



# Medicinal plant use at the beginning of the 21<sup>st</sup> century among the religious minority in Latgale Region, Latvia

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## Research

### Abstract

**Background:** As identified by scholars, even when communities co-habit the same natural environment, there may be visible differences due to cultural factors, and thus local knowledge on medicinal plants evolves along with the culture. This paper addresses the complexity of medicinal plant use across different social groups situated in the same natural environment with a focus on a distinct religious minority: Old Believers.

**Methods:** This paper covers ethnobotanical data from 27 villages and populated areas in Dagda Municipality of Latgale, Latvia. The region is highly diverse, especially in terms of language and ethnic groups. In total, seventy-three interviewees were interviewed, of which nineteen represented Old Believers.

**Results:** The number of used taxa among Old Believers (40 taxa) was half of that used by the other local community members such as Latgalians (81) and the multi-ethnic group (77). Because of the scarcity of available materials on plant uses by Old Believers, we speculate that religious characteristics such as self-isolation from other cultures might be one of the reasons for such a difference. On the other hand, historical aspects such as migration and the subsequent need for adaptation to the local flora could also partly explain the low number of medicinal taxa in comparison to the other groups.

**Conclusions:** The study indicates that self-isolation, being a characteristic of Old Believers, potentially plays a role in medicinal plant use. We recommend

further research to study in detail aspects of medicinal plant use in self-isolated communities within highly literate societies.

**Keywords:** Latgale, Old Believers, religious identity, ethnobotany, medicinal plant use

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### Kopsavilkums

**Pamatojums:** Zinātnieki ir definējuši – pat, ja kopienas dzīvo vienā dabiskajā vidē, kultūras faktoru ietekmē starp tām var veidoties uzskatāmas

atšķirības. Tādējādi, attīstoties kultūrai, attīstās arī vietējās zināšanas par ārstniecības augiem. Šajā rakstā aplūkota ārstniecības augu pielietojuma komplicētība un dažādība trijās sociokultūras grupās, kas dzīvo vienā vidē, akcentējot reliģisko minoritāti - vecticībniekus.

*Metodes:* Rakstā apkopoti etnobotāniskā pētījumā iegūti dati no 27 ciematiem un apdzīvotām vietām Dagdas novadā, Latgalē. Izvēlētajā reģionā novērojama liela bioloģiskā un kultūras daudzveidība, īpaši etnisko grupu un valodas dažādībā. Etnobotānikas lauka ekspedīcijas notika 2017. gada jūlijā un to laikā tika ievākti dati, izmantojot daļēji strukturētas intervijas. Tika aptaujāti septiņdesmit trīs intervējamie, deviņpadsmit no tiem bija vecticībnieki.

*Rezultāti:* Vecticībnieku grupa ir izmantojusi pusi (40 sugas) no tā augu sugu skaita, ko izmantojuši citi vietējās kopienas locekļi, piemēram, latgalieši (81 suga) un multietniskā grupa (77 sugas). Sakarā ar to, ka vecticībniekiem pieejamo materiālu par augu lietojumu ir maz, autori pieļauj, ka reliģiskās īpašības, piemēram, pašizolācija no citām kultūrām, varētu būt viens no šādu atšķirību iemesliem. No otras puses, tādi vēsturiski aspekti kā migrācija un nepieciešamība pielāgoties vietējai florai, daļēji varētu izskaidrot zemo izmantoto ārstniecības augu sugu skaitu salīdzinājumā ar citām grupām.

*Secinājumi:* Pētījums rāda, kā pašizolācija, viena no vecticībnieku kultūrai raksturīgām iezīmēm, potenciāli ieņem savarīgu lomu medicīnisko augu izmantošanā. Tādējādi autori akcentē, ka ir iespējami būtiski ieguvumi pētniecībā, izzinot augu lietošanas aspektus tieši šādās - pašizolētās kopienās, kas pastāv augsti izglītotu, literāru sabiedrību ietvaros.

*Atslēgasvārdi:* Latgale, vecticībnieki, reliģiskā identitāte, etnobotānika, ārstniecības augu izmantošana

## Background

The Convention on Biological Diversity (United Nations 1992) and the Convention for the Safeguarding of Intangible Cultural Heritage by UNESCO (2003) stress the need to recognize the importance of local community knowledge and practices, especially nowadays considering the loss of traditional knowledge (e.g., Reyes-García et al. 2013). Numerous scholars advise going beyond the listing of medicinal plant uses and carrying out an in-depth analysis of the human-nature relationship (Leonti 2011) and enhancing close cooperation with communities (Vandebroek et al. 2011). In this respect, comparative analyses are highly welcome in

the discipline (Heinrich et al. 2009). Cross-cultural studies have already addressed the question of medicinal plants comparing different ethnic groups living in different areas (e.g., Saslis-Lagoudakis et al. 2014), countries (e.g., Leporatti & Ivancheva 2003) or even continents (Moerman et al. 1999). However, differences in medicinal plant uses can also exist when the study groups are closely situated and share the same natural resources (e.g., Sökand & Pieroni 2016, Collins et al. 2006).

The practices and knowledge of local communities regarding plant uses are complex (e.g., Ososki et al. 2007). As outlined by Pieroni & Quave (2005), cross-cultural comparisons of the application of plants as medicinal remedies could provide a better understanding of cultural differences regarding pharmaceutical practices. Menendez-Baceta et al. (2015) note that cultural factors hold similar importance to ecological and chemical factors concerning the traditional folk use of medicinal plants. These cultural triggers include language, cultural history, and other social aspects, including access to information (e.g., Menendez-Baceta et al. 2015, Gairola et al. 2014, Akerreta et al. 2007) and human characteristics such as gender (e.g., Nesheim & Stølen 2006). The formation of new borders (Sökand & Pieroni 2016), migration (e.g., Inta et al. 2008), and acculturation (Geck et al. 2016) also have an impact on local knowledge regarding medicinal plants. Additionally, religion generates diversity in social behaviour (e.g., Botero et al. 2014), including the protection of natural resources (Chunhabunyatip et al. 2018). More precisely, plants have a distinct place regarding religion and vice versa (see Niroula & Singh 2015; Barrow 2012; Musselman 2003, Chandran et al. 1997). Religion and cosmological views not only play a role in medicinal plant usage but also how the treatment is approached, e.g., "plants as mediators" (see also Frazão-Moreira 2016). Religion may also be an essential agent in changing traditional behaviour in some instances, such as the case of traditional burial during the spread of Ebola (Marshall & Smith 2015, Pandey et al. 2014). And yet, religion as a factor shaping medicinal plant diversity, especially with attention to religious minorities, has been rarely explored (see Pieroni and Sökand 2019 and the references therein).

For this reason, the Latgale region of Latvia, which is multi-lingual, multi-religious, and multi-ethnic, has been chosen for the study. Latgale also has settlements of Old Believer communities that migrated from Belarus (Belarusian Old Believers; Engelking et al. 2008) who speak the Russian language (Пилипенко 2016). Increasing the complexity, the study site of Dagda Municipality is

also a borderland between Latvia and Belarus and represents a diversity of nationalities (Latvians, Poles, Belarussians, Russians, and others; Dagdas novada pašvaldība 2012). In terms of language, the region also features a historical sub-type of the Latvian language – Latgalian (Saeima 1999). The distinctive historical marks of the region are still visible nowadays as the inhabitants have experienced numerous changes throughout history, including the Soviet regime (Nikodemus et al. 2018). The ethnic identity of Latgalian Old Believers was built on confessional (religious) grounds emphasising neighbours (outlanders) as strangers and a source of danger (Korolyova 2012). Old Believers in Latgale are constantly faced with a multi-lingual society, and they are surrounded by other ethnicities – Latgalians, Latvians, Belarusians, Poles, Lithuanians, etc. According to Korolyova (2012), the religious tolerance of Old Believers towards other ethnicities is higher than in the past (although they still consider their neighbours as "outlanders" if they do not share the same faith).

Recent attempts have been made towards recording the written folklore materials of Latvia (Sile et al. 2020). However, to the best of our knowledge, no ethnobotanical field studies have been conducted in the region regarding medicinal plant use. To add, some authors have pointed out that not enough attention has been paid to the interaction between Latgalian, Latvian and Russian languages (Jankovjak 2009). The statistics in 1925 showed that 25.6% of Poles and only 7.1% of Russians (including Belarussians) spoke Latvian, whereas 46.0% of Latvians spoke other languages (Pilipenko 2018).



Figure 1. The local landscape. Credit: IM & IH.

Latgalians, a tribe of Eastern Balts speaking a Baltic language variety, Latgalian (Lazdiņa & Marten 2012) or High Latvian dialect (Stafecka 2009), have inhabited the territory of Latgale and part of the Vidzeme region since the 6<sup>th</sup> or 7<sup>th</sup> century (Belasova et al. 2012). After the invasion of Germans in the 13<sup>th</sup>

The multi-cultural environment represents an ideal setting for contributing to the discussion on the complexity of medicinal plant use. To that end, we aim to: a) document local medicinal plant knowledge and practices, including a reflection on the potential sources of knowledge; and b) analyse the differences in medicinal plant uses, if any, among Old Believers and the other community groups. Our working hypothesis is that there are a limited number of medicinal plant uses for Old Believers in comparison with the other community members from the region.

## Materials and Methods

### *Region of the study site*

The Latgale region (Figure 1) of Latvia shares a border with Lithuania, Russia, and Belarus. The present-day territory of Latvia was historically part of Livonia (from the end of the 13<sup>th</sup> to the 16<sup>th</sup> century) (Purs & Plakans 2017), the Polish-Lithuanian Commonwealth, Sweden and the Russian Empire, with the Proclamation of Independence taking place in 1918 (Nikodemus et al. 2018). The entire territory of present-day Latvia experienced the same historical events and had a similar fate until the 17<sup>th</sup> century (see Birkerts 1926; Ivanovs & Soms 2007). However, the situation changed when Latgale was administratively isolated beginning in the mid-17<sup>th</sup> century, as the region was then controlled by Catholic Poland, and it started on a different path from that of the rest of the territory of Latvia (see Birkerts 1926, Ivanovs & Soms 2007, Purs & Plakans 2017).



century, the borders of these lands changed (Kursīte 2005). During the last 800 years, Latgale has experienced several dramatic changes in socio-economic, political, cultural and spiritual conditions, being influenced by different rulers, including German (until 1561), Polish (1561-1772) and

Russian (1772-1918), that shaped the region with its tradition of multilingualism and cultural diversity (Marten 2012). In the 16<sup>th</sup> century, the Polish-Lithuanian Commonwealth introduced the Catholic faith in Latgale in contrast to the Reformation movement in other territories of Latvia. Jesuits introduced the use of Latgalian in the church, which later played a significant role in the preservation of the language and local traditions (Ivanovs et al. 2003).

The Latgalian written language was formed in the 18<sup>th</sup> century by Catholic priests. Latin script was banned in 1865, and widespread Russification took place in the region in numerous historical periods (Stafecka 2009) (e.g., until 1918 when Latgale became part of The Republic of Latvia, during Soviet Union times (Green 1997)). Russification contributed to the adoption of Russian customs and lexis by local Latgalians (Leikuma 2005, Stafecka 2005). This

impact should be distinguished from interactions with other Russian groups, such as Old Believers, who established their settlements in Latgale after migration from Russia starting in the 18<sup>th</sup> century (due to a schism within the Russian Orthodox Church) (Žilko & Mekšs 1997). An especially beneficial situation for the formation of Old Believer settlements in Latgale developed after The Great Plague in 1710 when landowners supported the immigration of new inhabitants into abandoned lands (Nikonov 2000) (see Figure 2). Approximately 70,000 Old Believers are still living in Latvia (2011), mostly in the Latgale region, with 61 Old Believer congregations (Ivanova 2014, Russians of Latvia n.d.). Other sources place this number at 55,000 in 2017 (Pazuhina 2019). According to Gibson (2013, p.40): "identity was also determined to a large part by religion, for example, to be 'Polish' in the eastern areas of former Poland-Lithuania meant being of the Catholic faith."



Figure 2. Photography by Михаил Кустинский (1866) of Old Believers in Daugavpils Region (Daugavpils apriņķis), part of present-day Latgale [source: Vilnius University Library – digital collections].

Each ethnic group, including Old Believers, develops its own way of using natural resources (Batocirenov & Tukacheva 2016). According to Lubickaja & Shevin (2017), human supremacy over nature, characteristic of Christianity, great respect and responsibility for the earth (deriving from pagan beliefs), and strict rules regarding the harvesting of natural products (including berries and medicinal plants) have preserved natural resources from excessive consumption by Old Believers. The

rejection of modern medicine by Old Believers contributed to the development of ethnomedicine, and thus Old Believers became aware of the characteristics of local plants and learned to use them for their own purposes (Lubnickaja & Shevin 2017). This is also supported by a study in other regions in which Old Believers maintained two positions: the traditional conceptual worldview and practices (sacred rituals) and the need to adapt to new realities (Prygarine 2004).

***The socio-economic situation in Latgale region with a focus on Dagda municipality***

The municipality of Dagda has a territory of 949.7 km<sup>2</sup> and shares a 44 km long border with Belarus. Parts of the municipality parishes are enclosed in Rāznas National Park. One of the primary natural resources of the area is the lakes (123 lakes in the municipality). Agricultural land, including meadows, fruit orchards, and arable land, comprise 39.3% of the available land of the municipality. The distance to the capital city is close to 300 km (Dagdas novada pašvaldība 2018). The topography of Dagda Municipality is relatively flat without massive summits (absolute height does not exceed 200 metres above sea level) (Dagdas novada pašvaldība 2012).

The number of inhabitants per 1 km<sup>2</sup> at the end of 2017 was 8, which in comparison is about 3.75% lower than the average for the whole country. The number of registered inhabitants in 2017 was 3740 men and 3868 women. In 2017, the poverty rate in the country (22.1%) was about 5% higher than the average rate in the European Union (EU) (16.9%). Geographical distance has been reported as one of the reasons for limited access to health care services (OECD 2019, OECD 2017, OECD 2016). Health expenditure per capita is the second-lowest in the European Union (1213 EUR in 2017), with only 57.3% covered by public funding (EU average: 79%) (OECD 2019).

The number of pensioners in 2017 was around 557,000, including old-age pensions, disability pensions, survivor's pensions, and service pensions. The average amount of an old-age pension in 2017 was 297.61 EUR per month (CSB 2017). The percentage of post-working age people among the inhabitants of Dagda Municipality was 22%, while around 14% were unemployed (OECD 2017)

Compared to the rest of the Latvian administrative regions, Latgale has the lowest gross domestic product per capita (CSB 2019). According to Country Health Profile, the average number of doctors in 2017 reached 3.2 per 1000 people, while in Latgale this number is only 2.2. In comparison, a newsletter from 1941 noted that the aim of the Latgale region (specifically Daugavpils County) was to provide one doctor for every 3000 inhabitants (Taisneība (No 89) 1941). The available information on pharmacies in the region is scarce. However, in 1982 a pharmacy located in Dagda city celebrated its 100-year anniversary (Komunisma Ausma (Krāslava No 70) 1982). The municipality has family doctors and additional services such as public showers and washing facilities in Dagda city (Dagdas Novada Dome n.d., VSPC "Dagda" n.d.).

The unequal distribution of health workers is of great concern for rural areas (OECD 2019). In comparison, a newspaper in 1939 noted that doctors with practices in rural regions were content, even in areas where patients expressed sympathy towards doctors (Brīvā Zeme (No 176) 1939). In 2017, the municipality of Dagda had four feldsher and midwife aid points (Figure 3). The local newspaper announced in 2009 that the hospital in the only town of Dagda Municipality was renamed the Health and Social Service Centre (Ezerzeme 2009).

***Field study***

The analysis represented in this paper utilises ethnobotanical data from 27 villages and populated areas in Latgale, one of the four distinct regions of Latvia (Figure 3). Apart from Dubuļi parish and Auguļova, all of the villages were located in Dagda Municipality.

The ethnobotanical fieldwork took place in July 2017, during which the data were collected using semi-structured interviews lasting from 30 minutes to 2 hours. The total number of interviewees providing information on wild plant medicinal uses was 69 out of 73 interviews. Seventeen interviewees were born before 1945. About 67% of the interviewees were women. The average of women was 64 years. The average age of men was 59 years. The interviewees were asked questions regarding wild plant uses for food, followed by questions related to folk medicine. The interviewees were asked to free-list wild plant species used as medicine and then to name the wild plants they (or their family members) use now or have used in the past, as a remedy for specific diseases. People were interviewed at their homes and outside apartment buildings, on the street, or at the auto-shop, employing pseudo-random and snowball sampling methods.

Interviews were conducted in either Latvian or Russian, depending on which language the person was most comfortable with. The interviewees had the option to choose between Russian and Latvian for the interview, as the interviewing team was always bi-lingual.

The majority of the people interviewed lived in small farmhouses with limited access to the town shop and/or other supplies. From household to household, the gardens and surroundings differed with respect to maintenance (Figure 4). Nevertheless, even in considerably poorer conditions, the people interviewed were very hospitable, e.g., inviting us into their homes, offering coffee, etc.

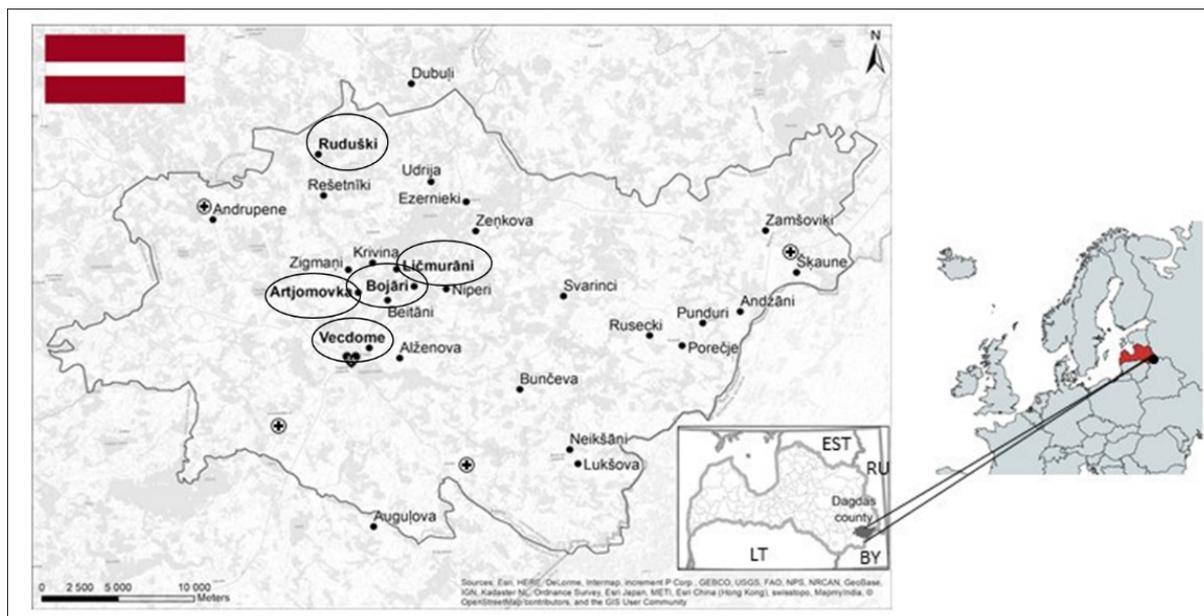


Figure 3. Map of the study area (⊕ - feldsher & midwife aid points; ♥ - "Health and Social Service Centre" Dagda); in circles – villages in which Old Believers live.



Figure 4. Household areas in Dagda Municipality. Credit: IM & RS.

The interviewee was guided by using lay people terminology for identifying the purpose of an application. The Code of Ethics of the International Society of Ethnobiology (ISE 2006) was followed, and informed oral consent was obtained from all interviewees. The interviews were recorded with the written permission of the interviewees for the purpose of transcription. Field notes were taken, and whenever possible, voucher plant specimens were collected, including dried plant samples. In the field, the plants were identified by two authors of the study based on the local flora (Priedītis 2014). The primary identifications were checked by Toomas Kukk, curator of the Estonian University of Life Sciences herbarium. Voucher specimens were deposited at the Estonian University of Life Sciences herbarium (TAA), bearing numbers LGA001-120 and herbarium numbers TAA0146373-495. The dried plant samples collected in small-sized sample bags were deposited

at the Herbarium of DAIS at Ca' Foscari University of Venice (UVV), bearing numbers UVVDLGA001-71. Taxonomic identification, botanical nomenclature, and family assignments followed the Flora Europaea (Tutin et al. 1964 -1980), The Plant List database (2013), and the Angiosperm Phylogeny Group IV (Stevens 2017).

#### **Data analysis**

The collected data from notebooks and recordings were entered in a Microsoft Excel spreadsheet according to medicinal categories as defined by interviewees. The data was further structured in detailed use-reports (DUR) reflecting the use of a plant part (e.g., flowers, roots, leaves, aerial parts, etc.) prepared or applied in a certain way (e.g., boiled, topical application) for a specific medicinal category, multiplied by the number of people mentioning such a use. Use Instances (UI - the

detailed use-report regardless of the number of people mentioning such a particular use), which were calculated for comparison, were derived from the emic categories. A total of 113 emic medicinal use-categories were identified, including burns, earache, heart problems, etc. The names of the diseases and symptoms are literal translations in English from Latvian and Russian. Besides that, whenever possible, for comparative purposes, ICPC-2 (International Classification of Primary Care 2<sup>nd</sup> Edition 2003) medicinal categories were provided for each emic category (e.g., respiratory, neurological disease, etc.; Figure 9) and applied in the network analysis. Some emic medicinal use-categories such as fright were not part of the ICPC-2 classification and therefore assigned by the authors to the cultural bond category. Additionally, beauty procedures and other cosmetic-related uses were assigned by the authors to the cosmetics category. The emic use against fleas was included within the other uses category, not part of the ICPC-2 classification system.

Two-time divisions were utilised: a) past, including temporal, uses: referring to applications which were used previously but no longer, e.g., due to loss of the plant, use of medication from the pharmacy, used during childhood; b) current uses: referring to applications which are used now regardless of when the use started.

Plants and their uses can also be viewed as nodes in a network linked together by DUR. This perspective allows for the interpretation and analysis of the data with graph theory. In the network, each plant family is linked with all of its uses (ICPC-2 medicinal categories). The number of different connections corresponds in the language of social network analysis (SNA) to "degree" (Wasserman & Faust 1994) and effectively represents a measure of the diversity of a plant's possible uses. DUR are the strength of the links or "weight" in the SNA language (Wasserman & Faust 1994). SNA allows not only to differentiate between frequently and rarely mentioned plants/medicinal categories but also between specialized applications (plants/medicinal categories with predominantly high weight links/high DUR) and generalized applications (plants/medicinal categories with predominantly low weight links/low DUR). For the analysis, use networks for plant families in combination with the ICPC-2 medicinal categories were created using R (v. 3.5.1), the R Packet igraph (Csárdi 2019), and the Gephi analysis tool for SNA (Bastian et al. 2009).

For comparative purposes, the interviewees who did not identify themselves as Old Believers (OB) nor followed the Old Believer Eastern Orthodox Christian

faith were assigned to one of the following two groups:

- a) Latgalian (LG) group: those study participants who were Catholic, spoke fluent Latvian and/or Latgalian, chose Latvian as the preferred language of communication and claimed to come from the Latgale region, even if, on the rare occasion, one of their parents was of non-Latgalian origin;
- b) Mixed (MIX) group: the remaining interviewees were assigned to this group, which consisted of people who had very diverse ethnic, linguistic, and spatial origins but chose Russian as the preferred language for the interview.

The authors compared the total number of DUR, UI, taxa and network links for all three groups.

Given the likelihood that people used various species of the same genus equally in different stages of life, some species that botanically belonged to the same genus were gathered into a species *pluralis* (also for related calculations), such as *Symphytum* spp. including *Symphytum asperum*, *Symphytum officinale*; *Mentha* sp. (e.g., *Mentha x piperita*, *Mentha x piperita var Piperita*, *Mentha longifolia*, *Mentha suaveolens*); *Trifolium* spp. including *Trifolium medium*, *Trifolium pratense*; *Urtica* spp. including *Urtica dioica* and *Urtica urens*, and *Paeonia* spp. including *Paeonia lactiflora*. In particular, the interviewees mixed *Matricaria chamomille* with *Leucanthemum vulgare*, and thus the taxa were treated separately when an herbarium specimen had been added, otherwise *Matricaria* spp. represented all similar taxa, if not noted differently.

## Results and Discussion

### Overview

In total, 116 plant taxa belonging to 51 families were named for medicinal use (both past and current), of which 35 were cultivated plant species (Table 1). The top five most used families with the highest number of DUR (including past and current uses) were: Asteraceae (174), Rosaceae (74), Betulaceae (61), Ericaceae (47), and Lamiaceae (40). The highest numbers of taxa per family were observed for Asteraceae (20 taxa), Rosaceae (12 taxa), and Lamiaceae (7 taxa). The highest number of DUR on the taxon level were found in *Betula* spp. (59), *Matricaria chamomilla* (41), *Urtica* spp. (31), *Plantago major* (31), *Achillea millefolium* (29), and *Quercus robur* (28). In comparison, yarrow, chamomile and greater plantain are the most frequently mentioned in folklore sources. According to Sile et al. (2020), the highest number of medicinal plants cited in Latvian folk records is *Achillea Millefolium* L. (90), followed by *Matricaria chamomilla*

(89), *Allium cepa* L. (69), *Artemisia absinthium* L. (62), *Plantago major* L. and *Plantago lanceolata* L. (56).

Of the 113 emic categories, the following were the most well-represented: healthy (114 DUR/30 taxa),

cold (63/20), stomach-ache (40/18), and wounds (40/13). Of the 19 ICPC medicinal categories, the top five (including past and current uses) were: general health (242 DUR /61 taxa), respiratory (132/35), digestive (91/34), musculoskeletal (78/24) and dermatological (70/17).

Table 1. Medicinal use of plants in Dagda Municipality as named by the interviewees among OB, LG, MIX

Latin name	Local names	Wild / Cultivated	Used part	Preparation	Uses	LG	MIX	OB
<i>Acorus calamus</i> L., Acoraceae (LGA013)	airi*, аир, kalmes, trovŋik^	W	leaves	fresh	against fleas	/2		/2
			roots	dried	healthy		1	1
				fresh	against fleas		/1	
					liver diseases	1		
<i>Viburnum opulus</i> L., Adoxaceae (LGA023)	калина, красная калина, irbenājs, irbenes	W	fruits	fresh	healthy			1
					heart problems	1		1
				stored with honey	cough		1	
				tea	healthy			1
				hypertension			1	
				hypotension			1	
			twigs	tea	cold	2		
					cough	1		
<i>Atriplex</i> sp., Amaranthaceae	лебеда	W	aerial parts	tea	healthy			2
<i>Beta vulgaris</i> L., Amaranthaceae	бурак	C	roots	cooked	constipation		1	
<i>Allium cepa</i> L., Amaryllidaceae	sīpols, лук, луковая шелуха	C	bulbs	cooked	asthma	/1		
				topical application	runny nose	1		
			inflorescences	decoction	boils		1	
			skin	decoction	hair care		2/1	
			aerial parts	eaten	immune boosting		1	
					periodontitis		1	
	fresh	cholesterol		1				
	topical application	joint pain		1				
<i>Allium sativum</i> L., Amaryllidaceae	ķiploki, чеснок	C	bulbs	eaten	healthy	1	1	1
					high cholesterol		1	
				fresh, topical application	hair care	1		
					toothache	2	3	2
				veins			1	
				wounds		1		
	tincture, massage	joint pain	1					
<i>Anethum graveolens</i> L., Apiaceae	кроп^, dillite (dille), dilles, укроп	C	leaves	tea	insomnia	1		
			seeds	tea	stomach-ache		1	
			aerial parts	tea	constipation	1		
	diarrhoea	1						
<i>Carum carvi</i> L., Apiaceae (LGA061, LGA107)	тмин, ķimenes, ķimene, savvaļas ķimene	W	seeds	ground, used with honey	diarrhoea	1		
				tea	appendicitis	1		
				stomach-ache	2	1	/1	
				to increase milk production in women		2		
				women's diseases		1		
			tea	appendicitis		/1		

			aerial parts		post surgery		/1	
					stomach-ache		/1	
<i>Daucus carota</i> L. subsp. <i>sativus</i> (Hoffm.) Arcang., Apiaceae	burkāni, burkāns	W	roots	fresh, ground	softens hands	1	1	
				roasted, tea	cold	/1		
<i>Heracleum sosnowskyi</i> Manden., Apiaceae	latvāņi	W	young flowers	dried	prostate health	1		
<i>Levisticum officinale</i> W.D.J.Koch, Apiaceae	lupstājs	C	leaves	fresh	to increase sexual ability	1		
<i>Achillea millefolium</i> L., Asteraceae (LGA002, LGA047, LGA088, DLGA002a, DLGA002h, DLGA040)	pelašķis, pelašķi, pelešķi*, syuriņis*, parastais pelašķis^^, žyužuoni*, žyužuons*, тысячелистник, tisočulistņiks^, tisjaselistņik^, pelruškene*, кривавник, peļeji*	W	flowering aerial parts	tea	cold		1	
					headache	2		
					sore throat		1	
					stomach-ache	3/1		
					tuberculosis		1	
					appetizer	1		
					diarrhoea	1		
					healthy	1		
					panacea	2		
			women's diseases		1			
			leaves	fresh, topical application	bleeding	1		
					wounds		3/1	
					tea	healthy	/1	
roots	dried	lung diseases	1					
		joint pain		/1				
aerial parts	dried, ground, topical application	wounds	1					
		tea	stomach-ache	2	2			
		tea mixture	gall-bladder problems	1				
<i>Arctium tomentosum</i> Mill., Asteraceae (LGA017, LGA038, LGA084)	baduļka^, lielais dadzis, badzuļka^, dadzis, dodzs*, gedi^, репейник^, badzuļi^, деды, дэдовник, лапухи, лопуха, лапух, лапухи, репейник	W	leaves	fresh, topical application	backache	1		
					bruises		1	
					joint pain	3	6	
					pain	/1	1	2
					spondylosis	1		
					swelling		1	
			roots	decoction	hair care	2		1
					tea	men's diseases	1	
<i>Artemisia absinthium</i> L., Asteraceae (LGA021, DLGA015, DLGA016, DLGA052)	vērmele, staņovņiks^, peļejumi*, полынь	W	aerial parts	fresh	against insects (mosquitoes)		2	
				tea	stomach-ache	1	2/1	1/1
<i>Artemisia vulgaris</i> L., Asteraceae	vībotne	W	roots	tea	joint pain	1		
			aerial parts	tea	healthy	1		
				whisked in sauna	joint pain	1		
<i>Bidens tripartita</i> L., Asteraceae (LGA018)	sunīši, череда, treijs*	W	aerial parts	decoction; bath or topical application	allergies	/1		
				decoction, topical application	diathesis in children	/1	/1	/1
				decoction, topical application	skin inflammation around the mouth in	1		

					toddlers using a pacifier			
				fresh	hair care		1	
				tea, rinsing	eye infection	1		
<i>Calendula officinalis</i> L., Asteraceae (LGA019, LGA050, LGA066, DLGA002f, DLGA020, DLGA045)	kliņģerītes, kliņģerīts, календула, ноготки	C	flowers	tea	breast inflammation	1		
					calming	1		
					diuretic		1	
					menstrual pain		1	
					sore throat	1		
					stomach-ache	1		1
				women's diseases	1	1	1	
				tea, rinsing	eye infection	1		
					sore throat	1		
tea, vaginal rinsing	women's diseases		1					
tincture	disinfection	1						
<i>Cirsium heterophyllum</i> (L.) Hill, Asteraceae (LGA039)	mārdadzis	W	aerial parts	tea	cancer	1		
<i>Cyanus segetum</i> Hill, Asteraceae	rudzupuķes, васильки, василёк	W	flowers	tea	diarrhoea		1	
					healthy		1	1
			insomnia			1		
			aerial parts	tea	cleansing in children	1		
<i>Erigeron acris</i> L., Asteraceae	jānīši	W	flowers	tea	bleeding	1		
					inflammation	1		
					women's diseases	1		
<i>Helianthus tuberosus</i> L., Asteraceae	topinambūrs	C	leaves	fresh, topical application	pain	1		
<i>Helichrysum arenarium</i> (L.) Moench, Asteraceae	бессмертник	W	flowering aerial parts	tea	healthy		/1	
<i>Leucanthemum vulgare</i> (Vaill.) Lam., Asteraceae (LGA014)	ромашус	W	aerial parts	tea	fever		2	
<i>Matricaria chamomilla</i> L., Asteraceae (DLGA011, DLGA023, DLGA048)	kumelīte, rumaška^, ромашка, kumelītes, romaška^, ромашечка, ramaška^, kumeleitys*, kumeļeites*	C	flowers	bath	diathesis in children		/2	/1
					decoction	hair care		3
				tea	antimicrobial		1	
					inflammation	1		
					appetizer		2	
					calming		1	
					cold	/1	2	1
					disinfection			1
					fever	1		
					healthy	2/1	/1	2
					indigestion		2	
					organism cleansing	1	1	
					refreshing	/1		
				stomach-ache	/1			
				tea, rinsing	eye infection	3	4	
	sore throat	2		/1				
roots	decoction			1				
<i>Matricaria discoidea</i> DC., Asteraceae	подорожник	W	flowers	fresh, topical application	wounds		1	

<i>Petasites spurius</i> (Retz.) Rchb., Asteraceae (LGA022)	[did not know the local name]	W	leaves	fresh, topical application	pain			1
<i>Pilosella officinarum</i> Vaill., Asteraceae (LGA054)	valasņik^	W	aerial parts	boiled in milk, topical application	skin diseases	1		
<i>Tanacetum vulgare</i> L., Asteraceae (LGA093)	biškrēsliņš, пижма, bišu kriesļeņi*	W	inflorescences	tea	gastritis	1		
					helminthic infections	2/1	1/2	
			seeds	tea	stomach-ache	1		
			aerial parts	fresh, topical application	trauma	1		
<i>Taraxacum officinale</i> (L.) Weber ex F.H.Wigg., Asteraceae	одуванчик, pieneņes, piņeņe*, pieneņites	W	leaves	decoction, vapour	haemorrhoids		1	
				fresh	allergies	1		
			roots	tea	constipation	/1		
			sap	topical application	bee sting	1		
			aerial parts	tea	cold		1	1
<i>Tripleurospermum inodorum</i> (L.) Sch.Bip., Asteraceae (LGA015)	ромашуc	W	aerial parts	tea	fever		1	
<i>Tussilago farfara</i> L., Asteraceae (LGA001, LGA081)	мать-и-мачеха, мällēpe, маc i маcиha^, sätlopus*, мällēpenes, mace maceha^	W	flowers	tea	cold	2		/1
					cough	1		
			leaves	cooked	soup		/1	/1
				fresh, topical application	bruises	2		
					headache	1		
					joint pain	2	2	
					muscle pain	1		
				scars	1			
			tea	asthma			1	
				cough	1	1/1		
medicinal		1						
			sore throat		1			
<i>Alnus incana</i> (L.) Moench, Betulaceae	ольха	W	buds	tea	asthma			/1
<i>Betula</i> spp. including <i>B. pendula</i> Roth, Betulaceae (LGA095, DLGA002b, DLGA006b, DLGA070)	берёза, bērzs	W	buds	eaten	cold		1	
				tea	healthy	1		
				tincture, topical application	joint pain	2	1	
			leaves	fresh, topical application	headache	1		
					joint pain			1
			tincture, topical application	joint pain	1			
			sap	decoction	hair care	1		
				fresh	vitamins	1		
twigs	fresh, topical application	joint pain	1					
	whisked in sauna	backache			1			
		healthy	18/1	11/2	11/2			
	joint pain	1		1				
<i>Corylus avellana</i> L., Betulaceae (DLGA025)	хлещина, орешник, крешина	W	twigs	tea	cholesterol		1	
<i>Symphytum asperum</i> Lepech.,	живокость, окопник	C	roots	tea	broken bones		1	

Boraginaceae (LGA089)								
<i>Symphytum officinale</i> L., Boraginaceae (DLGA001)	tauksakne	W	roots	tea	broken bones	1		
<i>Armoracia rusticana</i> P.Gaertn., B.Mey. & Scherb., Brassicaceae	mārrutks, хрен, mārrutki, hrens^	C/W	leaves	fresh, topical application	joint pain	3		
			roots	fresh, topical application	joint pain	1		
<i>Brassica oleracea</i> var. <i>capitata</i> f. <i>alba</i> DC., Brassicaceae	капуста, kāposti, kuopusti*, kāposts	C	leaves	fresh, topical application	bruises	1	1	
					burns	1		
					headache		1	
					joint pain	2	2/1	
					lumps after injections for backpain	1		
					sunstroke		1	1
<i>Sinapis alba</i> L., Brassicaceae	горчица	P	seeds	pulverized	cold			1
<i>Humulus lupulus</i> L., Cannabaceae (DLGA051)	аріņи, хмель, аріņи*	W	cones	tea	insomnia	1/1	1	
<i>Valeriana officinalis</i> L., Caprifoliaceae (LGA033, DLGA034)	валерианка, валериана, валериан, baldrejāns, balderjāņi, bolderjāņi, vaļerjanka^, valerjanki^, baldriāns, baldriāņi, valerjankas^, balderiānus	W	roots	dried	fever	/1		
				tea	calming	2	2/1	/1
					healthy	/1		
					insomnia	1		
tincture	calming	1/1	1	1/1				
aerial parts	tea	calming	2					
<i>Saponaria officinalis</i> L., Caryophyllaceae	gārkstes*	W	roots	fresh	instead of soap	/1		
<i>Stellaria media</i> (L.) Vill., Caryophyllaceae	мокрица	W	aerial parts	tea	healthy			2
					liver diseases			1
					stomach-ache			1
<i>Callisia fragrans</i> (Lindl.) Woodson, Commelinaceae	zelta stīga	C	aerial parts	tincture	joint pain	1		
<i>Crassula ovata</i> (Mill.) Druce, Crassulaceae	naudas koks, денежное дерево	C	leaves	fresh	bruises	1		
					cuts	1	1	
					wounds		1	
<i>Sedum roseum</i> (L.) Scop., Crassulaceae	rozā radiola	C	aerial parts	eaten	better mood	1		
					tonus support	1		
<i>Cucumis sativus</i> L., Cucurbitaceae	огурцы	C	fruits	fresh, topical application	rejuvenating		1	
<i>Juniperus communis</i> L., Cupressaceae	верес, можжевельни к, раеглис	W	twigs	fresh	against fleas			1
				whisked in sauna	healthy	1	3	2/1
<i>Elaeagnus rhamnoides</i> (L.) A.Nelson, Elaeagnaceae	smiltsērķšņi	C	flowers	tea, rinsing	eye infection	1		
<i>Equisetum arvense</i> L., Equisetaceae (LGA016)	kosa, хвощ	W	aerial parts	dried	stomach-ache		1	
				tea	men's diseases	1		
	медвежьи ушки	W	aerial parts	tea	diuretic		1	/1
					kidney diseases		1	

<i>Arctostaphylos uva-ursi</i> (L.) Spreng., Ericaceae					organism cleansing		1	
<i>Vaccinium myrtillus</i> L., Ericaceae	черника, mellenes	W	fruits	dried	stomach-ache		1	
				dried, frozen, tea	diarrhoea	2	5/2	
				fresh, dried, cooked, tea	eye problems		/1	5
				infused in strong alcohol	diarrhoea		/1	
			aerial parts	tea	eye problems	1		
				medical			/1	
				stomach-ache	/1	1	1	
<i>Vaccinium oxycoccos</i> L., Ericaceae	Клюкwa, dzērvenes	W	fruits	fresh	thickening of blood			/1
					healthy hypertension		1	1
					fever	3		
			fresh, tea	earache	1			
			fresh, topical application	cold			1	
			drink	fever		1		
			tincture	cold			1	
<i>Vaccinium uliginosum</i> L., Ericaceae	golubnika^	W	fruits	fresh	constipation	1		
<i>Vaccinium vitis-idaea</i> L., Ericaceae (DLGA066)	брусника, brūklenes, брусничник	W	fruits	fresh	intoxication	1		
				tea	diuretic	/1		
			leaves	tea	diuretic	1/1	2	/1
					hypertension	1		
				stomach-ache	/1			
<i>Quercus robur</i> L., Fagaceae	ozols, ozoli, дуб, ūzuls*	W	bark	decoction	toothache		1	
				dried	diarrhoea	/1		
				tea	diarrhoea		1	/1
				tincture	healthy		1	1
			twigs	whisked in sauna	healthy	4	5/1	8/2
					joint pain	1		1
<i>Pelargonium graveolens</i> L'Hér, Geraniaceae (LGA030, LGA067)	юранина, юранька, герания, jurgamin^, gerānija, герань, juraņina, uramins*^, uramina^, geraņ^, мушкат, цвет юранина	C	leaves	fresh, topical application	earache	4/2	9/1	3/1
<i>Ribes nigrum</i> L., Grossulariaceae (LGA106)	черная смородина, upepes, смородина, melnās jāņogas, čornaja smarogina^	C	fruits	eaten	hypertension		1	
				tea	cold	1	1	
					diarrhoea	1		
			twigs	bath	fever in children	1		
				tea	body cleansing	1		
		cold	1					
			fever		2	/1		
<i>Philadelphus coronarius</i> L., Hydrangeaceae	жасмин	C	leaves	tea	heart problems			1
<i>Hypericum</i> spp. including <i>H. maculatum</i> Crantz	звербой, звербой,	W	aerial parts	fresh	wounds	1		
				tea	cleansing blood	/1		
					cold	1	2	/1

and <i>H. perforatum</i> L., Hypericaceae (LGA020, LGA048, LGA060)	zveraboj <sup>^</sup> , asinszāle				heart problems		/1	
					hypertension	1	/1	
					indigestion		2	
					pain		/1	
					panacea		1	
					sore throat		1	
					stomach-ache	2		
				tincture	liver diseases	1		
<i>Leonurus cardiaca</i> L., Lamiaceae (LGA042, LGA075)	māteres, пустырник, собачья крапива	C	aerial parts	tea	calming	1	2	
					heart problems		2	
					hypertension	1	1	
<i>Mentha</i> sp. (eg <i>M. × piperita</i> L., <i>M. longifolia</i> (L.) Huds., <i>M. suaveolens</i> Ehrh), Lamiaceae (LGA052, DLGA035)	мята, mjata <sup>^</sup> , piparmētras, mētras	C	leaves	fresh	bad breath after smoking			1
			aerial parts	tea	calming	3	3	
					cold		1	1
					healthy		/2	2
					hypertension	1		
insomnia		1						
<i>Nepeta cataria</i> L., Lamiaceae (LGA074)	мелисса	W	aerial parts	tea	calming		1	
					heart problems		1	
					hypertension		1	
					insomnia		1	
<i>Origanum vulgare</i> L., Lamiaceae	raudene, dušica <sup>^</sup>	W	aerial parts	tea	better mood	1		
					calming	1		
<i>Prunella vulgaris</i> L., Lamiaceae (DLGA064b, DLGA068e)	gorļankas <sup>^</sup> , garļankas <sup>^</sup> , горлянка, горлянки, garļāņočas <sup>^</sup> , svētītais maisījums	W	aerial parts	blessed in church on Midsummer's Day, tea	panacea	1		
				dried	sore throat		1	
				tea	cough	1		
				sore throat		3/1		
tea, rinsing	sore throat	/1	1					
<i>Thymus serpyllum</i> L., Lamiaceae	чабрец	W	aerial parts	tea	bronchitis		1	
					cough		1	
<i>Phaseolus vulgaris</i> L., Leguminosae (DLGA032)	фасоль, фасоля	C	pods	tea	diabetes		1	
					high blood sugar		1	
<i>Trifolium</i> spp. including <i>T. medium</i> L., <i>T. pratense</i> L., Leguminosae (DLGA068a)	sarkanais āboliņš, красный клевер, svētītais maisījums	W	inflorescences	tea	heart problems	1		
			aerial parts	blessed in church on Midsummer's Day, smoked	panacea	1		
				tea	cold	1		
					epilepsy	1		
women's diseases		2						
<i>Vicia faba</i> L., Leguminosae	cūku pupas, bob <sup>^</sup>	C	leaves	fresh, topical application	wounds	1		
<i>Linum usitatissimum</i> L., Linaceae	linsēklas, лён	C		decoction	diabetes		1	
				diarrhoea	1			
hot compress	sore throat	1		/1				
<i>Tilia cordata</i> Mill., Malvaceae (DLGA009)	lēpa, līras <sup>*</sup> , līpas, липа, līpa <sup>*</sup>	W	inflorescences	tea	beauty treatment	1		
			twigs	whisked in sauna	cold	9	4	2
					healthy	/1		
healthy	1/1		2					

<i>Ficus carica</i> L., Moraceae	фикус	C	leaves	tincture, topical application	joint pain			1	
<i>Syzygium aromaticum</i> (L.) Merr. & L.M.Perry, Myrtaceae	krustnagliņa	C	flower buds	dried	toothache	1			
<i>Syringa vulgaris</i> L., Oleaceae (DLGA055, DLGA060)	belie sereņā, baltie ceriņi, ceriņš, белая сирень, синяя сирень	C	flowers	tincture, topical application	joint pain	2	2	/1	
<i>Epilobium angustifolium</i> L., Onagraceae (DLGA019, DLGA047)	иван-чай, иван čaj <sup>^</sup> , ugunspuķe	W	leaves	tea	strengthening of organism		1		
			aerial parts	tea	cold		1		
					headache		1		
					healthy		2	1	
					immune boosting		1		
					menstrual pain	1			
					vesical cleansing		1		
women's diseases	1								
<i>Paeonia</i> spp. including <i>P. lactiflora</i> Pall., Paeoniaceae (DLGA053b)	sarkanā пеонija, tukšziedu пеонija, пион ранний (красный), пионь, пеонija, красный пион	C	flowers	dried, smoked	epilepsy	/1			
					nerves	/1			
				tea	fright		2		
				tea, gargle	sore throat	1			
	roots	dried and powdered	fright	/1					
<i>Chelidonium majus</i> L., Papaveraceae (LGA046)	чистотел, strutene, strutenes, čistoķel <sup>^</sup>	W	sap	fresh	warts	2			
					wounds			/1	
			aerial parts	fresh	wounds			/1	
					tincture	bruises		1	
						healthy		1	
		joint pain		1					
<i>Papaver somniferum</i> L., Papaveraceae	magone	C	seeds	eaten	epilepsy	/1			
<i>Picea abies</i> (L.) H.Karst. , Pinaceae	ēlka, ель, egle	W	buds	tincture	bronchitis		2		
			resin	ointment	wounds	/1			
				tincture	joint pain			/1	
			twigs	whisked in sauna	healthy			/1	
<i>Pinus sylvestris</i> L., Pinaceae (DLGA022, DLGA046, DLGA065)	сосна, priedes, priede	W	buds	tea	asthma	1			
					cold	1	1		
					cough	2	3		
				tea, gargle	sore throat	1			
				tincture	cold	1			
					cough			/1	
			healthy		1				
				lung diseases	1/1				
			needles	decoction, foot bath	calming		1		
			resin	ointment	wounds	1			
tincture	joint pain				/1				
twigs	brought into the home	prophylactics		1					

				decoction used for bath	healthy		2	
				whisked in sauna	healthy	1		
<i>Piper nigrum</i> L., Piperaceae	перец, черный перец	P	seeds	dried	diarrhoea		1	
					stomach-ache		1	
<i>Plantago major</i> L., Plantaginaceae (LGA062, LGA071, LGA113)	подорожник, сејmala лара, сејteka, padarožņiks^, сејmallapa, трипутник, сејlateka	W	leaves	fresh, topical application	bruises	1		
					cuts	2		1
					pain	1	2	1
					wounds	5	8	7
				tea	cough	2		
					stomach-ache	1		
<i>Avena sativa</i> L., Poaceae	овес, auzas	C	grain	porridge	constipation		1	
			stem	bath	skin diseases	1		
<i>Briza media</i> L., Poaceae	zaķu auziņas	W	aerial parts	tea	diuretic	1		
<i>Polygala vulgaris</i> L., Polygalaceae (LGA082)	naksneņis*, naksneņīcas*	W	flowers	bath	sleep problems in children	/1		
<i>Polygonum arenastrum</i> Boreau, Polygonaceae (LGA110)	подорожник	W	leaves	fresh	nosebleed		1	
<i>Polygonum aviculare</i> L., Polygonaceae	maura sūrene	W	aerial parts	tea	gall-bladder problems	1		
<i>Rumex longifolius</i> DC., Polygonaceae (LGA032)	zirgskābenes	W	flowers	tea	diarrhoea	1		
<i>Rumex</i> spp. including <i>R. thyrsiflorus</i> Fingerh., <i>R. acetosa</i> L., Polygonaceae	щавель конский, skuobīņes*, zirgu skābenes	W	flowers	tea	stomach-ache	/1		
			leaves	tea	cough	1		
					diarrhoea			/1
Polypodiopsida	папоротник, paparde	W	aerial parts	dried	backache	/1		
				tincture	joint pain		2	
				whisked in sauna	healthy			2
<i>Primula elatior</i> (L.) Hill, Primulaceae (DLGA027, DLGA037)	петушки, gaiļbiksītes, pervocvet	W	inflorescences	tea	cough	1	1	
					sore throat		1	
<i>Primula veris</i> L., Primulaceae (DLGA063, DLGA021)	первоцвет, gaiļbiksītes, petuški^, gaiļīši, pervocvet, gaiļbiksītes, gaiļapieši, gaiļbiksīte	W	inflorescences	tea	antimicrobial		1	
					bronchitis		1	
					cold	4/1		/1
					cough	2	1	
					fever	1		
					healthy	1		
					heart problems		1	
					insomnia	1		
<i>Alchemilla vulgaris</i> auct. (coll.), Rosaceae (LGA049, LGA118)	raspodiņš , rasas krēsliņš, raspodiņi, čisčik^, raseņys*, rasiņas*, manžetka^, krūšu kurvīši, rasaskrēsliņš , rasaspodiņš	W	inflorescences	tea	hypertension	1		
			leaves	tea	gall-bladder problems	1		
			aerial parts	tea	cleansing blood	1/1		
					diuretic	1		
					fever	1		
					pain	1		
					women's diseases	2		
				tea, rinsing	eye infection	1		
	черная арония,	C	fruits	eaten	headache		1	
					hypertension	1	4	

<i>Aronia melanocarpa</i> (Michx.) Elliott, Rosaceae	аронія, аронія			tea	promotes the bloodstream		1	
<i>Crataegus</i> sp., Rosaceae	боярышник	W	flowers	tea	heart problems		1	
			fruits	tea	heart problems		2	
<i>Filipendula ulmaria</i> (L.) Maxim., Rosaceae (LGA077)	meduņica <sup>^</sup> , vīgrieži, veigrišķis*, медуница	W	flowers	tea	headache	1		
					women's diseases			1
			aerial parts	pulverized	sore skin between the fingers	1		
				tea	calming	3		
				insomnia	2			
<i>Potentilla anserina</i> L., Rosaceae	лапчатка, гусиные лапки	W	aerial parts	tea	healthy		/1	
					heart problems		2	
<i>Potentilla erecta</i> (L.) Raeusch., Rosaceae	дубровка, kalgan <sup>^</sup> , retējs	W	roots	tincture	medicinal purposes	1		
					stomach-ache	/1		
			aerial parts	tea	diarrhoea		1	
<i>Prunus domestica</i> L., Rosaceae	сливка	C	fruits	dried	constipation		1	
<i>Prunus padus</i> L., Rosaceae (DLGA067)	ievās	W	fruits	tea	diarrhoea	1		
<i>Rosa</i> spp., Rosaceae	шиповник	W	fruits	dried	insomnia		1	1
				tea	healthy			/1
			twigs	tea	healthy			2
<i>Rubus idaeus</i> L., Rosaceae (DLGA012, DLGA033)	малина, meža avenes, avenes, aveņis*, oveņis*	W	fruits	jam	cold	3		1
					cough	1		1
			twigs	tea	cold	4/1	1	1
					cough	/1	2	
				fever	2/1	6	2/1	
<i>Rubus nessensis</i> Hall, Rosaceae (LGA005)	kazene, melnās avenes	W	fruits	tea	cold	1		
<i>Sorbus aucuparia</i> L., Rosaceae (LGA083)	рябина, pīlādzis, čērmūkslis*, rjabina <sup>^</sup>	W	fruits	fresh	cough	1		
				jam	cough	1		
			twigs	whisked in sauna	healthy	1	1	
<i>Citrus limon</i> (L.) Osbeck, Rutaceae	лимон	P	fruits	eaten	thickening of blood			/1
				added to hot drink	bronchitis		/1	
					cough		/1	
					hair care			2
<i>Populus balsamifera</i> L., Salicaceae	topuļi*, topoļ, тополь, papele, apse	W	buds	as additive in ointment	wounds	1		
				dried	veins	1		
				infusion in olive oil	hair care	/1		
				ointment	hair care	/1		
					infected wounds	/1		
tincture	healthy	1	1	1				
<i>Populus tremula</i> L., Salicaceae	apse	W	twigs	whisked in sauna	healthy	/1		
<i>Salix</i> spp., Salicaceae	purva vītols, верба	W	bark	topic application	wounds	/1		
			young leaves	tea	diabetes		1	

<i>Acer platanoides</i> L., Sapindaceae	kļavas, клён	W	sap	fresh	organism cleansing		2	
					vitamins	1		
<i>Aesculus hippocastanum</i> L., Sapindaceae (LGA025, LGA076)	kastāņi, kaštans*, kastāņi, каштан, kastaņas^^	W	conkers	tincture, topical application	joint pain	3	1	1/1
			flowers	boiled, topical application	headache	/1		
				tincture, topical application	backache	1		
			leaves	fresh, topical application	joint pain	1		
<i>Verbascum thapsus</i> L., Scrophulariaceae	deviņvīru spēks	W	roots	tea	joint pain	1		
<i>Capsicum annuum</i> L., Solanaceae	перец	C	fruits	fresh	strengthening of organism			1
<i>Solanum tuberosum</i> L., Solanaceae	kartupeļis, картошка	C	tubers	boiled, topical application	cough		2	
				boiled, vapour inhaled	cold			2
					stuffy nose	1		
				fresh, topical application	eye problems		2	
	ground	burns	/1					
<i>Urtica</i> spp. including <i>U. dioica</i> L., <i>U. urens</i> L., Urticaceae (LGA058, LGA059)	крапива, nātres, nātras, nātre, ārtsnieciskā nātre, volk trava^, krapiva^	W	leaves	fresh, topical application	boils		1	
			aerial parts	boiled in milk, topical application	for specific illness - polosņik (RU)	/1		
				decoction	hair care	1/1	7/1	1/1
				tea	body cleansing		1	1
					healthy		2	
					immune boosting		1	
					joint pain		1	
					liver diseases	/1		
			whisked in sauna	healthy	1	3	4	
			joint pain	1	1	1		
promotes the bloodstream	2							
	medicinal			/1				
<i>Viola</i> sp., Violaceae	lauku atraitnīte	W	aerial parts	tea	itching from scabs	/1		
<i>Aloe arborescens</i> Mill., Xanthorrhoeaceae	столетник, алоя, алое, stoļetņiks^, alveja, алоэ	C	leaves	fresh, topical application	cuts			1
					wounds	2		2
				prepared with honey	bronchitis		1	
					healthy	1		
					stomach-ache			1
				cough		1		
tincture	healthy		1					

Abbreviations: C – cultivated, W – wild, P – purchased; LG – Latgalians, MX – Mixed (non-Old Believers), OB – Old-believers; /X – refers to uses from the past; ^^Latgalian dialect origin borrowed by Latvian speakers; ^Latvian-speaking respondent providing Russian plant name, \*^Russian language origin borrowed by Latgalians speakers, \*Latgalian name, rest – names in Latvian language.

The very small numbers for each use reflect a similar pattern, as identified in a study in Belarus (Söukand et al. 2017). This may be explained by individualization in the medicinal use of plants; yet numerous single plant uses can also signal the erosion and/or transformation of knowledge once shared within the community (Söukand et al. 2017).

The most common plant parts used as medicine (including past and current uses) for OB were: aerial parts in general, including leaves and twigs, followed by fruits, flowers, roots, etc. The most frequent

preparation techniques of OB (including past and current uses) included: tea, whisked in sauna, and topical application.

Several plant taxa were included in bouquets by Catholic interviewees (a mix of plants, such as *Prunella vulgaris* and *Trifolium* spp.) to be blessed in Church on Midsummer's Day and either prepared as a tea or burned in the room as a panacea (Figure 5). An OB (born 1968) recalls a past use of mixing two plants namely *Ribes nigrum* and *Rubus idaeus* in order to treat children with a high temperature.



Figure 5. Dried herbs in the homes of interviewees. Credit: BP & RS & IM.

#### **The combinations of current and past uses: plant families vs. medicinal categories**

There were 184 different combinations of plant families and ICPC-2 medicinal categories. The ten most commonly mentioned combinations were Asteraceae [synonym Compositae] contributing to general health (47 DUR), and the digestive (31), musculoskeletal (23), and respiratory (23) ICPC-2 categories. General health was also most commonly cited to be helped by Betulaceae (47), Fagaceae (22) and Rosaceae (21). Plantaginaceae (23) was seen to have dermatological effects, Geraniaceae to help with the ear (20) and Rosaceae to have respiratory effects (19).

The connections between plant families and medicinal ICPC-2 categories are presented as a network (Figure 6), in which the strength of the link corresponds to the DUR, and a bigger node size corresponds to a higher number of DUR. Large green bubbles in the network are commonly used plants, while large yellow bubbles represent often mentioned medicinal categories. Small bubbles are the plants/medicinal categories that were rarely mentioned.

As indicated by the strength of the links, the three plant families with the most specific use(s) were Geraniaceae (used for problems with the ear), Asteraceae (general health, digestive, musculoskeletal and respiratory) and Betulaceae (general health). An example of a non-specifically used plant category is that of Leguminosae, which exhibits 10 DUR associated with seven different

ICPC categories. Most medicinal categories were somewhat unspecific, meaning that they had many possible treatments. The category with the lowest number of specific plant treatments was psychological issues.

#### **Past uses and knowledge**

Of all the plant taxa, eight were only used in the past: *Alnus incana*, *Helichrysum arenarium*, *Melissa officinalis*, *Papaver somniferum*, *Polygala vulgaris*, *Populus tremula*, *Saponaria officinalis*, and *Viola* sp. Among the emic diseases, 12 were only mentioned as past applications, e.g., infected wounds (*Populus balsamifera*). A woman born in 1938 noted, "when there was no commercial soap available, bodies were rubbed with this grass instead of soap", referring to the use of *Saponaria officinalis*. Also, a woman born in 1959 recalled the use of *Paeonia* spp. roots against fright, which was knowledge she received from her grandmother.

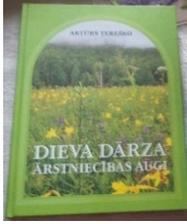
The source of knowledge varied from person to person (Table 2), with the number of taxa mentioned by an interviewee reaching as high as 29. Interviewees recalled having gained knowledge from older relatives and through literature, e.g., local newspapers, books from 1974 and more recent editions. As identified by Mattalia et al. (2020) the transmission of knowledge on plant uses may differ across borders even if culture and linguistic backgrounds are shared. In addition, a similar diversity of sources of knowledge transmission has been noted for Ukrainian Hutsuls (Mattalia et al. 2020).



(Ausma (Rēzekne No 88) 1957). The vice-director of Dagda's Society of Consumers indicated that 40% of all medications produced in Latvia in 1965 were made from medicinal plants, and it was promised

that bonuses would be paid to the most diligent harvesters of these plants (Zarja Komunizma (Krāslava No 24) 1965).

Table 2. An overview of the popular-scientific books and other sources used by respondents. Credit: IM & BP & IH.

Photo of the source	Name of the book, author and year	Main components
	Rubine, H.; Ozola, S. Eniņa, V. (1974). Ārstniecības augu sagatavošana un lietošana.	Informative literature on plant uses.
	Даников, Н. И. (2006). "Ваш травник".	Recipes for preparing medicinal remedies from plants.
	Kerstina, L. (2007). Lielais dabas ceļvedis bērniem.	A translation from German; informative literature for children regarding animals and plants.
	Reader's Digest (2011). 1001 Padoms Jūsu veselībai.	Informative literature on home "first aid kits".
	Reader's Digest Association. (2012). Dabiski līdzekļi tavai veselībai.	A translation from English; about natural sources for health.
	Tereško, A. (2014). Dieva dārza ārstniecības augi.	Informative literature on the art of tea preparation and provides advice on how to regain health.

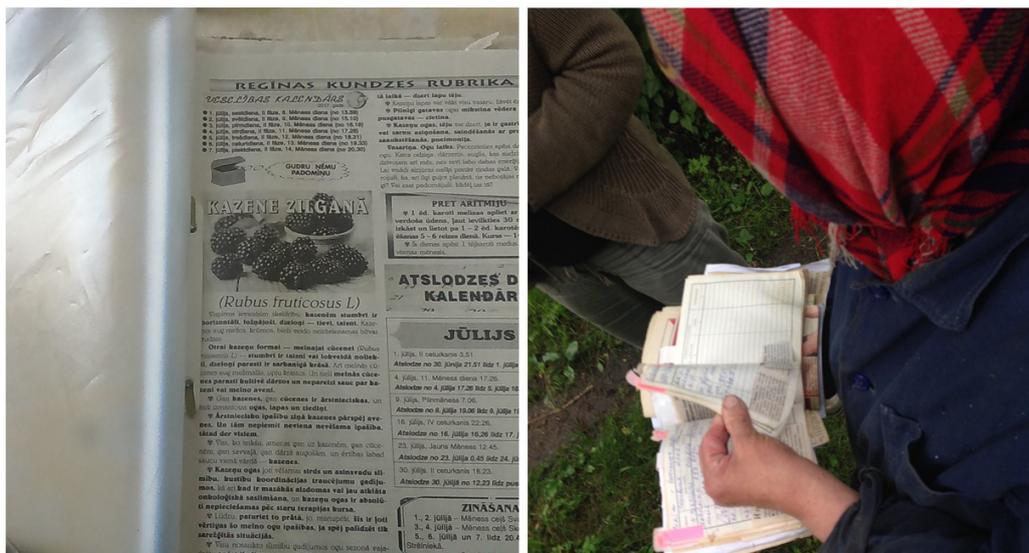


Figure 7. Notebooks from interviewees on plant remedies (Photo IH & IM).

Some newspapers introduced medicinal plants and their preparation, including collecting, proper drying, etc. For example, in an article published in Latgalian, agronomist Pēteris Dindonis (Taisneiba (No 66) 1940) described the cultivation of *buldurjõņu* or *valerjanu* (*Valeriana officinalis*) roots and their use to treat nerve pain, spasms, epilepsy, insomnia, anxiety, and weakened heart rate. These uses of *Valeriana officinalis* differ slightly from the ones noted in our field material. The autumnal medicinal plant *reteji* (*Potentilla erecta*, pulverized, used to treat diarrhoea) has also been noted in a Latgalian language newspaper. For *Potentilla erecta*, preparation differs as our field material mentions tincture and tea but no pulverization. Other newspaper articles have described the use of *Kalmenes* or *skajbes* (*Acorus calamus* to alleviate toothache, tincture for stomach diseases) and *Tauku sakne* (*Symphytum officinale* to treat diarrhoea and respiratory diseases) (Taisneiba (No 69) 1940). These applications of *Symphytum officinale* and *Acorus calamus* also differ from that of our field data (Table 1).

The series of articles in the magazine *Dzeive* published by several authors during their exile after World War II (e.g., Leonards Latkovskis (1972, The United States of America) and V. Bojārs, Canada) from the 1950s to the 1970s promoted the heritage value of such wild and cultivated plants traditionally used in Latgalian culture (e.g. Latkovskis 1963, Bojārs 1970, Latkovskis 1972, Latkovskis 1973) (e.g., *bārzis* (*Betula spp.*)). This also appears in our data set, as *Betula spp.* stands out as one of the main taxa used across the Latgalian group.

Latgalians more often spoke several languages (for example, an informant in the Dagda region (1942)

spoke Latgalian, Latvian, Russian and Belarusian, using them to communicate with neighbours). In this way, the Latgalian language was more highly influenced by borrowed lexis than the Russian spoken by Old Believers. This can be observed in borrowed plant names (for example, *krop*, *tisočulistņiks*, *topuļi*, *kaštans*, *stoļetņiks*, *romaška*, *padarožņiks* etc.; Table 1).

#### Comparison of current uses among the groups

The current use of plants consists of 108 taxa belonging to 49 families. The most well-represented families were: Asteraceae (19 taxa/147 DUR), Rosaceae (12/66), Betulaceae (2/55), Ericaceae (5/35), and Lamiaceae (6/35), while the most used taxa for medicinal applications included: *Betula spp.* (54 DUR), *Matricaria chamomilla* (32), *Plantago major* (31), and *Urtica spp.* (29) (Table 3). Table 3 presents the mean numbers of all three groups and the total numbers for DUR and taxa.

#### The differences and similarities among the groups based on families and taxa

The Latgalian group stands out with regard to the large number of taxa used, whereas Old Believers exhibit a comparably lower number of used taxa (Figure 8, Table 3). This might be explained by the general nature of Old Believers and their conservative views on customs and religion (Zielińska 2017), as well as the nature of isolation (Gibson 2016).

Table 3. Descriptive overview among the groups.

Groups	Number of interviewees reporting medicinal current and past uses	Total number of taxa (families) for current uses	Number of taxa (families) for current uses	Total number of taxa (families) for current and past uses	Total number of taxa (families) for current and past uses	Average number of taxa per interviewee for current uses	Min/Max value value of taxa by interviewees	Total number of DUR for current and (past) uses	Number of DUR for current and (past) uses	Average number of current DUR per interviewee	Min/Max value of DUR by interviewees
Old Believers (n=^19)	17	108 (49)	40 (27)	116 (51)	54 (36)	7 ± 4	2/18	710 (846)	125 (165)	8 ± 5	2/19
Latgalians (n=^28)	27		81 (41)		90 (45)	9 ± 8	1/29		303 (362)	12 ± 11	1/42
MIX (n=^26)	25		77 (41)		79 (42)	9 ± 7	1/22		282 (319)	12 ± 10	1/29
Mean number			66 (36)		74 (41)						

Abbreviations: ^Total number of interviewees. Only interviewees reporting plants as a medicinal remedy were considered for further analysis.

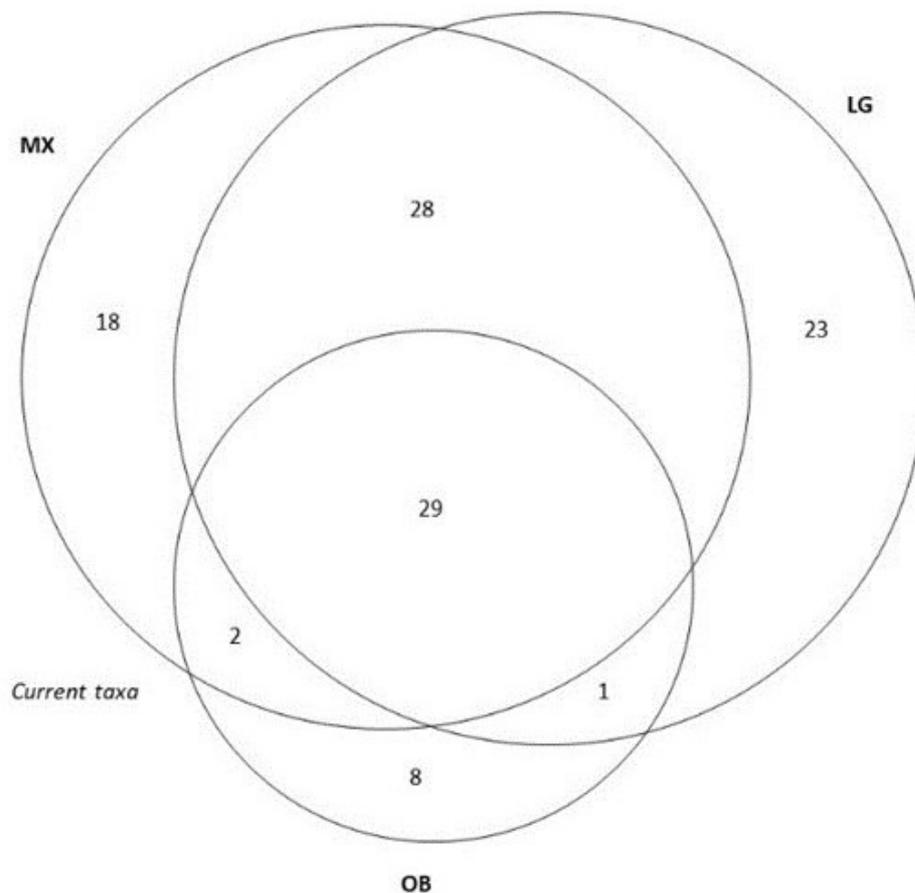


Figure 8. The overlap between currently used taxa (numbers) among the three groups

Diversity among the groups regarding the unique taxa used for treating diseases is evident (Table 3, Figure 8). The Latgalian group exhibited 23 unique species not shared by the other groups, followed by the Mixed group with 18 taxa and Old Believers with 8 taxa. The lower number of taxa for the latter group can perhaps be explained by different prohibitions imposed in the Old Believer faith, which may have influenced the local tradition of plant use (Svalova 2019). Plants with intoxicating or stimulating effect, for example, black tea (grown in China) and *хмель* (*Humulus lupulus* L.), were prohibited and were considered sinful and cursed by Satan, according to the folk beliefs and superstitions of Old Believers (Pigin 2014).

A set of religious ideas and conservatism have also contributed to the creation of restrictions on communication with outsiders (people of different faiths) (Korolyova 2012).

Additionally, for the Latgalian group, there appears to be distinct markers of used taxa among the interviewees, e.g., *Alchemilla vulgaris* and *Achillea millefolium*. As for the remaining taxa, *Betula spp.*, *Matricaria chamomilla*, and *Plantago major* stand out as widely shared among the three groups.

#### **Differences and similarities based on disease categories among the three groups**

The Latgalian group did not mention the use of any taxa for endocrine-related diseases (e.g., diabetes). However, according to SPKC meta-data, the number of diabetes cases is increasing every year in the Latgale region, and in Dagda Municipality, the number of diabetes mellitus cases is 358-448/10,000 inhabitants (473 - the average in Latvia) (SPKC 2019, CSB 2017). For most disease categories, Latgalians provided a larger number of taxa in comparison to the other groups (Figure 9).

Old Believers did not name any taxa for male genital, blood, urological, or neurological diseases. However,

this may also be linked to the fact that male- and female-related illnesses are sensitive topics not often discussed openly. Additionally, when it comes to sicknesses, Old Believers are very faithful and place

their trust in God (Polek 1900). A woman born in 1957 representing Old Believers added that "she does not believe in the power of medicinal plants, but sometimes she accepts using some of them."

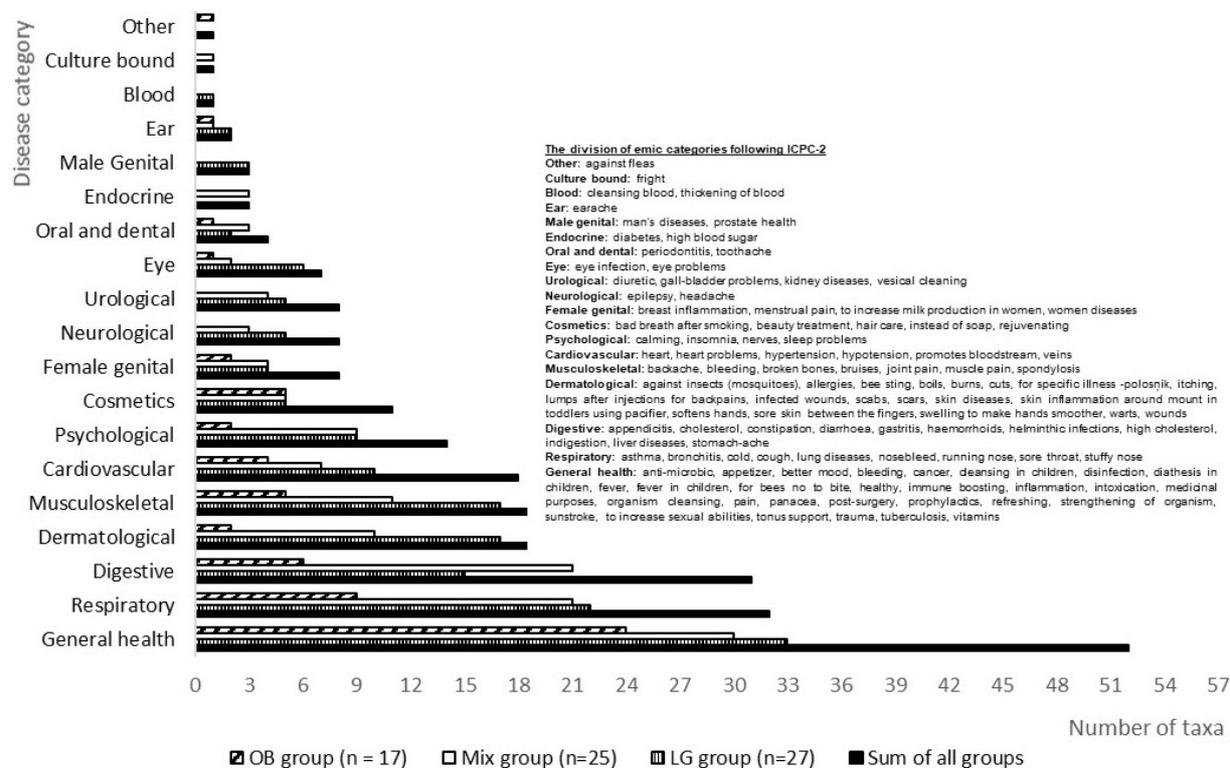


Figure 9. The number of taxa per ICPC-2 disease category among all three groups.

Taking into account the opportunities available at the beginning of the 21<sup>st</sup> century (e.g. for individuals from closed communities to move around and educate themselves elsewhere), the authors tested whether there would be any decrease in taxa if only Old Believers who had not been out of the region and did not have a higher education were considered. The number of interviewees dropped from 17 to 7, as did the number of taxa and families to 18 and 16, respectively. The average number of taxa mentioned dropped from 7 to 5, with a maximum of 7. This provides the grounds for further analysis as the results indicate that having been isolated in the past also influences the new generation's choices in more open societies.

Additionally, the experience of communication among neighbours is based on Old Believer religious prohibitions and principles passed down through the centuries. According to Korolyova (2012), the tolerance Old Believers in the region towards other ethnicities nowadays is greater than in the past (although they still consider their neighbours as "outlanders" if they do not share the same faith).

In comparison, during an ethnolinguistic study (conducted in 2016 by researchers from the Institute for Slavic Studies of the Russian Academy of Sciences and Daugavpils University (Pilipenko 2018)) informants stressed that they speak Russian with their Latgalian neighbours: "По-русски! Никто ту не калякал по-латыски, этого разговору не было, никогда!" (Андрупенская в., ДК, жен., рус., стар, 83) [Russian! Nobody prattled on in Latvian here, never even spoke it! (83-year-old OB woman from Andrupene parish)]. When speaking about their neighbours, Old Believers used the terms Latgalians and Latvians as synonyms. Some of the interviewees admitted that the Latgalian language was also used by Old Believers, although it was not common. Moreover, informants reported that (especially during the Soviet period) Latgalians felt uneasy speaking their native language, as it was characterized as a mixed language (Pilipenko 2018).

To add, less specific application on the family level is noted for the Latgalian group (density: 0.16) in comparison to Old Believers (density: 0.13). For the Mixed group, the density of links was 0.14. This indicates that the Latgalian group tends to apply the same plant family for treating various diseases,

whereas Old Believers hold distinct uses for certain plant families. There also appears to be distinct plant families that are only used for treating specific diseases among all three groups, such as Geraniaceae for earache.

## Conclusions

The results corroborate the recent findings of other scholars that a similar environment and proximity of communities do not result in identical medicinal plant uses. Nevertheless, the differences were relatively small. As expected, Old Believers used fewer medicinal taxa than the rest of the neighbouring communities. In comparison to other groups, Old Believers also exhibited a limited number of applications for medicinal plants.

The data adds support to the argument that self-isolation from other cultures influences one's willingness to absorb the knowledge of other cultures. The transmission of ethnobotanical knowledge has occurred mainly orally among Old Believers, while the other two groups have made use of different sources more often (especially published media and books). This may reveal the impact of cultural peculiarities of the Soviet Union where knowledge gained from books was highly esteemed.

The authors also stress the importance of addressing cultural factors, even in relatively small municipalities. This study provides the grounds for further analysis regarding religious minorities and medicinal plant uses.

## Declarations

**List of abbreviations:** OB = Old Believers, LG = Latgalian, MIX (MX) = Mixed group

**Ethics approval and consent to participate:** All participants provided prior oral informed consent. No personal data was collected.

**Consent for publication:** Not applicable.

**Availability of data and materials:** The data that support the findings of this study are available from the corresponding author upon reasonable request.

**Competing interests:** The authors declare that they have no conflict of interest.

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**Authors' contributions:** BP, RS and RK designed the study; AS, BP and RS drafted the manuscript; RK, RS, BP, AS, IM, IH, SKr conducted the field research; AP, JP and SKo interpreted the data and AP, JP, SKo, IM critically revised the manuscript for important intellectual content. All authors read and approved the final manuscript.

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