plants, is more homogenously distributed within a population (Sõukand et al. 2017) and more evenly shared by different ethnic groups inhabiting the same ecological niche (Quave and Pieroni 2015) or the same cultural group divided by a state border (Sõukand and Pieroni 2016). Uses of wild food plants are mainly learned during childhood and nowadays are often subject to abandonment rather than valorization (Kalle and Sõukand 2016; Reyes-García et al. 2015).

Our recent studies conducted among the Bukovinian Hutsuls and Boikos in Ukraine have shown that state borders (between Ukraine and Romania) in close proximity are more effective diversifiers within the wild food domain than mountains separating ethnic groups and dialects (Pieroni and Soukand 2017; Sõukand and Pieroni 2016). Moreover, our study comparing the use of wild food plants by Boikos and Hutsuls (Pieroni and Soukand 2017) supported the possiblity of a homogenizing and standardizing effect of agrarian reforms (including collectivization, ammelioration, substitution of small-scale agriculture with an intensive one), and the obligation to work on collective farms in the former Soviet Union.

As the numbers of interviewees in our previously mentioned studies were relatively low, there was a need to increase the number of participants. Therefore, we decided to compare the current use of wild food plants within two regions of present-day Ukrainian Polesia which, due to vicissitudes of the first part of the twentieth century, were subjected to different socioeconomic and political factors, as one region belonged to the Soviet Ukraine and the other to Poland. Although both research sites now belong to one country (Ukraine), the Chernobyl disaster area lies in between them, dividing the region that extends over quite a large territory with similar ecological conditions and within presumably one ethnic group. The bird's-eye distance between the two research sites is circa 400 km, traversable in about 8 h by car.

Polesia is also referred to as "the land of forest," and this introduces an additional perspective. Several recent scholarly works conducted in rural Africa have found a correlation between the level of deforestation and the variety of the wild food used, the level of dietary diversity, and nutrient density (Maseko et al. 2017 and the references therein). Broegaard et al. (2017) demonstrated that "wild food contributed less to human diets in areas where pressure on land from commercial agriculture and conservation efforts was more intense." These authors also suggested that the relationship between forest and land use change must be further investigated. Therefore, as locations of the villages in one of the selected regions provided the opportunity to differentiate based on proximity of the forest, we wanted to establish if proximity affects the extent of LEP.

The current research aimed to contribute to a better understanding of the factors affecting the practice of collecting food from the wild and particularly within the post-Soviet realm. The specific objectives of the study were (a) to document the use of wild food plants in two separate research sites of Ukrainian Polesia, (b) to quantitatively compare the results obtained from the two regions, and (c) to compare the results obtained from sylvan and woodless (agriculturally disturbed) areas situated nearby in order to evaluate whether "living within the forest" affects the use of plants and to what extent.

The current use of wild food plants in Ukraine (as well as neighboring regions of the Russian Federation and Belarus) remains a little-studied subject, limited to only five fieldwork-based publications (Łuczaj et al. 2013; Pieroni and Soukand 2017; Sõukand and Pieroni 2016; Sõukand et al. 2017; Stryamets et al. 2015), two recently published studies based on archival sources (Kujawska et al. 2015; Łuczaj 2008), and the pionering work of Moszyński (1928) in a Polesia not yet divided by borders. Polesia is an importan region because of its relative isolation and borderland status. The current study is therefore an essential addition to the existing literature.

Data and Methods

The Land of the Forest

The Encyclopaedia of Ukraine describes the Polesia region as Ukraine's forest belt, covering approximately 100,000 km^2 Greater Polesia includes Polesia proper and several neighboring areas (including Chernihiv Polesia). The whole region is a uniform lowland plain with few higher elevations and valleys; large areas are covered with dunes. Polesia belongs to a temperate continental climate zone which has high humidity, and the region is characterized by foggy autumns, mild, snowy winters, and warm but humid summers with an average annual temperature of around 7 °C. Polesia is well supplied with water, with many lakes, especially in the western part, and nearly 70% of the land consists of low fertility (podzolic) soils. Vegetation of the region belongs to the mixed forest subzone of the East European broad-leaved forest zone. Historically, the region was completely covered with forest (dominated by *Pinus sylvestris* L., *Quercus robur* L., and *Betula* spp.) and marshland, but only one third of present-day Polesia is occupied by forest due to deforestation (which occurred in the second half of the nineteenth century) and the growth of swamps (Kubijovyč et al. 1993).

Both sites selected for comparison presently belong to the Ukrainian Polesia. The distance between Ljubeciv and Chernihiv is ca 600 km by car. People living in the Chernihiv region speak a mixture of Russian and a little Belarussian, and although they call themselves Ukrainians, very few speak standard Ukrainian. Those living in the Ljubeciv region speak a Polesian dialect, which is something between Ukrainian and Belarussian, very similar to standard Ukrainian. The second author, being fluent in both Ukrainian and Russian, routinely inquired about preferred language of the interview. Notably, without exception, Ukrainian was the preferred language for the Ljubeciv region, whereas in the Chernihiv region the interviewees preferred Russian. The Chernihiv region is technically on the borderland of Polesia proper and Chernihiv Polesia, which historically had similar ecological communities, but currently different extent of forestation. While the villages in the Ljubeciv region were all within about a 1–2 km distance from the nearest forest, the locations of the villages in the Chernihiv region provided the opportunity to differentiate based on proximity of the forest. The villages that we will later refer to as the "sylvan area" of Chernihiv were situated within the forest, while the villages of so-called "woodless area" were at least 5 km away from the nearest forestated zone. The woodless area was the result of relatively recent deforestation (within the lifetime of oldest interviewees, many of them mentioning going to the woods during childhood, but now "the forest being too far away").

Both sites have belonged to the Ukrainian side of the present-day Ukrainian-Belarus border since the 1940s, but were subjected to considerably different influences between the 1920s and 1940s. In 1921, the Peace Treaty of Riga ascribed all of eastern Polesia to the USSR, leaving western Polesia to Poland. This division resulted in the high Polonization of western Polesia with the Ukrainian language not recognized on an official level (Cichoracki 2014). At the same time, eastern Polesia was subjected to Holodomor, the artificial famine imposed in 1932–1933 by the Soviet regime across large areas, including all of eastern Polesia. Wolowyna et al. (2016) estimated the total direct loss from Holodomor in the Chernihiv region among rural populations to be 254,000 (slightly less than 1%), which is relatively low compared to other regions.

Among the nearly 120 people approached, we succeeded in interviewing one survivor of the Holodomor and altogether over 30 people born before 1942, who remembered the hardships of the 1940s during WWII or after it. Many of them repeatedly stressed that it was the forest that saved them from starvation, and a few even testified that they do not remember extreme hunger in their villages due to the availability of forest foods.

Field Study

We conducted the field study in October 2016 in nine villages in the Chernihiv region and 14 villages in the Ljubeciv region of Ukrainian Polesia (Fig. 1). The majority of 118 interviewees were approached on a pseudo-random basis (people working in their gardens or walking along the street), yet occasionally a snowball method was used to locate elderly people. We followed the ethical guidelines prescribed by the International Society of Ethnobiology (ISE 2008). Before beginning the interviews, the purpose of the research was explained, and oral informed consent was obtained from the participant(s). The interviews (lasting from 0.5 to 1.5 h) had a semi-structured format, with the subject of wild food plants approached through intuitive food categories (e.g., soups, preserves, salads, snacks, fresh fruits, fermentation, bread, recreational teas). In total, 69 interviews were conducted, of which 37 were individual interviews, 26 interviews were conducted with 2 individuals, 5 interviews were carried out with 3 people, and 1 with 4 individuals (interviewees worked or lived together, or neighbors were encountered while visiting each other). In the case of group interviews, disagreements, as well as agreements, were carefully recorded. The interviews were recorded in order to better extract the data, but this was done only with the permission of the interviewees and upon a promise not to disclose nor deposit recordings. In parallel (and in few cases where recording was not allowed), information was directly transcribed into field notebooks, which are deposited at the Folklore Institute Archives of the Estonian Literary Museum. All interviews were conducted anonymously, with only age, gender, and origin of the interviewee recorded. Only locally-born people were interviewed. Men represented 29% of the sample; mean age of all interviewees was 60.5 years, and birth year ranged from 1924 to 2002. The majority of the interviewees from the Chernihiv woodless area and all interviewees from the Ljubeciv region are or were (before retiring) involved with the collective farm. Later private agricultural enterprises replaced collective farms. Conversely, more than half of the interviewees in the Chernihiv sylvan area were involved to a greater or lesser extent in forestry work (as forest-managing collective farms and later enterprises were the primary employers in the region).

Local plant names were transcribed following the rules of standard Ukrainian and Russian using the Cyrillic alphabet. We collected few voucher specimens (deposited at the Estonian University of Life Sciences herbarium [TAA], bearing numbers POLEG001–7 and herbarium numbers TAA0140964–70). As the time of the field visit was the off-season for live plant collecting, we accepted dried plant samples offered by the interviewees (deposited at the Folklore Archives of the Estonian Literary Museum, bearing numbers POLED001–45).

Whenever it was not possible to collect voucher specimens or receive dried plant samples, identification was made based on the folk botanical name and precise description of the plant. In a few cases, when interviewees did not differentiate taxa at the species level, it was identified at the genus level, even if we collected dried plant samples for some representatives of the genus (for example, *Rumex* and *Rosa*). We followed this practice as there is no guarantee that interviewees, at some point in their lives, did not collect representatives of other local growing species belonging to the same genus. Taxonomic identification, botanical nomenclature, and family assignments followed the Flora Europaea (Tutin et al. 1964), The Plant List database (2013), and the Angiosperm Phylogeny Group IV (Stevens 2015).

Data Analysis

Information was assembled into an Excel database following emic (interviewee defined) food categories. In sum, we defined 21 use-categories (additives to fermentation, beer, boiled for food, compote, dessert, drink, fruit water, jam, raw, juice, kvass, *okroshka* [or cold soup], pies, salad, snacks, soup, strong alcohol, syrup, tea, wine, and wraps). The data was structured in detailed use-reports (DUR) reflecting the use of a plant part (e.g., fruits, leaves, aerial parts, flowers, etc.) prepared in a certain way (e.g., cooked, fresh) for a certain food category multiplied by the number of people mentioning such a use. We also calculated use instances (UI—the detailed use-report regardless of the number of people mentioning such a particular use) for comparison.

Further, we compared current UIs and taxa recorded for the Chernihiv and Ljubeciv research sites and also dividing the Chernihiv research site into two regions, sylvan and woodless areas, to address the question of the possible influence of the proximity of the forest. Jaccard Similarity Indices (JI) were calculated for used taxa and UI

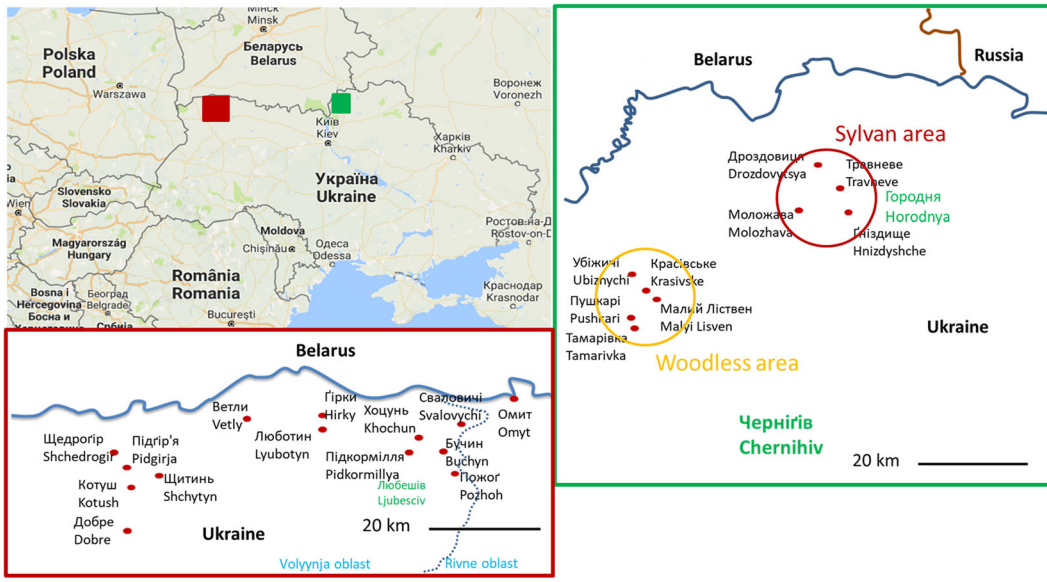

Fig. 1. Map of the region.

following the methodology of González-Tejero et al. (2008):

JI = (C/(A + B-C)) × 100, where A represents the number of taxa/UI in sample A, B is the number of taxa/UI in sample B, and C is the number of taxa/UI common to A and B.

Results

We recorded current uses for 70 taxa belonging to 33 plant families (Table 1), of which the most represented were Rosaceae (14 taxa), Ericaceae and Asteraceae (both 8 taxa), and Lamiaceae (6 taxa). The majority of the fruiting taxa were utilized in a wide variety of emic food uses. Of these taxa, the most versatile was *Vaccinium vitis-idaea* L., used in 9 emic food categories mainly related to (sweet) winter preserves but also recreational tea, followed by *Viburnum opulus* L., *Rubus idaeus* L., *Vaccinium oxycoccos* L., and *Vaccinium myrtillus* L., all used in 8 food categories similar to the "leader." *Vaccinium oxycoccos* was the only taxa for which solely fruits were used; for the others aerial parts, twigs, and leaves (*Rubus idaeus*) or flowers and leaves (*Viburnum opulus*) were also used, mainly for making recreational tea. Among 20 other taxa used in more than 2 food domains, there were only 5 that do not produce so-called fleshy fruits, such as *Betula* spp. (buds and sap utilized in variety of ways), *Rumex acetosa* L. (leaves snacked on, eaten as a salad, or boiled and served as soup or a side dish), *Armoracia* spp. roots ground for salad, soup, or strong alcohol and used with or without leaves for lactofermenting cucumbers and tomatoes. The most popular taxa also included *Urtica dioica* L., the leaves of which are utilized mainly for recreational tea but also as soup or salad, and *Quercus robur*, the bark of which was used for seasoning strong alcohol and fresh leaves added to lactofermented cucumbers and tomatoes dominantly in the Ljubeciv area, where children also tried the sap.

The most popular used taxa was *Vaccinium myrtillus*, eaten by almost 80% of interviewees. This was followed by *Rumex acetosa* (70%), *Rubus idaeus* and *Armoracia* spp. (eaten by slightly more than 50%), and *Betula* spp., *Prunus* subgen. *cerasus,* and *Fragaria vesca* L. (used by slightly less than 50% of the interviewees). The most popular uses within the food categories were a soup made with *Rumex acetosa* (over 65% of interviewees), snacks and jam made from *Vaccinium myrtillus* (around 50%), leaves and roots of *Armoracia* spp. as additives for lactofermentation (more than 40%), and the sap of *Betula* spp. as a drink (also more than 40% of interviewees). The most popular emic food category in which wild plants were represented was that of recreational tea (with 45 used taxa). This was

TABLE 1. TAXA USED.

Taxa	Local name	Used parts	Mode of use	Food made	Chernigiv Sylvian area (n = 30)	Chernigiv Woodless area (*n* = 29)	Lyubeshiv (n = 61)
Acer platanoides L., Sapindaceae	клён	Sap	Fermented	Kvass	2		1
			Fresh	Drink	13/1*	9	5
			Processed	Drink	2		1
Achillea millefolium L., Asteraceae (POLEG001)	деревей, серопорезник, тысячелистник	Aerial parts	Dried	Tea	7	5	
Acorus calamus L., Acoraceae	плюшняк, а р	Stem, white part	Fresh	Snacks		2	
Allium spp., Amaryllidaceae	дикий чеснок	Whole plant	Fresh	Snacks	3		
Arctostaphylos uva-ursi (L.) Spreng., Ericaceae (POLED040)	кам'яниця, медвеж ушк , камяниця	Fruits	Fresh	Snacks			3
		Leaves	Dried	Tea			1
Armoracia spp., Brassicaceae	хрен, хрін, хрон	Roots, leaves	Fresh	Added to lactofermented cucumbers and tomatoes	17	13	26
		Roots	Fresh	Salad	5	15	20/2*
				Soup		2	
				Strong alcohol	2		
Aronia melanocarpa (Michx.) Elliott, Rosaceae	чорна рябина, чорная рябина, чорна горубина	Fruits	Dried, processed	Compote			3
				Tea	3		1
			Fresh	Snacks		2	
			Processed	Drink	1		
Artemisia absinthium L., Asteraceae (POLED014)	палинь, полинь	Aerial parts	Dried	Tea	1	3	
			Unknown	Pancakes	/2*		
Berberis vulgaris L., Berberidaceae	барбарис	Fruits	Dried	Tea		2	
				Compote		2	
				Snacks	2		
Beta vulgaris L., Amaranthaceae	буряк, буряк червоний	Leaves	Fermented	Food		/1*	
		Roots	Fermented	Added to fermented birch sap for coloring			3
				Kvass			18/1*
				Kvass added to horseradish salad, for color on Easter			12
				Soup			7/1*
Betula spp., Betulaceae	береза	Buds	Fresh	Tea			1

TABLE 1. (CONTINUED).

Taxa	Local name	Used parts	Mode of use	Food made	Chernigiv Sylvian area (n = 30)	Chernigiv Woodless area (*n* = 29)	Lyubeshiv
		Sap	Fermented	Kvass	13	11	25
				okroshka	2	1	2
			Fresh	Drink	13/1*	14	24
			Processed	Drink	10		16
Calluna vulgaris (L.) Hull, Ericaceae (POLED045)	верос	Aerial parts	Dried	Tea	1		1
Carum carvi L., Apiaceae	тмин	Seeds	Dried	Bread			/1*
Centaurium erythraea Rafn, Gentianaceae	золотатисячник	Aerial parts	Dried	Tea	6		
Chenopodium album L., Amaranthaceae	лебеда, лебеда свиннячия	Aerial parts	Fresh	Boiled			/1*
				Snacks	/1*		
				Soup	/7*		/5*
				Pancakes	/3*		
Cichorium intybus L., Asteraceae	цикорий	Aerial parts	Fresh	Strong alcohol		1	
Corylus avellana L., Betulaceae (POLED038)	ор хи, л сов ор хи, ор шки л сов , ліщина	Nuts	Dried	Dessert		4	
			Fresh, Dried	Snacks	6	8	3
Crataegus spp., Rosaceae (POLED027)	лод, бояришн к	Fruits, flowers	Dried	Tea	2	2	
		Fruits	Dried, fresh	Compote	2	2	
			Fresh	Snacks	2	1	
			Processed	Jam		3	
Daucus carota L., Apiaceae	морква	Leaves	Fresh	Added to lactofermented cucumbers			1
Epilobium angustifolium L., Onagraceae (POLED039)	ван-чай	Aerial parts	Dried	Tea	4		2
Equisetum palustre L., Equisetaceae (POLED021)	хвощ	Aerial parts	Dried	Tea		2	
Fragaria vesca L., Rosaceae (POLED019)	земляника, земляничник, суниця, суничник	Aerial parts	Dried	Tea	7		
		Fruits	Dried, frozen, processed	Compote	4	2	3
			Fresh	Dessert	2		
				Snacks	17	17	12

TABLE 1. (CONTINUED).

Taxa	Local name	Used parts	Mode of use	Food made	Chernigiv Sylvian area (n = 30)	Chernigiv Woodless area (*n* = 29)	Lyubeshiv
			Frozen	Jam, raw	2	7	4
			Processed	Jam	6	9	1
Frangula alnus Mill., Rhamnaceae	крушина, вовча я ода	Bark	Fresh	Strong alcohol	3		
		Fruits	Fresh	Snacks	1		
Helichrysum arenarium (L.) Moench, Asteraceae (POLED010)	бессмертник	Aerial parts	Dried	Tea	6	3	
Hierochloe spp., Poaceae (POLED001)	зубровка	Leaves	Dried	Tea	4		
			Fresh	Strong alcohol	7		
Humulus lupulus L., Cannabaceae (POLEG006)	хміл	Hops	Unknown	Additive to bread			/2*
			Fresh, dried	Beer		3	2
Hypericum perforatum L., Hypericaceae (POLED002)	зверобой, зв роб й	Aerial parts	Dried	Tea	17	12	9
			FRESH	Strong alcohol			2
Juglans regia L., Juglandaceae	ор х домашн й (р цкий), волоський ор х	Leaves	Fresh	Added to lactofermented cucumbers			2
		Nonedible part of the nut	Fresh	Strong alcohol	3		
Ledum palustre L., Ericaceae (POLED042)	багун, богун, бо улник, клоповник	Aerial parts	Dried	Tea	11		5
Malus spp., Rosaceae	дикие яблоки, дик яблоки, яблука, яблоки	Fruits	Dried	Compote		2	6
			Fermented	Added to sauerkraut	2		3
				Lactofermented with rye straw and/or sugar			/7*
			Fresh	Snacks		3	3
			Processed	Jam		1	
		Leaves, stems	Dried, fresh	Tea	1		1
Malva pusilla Sm. (POLEG002), Malvaceae	ладочки	Flowers	Fresh	Snacks	2		
Matricaria spp. (Incl. *Matricaria chamomilla* L. POLED008), Asteraceae	ромашка	Flowers	Dried	Tea		5	

TABLE 1. (CONTINUED).

Taxa	Local name	Used parts	Mode of use	Food made	Chernigiv Sylvian area (n = 30)	Chernigiv Woodless area (*n* = 29)	Lyubeshiv
Mentha arvensis L., Lamiaceae (POLED004)	мята полевая	Aerial parts	Dried	Added to fermented birch sap for flavoring			1
Mentha spp., Lamiaceae	мята, мята болотная, мята холодная, мел са, мята домашняя	aerial Parts	Dried, fresh	Tea	14	11	4
			Fresh	Strong alcohol			2
Mentha longifolia (L.) L., Lamiaceae (POLED043)	мята р чкова	Aerial parts	Dried	Tea			3
Nepeta cataria L., Lamiaceae (POLED037)	мел са	Aerial parts	Fresh, dried	Tea	8	10	
Origanum vulgare L., Lamiaceae	матеренка	Aerial parts	Dried	Tea	2		
Pastinaca sativa L., Apiaceae	пастернак	Roots	Fresh	Snacks			/2*
Picea abies (L.) H.Karst., Pinaceae	ль	Shoots	Fresh	Snacks	4		
Pinus sylvestris L., Pinaceae	сосна	Cones, shoots	Processed	Jam	9	8	
Plantago major L., Plantaginaceae	подорожн к	Leaves	Dried	Tea	1		
			Fresh	Salad		1	
Potentilla erecta (L.) Raeusch., Rosaceae (POLED020)	калган, колган	Roots	Dried	Tea	4/2*	3	
			Fresh, dried	Strong alcohol	9	11	4
Potentilla argentea L., Rosaceae (POLEG003, POLED033)	под удн к	Aerial parts	Dried	Tea	2		
Prunus domestica L., Rosaceae	слива	Fruits	Fresh	Strong alcohol			2
		Leaves	Fresh, dried	Tea	1		
		Resin	Fresh	Snacks	1		
Prunus padus L., Rosaceae	черемуха	Fruits	Fresh	Snacks	1		
Prunus subgen. *Cerasus* (Mill.) A.Gray, Rosaceae	вишня	Leaves, twigs	Fresh	Added to lactofermtented cucumbers (and tomatoes)	7	9	27
		Leaves	Fresh	Added to sauerkraut			2
		Resin	Fresh	Snacks		9	
		Twigs, leaves	Fresh	Tea	5	3	4
Pyrola sp., Ericaceae	рушанка	Aerial parts	Dried	Tea	1		
Pyrus pyraster (L.) Burgsd., Rosaceae	руша дичка, дикие руши, д ка руша, дик рушк	Fruits	Dried	Compote	2/1*	4	6
			Fresh	Snacks		7	5
			Processed	Jam		1	

TABLE 1. (CONTINUED).

Taxa	Local name	Used parts	Mode of use	Food made	Chernigiv Sylvian area (n = 30)	Chernigiv Woodless area (*n* = 29)	Lyubeshiv
		Twigs, leaves	Fresh, dried	Tea	2	3	
Robinia pseudoacacia L.., Fabaceae	акац я	Flowers	Fresh, boiled	Snacks	/2*		
			Processed	Jam	3		
Quercus robur L., Fagaceae	дуб	Acorns	Dried, fresh	Bread			/5*
		Bark	Fresh	Strong alcohol	3		
		Leaves	Fresh	Added to fermented cucumbers and tomatoes	1		22
				put under bread			/8*
		Sap	Fresh	Drink			1
Ribes nigrum L., Grossulariaceae	смородина, смородина чорна, смородина дика	Fruits	Dried	Compote			3
			Fresh	Added to sauerkraut			1
				Compote			2
				Jam			3
		Inflorescenses	Fresh	Tea	5	2	2
		Leaves	Fresh	Added to fermented cucumbers and tomatoes	8	8	24
		Twigs	Fresh	Tea	4	3	1
Ribes rubrum L., Grossulariaceae	смородина червона	Fruits	Fresh	Added to sauerkraut			1
Rosa spp., Rosaceae (POLED009)	роза, шипршина, шиповник	Flower petals	Fresh	Strong alcohol	1	2	
		Fruits	Dried, fresh	Compote	2		1
		Fruits, flower petals	Dried, frozen	Tea	11	8	5
			Fresh	Snacks		1	
			Processed	Jam	4	2	
Rubus fructicosus L. and/or *Rubus caesius* L., Rosaceae	ежевика, ожинн к, ожина, ожена, ожина черна	Fruits	Dried, fresh, processed	Compote	2		12
			Fermented	Wine			3
			Fresh	Snacks	5	5	17
				Strong alcohol			2
			Frozen	Jam, raw			2
			Processed	Jam	3	1	18
		Twigs	Dried	Tea			2
Rubus idaeus L., Rosaceae	малина	Aerial parts	Fresh	Strong alcohol			2

TABLE 1. (CONTINUED).

Taxa	Local name	Used parts	Mode of use	Food made	Chernigiv Sylvian area (n = 30)	Chernigiv Woodless area (*n* = 29)	Lyubeshiv
		Fruits	Dried, fresh, frozen, processed	Compote	4	2	17
			Fresh, processed	Dessert	1		2
			Fresh, dried	Snacks	12	18	19
			Frozen	Jam, raw		3	1
			Processed	Jam	11	14	19
		Leaves	Fresh	Added to lactofermented cucumbers		1	1
		Twigs, leaves	Fresh, dried	Tea	9	7	5
Rumex acetosa L., Polygonaceae (POLED034)	щавель, щавей, щавя	Leaves	Fresh	Boiled and eaten as a side dish			2
				Salad		1	
				Snacks	4	5	1
			Fresh, dried, fermented, processed, frozen	Soup	24/1*	18	39/1*
Salix sp., Salicaceae (POLED022)	верба	Bark, young	Fresh	Soup	1		
Sambucus nigra L., Viburnaceae	бузина	Flowers	Dried	Tea	2		
			Fermented	Kvass	4		
		Flowers, leaves	Processed	Syrup		1	
		Fruits	Fresh	Snacks	1		
			Processed	Jam	5	1/3*	
Scirpus spp., Cyperaceae	очерет, камыш	Leaves	Fermented	Added to lactofermented cucumbers			1
Sorbus aucuparia L., Rosaceae	червона рябина, красна рябіна, рябина, горобина	Fruits	Dried, frozen	Tea	2		2
			Fresh	Snacks	1		
			Frozen	Dessert			1
			Processed, dried	Compote			3
			Processed	Jam			4
Zea mays L., Poaceae	кукуруза	Leaves	Fermented	Added to lactofermented cucumbers	2		

TABLE 1. (CONTINUED).

Taxa	Local name	Used parts	Mode of use	Food made	Chernigiv Sylvian area (n = 30)	Chernigiv Woodless area (*n* = 29)	Lyubeshiv
Tanacetum vulgare L., Asteraceae (POLED016)	пижма	Inflorescenses	Dried	Tea	1		
Taraxacum officinale (L.) Weber ex F.H.Wigg., Asteraceae	кулбаба	Flowers	Processed	Jam	8	3	
		Leaves	Fresh	Salad		1	
		Roots	Dried	Tea	1		
Thymus serpyllum L., Lamiaceae (POLED029)	чабрец, чобрик	Aerial parts	Dried	Tea	9	5	2
Tilia cordata Mill. (POLED012), Malvaceae	липа	Buds	Fresh	Snacks	/2*		
		Inflorescenses	Dried	Tea	6	14	11
			Fermented	Added to fermented birch sap for flavoring			2
		Leaves		Eaten fresh and boiled		/2*	
Trifolium spp., Leguminosae	клевер	Inflorescences	Dried and milled	Made into a sort of pancake during famine	/5*	/4*	
Tussilago farfara L., Asteraceae	мать- -мачеха	Leaves	Dried	Tea	4	3	2
Urtica dioica L., Urticaceae (POLEG007)	карапива, кропива, жи уха	Aerial parts	Dried	Tea	3	3	
			Fresh	Snacks	/1*		
				Soup	14/1*	6/2*	1/4*
				Boiled		/1*	
		Leaves, very young	Fresh	Salad			1
				Dried and milled, made into a sort of pancake during famine	/1*		
Vaccinium myrtillus L., Ericaceae (POLED006)	черника, черничник, я одник, чорничник, чорниц , чорниця, я оди чорн	Aerial parts with fruits	Dried	Tea	18	2	10
			Fresh	Strong alcohol			4
		Fruits	Dried, fresh, frozen, processed	Added to kissel, compote to color and add sweet taste	5	4	23
			Fermented	Wine			2
			Fresh, frozen, processed	Dessert	3	3	2
			Fresh, dried, frozen	Snacks	19	18	26
			Frozen	Jam, raw	2	3	3

TABLE 1. (CONTINUED).

Taxa	Local name	Used parts	Mode of use	Food made	Chernigiv Sylvian area (n = 30)	Chernigiv Woodless area (*n* = 29)	Lyubeshiv
			Processed	Jam	16	13	29
Vaccinium oxycoccos L., Ericaceae	журахвина, журахлина, кислиця	Fruits	Fresh	Added to sauerkraut (to promote fermentation)	1		10 (2)
			Fresh, dried	Compote	2		2
			Fresh	Fruit water			2
				Salad			2
				Snacks	4		10
				Jam			2
				Strong alcohol			5
			Frozen	Jam, raw			8
Vaccinium uliginosum L., Ericaceae	олубика, лохач , лохва	Fruits	Dried, processed	Compote			3
			Fresh	Snacks	4		6
			Frozen	Jam, raw			1
			Processed	Jam	2		3
Vaccinium vitis-idaea L., Ericaceae (POLED024)	брусника, брусничник, брусниця, красние я оди	Aerial parts	Dried, fresh	Tea	12	2	9
		Fruits	Dried, fresh, processed	Compote			2
			Fermented	Wine			2
			Fresh, dried	Snacks	7	4	20
			Fresh	Strong alcohol			4
			Frozen	Dessert	1		
				Jam, raw	1		2
			Preserved, dried	Tea	3	2	
			Processed	Jam	11	4	18
Valeriana officinalis L., Caprifoliaceae	валер ана, валер анка	Aerial parts, roots	Dried	Tea	3		
Viburnum opulus L., Adoxaceae	калнна	Flowers, leaves	Dried	Tea		2	
		Fruits	Cooked	Juice	2		
			Dried, processed, frozen	Tea	2	3	10
			Fresh	Compote			2

TABLE 1. (CONTINUED).

Taxa	Local name	Used parts	Mode of use	Food made	Chernigiv Sylvian area (n = 30)	Chernigiv Woodless area (*n* = 29)	Lyubeshiv
			Fresh, frozen	Snacks	1	1	7/1*
			Frozen	Pies			1
			Processed	Dessert			3
				Jam	6		7
			Processed, frozen	Syrup	3	2	9
Vitis spp., Vitaceae	вино рад	Leaves	Fresh	Added to lactofermented cucumbers		3	1
				Wraps	1		5
		Twigs	Dried, fresh	Tea	1		

Sy Chernigiv Sylvian area, *Wo* Chernigiv Woodless area, *Ly* Lybeshiv area, /x* refers to uses from the past and/or during times of famine, @ *cultivated plant* used in an unusual manner

followed by the categories of wild snacks (27 taxa) and jams (19 taxa), and compotes and additives to strong alcohol (both 16 taxa). Also, 8 taxa were quite consistently used as additives to lactofermented cucumbers and/or tomatoes.

PAST AND/OR UNCOMMON USES

In addition to the currently used 70 taxa, 4 wild taxa were recalled as used only in times of hardship. Of these, the most often recalled were a soup made of the fresh aerial parts of *Chenopodium album* L., used in the Chernihiv sylvan and Ljubeciv areas, and the inflorescences of *Trifolium* spp. which were dried, milled, and made into some kind of pancake during famine times in the Chernihiv region. Also, a few people recalled snacking on the roots of *Pastinaca sativa* L. in the past in the Ljubeciv region, and one person recalled adding the seeds of *Carum carvi* L. to bread in times of need.

Some of the taxa still used currently also had some nearly forgotten food uses, which were recalled by only a few of our interviewees. For example, apple (*Malus* spp.) fruits fermented with rye straws or flour were recalled as last used during the 1960s in the Ljubeciv region. Likewise, hops (*Humulus lupulus* L.) were added to bread in times of need in the Ljubeciv region. In addition, flowers of *Robinia pseudoacacia* L. were eaten fresh and boiled during famine times in the Chernihiv sylvan area, while leaves of *Tilia cordata* Mill. were similarly prepared and used in the woodless area of Chernihiv. Acorns of *Quercus robur* were added to bread during times of famine, and leaves were put under bread when it was still widely baked at home in the Ljubeciv region. Also, historically, the use of *Urtica dioica* seems to be more diverse than now, as few interviewees remember it being either snacked on fresh or dried, milled and made into a sort of pancake during famine times in the Chernihiv sylvan area, and boiled and served as a side dish in the woodless area of Chernihiv. Furthermore, during times of famine, the aerial parts of *Artemisia* sp. were added to pancakes. Unfortunately, the elderly interviewee from the sylvan area of Chernihiv did not remember the method of preparation.

As an exception, we also included in the results the archaic use of cultivated red beet (*Beta vulgaris* L.), as we asked for additives to fermentation and this long-standing but disappearing tradition, which warrants documentation, was repeatedly mentioned by interviewees in the Ljubeciv region. Specifically, red beetroot was fermented with water, and on

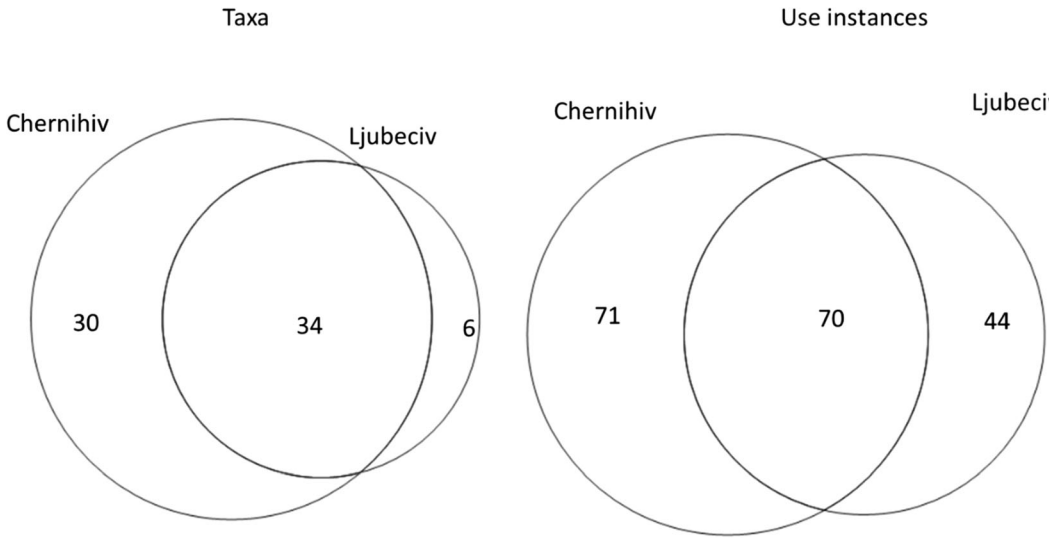

Fig. 2. Venn diagrams for the division of currently used taxa and use instances between the two main study regions.

Easter this *kvass* was added to horseradish salad to color it, although the reasoning behind such a use seems to have been forgotten. On rare occasions, kvass leftovers (pieces of fermented beetroot) were used in soups (*borsh*) instead of fresh beetroots which were usually used. It is also interesting to note that two interviewees recalled the use of *Vaccinium oxycoccos* or rye bread (in the absence of fruits) as a starter for the fermentation of sauerkraut, whereas others used *Vaccinium oxycoccos* in sauerkraut for color and taste only.

Comparisons Between and Within Regions

At first glance, the difference between regions looks considerable, with the Chernihiv region clearly dominating in terms of both the number of plants and uses (Fig. 2). When we compare three regions (dividing Chernihiv into sylvan and woodless areas), the results are more homogenized, with the sylvan area leading in taxa and the Ljubeciv area in uses (which is probably due to double the number of interviewees in the latter region) (Fig. 3).

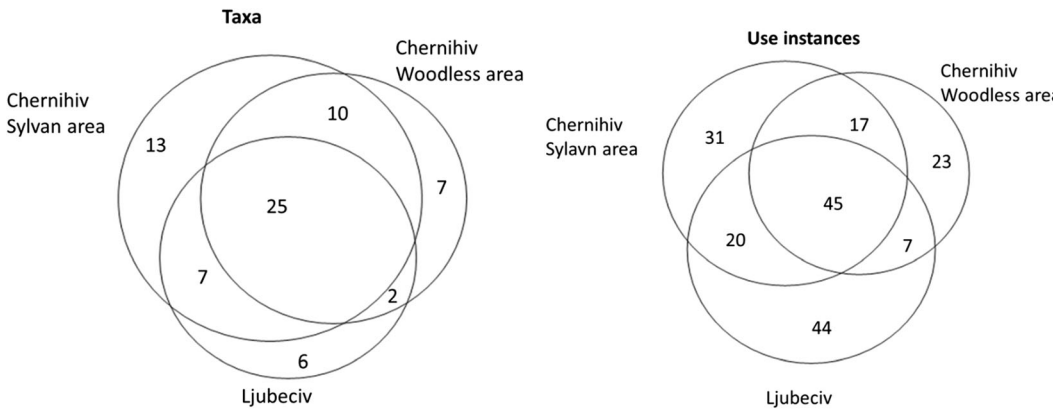

Fig. 3. Venn diagrams for the division of currently used taxa and use instances among the three regions.

Table 2. Jaccard Similarity Indices for the Various Compared Groups Based on Current Use.

Compared groups	JI_{taxa}	JI_{UI}
Chernihiv and Ljubeciv	48.57	37.84
Chernihiv two areas	54.69	42.55
Chernihiv woodless area and Ljubeciv	47.37	32.25
Chernihiv sylvan area and Ljubeciv	53.23	39.13

Comparison of Jaccard Similarity Indices shows even overlap between the different research sites. As expected, there is highly significant overlap between the two areas of Chernihiv, as the distance between them is no more than 30 km. Surprisingly, however, there is extensive overlap between the Chernihiv sylvan area and the Ljubeciv region (Table 2).

As observed in Table 3, the demographic differences among the regions are minimal (like mean age in the Chernihiv sylvan region is slightly lower and the percentage of men in the sample is slightly higher in the Chernihiv woodless area). Yet the number of used plants and UIs, as well as the mean number of plants and DURs per person, are at least 10% greater in the Chernihiv sylvan area. The number of UIs is lower in the Chernigiv sylvan area compared with the Ljubeciv region; however, this is likely due to the fact that twice as many people were interviewed in the latter region, and the total of UIs for the Chernigiv region is greater by at least 20%.

The differences in the number of plants used in one or two territories, however, decreases considerably if we leave out the taxa mentioned by fewer than three people (Fig. 4). While the seven most popular taxa are used quite evenly in all territories, some of the remaining plants are more characteristic of a specific region or area. For example, *Vaccinium oxycoccos* (as a snack, jam, and additive to sauerkraut) and *Quercus robur* (mainly used as an additive to lactofermentation) were predominantly used in the Ljubeciv region. The interviewees repeatedly stressed that cranberry *Vaccinium oxycoccos* habitats are, due to amelioration, scarce and distant from villages in the Chernihiv sylvan area (so they often buy them), while in Ljubeciv almost every village had its "own" bog within walking distance. However, *Quercus robur*, being present in the Chernihiv area, was not recognized as a component for fermentation in this region and thus was used only by a few individuals. Similar reasons also apply to the prioritized use of *Rubus fructicosus* L. and/or *Rubus caesius* L., which were used in all three territories, but most commonly in the Ljubeciv region where its habitats were close to the villages.

The case of *Viburnum opulus*, which grew in all villages we visited, is especially compelling. In the Chernihiv region, people used it occasionally, but in the Ljubeciv region, literally every second household had some variation of preserves made from its fruits. While all the interviewees in the Ljubeciv region referred to the use of *Viburnum opulus* as "traditional" and "local" and deriving from old people, they all admitted that their mothers never made anything from those fruits. Among the other plants, noteworthy, regionally preferred taxa included *Ledum palustre* L., which was widely used for recreational tea in the Chernihiv sylvan area but only occasionally in the Ljubeciv region.

In addition to a greater variety of used taxa, a notable difference also emerged in attitudes toward life in general. A humble thankfulness for being provided for and supported by both the forest and

Table 3. Demographic and Other Numerical Details of the Regions.

	Chernihiv		Ljubeciv	Whole sample
	Sylvan	Woodless		
No of people	30	28	60	118
Mean age	56	62	62	60.5
% of men in the sample	27	32	28	29
Mean no of used plants	13.3	11.6	10	10.8
Mean no of DURs	21.8	18.5	15.3	17
No of used plants	55	44	40	70
UIs	110	91	114	185

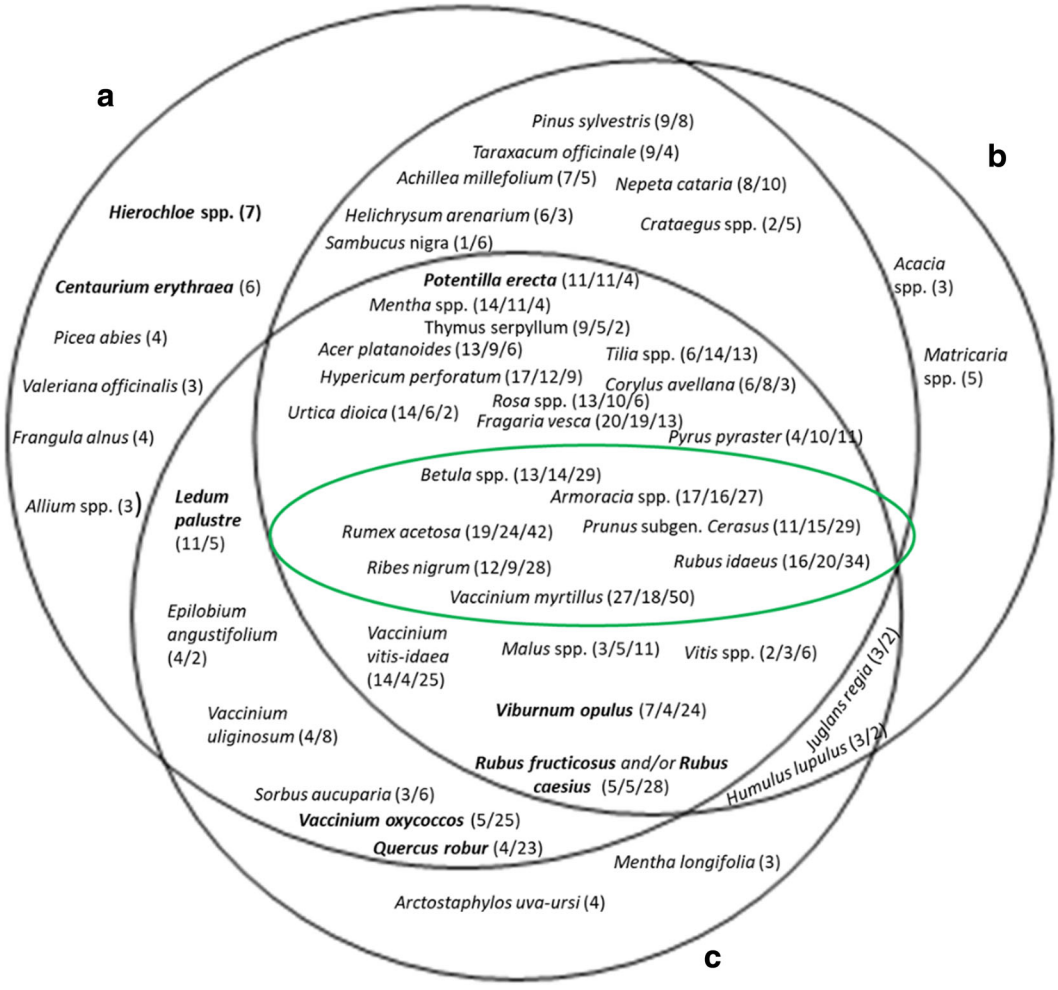

Fig. 4. Taxa currently used in the three different regions. A = Chernihiv sylvan area (n = 30); B = Chernihiv woodless area (n = 28); C = Ljubeciv region (n = 61). In the overlapping area of all three regions, we included only taxa used by at least ten people in total, where the numbers of the people reporting uses are presented as (A/B/C). For the taxa used solely in one or two regions, only taxa with at least three users are represented, where the number of the people reporting uses are provided as (A/B), (A/C), and (B/C), respectively. The green area in the middle highlights the most widely used taxa that are most equally utilized. Names in bold represent borderline taxa used predominantly in one region.

the state was mentioned by roughly half of the people in the sylvan area, while in the Ljubeciv region we encountered only a few people with such an attitude and none in the woodless area of Chernihiv. We often heard comments in the sylvan area regarding the importance of the forest as a food provider. Moreover, about 70% of the interviewees from the Chernihiv sylvan area reported selling forest berries, mushrooms, and dried herbs to vendors routinely visiting the region as an additional or only source of income.

The apparent tendency of the inhabitants of the sylvan area to be more open to the use of different traditionally used taxa as well as being eager to experiment with taxa introduced by the media also speaks to the influence of the forest. The lives of forest dwellers are centered more around the wild (working in the forest, collecting berries and mushrooms to sell), and thus they have more possibilities to make so-called unintended contact with nature and have greater trust in it. This is contrary to their close neighbors who visit the forest less often,

mainly because they do not live within a short walking distance of the forest and, more importantly, they devote the majority of their time to agriculture and other activities not supporting unintended contact with nature. The example of *Viburnum opulus*, which was more often used in the Ljubeciv region, seems to be the exception that confirms the rule: it also grows extensively in the village and so villagers have direct contact with it, without the need to go foraging in distant areas.

Discussion

The number of recorded taxa (70) is relatively high, especially when compared with other regions in Ukraine, such as in Roztochya (western Ukraine) where Stryamets et al. (2015) recorded the use of 26 taxa. Similarly, we recorded only 35 taxa used among Boikos (Pieroni and Soukand 2017) and 40 taxa among Hutsuls (Sõukand and Pieroni 2016). It is also higher than the number of taxa recorded in areas neighboring Ukraine: 44 taxa used by Ukrainians in Maramures (Łuczaj et al. 2015) and 58 taxa used in central Belarus (Sõukand et al. 2017). Yet it is important to note that a large number of the taxa (30) are used only in the Chernihiv region, whereas the number of taxa used solely in the Ljubeciv region is clearly comparable with neighboring regions. The large number of used taxa may be partially explained by the high number (16) of taxa used exclusively for recreational teas, compared with, for example, the 8 taxa used in Maramures (Łuczaj et al. 2015), 7 among the Boikos (Pieroni and Soukand 2017), and 2 in central Belarus (Sõukand et al. 2017). The number of used taxa is also higher than the 58 mentioned by Rostafinski's respondents from Belarus in the nineteenth century (Łuczaj et al. 2013); however, differences in the nomenclature of the taxa show quite considerable erosion of nutritious foods collected from the wild, which are now replaced mainly by teas, snacks, and additives (to fermented foods).

However, the results obtained in Polesia are still lower than the number of wild food taxa (89, Kalle and Sõukand 2016) utilized in Saaremaa, Estonia—although geographically and culturally distant, this region shared a common Soviet past from 1944 to 1991. In comparison to other post-socialist republics, the recorded number of used plants in Polesia was greater in some areas, as for example on the Dubrovnik coast where 55 taxa are used (Dolina and Łuczaj 2014), but lower in others, for example the 82 taxa used in southern Herzogovina (Łuczaj and Dolina 2015) or in costal Croatia (80 in Poljica and 76 in Krk; Dolina et al. 2016).

The similarities among the taxa used in the different regions in this study are fewer than in the case of the Boykos and Hutsuls (69% overlap for taxa; Pieroni and Soukand 2017), yet the overlap of uses is quite similar (around 39%). The overlap for all compared groups is higher than that between Ukrainian and Romanian Hutsuls separated by state borders (overlap for taxa = 42%, overlap for uses = 27%; Sõukand and Pieroni 2016). Utilization of a smaller amount of resources has contributed to the greater difference in uses than in used taxa, especially when comparing the Chernihiv woodless area and the Ljubeciv region.

A comparison from outside the Soviet and socialist realm: the overlap between spring vegetable taxa used by Christian Assyrians and Yazidis or Sunni Muslim Kurds in Iraqi Kurdistan was around 34% and 32% respectively, regardless of the fact that the villages were situated close to each other (Pieroni et al. 2018).

Therefore, given that the distance between two the Polesia regions is at least three times that of the Boykos and Hutsuls, as well as the language difference between the eastern and western regions, which historically belonged (although for short time) to two different countries, and the recent Chernobyl disaster, which has physically divided Polesia, the findings support the idea of homogenization and standardization imposed by the centralized government.

Specific literary or other media influence is detectable in a few cases. For example, according to our interviewees, *Potentilla erecta* (L.) Raeusch., used extensively in central Belarus (Sõukand et al. 2017), was used predominantly in the Chernihiv region. It was claimed, however, to have once been used in the Ljubeciv region, but now forgotten. In which case, popularization most likely supported the revitalization of an old local use. Also, the use of *Centaurium erythraea* Rafn, present only in two neighboring villages of the sylvan area of Chernihiv, was reported by several interviewees as having literary origin.

Even though the general erosion of LEP is clearly detectable in the documented use of wild food plants in Polesia based on currently reported past uses and the historical literature from closely neighboring regions, and the homogenizing influence of modern media sources is evident, the forested

region still holds the potential for valorization (sensu Serrasolses et al. 2016). As Hernández-Morcillo et al. (2014) suggest, TEK in Europe has been constantly changing, and therefore, as long as some parts of it are abandoned and new ones generated, we can still talk about sustainable TEK/LEK/LEP. The situation is more problematic when new knowledge is not acquired because the mechanisms supporting acquisition no longer exist. In our study case, the forest, which not only provides wild food but is also the place for everyday work and interaction, seems to be one such supporting mechanism. Barthel et al. (2014) suggest that in urban environments, allotment gardens, which provide practice space for communities, serve as "incubators of social-ecological knowledge with experiences that can be accessed and transferred to other land uses in times of crisis, contributing to urban resilience." We suggest that living in close proximity to the forest and interacting with it on a daily basis provides the training ground not only for the preservation of LEP, but also the base for experimentation with new ideas coming from a variety of sources, serving therefore as a stronghold for "rural resilience" of wild biocultural diversity.

Conclusions

The results of this study illustrate the significant overlap in LEP within three different regions in Ukrainian Polesia. While such homogenized use of plants within one ecological region may seem boringly repetitive at first glance, the reasons behind such homogenization may have significant implications for ethnobotanical theory. The results indicate that two regions with distinct dialects and histories, which are also separated by a considerable distance, had only slightly less overlap than the areas within one region that share a common language and history, and are in close proximity to each other; the only considerable differences were the extent of forestation and the different occupational backgrounds within the area.

Despite the fact that during Soviet times LEP underwent considerable homogenization, as access to nature was limited because of obligatory work on collective farms, living within the forest, and hence having constant unintended contact with nature, preserved not only traditional uses but, more importantly, also nurtured natural curiosity and the desire to experiment with wild food ingredients. Collecting from the wild requires more time and effort than the use of cultivated species, and the high prevalence of condiments and plants used for recreational teas is a clear sign of the shift of the wild food domain to a secondary resource in human nutrition in present-day Ukraine.

Future research should pay closer attention to the influence that access to natural resources as well as the balance between work and leisure time (creating opportunities to access wild habitats) may have on the everyday use of wild food plants.

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