Green pharmacy at the tips of your toes: medicinal plants used by Setos and Russians of Pechorsky District, Pskov Oblast (NW Russia)

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Abstract
Background: While the hybridization of ecological knowledge has attracted substantial attention from researchers, the coexistence of local and allopathic medicinal traditions in literate societies widely exposed to centralized schooling and medical services has not yet been investigated. To this end, we studied the current and remembered local ethnomedical practices of Setos and neighboring Russians at the border with Estonia.

Methods: During 2018–2019, we carried out 62 semi-structured interviews in the Pechorsky District of Pskov Oblast, NW Russia. For cross-border comparison, we utilized the data from 71 interviews carried out at the same time among Setos in Estonia. The Jaccard Similarity Index and qualitative comparison were used to analyze the data.

Results: The study participants mentioned 819 uses of 112 taxa belonging to 54 families. More than two-thirds of the uses (565) were quoted by 36 Russian interviewees, while the remaining third (254) were quoted by 26 Seto interviewees, with the top 3 in both groups being Viburnum opulus, Rubus idaeus, and Plantago major. The Seto intraethnic similarity index was lower (0.43) than the interethnic similarity in Estonia (0.52) and comparable to the interethnic similarity in Russia (0.43). Setos in Russia and local Russians rely more on wild plants (86% and 80% of medicinal plants, respectively), while Setos in Estonia and Estonians show less preference to them (63% and 61%, respectively). Nevertheless, Setos tend to source wild plants available in their gardens (33% of plants for Setos in Estonia and 38% in Russia), while Russians prefer to source them in the wild (38%).

Conclusions: The preference of both groups in Russia for wild plants over cultivated and purchased plants was inspired by the overall plant literacy, access to nature, and one-to-many knowledge transfer favoring wild plants. Setos in Russia reported a narrower and more homogenous set of plants transferred vertically. However, due to atomization and the erosion of horizontal connections, there are singular plant uses among Setos that overlap with the local Russian set of medicinal plants and differ qualitatively from that of Setos in Estonia.

Keywords: Herbal medicine, Ecological knowledge hybridization, Post-Soviet, Ethnomedicine, Cultural variation

Background
The combination of traditional medicinal knowledge with that belonging to allopathic medicine is called hybridization, and it is characteristic of contemporary indigenous societies exposed to Western medicine and education systems. In fact, in such cases pharmaceuticals do not permanently replace traditional remedies but rather the two systems coexist [1]; moreover, the hybridization of traditional local knowledge can be a precursor to its
resilience [2]. Studies on post-Soviet materials reveal that while the return to complementary and alternative medicine (CAM), to which local ecological knowledge (LEK) can be attributed, can be linked to a collapse of allopathic medicine [3], the restored accessibility to allopathic or mainstream medicine does not necessarily mean abandonment of CAM [4]. However, since traditional medicinal systems are more pragmatic, by their nature, and much less loaded with value and symbolic meaning than traditional food, they are more susceptible to change [5, 6]. Being an adaptive system, local ecological knowledge (LEK) is itself defined by a number of socioeconomic factors starting with age, gender, education, and religion, but also including income, access to a home garden, wild resources, and access to health providers, their attitude toward nature and the quality of services provided by them [7–12]. Lastly, a role in traditional knowledge preservation is played by the horizontal connections within the local community [13].

Education and schooling are usually regarded as a factor in the erosion of local ecological knowledge (LEK). It has been widely accepted for some time that there is a negative correlation between the level of education and the preservation of medicinal LEK [14–17]. However, Beltran-Rodriguez et al. [18] found no correlation between LEK and the level of education in Mestizo communities in Mexico. Reyes-Garcia et al. [15] argued that the contextualization of the content of school programs might be crucial for LEK integrity and there are suggestions that some schooling systems, on the contrary, adapt their organization to the traditional practices [19].

Indigenous ways of life have changed drastically by the expansion of industrial and post-industrial economies. Studies in Chukotka have shown that in situations of close contact not only medicinal [20] but also food practices can change dramatically [21], and language preservation can play a key role in LEK resilience [22]; however, Krupnik and Vakhtin [23] reported that there is a slow hope regarding the preservation of key concepts of ecological knowledge during language attrition. The impact is even more obvious when one examines the changes experienced by a community that was at some point separated, became a diaspora, or was divided by a newly established border. The transformations occurring in divergent communities can highlight the changes in the environmental or socioeconomic contexts linked to them.

A newly formed state border separated the Seto community 30 years ago following the collapse of the Soviet Union. Setos are a Finno-Ugric people, with the majority of the population residing in Estonia (ca. 12,000) and only about 170 individuals living in Russia, but they have remained in close contact with Russians for centuries.

### Table 1: Demography of the field study participants

| Gender | Education | Religion       |
|--------|-----------|----------------|
| Setos  | N = 26    | 2 Secondary   | Mainly Orthodox |
|        | 16 F/10 M | 11 Vocational |                |
|        |           | 11 College    |                |
|        |           | 2 Higher      |                |
| Russians | N = 36   | 1 Primary     | Orthodox or atheist |
|         | 27 F/9 M  | 8 Secondary   |                |
|         |           | 5 Vocational  |                |
|         |           | 12 College    |                |
|         |           | 10 Higher     |                |

Setos speak a sub-dialect of the Võro dialect of Estonian and, like Russians, belong to the Orthodox faith. The traditional occupations of Setos were agriculture and pottery. Being located in a rural area on the frontier between West and East, the Seto tradition has absorbed features of both. At different times during the twentieth century, Setos resided in the territory of the Russian Empire, independent Estonia, and the Soviet Union, being exposed to collective farming and Soviet healthcare while being schooled in Estonian.

The aims of the study were:

- to document the current ethnomedical practices in the area related to the use of plants and to conduct cross-cultural and diachronic analyses;
- to consider the factors that could influence the transmission of local ecological knowledge regarding medicinal plants and its hybridization in the study area;
- to assess changes in LEK and address their potential provenance using cross-cultural and cross-border data.

### Data and methods

#### Field study

During the summers 2018–2019, we conducted 62 semi-structured interviews among Setos and Russians residing in the Pechorsky District of Pskov Oblast, Russia. In the second year of the project, we spoke for a second time to 15 participants to discuss the details of their plant use. The demographic distribution of the study participants is shown in Table 1. We aimed to recruit participants aged 40 years or above so that they had gained sufficient experience in various plant uses linked to multiple contexts. The oldest participant was born in 1916 and the youngest in 1980. The participants were recruited through convenience sampling, i.e., we spoke to individuals available on the street and in yards of country houses, and also via the snowball method, especially the Seto informants due to

### Table 1: Demography of the field study participants

| Median age | Gender | Education | Religion       |
|------------|--------|-----------|----------------|
| Setos      | 66     | N = 26    | 2 Secondary   | Mainly Orthodox |
|            |        | 16 F/10 M | 11 Vocational |                |
|            |        |           | 11 College    |                |
|            |        |           | 2 Higher      |                |
| Russians   | 68     | N = 36    | 1 Primary     | Orthodox or atheist |
|            |        | 27 F/9 M  | 8 Secondary   |                |
|            |        |           | 5 Vocational  |                |
|            |        |           | 12 College    |                |
|            |        |           | 10 Higher     |                |
their limited presence in the region. Oral informed consent was always obtained before the start of the interview and the ISE ethical guidelines were followed [24].

During the interviews, we asked about domestic plant remedies for the most common illnesses, addressing various parts of the body (head, eyes, ears, heart, stomach) or the most common ailments (cough, female or male problems, children’s diseases), the sources of information about the uses, and the temporality of use (see details below). All interviews were conducted in Russian. Seto plant names were actively elicited from Seto informants unless they were mentioned during the interview. During the course of our interaction with the study participants, we asked them to show us around their home gardens or the forest in order to locate and collect voucher specimens. We also asked our informants for permission to collect ‘dry specimens’—small portions of homemade herbal preparations, most frequently recreational or medicinal teas. Finally, we recorded the titles of books or copied magazines and other materials that were mentioned by the informants as a source of medical information.

Data processing
The obtained materials were transcribed and tabulated according to the following categories: informant code, local plant name, Latin plant name, used part, preparation, time of use, mode of use, emic disease name, and etic disease category. For the etic disease classification, we relied on the second edition of the International classification of primary care issued by the WHO [25]. The correspondence between emic disease terms and etic ICPC-2 disease categories is indicated in Table 2.

The information was then organized into use instances (UI), with one UI containing information about one plant used for a certain ailment and prepared in various ways. In the data analysis, we only included the plants used personally by the participants or by their closest relatives. All uses were ordered on a temporal scale according to the interviewees’ indications (Table 3). We relied on the self-declarations of the study participants; therefore, some of the use reports, especially in the category of ‘all time,’ may have in fact been acquired during their lifetime, but not perceived as such due to the age of our participants—60 years old on average.

To measure similarity in the cross-border context, we applied the Jaccard Similarity Index (JI), following the methodology used in González-Tejero et al. [26]:

\[
JI = \frac{C}{(A + B - C)} \times 100,
\]

where \(A\) is the number of wild plant taxa reported in sample A and \(B\) is the number of wild plant taxa reported in sample B, and \(C\) is the number of taxa common to both samples. We only included plants in the data sample that were mentioned more than three times in each ethnic group. The Jaccard similarity index is known to be biased for small samples, especially those with a high incidence of rare species [27]. To address this issue, we only included plants in the data sample that were mentioned more than three times in each ethnic group.

Venn diagrams were created using the web service provided by the Bioinformatics and Evolutionary Genomics Unit of the University of Ghent [28] and BioVenn [29].

We started our interviews with a focus on wild food plants and then proceeded to home remedies, not limited to wild plants, for the most common illnesses. These also include cultivated and purchased plants (see remarks in Table 5). Nine taxa were identified on the genus level as individual species are used interchangeably in local practice and some could not be identified: Bergenia, Betula, Calanchoe, Hypericum, Mentha, Pelargonium, Rosa, and Sphagnum. Since Matricaria chamomilla is not very common in the region and is often confused with Tripleurospermum inodorum and other plants of the Asteraceae family, we combined them into the ethnotaxon ROMASHKA (Russian for chamomile).

Romanization of the Russian language was made following the ALA-LC (American Library Association—Library of Congress) Romanization without Diacritics set of standards. Russian geographic names are provided according to their English spelling.

We used Efimov and Konechnaia [30], being the most up-to-date and comprehensive description of Pskov region flora, as a reference for plant habitats with a focus on synanthropic plants. However, we updated their data in several cases when wild plants were pointed out by our interviewees in their gardens or immediately next to their plots.

The voucher specimens are deposited at the Komarov Botanical Institute of the Russian Academy of Sciences in Saint Petersburg and are available online at [31] bearing the following codes: LE 01063392-461, LE 01063463, LE 01063465, LE 01063466, LE 01063469, LE 01063477, LE 01063496, LE 01063498, LE 01063504-6, LE 01063510-14, LE 01063544, LE 01063578, and LE 01063946. The dry specimens bearing the codes dsPCH19-001-032 are stored in the first author’s personal archive. The plant nomenclature followed the World Flora Online database [32] and Flora Europaea [33]; the plant families were classified according to the Angiosperm Phylogeny database [34].

Research area
Pechorsky District (1251 km²) is a subdivision of Pskov Oblast located in northwestern Russia on the border with Estonia (Fig. 1). The study area lies between Lake
| Table 2 | The correspondence between ICPC-2 disease categories and the diseases recorded in the field |
|---------|----------------------------------------------------------------------------------------|
| **Blood** |                                                                                       |
| Blood cleansing | Blood dilution | Instead of aspirin | Low hemoglobin |
| **Cardiovascular** |                                                         |
| Atherosclerosis | Heart pain | Heart support | Leg vein problems | Spasms in blood vessels |
| Balancing blood pressure | Heart herb | Hemorrhoids | Low blood pressure | Strengthens blood vessels |
| Coronary heart disease | Heart problems | High blood pressure | Shortness of breath | Vein problems |
| Foot tiredness |                                                                                       |
| **Digestive** |                                                         |
| Anti-inflammatory | Digestion recovery after oncology treatment | Intestinal problems | Liver cleansing | Stomachache in children |
| Bad breath | Flatulence | Intestinal problems in children | Liver problems | Stomach problems |
| Bile expelling | Flatulence in children | Jaundice | Poisoning | Stomatitis in children |
| Colitis | Gastritis | Laxative | Stomachache | Upset stomach |
| Diarrhea | Helminths | Liver cirrhosis | Stomachache in babies | Intestinal infections |
| Diarrhea in children | High acidity |                                                                                    |
| **Ear** |                                                                                       |
| Ear pain | Noise in ears |                                                                               |
| **Endocrine** |                                                         |
| Cholesterol balance | Gout | Pancreas problems | Thyroid gland problems | |
| Diabetes | Iodine source | Salt deposition in joints |                                                                      |
| **Eye** |                                                         |
| Eye irritation | Goopy eyes | Tired eyes |                                                                        |
| **Female Genital** |                                                    |
| Female problems | Menorrhagia | Women's health |                                                                 |
| **General** |                                                                                       |
| 99 diseases | CO poisoning | Good for blood | Immunity | Panacea |
| Aches | Cold prophylactic | Good for health | Inflammation | Sudorific |
| Allergy | Edema | Good for heart | Mumps | Tonic |
| Anti-inflammatory | Fever | Good for intestines | N/A | Vitamins in spring |
| Infant diseases | General health | Good for stomach | Oncology | Vitamins in winter |
| Cleansing | General sickness | Good for vision |                                                                      |
| **Male Genital** |                                                    |
| Male diseases | Prostatitis |                                                                  |
| **Musculoskeletal** |                                                    |
| Arm pain | Bursitis | Knee edema | Painkiller | Rheumatism |
| Arthritis | Foot pain | Knee pain | Radiculitis | Wounds |
| Back pain | Joint problems | Leg pain |                                                                      |
| **Neurological** |                                                    |
| Analgesic | Hangover | Nerve restoring |                                                                      |
| Finger spasms | Headache | Seizures |                                                                      |
| **Psychological** |                                                    |
| Sedative | Sedative for children | Sleep improvement | Sleeplessness | |
| **Respiratory** |                                                    |
| Tonsillitis (angina) | Cold | Cough | Running nose | Sore throat |
| Antiseptic for cold | Cold in children | Cough in children | Sinusitis | Throat inflammation |
| Asthma | Congested nose | Flu |                                                                      |
| **Skin** |                                                    |
| Abscessed blister | Boils | Foot dryness | Pimples | Skin irritation |
| Abscessed wound | Bruises | Hair growth | Pus extraction | Warts |
| Bath for babies | Burns | Inflammation | Skin inflammation | Wounds |
| Bleeding | Cuts | Insect bites |                                                                      |


Peipus (3550 m²) to the north and the Haanja Upland to the south, with an elevation up to 200 m. Depressions are frequently transformed into wetlands which often become bogs rich in peat. The Izborsk area of Pechorsky is characterized by the peculiar karst topography. The soils are ash gray (podzol). The region does not feature great rivers, so all local communication is conducted over land. Some of the roads are subject to seasonal flooding rendering some areas virtually inaccessible, especially in autumn and spring. Pechory is the cultural,
spiritual, and administrative center of the region, while other prominent settlements coinciding with historical parishes include Izborsk (also an important cultural, ecological, and tourist site), Panikovichi, Lavry, Zales’yé, Podles’yé, and Krupp. The majority of Setos have moved from their family homes at least once since 1940 (reasons varying from forced relocation to Siberia, to emigration to Estonia, to moving from abandoned villages and urbanization). The local population of the region is retired or close to retirement age. The main occupation in the region is farming. Some individuals seek jobs in Estonia (e.g., electrician, truck driver) or next to the border (e.g., customs officer). One of the major employers in the region is Evrokeramika, a manufacturing company producing ceramic tiles. The younger inhabitants have arrived in the region within the last two decades seeking a ‘more healthy’ rural environment for their families and an occupation like farming or traditional crafts.

Vegetation of Pechorsky District
The environment of the Russian part of Setomaa had long been affected by human activities until several decades ago when the majority of agricultural lands were abandoned due to economic instability. While Pechorsky rayon, as part of Pskov Governorate, was described in several naturalists’ reviews [35], the first detailed study dates back to 1928 [36]. According to that investigation, the studied area had suffered from deforestation: Forests were less than 50 years old, mostly consisting of pine forests on infertile lands and tiny patches of spruce-birch forests on fertile ones. The majority of lands were arable or semi-natural meadows [36]. The second thorough study of the region documented the abandonment of agricultural lands and the continued low percentage of forests [37]. Between 1990 and 2000, arable lands diminished from 77 to 60%, while natural meadows located around bodies of water, representing 14% of arable land, started to be succeeded by shrubs. The forests still occupied a bit less than 1/5 of the area, and consisted mainly of pines (82%) and, to a much lesser extent, birch, and spruce (8.5% and 8%, respectively). Settlements demonstrated a rapid growth from 0.6% to 14%; meanwhile, biodiversity was in gradual decline [37]. Currently, there are 1248 vascular plant species in Pskov region [30].

The ‘discovery’ of Setos and early contact with Russians
The presence of Finnic tribes around the Baltic Sea dates back to 3500 years ago [38]. Setos occupied the territory adjacent to Lake Peipus, Lake Pskov, and the Velikaya River [39]. In 862, East Slavs invaded this territory and built the fortress of Izborsk attached to the Principality of Pskov. The creation of Pskov-Pechory Monastery in 1473 occurred shortly before the annex of the independent Principality of Pskov to the Russian state, which fostered the Orthodox faith. Setos did not understand the Orthodox sermons delivered in Old Slavonic, and at the same time their culture preserved archaic pagan as well as catholic features [40–42].

The earliest mention of ‘Pskov Estonians’ appeared in the eighteenth century, but the first comprehensive descriptions were made only in the late nineteenth century by linguist Yuri Trusman (1856–1930) and folklorist Jakob Hurt (1839–1906). While initial researchers were puzzled by the combination of ‘Estonian’ language, Orthodox faith, distinctive female clothing, and celebrations, later studies also specified an open hearth and dwellings combining the barn and living space under one roof [43, 44].

There are no published records regarding the historical herbal medicines of Setos from the nineteenth century, just a few notes concerning plant use sent by correspondents of Estonian pastor and folklorist Jakob Hurt (1839–1906) in 1889 and 1904, and a dozen records collected by Hurt himself during his Seto expedition conducted in 1903 [45]. In the 1930s, the first Estonian ethnobotanist Gustav Vilbaste (1885–1967) collected, with the help of students of several Setomaa schools, a comparable body of knowledge [45] which we will use for diachronic analysis.

School education in Pechorsky District, emigration, and the disintegration of the Seto community in Russia
Since the end of the nineteenth century, Setos have been exposed to the waves of Russification and Estonianization. Primary education became widely available in Pechory District after 1864 and was provided in parochial schools (focused on scripture) as well as in locally governed zemstvo schools teaching the Russian language and mathematics. There were seven schools as of 1890, and 20 soon after 1900 [46]. In 1891, the Russian clergy in Pskov raised the question of leading sermons and establishing education in a language ‘understandable to them’ so that they could be followed by Setos [47]; however, the final goal of such schools was Russification of the non-Russian locals. In 1892, a parochial school in the village of Avichische (now Obinitsa, Estonia) was established. In 1899, it provided education to 66 Seto pupils among another 110 [46]. However, compared to Livonia, where parochial education had been widespread since 1840, the number of literate Seto and Russian children (especially girls) was low.

During the Estonian period (1920–1940), education in Estonian was made available in a systematic manner as part of the Estonianization policy. The Seto people were
given family names (surnames) which they did not have before. Petseri (Estonian name of Pechory) gymnasium opened in 1919, replacing a primary school founded by Orthodox priest Father Karp in 1905, which offered education in Estonian as well as in Russian [46]. The first reading book in Seto was published in 1922. Church congregations were also segregated: Ethnic Russians were allowed to preach in Russian, and then Seto congregations began to deliver sermons in Estonian [48]. After Pechorsky District was annexed by the USSR, the network of primary schools with education in Estonian was preserved. However, in the 1970s, due to massive centralization, schools in the less populated Troitskoe and other villages were closed. Pechory gymnasium, converted into School № 2 (later Pechory linguistic gymnasium), reopened in 1957 and started to operate as a boarding school providing secondary education in Estonian to all the Setos of the district. Those closer to the Estonian border could attend the school in Luhamaa up until 1992 when the border regime with Estonia was introduced.

The lack of vocational or higher education in the Estonian language was one of the main reasons for the mass immigration of Setos into the territory of Estonian SSR in the 1950s. In the 2004–2005 academic year, due to the lack of Seto pupils, the Pechory linguistic gymnasium ceased teaching in Estonian and converted to Russian [49]. Currently, it only offers extracurricular activities in Estonian and Seto in the framework of a Seto ethnocultural center: Òsirgukõsõ (Seto ‘birdies’) choir, culinary and other exhibitions, and masterclasses.

The current education system in the Russian Federation mainly follows that of the former Soviet Union. Education is divided into three levels: primary, secondary, and higher education. Primary education consists of the first three or four years of school. To complete secondary education, one should either graduate after 10 or 11 years of schooling or complete 8 or 9 years and then graduate from a vocational school, having become a qualified worker or technician. After that, one can enter higher education, attending either college (or institute) to become a pedagogical worker or technical specialist, or university to acquire a scientific qualification.

There are no statistics regarding the language situation of the Seto language, as it is not separated by linguists from the Southern Estonian dialect Võro. Currently, there are about 170 Setos in Pechorsky District (Russian census 2010) and about 5000 across the border in Estonia [50]. Our field observations as well as the presumptions of linguists [50] indicate that Seto is spoken mainly by middle-aged or older individuals, while all speakers are bilingual in Russian and/or Estonian depending on their place of residence. In Estonia, education in Seto is offered on an extracurricular basis. The language is predominantly used in the private sphere as well as in events dedicated to Seto culture and leelo (Seto polyphonic singing).

The totality of the cultural and economic processes of the twentieth century led to the fragmentation of the Seto community on the Russian side of the border. Some of the important factors included the system of isolated farmsteads, the system of ‘social lift,’ and later the economic disparity that provoked massive emigration from Pechory District to Estonia and to regional Russian centers, and, on the other side, the influx of qualified workers recruited from Pskov and Leningrad and later the incoming summer folks from Moscow and Saint Petersburg (see [43]). From our 26 interviews, only two featured families in which both spouses were Seto. Due to geographical isolation—scarce population spread across isolated farmsteads—the majority of Setos have a chance to meet each other only at celebrations organized on both sides of the border and dedicated to the Kingdom of Seto (Estonia, July–August) and family meetings (Rus. Semeinye vstrech, last week of August, Russia).

**Allopathic medicine of the region**

In this article, the dichotomy between allopathic medicine and ethnomedicine as part of LEK will be used. The terms ‘Western medicine’ and ‘biomedicine’ do not particularly fit the case of the medical practices in the healthcare system of the Soviet Union, as it sometimes utilized the approaches of various traditional non-western medicines, such as Tibetan medicine.

The healthcare infrastructure of Pechory District consists of Pechory Hospital (founded 1885) and eight GP offices in Izborn, Lavry, Lazarevo, Mikovitsy, Novoizborsk, Panikovichi, Pechki, and Rotovo. The hospital is equipped with 53 beds offering surgical, gynecological, neurological, pediatric, and general therapeutic care. The healthcare facility also includes a clinic, an obstetrics center, a pediatrics center, and an emergency unit with two crews and a dentist's room. All six pharmacies of Pechory District are located in Pechory. Throughout the Soviet era, one of the main goals of local healthcare providers was to medicalize pregnancy, that is, the delivery taking place in the hospital or at least being assisted by a qualified medical worker in case of home delivery. While the current infant mortality rate in the region is 4 per 100,000, in 1959 it was as high as 40.6 per 1000 (or, according to other computations, 46.4; see [51, p. 6]).

Basic medical services as well as medication for certain patient categories are now covered by the state, but due to high demand certain specialists and drugs are sometimes inaccessible. The compulsory medical insurance offered by the state to all citizens and foreign visitors covers the GP; specialized medical assistance, as
well as emergency hospitalization. Although medicines are currently provided for free to some social groups (disabled people, infants of up to three years old, war veterans, etc.) and to certain patients (those with diabetes, tuberculosis, etc.) and to certain patients (those with diabetes, tuberculosis, etc.), they can be inaccessible due to shortages caused by various factors [52, 53]. Some of the shortages involve the replacement of imported drugs, changes in pharmaceutical certification, as well as insufficient financing of local healthcare providers. Nevertheless, 70% of prescription medicines are eventually paid for by the end consumer [54], which makes the problem of limited accessibility to prescription drugs due to high pharmaceutical costs quite significant.

The majority of the study participants were retired people whose allowance was not compatible with purchasing medicaments, one pack of which could cost up to one twentieth of the average monthly retirement allowance. Even though for some individuals the pharmaceuticals are subsidized, the poor road and transportation network becomes an obstacle. Most older participants did not own a car, which made access to the nearest pharmacies in Pechory extremely time-consuming, and in the case of decreased mobility nearly impossible, given the schedule and penetration of the public transportation network. The combination of these factors has made them dependent on their children for sourcing and purchasing the needed pharmaceuticals, and has encouraged the use of traditional ‘self-care’ practices [55].

### Results

#### General overview

The study participants mentioned 738 uses of 106 taxa belonging to 50 families (Table 4, differing elements are underlined). More than two-thirds of the uses (484) were recorded among the 36 Russian participants, while the remaining third (254) were recorded among the 26 Seto participants. Overall, Setos used 67 taxa, with every person mentioning 8.2 taxa on average (standard deviation 5.61), whereas Russians used 101 taxa, with an average of 11 taxa per person (standard deviation 8.64).

The detailed list of local medicinal plant uses with local names and voucher specimen numbers is presented in Table 5. This table lists use instances (UI), with each UI referring to a use of a certain plant part for a specific condition, whatever the preparation.

#### Top 21 taxa

Figure 2 shows uniformity in the cross-cultural distribution of uses of the top 21 taxa used in Pechorsky District. Among the plants more frequently reported by Setos, *Viburnum opulus* is used for cough and high blood pressure, *Vaccinium oxyccocus* is used for fever, heart problems, headache, and CO poisoning, and *Juniperus communis* is applied as a bath whisk for joint problems. The use of *Potentilla erecta* to alleviate diarrhea and more generally stomach problems was more frequently mentioned by Russians. Only one plant, *Brassica oleracea*, which is used topically to treat headache and joint problems, is cultivated, while the others are sourced in the wild.

Seto names were reported for the majority of the most used plants, except for *Plantago major, Arctium tomentosum, Brassica oleracea, Potentilla erecta,* and *Chelidonium majus.*

| Table 4 Cross-cultural distribution of the most important plant families, taxa, and disease categories. Differing elements are underlined
|---|---|
| **Setos, N = 26** | **Russians, N = 36** |
| **Families** | **Families** |
| Asteraceae (45 UI) | Asteraceae (107 UI) |
| Ericaceae (39) | Rosaceae (84) |
| Rosaceae (34) | Ericaceae (55) |
| Adoxaceae (19) | Lamiaceae (34) |
| Plantaginaceae (14) | Plantaginaceae (29) |
| **Taxa** | **Taxa** |
| Viburnum opulus L. (19) | Rubus idaeus L. (34) |
| Rubus idaeus L. (14) | Plantago major L. (29) |
| Plantago major L. (14) | Viburnum opulus L. (25) |
| Vaccinium oxyccocus, L. (15) | Hypericum perforatum L. (22) |
| Hypericum perforatum L. (12) | Vaccinium myrtillus L. (21) |
| **Disease categories** | **Disease categories** |
| Respiratory (66) | Respiratory (109) |
| General (46) | Digestive (100) |
| Cardiovascular (29) | General (78) |
| Digestive (28) | Skin (72) |

The role of family and social factors in plant acquisition and use

Table 6 presents the average number of plants and plant uses reported by the study participants of various ages. It shows that the largest number of medicinal plants and their uses were reported by people born in the 1940s—the post-war generation who observed wild plants being used by their parents. However, a biology teacher admitted that the local children were more knowledgeable about forest plants than was required by the school program and they showed their expertise during excursions to the forest included in the curriculum (Seto woman, b. 1950). Indeed, the informants who mentioned plant uses by close relatives (usually parents and grandparents) displayed a higher diversity of plants in their own practice. Usually, grandparents served as such mediators because parents were too busy with work in kolkhoz.
Table 5  Plants and their medicinal uses recorded during the fieldwork

| Family/taxon, voucher specimen, local names/part | Medicinal use | Mode of use | Russians, UI N = 36 | Setos, UI N = 26 |
|--------------------------------------------------|---------------|-------------|---------------------|------------------|
|                                                  |               | Past        | Present             | Past             | Present         |
| Acoraceae                                         |               |             |                     |                  |
| Acorus calamus L.                                | RU *puchka*   | 1           |                     |                  |
| Stalk bottom                                      | Iodine source | 1           |                     |                  |
| Adoxaceae                                         |               |             |                     |                  |
| *Viburnum opulus* L. * LE 01063405* Flowers      | RU *kalina*   | 8           | 17                  | 12               | 7               |
| Fruit                                             | Cough         | 8           | 17                  | 12               | 7               |
|                                                    | Antiseptic for cold | 2 | 3 | 7 | 3 |
|                                                    | Cold          | 3           | 3                   |                  |
|                                                    | Cough         | 3           | 3                   |                  |
|                                                    | Fever         | 1           |                     | 1                |
|                                                    | Good for the heart | 1 | 1 | 1 | 1 |
|                                                    | High blood pressure | 1 | 3 | 1 | 2 |
|                                                    | Heart problems | 1           | 1                   | 1                |
|                                                    | Heart support  | 1           | 1                   | 1                |
|                                                    | Immunity      | 1           | 1                   | 1                |
|                                                    | Medicine      | 1           |                     |                  |
|                                                    | Shortness of breath | 1 | 1 | 1 | 1 |
|                                                    | Spasms in blood vessels | 1 | 1 | 1 | 1 |
|                                                    | Strengthens the blood vessels | 1 | 1 | 1 | 1 |
|                                                    | Vitamins in spring | 1 | 1 | 1 | 1 |
| Leaves                                            | Cold          | 1           |                     |                  |
| Twigs, bark                                       | Infusion      | 1           |                     |                  |
| Amaranthaceae                                      |               |             |                     |                  |
| *Beta vulgaris* L.†                               | RU *svekla kormova* | 1 | 1 | 1 | 1 |
| Leaves                                            | Wounds        | 2           | 3                   | 2                |
| Amaryllidaceae                                    |               |             |                     |                  |
| *Allium cepa* L.†                                 | RU *luk*      | 2           | 3                   | 2                |
| Bulbs                                             | Cold          | 2           | 3                   | 2                |
|                                                    | Cough         | 1           |                     |                  |
|                                                    | Pus extraction, boils | 1 | 1 | 1 | 1 |
| Peels                                             | Blood cleansing | 1           |                     |                  |
|                                                    | Infusion      | 1           |                     |                  |
|                                                    | Cough         | 1           |                     |                  |
| Apiaceae                                          |               |             |                     |                  |
| *Anethum graveolens* L. * LE 01063460* Seeds     | RU *ukrop*    | 3           | 13                  | 1                | 1               |
| Seeds                                             | Flatulence or stomach-ache in babies | 3 | 13 | 1 | 1 |
|                                                    | Decoction or infusion | 3 | 1 | 1 | 1 |
|                                                    | RU *tmin*     | 5           | 1                   |                  |
| Seeds                                             | Good for health | 1           |                     |                  |
|                                                    | Infusion      | 1           |                     |                  |
|                                                    | Heart problems | 1           |                     |                  |
|                                                    | Intestinal problems or flatulence | 1 | 1 | 1 | 1 |
|                                                    | Liver problems | 1           |                     |                  |
|                                                    | Stomach problems | 1           |                     |                  |
### Table 5 (continued)

| Family/taxon, voucher specimen, local names/part | Medicinal use | Mode of use | Russians, UI N = 36 | Setos, UI N = 26 |
|------------------------------------------------|---------------|-------------|---------------------|------------------|
| *Daucus carota* subsp. *sativus* (Hoffm.) Arcang.† | RU morkov’ | Infusion | 4 Past 1 Present | 2 Past 1 Present |
| Aerial parts | Good for the blood | Infusion | 1 Past | 1 Past |
| | Good for health | Raw | 1 Present | 1 Present |
| | Salt deposition in joints | Raw | 1 Present | 1 Present |
| Root | Pus extraction | Raw | 1 Past | 1 Past |
| *Levisticum officinale* W.D.J.Koch† | RU lubyatok | Raw | 2 Past | 2 Past |
| Aerial parts | Good for health | Raw | 1 Present | 1 Present |
| | Heart problems | Raw | 1 Present | 1 Present |
| *Petroselinum crispum* (Mill.) Fuss† | RU petrushka | Infusion | 2 Past 1 Present | 2 Past 1 Present |
| Aerial parts | Kidney problems | Infusion | 1 Present | 1 Present |
| | Liver problems | Infusion | 1 Present | 1 Present |
| Asphodelaceae | Aerial parts | Tonic | 2 Past 5 Present | 1 Past 5 Present |
| *Aloe arborescens* Mill.† | RU aloe, stoletnik | S aloe (RU) | 2 Past 5 Present | 1 Past 5 Present |
| Juice | Tincture | Topical application | 2 Past 1 Present | 2 Past 1 Present |
| | Abscessed blister or wound | Infusion | 1 Past 1 Present | 1 Past 1 Present |
| | Boils | Infusion | 1 Past 1 Present | 1 Past 1 Present |
| | Eye irritation | Drops | 1 Past | 1 Past |
| | Running nose | Raw | 2 Past 1 Present | 1 Past 1 Present |
| Asteraceae | Aerial parts | Bleeding juice, topical application | 6 Past 6 Present | 5 Past 6 Present |
| *Achillea millefolium* L. LE 01063441, LE 01063544, dsPCH19-004, dsPCH19-006 | RU tysiachelistnik, tysiachelistvennik | S tysiachelistnik (RU), raudrohi, verehaine | 6 Past 6 Present | 5 Past 6 Present |
| Flowers | Diarrhea | Infusion | 1 Past | 1 Past |
| | Diarrhea in children | Infusion | 1 Past | 1 Past |
| | Good for health | Infusion | 1 Past | 1 Past |
| | High blood pressure | Infusion | 1 Past | 1 Past |
| | Low hemoglobin | Infusion | 1 Past | 1 Past |
| | Stomachache | Infusion | 1 Past | 1 Past |
| | Upset stomach | Infusion | 1 Past | 1 Past |
| | Wounds | Topical application | 1 Past | 1 Past |
| | High acidity in the stomach | Infusion | 1 Past | 1 Past |
| | Intestinal problems in children | Topical application | 1 Past | 1 Past |
| | Wounds | Infusion | 1 Past | 1 Past |
| | Juice, topical application | 1 Past | 1 Past | 1 Past |
| | Topical application | 1 Past | 1 Past | 1 Past |
| | Topical application | 1 Past | 1 Past | 1 Past |
| | RU lopukh, repeinik | S lopukh, dedovnik(i) (RU) | 7 Past 12 Present | 5 Past 12 Present |
| Family/taxon, voucher specimen, local names/part | Medicinal use | Mode of use | Russians, UI $N = 36$ | Setos, UI $N = 26$ |
|-----------------------------------------------|--------------|-------------|------------------------|-------------------|
|                                              |              |             | Past | Present | Past | Present |
| Leaves                                       | Arthritis    | Topical application | 1   |          |      |         |
|                                              | Foot dryness | 1           |      |          |      |         |
|                                              | Foot pain    | 1           |      |          |      |         |
|                                              | Foot tiredness | 1     |      |          |      |         |
|                                              | Gout         | 1           |      |          |      |         |
|                                              | Hair growth  | 1           |      |          |      |         |
|                                              | Headache     | 1           | 1    |          |      |         |
|                                              | Joint problems | 3   | 3    | 1      |      |         |
|                                              | Knee edema   | 1           |      |          |      |         |
|                                              | Knee pain    | 4           | 1    |          |      |         |
|                                              | Leg vein problems | 1 |      |          |      |         |
|                                              | Painkiller   | 1           |      |          |      |         |
|                                              | Female problems | Tincture | 1 |          |      |         |
|                                              | Gout         | 1           |      |          |      |         |
|                                              | Knee pain    | 1           |      |          |      |         |
| Artemisia absinthium L. dsPCH19-031 Aerial parts | RU polyn' S polyn' (RU) | 2 | 2 | 2 |      |
|                                              | Good for health | Decoction | 1 |          |      |         |
|                                              | Sedative     | Infusion    | 1    |          |      |         |
|                                              | Stomachache  | Infusion    | 1    |          |      |         |
|                                              | Stomachache in children | 1 |      |          |      |         |
|                                              | Stomach problems | Tincture | 1 |          |      |         |
|                                              | Helminths    | Decoction   | 1    |          |      |         |
| Bidens tripartita L. Aerial parts            | RU chereda S chereda (RU) | 8 | 2 |      |      |
|                                              | Allergy      | Infusion    | 1    |          |      |         |
|                                              | Bath for babies | Decoction, infusion | 6 | 2 |      |
|                                              | Pimples      | Infusion    | 1    |          |      |         |
| Calendula officinalis L.† LE 01063421, dsPCH19-028 Aerial parts | RU nogortki, kalendula S kalendula (RU) | 2 | 6 | 3 |      |
|                                              | Heart problems | Infusion | 1    |          |      |         |
|                                              | Antiseptic for cold | Infusion, tincture | 3 |      |      |         |
|                                              | Cold         | Infusion    | 1    |          |      |         |
|                                              | Cuts         | Topical application | 1 |      |      |         |
|                                              | Liver cleansing | Infusion | 1    |          |      |         |
|                                              | Liver problems | 2          |      |          |      |         |
|                                              | Sleeplessness | 1           |      |          |      |         |
|                                              | Warts        | Topical application | 1 |      |      |         |
| Chamaemelum nobile (L.) All.† Aerial parts   | S romashka sadovaia (RU) |      |      | 1 |      |
|                                              | Heart problems | Infusion | 1    |          |      |         |
| Cichorium intybus L. Root                     | RU tskoni S tskoni (RU) | 2 | 1 |      |      |
|                                              | Liver problems, cirrhosis | Infusion | 2 |      |      |         |
|                                              | Medicine     | Infusion    | 1    |          |      |         |
Table 5 (continued)

| Family/taxon, voucher specimen, local names/part | Medicinal use | Mode of use | Russians, UI N = 36 | Setos, UI N = 26 |
|-------------------------------------------------|--------------|-------------|---------------------|-----------------|
|                                                 |              | Past        | Present             | Past            |
| **Comarum palustre L.** | RU sobešnik | 1 | 2 | 1 | |
| aerial parts | Joint problems | | | | |
| | Tincture: topical application or oral administration | | | | |
| root | Joint problems | | | | |
| | Tincture: topical application | | | | |
| **Cota tinctoria (L.) J.Gay LE 01063394** | RU zheltaiya romashka | 3 | 1 | 3 | 7 |
| Aerial parts | Good for health | | | | |
| | Infusion | | | | |
| | Heart problems | | | | |
| | Jaundice | | | | |
| | Liver problems | | | | |
| **Helichrysum arenarium (L.) Moench dsPCH19-002** | RU bessmertnik | 1 | | | |
| Aerial parts | Liver problems | | | | |
| | Infusion | | | | |
| **Inula helenium L.** | RU deviasil | 2 | | | |
| Root | Cough | | | | |
| | Tincture | | | | |
| **Matricaria chamomilla L.** dsPCH19-023 | RU romashka (aptechnaia) | 3 | 7 | 4 | 4 |
| **Tripleurospermum inodorum (L.) Sch.Bip. LE 01063445, LE 01063422, dsPCH19-012** | S romashka (RU), teekummel, karikakar | | | | |
| Aerial parts | Bath for babies | | | | |
| | Decoction, infusion: bath | | | | |
| | Cold | | | | |
| | Infusion | | | | |
| | Cold in children | | | | |
| | Colds | | | | |
| | Cough | | | | |
| | 1 | | | |
| | Good for health | | | | |
| | Heart problems | | | | |
| | 1 | | | |
| | Medicine | | | | |
| | 1 | | | |
| | Painkiller | | | | |
| | 1 | | | |
| | Stomach problems | | | | |
| | 4 | | | |
| | Upset stomach | | | | |
| | 1 | | | |
| **Matricaria discoidea DC. LE 01063395, LE 01063416, LE 01063444, dsPCH19-011, dsPCH19-019** | RU romashka, aptechnaia romashka, romashka ulichnaia | 9 | 5 | 8 |
| Aerial parts | S romashka (ulichnaia) (RU), teekummel | | | | |
| | Anti-inflammatory | Infusion | 1 | | |
| | Bath for babies | Decoction, infusion: bath | 3 | 2 | 2 |
| | Cold | Infusion | 1 | 1 | 3 |
| | Cough | 2 | 1 | 1 | |
| | Eye irritation | Decoction, drops | 1 | | 1 |
| | Fever | Infusion | 1 | | |
| | Mumps | Parboiled, topical application | | | |
| | Sore throat | Infusion, rinse | 1 | | |
| | Stomatitis in children | | 1 | | |
| **Seriphidium cinum (Berg ex Poljakov) Poljakov** | RU tsviarnoe semia | 1 | | | |
| Seeds | RU sobešnik | | | | |
| | Infusion | | | | |
| | 1 | | | |
| Family/taxon, voucher specimen, local names/part | Medicinal use | Mode of use | Russians, UI N = 36 | Setos, UI N = 26 |
|-----------------------------------------------|---------------|-------------|---------------------|-----------------|
|                                              |               |             | Past                | Present         |
|                                              |               |             | Past                | Present         |
| Tanacetum vulgare L. LE 01063442, LE 01063402 | RU pizhma, riabinka | S pizhma (RU), ussiroht | 2 | 1 |
| Aerial parts                                 |               |             |                     |                 |
| Inflorescences                               |               |             |                     |                 |
| Tanacetum officinale (L.) Weber ex F.H.Wigg. LE 01063407 | RU oduvanchik | S oduvanchik (RU) | 1 | 3 | 1 |
| Flowers                                      |               |             |                     |                 |
| Root                                         |               |             |                     |                 |
| Latex                                        |               |             |                     |                 |
| Tussilago farfara L. LE 01063452             | RU mat’-i-machekha | S mat’-i-machekha (RU), paiseleht | 3 | 10 | 5 | 1 |
| Aerial parts                                 |               |             |                     |                 |
| Leaves                                       |               |             |                     |                 |
| Betulaceae                                   |               |             | 3 | 6 | 1 |
| Alnus incana (L.) Moench, Alnus glutinosa (L.) Gaertn | RU ol’kha | S ol’kha (RU) | 2 | 1 | 1 |
| Female catkins                               |               |             |                     |                 |
| Young leaves                                 |               |             |                     |                 |
| Betula sp. LE 01063453 (incl. Betula pendula Roth, Betula pubescens Ehrh.) | RU bereza |                     | 1 | 5 |
| Buds                                         |               |             |                     |                 |
| Leaves                                       |               |             |                     |                 |
| Brassicaceae                                 |               |             | 9 | 11 | 3 | 8 |
| Brassica oleracea L.†                        | RU kapusta    | S kapusta (RU) | 7 | 7 | 2 | 7 |
| Family/taxon, voucher specimen, local names/part | Medicinal use  | Mode of use            | Russians, UI N = 36 | Setos, UI N = 26 |
|-----------------------------------------------|--------------|------------------------|---------------------|------------------|
|                                               |              |                        | Past       | Present | Past   | Present |
| Leaves                                        | Arm pain     | Topical application    | 1          |         |       |         |
|                                               | Edema        |                        | 1          |         |       |         |
|                                               | Gout         |                        | 1          |         |       |         |
|                                               | Hangover     | Brine from lactofermentation | 1       |         |       |         |
|                                               | Headache     | Topical application    | 4          | 2       | 2     |         |
|                                               | Joint problems |                        | 3          | 1       | 1     | 1       |
|                                               | Knee pain    |                        | 1          |         |       |         |
|                                               | Seizures     |                        | 1          |         |       |         |
|                                               | Skin inflammation |                    | 1          |         |       |         |
| Capsella bursa-pastoris (L.) Medik. LE 01063432, LE 01063427 | RU pastush′ia sumka | S pastush′ia sumka (RU) | 1          |         | 1     |         |
| Aerial parts                                  | Gastritis    | Infusion               | 1          |         |       |         |
|                                               | Menorrhagia  |                        | 1          |         |       |         |
| Raphanus raphanistrum subsp. sativus (L.) Domin† | RU red′ka (chernovia) | S red′ka (RU) | 1          | 4       | 1     |         |
| Root                                          | Cold         | Juice                  | 1          |         |       |         |
|                                               | Cough        |                        | 1          |         | 1     |         |
|                                               | Tonsillitis  |                        | 1          |         |       |         |
| Cannabaceae                                   |              |                        | 1          |         |       |         |
| Humulus lupulus L. * LE 01063406              |              | S khmel* (RU)          | 1          |         |       |         |
| Hops                                          | Hair growth  | Decoction              | 1          |         |       |         |
| Caprifoliaceae                                |              |                        | 1          |         |       |         |
| Valeriana officinalis L.                      | RU valer′iana, valer′ianka, valer′ianovka | S valer′iana (RU), paldõrjan | 7          | 5       | 7     |         |
| Flowers                                       | Headache     | Infusion               | 1          |         |       |         |
| Root                                          | Asthma       | Infusion               | 1          |         |       |         |
|                                               | Coronary heart disease | Tincture | 1          |         |       |         |
|                                               | Good for the heart | Infusion | 1          |         |       |         |
|                                               | Heart problems | Tincture               | 1          |         |       |         |
|                                               | High blood pressure | Infusion, tincture | 1          |         |       |         |
|                                               | Radiculitis  | Tincture, topical application | 2       |         |       |         |
|                                               | Sedative     | Infusion, tincture     | 3          | 2       | 2     |         |
|                                               | Sedative for children | Tincture | 2          |         |       |         |
| Caryophyllaceae                               |              |                        | 2          |         |       |         |
| Silene vulgaris (Moench) Garcke LE 01063400   | RU belye fonarki |                    | 1          |         |       |         |
| Aerial parts                                  | Diarrhea     | Decoction              | 1          |         |       |         |
| Stellaria media (L.) Vill. LE 01063424        | RU mokriška  |                        | 1          |         |       |         |
| Aerial parts                                  | Joint problems | Topical application | 1          |         |       |         |
| Commelinaceae                                 |              |                        | 3          |         |       |         |
| Callisia fragrans (Lindl.) Woodson† LE 01063401 | RU zolotoi us |                    | 3          |         |       |         |
| Aerial parts                                  | Joint problems | Tincture               | 1          |         |       |         |
|                                               | Insect bites |                        | 1          |         |       |         |
| Shoots                                        | Buritis      | Tincture               | 1          |         |       |         |
| Crassulaceae                                  |              |                        | 1          |         |       |         |
Table 5 (continued)

| Family/taxon, voucher specimen, local names/part | Medicinal use | Mode of use | Russians, UI N = 36 Past | Present | Setos, UI N = 26 Past | Present |
|-------------------------------------------------|---------------|-------------|--------------------------|---------|------------------------|---------|
| Calanchoe sp.† Juice | S kalankhoe (RU) | Running nose | Drops | Past | Present | Past | Present |
| Cucurbitaceae Cucumis sativus L. † Fruit | RU Ogurtsy | Hangover | Brine from lactofermentation | 1 | |
| Cupressaceae Juniperus communis L. LE 01063408 Fruit | RU veres, mohzhvehnik | Cold | Infusion | 1 | 1 |
| Dennstaedtiaeae Petrium aquilinum (L.) Kuhn Leaves | RU pororotnik treklistnyi | Headache | Put under headscarf while in forest | 1 | 1 |
| Dioscoreaceae Dioscorea communis (L.) Caddick & Wilkin† Aerial parts | RU kremlevskaja trava | Thyroid gland problems | Tea | 1 | |
| Dryopteridaceae Dryopteris filix-mas (L.) Schott Aerial parts | RU pororotnik | Back pain | Dried, put in mattress | 1 | 1 |
| Elaeagnaceae Elaeagnus rhamnoides (L.) A.Nelson * Aerial parts | RU obilepikha | Finger spasms | Infusion | 3 | |
| Ericaceae Arctostaphylos uva-ursi (L.) Spreng. LE 01063410 Aerial parts | RU toloknianka | Diarrhea | Infusion | 7 | 3 |
| | | Kidney problems | 1 |
| | | Low hemoglobin | 1 |
| | | Prostatitis | 1 |
| | Spring shoots | Good for health | Raw | 11 | 44 | 11 | 28 |
Table 5  (continued)

| Family/taxon, voucher specimen, local names/part | Medicinal use | Mode of use | Russians, UI N = 36 Past | Present | Setos, UI N = 26 Past | Present |
|-----------------------------------------------|--------------|-------------|-------------------------|---------|-----------------------|---------|
| Aerial parts (incl. fruit), leaves            | Diuretic     | Infusion    | 4                       | 1       |                       |         |
|                                               | Heart problems |            | 1                       |         |                       |         |
|                                               | Kidney stones  |            | 1                       |         |                       |         |
|                                               | Kidney problems |           | 1                       |         |                       |         |
|                                               | Leg vein problems |       | 1                       |         |                       |         |
| Calluna vulgaris (L.) Hull LE 01063447, dsPCH19-005 | RU elochny  | S kanarbik  | 1                       | 1       |                       |         |
| Aerial parts                                  | Cough        | Infusion    | 1                       |         |                       |         |
|                                               | Heart problems |           | 1                       |         |                       |         |
| Ledum palustre L. LE 01063438                 | RU bagul'nik  | S bagul'nik (RU) | 2  | 2          |                       |         |
| Aerial parts                                  | Cold         | Infusion    | 1                       |         |                       |         |
|                                               | Cough        |              | 2                       |         |                       |         |
|                                               | Shortness of breath |  | Decoction          | 1       |                       |         |
| Vaccinium myrtillus L. LE 01063440, dsPCH19-025 | RU chemika  | S chemika (RU), mustikas, must'kas | 4  | 17         | 4  | 8                   |
| Aerial parts (with fruit)                     | Diarrhea     | Infusion    | 1                       |         |                       |         |
|                                               | Diarrhea in children |  | 1                   |         |                       |         |
|                                               | Diuretic     |              | 1                       |         |                       |         |
|                                               | Good for health |         | 1                       |         |                       |         |
|                                               | Good for vision |        | 1                       |         |                       |         |
|                                               | Heart problems |        | 1                       |         |                       |         |
| Fruit                                         | Diabetes     | Raw         | 1                       |         |                       |         |
|                                               | Diarrhea     | dried, decoction | 2  | 3         | 1                   |         |
|                                               | Diarrhea in children |  | Dried             | 1       |                       |         |
|                                               | Good for vision |     | Dried, jam, kissel, raw, raw jam | 9  | 1           | 4                   |
|                                               | Stomach problems |     | Dried              | 1       | 2                   |         |
|                                               | Tired eyes   | Raw         | 1                       |         |                       |         |
|                                               | Upset stomach |         | Dried              | 1       |                     |         |
| Vaccinium oxyccos L. LE 01063435              | RU kliukvja  | S kliukvja (RU), kuremari | 4  | 7         | 4  | 9                   |
| Fruit                                         | Balancing blood pressure |  | Macerated          | 1       |                       |         |
|                                               | Blood cleansing |          | Macerated, raw     | 1       |                       |         |
|                                               | CO poisoning  |          | Topical application (ears) | 1  | 1                   |         |
|                                               | Cold         |          | Macerated, raw     | 1       | 1                   |         |
|                                               | Cough        |              | 1                       |         |                       |         |
|                                               | Ear pain     | Topical application | 1       |         |                       |         |
|                                               | Eye irritation |          | Drops               | 1       |                     |         |
|                                               | Fever        | Decoction, macerated, raw | 1  | 3           | 2  | 2                   |
|                                               |              | Raw        | 1                       |         |                       |         |
|                                               | Headache     | Raw        | 1                       |         |                       |         |
|                                               | Heart problems |       | Decoction, raw     | 1       | 2                   |         |
|                                               | High blood pressure |  | Raw                | 2       |                     |         |
|                                               | Instead of aspirin |   | Decoction          | 1       |                     |         |
| Vaccinium uliginosum L. LE 01063439           |              | S golubika (RU) | 1           |       |                       |         |
| Fruit                                         | Good for vision |        | Raw                 | 1       |                     |         |
| Vaccinium vitis-idaea L. LE 01063412          | RU brusnika (fruit, plant), brusnichnik (aerial parts) |  | S brusnika (RU), palohkas | 3  | 10          | 2  | 5               |
| Family/taxon, voucher specimen, local names/part | Medicinal use | Mode of use | Russians, UI N = 36 | Setos, UI N = 26 |
|------------------------------------------------|--------------|-------------|---------------------|-----------------|
|                                                |              |             | Past | Present | Past | Present |
| Aerial parts                                   | Diuretic     | Infusion    | 1    | 2       | 1    |         |
|                                                | Kidney problems |            | 2    | 2       |       |         |
| Fruit                                          | Cold         | Macerated   |       |          |       |         |
|                                                | Diuretic     | Raw         |       |          |       |         |
|                                                | Heart problems | Macerated, raw |     |          |       |         |
|                                                | Kidney problems | Macerated   |     |          |       |         |
| Leaves                                         | Cold         | Infusion    | 1    |       | 1    |         |
|                                                | Diuretic     |             | 1    |         | 2    |         |
|                                                | Good for health |            |     |          |       |         |
|                                                | Leg vein problems |            |     |          | 1    |         |
|                                                | Urinary tract infections |  |     | 1    |         |
| Fabaceae                                       |              |             | 5    |         | 1    |         |
| Trifolium montanum L. LE 01063393, dsPCH19-009, dsPCH19-021 | RU belyi klever |            |       |          |       |         |
| Aerial parts                                   | Stomachache  | Infusion    | 1    |       |       |         |
| Trifolium pratense L. LE 01063455, LE 01063456, dsPCH19-024  | RU klever krasnyi | S klever krasnyi (RU) | 1 | 4 | 1 | |
| Aerial parts                                   | Heart problems | Infusion   |       |          |       |         |
| Inflorescences                                  |              |             |       |          | 1    |         |
|                                                 | Atherosclerosis | Tincture     |       |          | 1    |         |
|                                                 | Heart support | Infusion    |       |          | 1    |         |
|                                                 | Medicine      | Tincture    |       |          | 1    |         |
|                                                 | Sleep improvement | Dry, put in mattress |       |          | 1    |         |
| Fagaceae                                       |              |             | 2    |         | 3    | 3       |
| Quercus robur L. LE 01063451                   | RU dub, zheludi (fruits) | S dub (RU) | 1 | 2 | 3 | |
| Bark                                           | Diarrhea     | Infusion    | 2    | 1       |       |         |
|                                                 | Stomachache  | Decoction   |       |          | 1    |         |
|                                                 | Stomach problems | Infusion | 1  |       |       |         |
| Fruit                                          | Diarrhea     | Baked       |       |          | 1    |         |
| Geraniaceae                                    |              |             | 3    |         | 1    | 1       |
| Pelargonium sp.†                                | RU geran’ (pakhuchaia) | S geran’ (RU) | 3 | 1 | 1 | |
| Leaves                                         | Ear pain     | Topical application | 3 | 1 | 1 | |
|                                                 | Noise in ears |            |     |          |       |         |
| Grossulariaceae                                |              |             | 2    |         | 3    | 4       |
| Ribes nigrum L. *                              | RU chernaia smorodina | S chernaia smorodina (RU) | 2 | 3 | 4 | |
| Fruit                                          | Cold         | Jam infusion |       |          | 1    |         |
| Leaves                                         | Cold         | Infusion    | 1    |         | 1    |         |
|                                                 | Congested nose |            |     |          | 1    |         |
|                                                 | Cough        |             | 1    |          |       |         |
|                                                 | Headache     |             | 1    |          |       |         |
|                                                 | High blood pressure |            |     |          | 1    |         |
| Twigs                                          | Anti-inflammatory | Infusion | 1  |       |       |         |
|                                                 | Vitamins in winter |            |     |          |       |         |
| Hypericaceae                                   |              |             | 8    | 14 | 4 | 8 |
| Hypericum spp. (including H. perforatum L. LE 01063443, LE 01063428, dsPCH19-007, dsPCH19-018) | RU zveroboi | S zveroboi (RU), naistepuna | 8 | 14 | 4 | 8 |
| Family/taxon, voucher specimen, local names/part | Medicinal use | Mode of use | Russians, UI N = 36 | Setos, UI N = 26 |
|-----------------------------------------------|--------------|-------------|---------------------|------------------|
|                                               |              |             | Past                | Present          |
|                                               |              |             |                     |                  |
| Aerial parts                                  | Abdominal infections | Infusion | 1                   |                  |
|                                               | Cold         | Infusion, tincture | 1 2 1               |                  |
|                                               | Diarrhea     | Infusion | 1                   |                  |
|                                               | Female genital hypothermia (UTI) | Infusion | 1                   |                  |
|                                               | Female problems | Infusion | 1                   |                  |
|                                               | Good for health | Infusion | 1 2 3               |                  |
|                                               | Good for the intestines | Infusion | 1                   |                  |
|                                               | Good for the stomach | Infusion | 1                   |                  |
|                                               | Heart problems | Infusion | 1 2 2               |                  |
|                                               | Inflammation  | Infusion | 1 1                 |                  |
|                                               | Knee pain     | Oil extract | 1                   |                  |
|                                               | Liver problems | Infusion | 1 1                 |                  |
|                                               | Panacea, ‘99 diseases’ | Infusion | 1 2                 |                  |
|                                               | Sedative      | Infusion | 1                   |                  |
|                                               | Stomach problems | Infusion | 1 1                 |                  |
|                                               | Upset stomach | Infusion | 1                   |                  |
| Lamiaceae                                     |              |            |                     |                  |
|                                               |              |            | 6 28 1 10           |                  |
|                                               |              |            |                     |                  |
| Leonurus quinquelobatus Gilib. LE 01079359, LE 01063471 | RU pustynik | S pustynik (RU) | 1 7 1               |                  |
|                                               | Aerial parts  |            |                     |                  |
|                                               | Heart pain    | Tincture | 1                   |                  |
|                                               | Heart herb    | Infusion | 1 1                 |                  |
|                                               | Heart problems | Infusion, tincture | 2 3     |                  |
|                                               | High blood pressure | Infusion | 3                   |                  |
|                                               | Sedative      | Infusion | 1 1                 |                  |
|                                               |RU miata rechnaia | Infusion | 1                   |                  |
|                                               | Good for health | Infusion | 1                   |                  |
|                                               | RU miata     | S miata (RU), mjatad, munt | 9 1 4  |                  |
|                                               | Aerial parts  |            |                     |                  |
|                                               | Cold, flu     | Infusion | 3                   |                  |
|                                               | Heart problems | Infusion | 3 1                 |                  |
|                                               | Sedative      | Infusion | 3 3                 |                  |
|                                               | Sudorific     | Infusion | 2                   |                  |
|                                               | Leaves        | Raw, chewing | 1                   |                  |
|                                               |Liver cleansing | Infusion | 1 1                 |                  |
|                                               | Nepeta cataria L.* LE 01079358, LE 01063476 | RU melissa | S melissa (RU) | 2 2  |                  |
|                                               | Aerial parts  |            |                     |                  |
|                                               | Sedative      | Infusion | 1 2                 |                  |
|                                               | Sleeplessness | Infusion | 1                   |                  |
Table 5 (continued)

| Family/taxon, voucher specimen, local names/part | Medicinal use | Mode of use | Russians, Ul N = 36 | Setos, Ul N = 26 |
|-----------------------------------------------|--------------|-------------|---------------------|------------------|
|                                               |              |             | Past    | Present | Past   | Present |
| Origanum vulgare L. dsPCH19-003, dsPCH19-008, dsPCH19-017 | RU dushitsa, bogoroditskaya travka | S dushitsa (RU) | 3       | 6       | 3      |
| Aerial parts                                  | Asthma       | Infusion    | 1       |         |        |         |
|                                               | Bath for babies | Infusion, bath | 1   |         |        |         |
|                                               | Cold         | Tea         | 2       |         |        |         |
|                                               | Good for health | Infusion | 1 | 1       | 1      |
|                                               | Headache     |             |         |         | 1      |         |
|                                               | Heart problems |             | 1      |         | 1      |         |
|                                               | Sedative     | Tea         | 1       |         |        |         |
|                                               | Sudorific    | Infusion    | 1       |         |        |         |
| Inflorescences                                | Sedative     |             |         |         |        | 1       |
| Prunella vulgaris L.                          | RU goriianka |             |         | 2       |        |         |
| Aerial parts                                  | Antiseptic for cold | Infusion, rinse | 1 |         |        |         |
|                                               | Throat inflammation | Infusion | 1 |         |        |         |
| Thymus serpyllum L.                           | RU chabrets  |             | 2       | 1       |        |         |
| Aerial parts                                  | Cough        | Infusion    | 1       |         | 1      |         |
|                                               | Heart problems |             | 1       |         |        |         |
|                                               | Rheumatism   |             |         |         |        | 1       |
| Linaceae                                      |              |             |         |         |        | 1       |
| Linum usitatissimum L.¹                        | RU len       | S len (RU)  | 1       |         |        | 1       |
| Stalks                                        | Boils        | Fiber rubbed with soap, topical application | 1 |         |        |         |
|                                               | Knee pain    | Topical application |        |         | 1      |         |
| Lycopodiaceae                                 |              |             |         |         |        |         |
| Lycopodium clavatum L.                         | RU likopodi, deriaga |             | 1       |         |        |         |
| Spores                                        | Wounds       | Topical application | 1 |         |        |         |
| Lythraceae                                    |              |             |         |         |        | 2       |
| Punica granatum L.²                            | RU granat    |             | 2       | 1       |        |         |
| Peels                                         | Diarrhea (also in children), stomach problems | Infusion | 2 | 1       |        |         |
| Malvaceae                                     |              |             |         |         |        |         |
| Tilia cordata Mill* LE 01063409, dsPCH19-022, dsPCH19-032 | RU lipa | S lipa, pahn, pahnapuu | 6 | 10 | 3 | 7 |
| Flowers                                       | Cold         | Infusion    | 6       | 4       | 3      | 3       |
|                                               | Cold in children |             | 1   |         | 1      |         |
|                                               | Cough        |             | 1       |         | 1      |         |
|                                               | General sickness |             | 1      |         |        |         |
|                                               | Fever        |             | 1       |         |        |         |
|                                               | Heart problems |             | 1       |         |        |         |
|                                               | Sedative     |             | 1       |         |        |         |
|                                               | Sudorific    | Infusion, tincture | 2 |         |        |         |
| Myrtaceae                                     |              |             |         |         |        | 1       |
| Acca sellowiana (O.Berg) Burretń²             | RU feikhoa   |             |         | 1       |        |         |
| Fruit, peels, leaves                          | Thyroid gland problems | Infusion | 1 |         |        |         |
| Oleaceae                                      |              |             |         |         |        | 3       |
| Olea europaea L.                              | RU olivkovoe maslo (olive oil) |             | 3 | 4 | 2 | 2 |
|                                               |              |             |         |         |        | 1       |
| Family/taxon, voucher specimen, local names/part | Medicinal use | Mode of use | Russians, UI N = 36 | Setos, UI N = 26 |
|-----------------------------------------------|--------------|-------------|---------------------|-----------------|
| Oil                                           | Wounds       | Ointment, topical application | 1                  |                 |
| Syringa vulgaris L. * LE 01063458 Flowers      | RU * siren'  | S * siren' (RU) | 3 3 2               |                 |
| Leaves                                        |              | Infusion    | 1                   |                 |
| Leaves                                        |              | Infusion    | 1                   |                 |
| Epilobium angustifolium L. dsPCH19-015         | RU * ivan-chai, kiprei | S * ivan-chai (RU) | 2 3               |                 |
| Aerial parts                                  |              | Infusion    | 1                   |                 |
| Flowers                                       |              | Sedative    | 1                   |                 |
| Leaves                                        |              | Infusion    | 1                   |                 |
| Orchidaceae                                   |              | Infusion    | 1                   |                 |
| Orchis militaris L.                           | RU yatryshnik|               | 1                   |                 |
| Paeonia officinalis L. †                      | RU * pion    |               | 2                   |                 |
| Petals                                        |              | Infusion    | 2                   |                 |
| Papaveraceae                                  |              | Infusion    | 3                   | 1               |
| Chelidonium majus L.                          | RU * chistotel| S * chistotel (RU) | 6 7 3 1            |                 |
| Aerial parts                                  |              | Decoction, infusion | 1 3               |                 |
| Skin irritation                               |              | Infusion, tincture | 2                 |                 |
| Wounds                                        |              | Tincture    | 1                   |                 |
| Latex                                         |              | Topical application | 4 3               | 1               |
| Pinaceae                                      |              | Decoction    | 1                   | 2               |
| Picea abies (L.) H.Karst                      |              | Decoction    | 1                   |                 |
| Twigs                                         |              | Infusion     | 1                   |                 |
| Pinus sylvestris L.                           | RU * sosna  | S * sosna (RU), petai | 1 3 1            |                 |
| Buds                                          |              | Infusion     | 2                   |                 |
| Shoots                                        |              | Decoction, infusion | 1                 | 1               |
| Immunity                                      |              | Infusion    | 1                   |                 |
| Twigs                                         |              | Decoction    | 1                   |                 |
| Piperaceae                                    |              | Infusion     | 1                   |                 |
| Piper nigrum L. ‡                             | RU * (chemys) perets | S * pipar | 1 1 1               |                 |
| Seeds                                         |              | Raw         | 1                   |                 |
| Stomachache                                   |              | Tincture    | 1                   |                 |
| Plantaginaceae                                |              | Infusion    | 11 3                |                 |
| Plantago major L. LE 01063457 Flower and stem | RU podorozhnik| S podorozhnik (RU) | 12 17              |                 |
| Flower and stem                               | Sedative     | Infusion    | 1                   |                 |
| Upset stomach                                 |              | Infusion    | 1                   |                 |
| Family/taxon, voucher specimen, local names/part | Medicinal use | Mode of use | Russians, UI N = 36 | Setos, UI N = 26 |
|-----------------------------------------------|---------------|-------------|---------------------|------------------|
| Leaves | Burns | Topical application | | 1 | |
| | Cough | Infusion | 4 | | |
| | Cuts | Topical application | 1 | 2 | 2 | 1 |
| | Diarrhea | Infusion | 1 | | |
| | Leg vein problems | Topical application | 1 | | |
| | Skin inflammation | | 1 | | |
| | Stomachache | Infusion | 1 | 1 | |
| | Stomach problems | | 1 | | |
| | Upset stomach | | 1 | | |
| | Wounds | Topical application | 11 | 6 | 4 | 2 |
| Poaceae | | | | | |
| Hordeum vulgare L. | RU yachmen', zhchina | | 1 | | |
| Seeds | Goopy eyes | Infusion | 1 | | |
| Polygonaceae | | | | | |
| Polygonum aviculare L. LE 01063454, LE 01063423 | RU sporysh | | 5 | 7 | 2 | |
| Aerial parts | Female problems | Infusion | 1 | | |
| | Kidney problems | | 1 | 1 | |
| | Menorrhagia | | 1 | | |
| | Stomachache | | 1 | | |
| Rheum rhabarbarum L. | RU reven' | | 2 | | |
| Stalks | Digestion recovery after oncology treatment | Jam, decoction | 2 | | |
| Rumex acetosa L. LE 01063414 | RU kisiltsa | S kisiltsa (RU) | 1 | | |
| Aerial parts | Diarrhea | Infusion | 1 | 1 | |
| Rumex confertus Willd | RU konskii shchavel' | S konskii shchavel' (RU) | 1 | 2 | 1 | |
| Aerial parts | Diarrhea | Infusion | 1 | 1 | |
| Leaves | | | 1 | | |
| | Root, seeds | | 1 | | |
| Primulaceae | | | | | |
| Primula veris L. dsPCH19-027 | RU pervotsvet, petushki | S petushki (RU) | 2 | 1 | |
| Flowers | Cough | Infusion | 1 | | |
| | Good for health | Snack | 1 | | |
| | Cough | Tincture | 1 | | |
| Ranunculaceae | | | | | |
| Anemone nemorosa L. | RU vetrenitsa | | 1 | | |
| Aerial parts | Inflammation | Topical application | 1 | | |
| Rosaceae | | | | | |
| Agrimonia eupatoria L. | RU repeshok | | 1 | | |
| Aerial parts | Good for health | Tincture | 1 | | |
| Alchemilla vulgaris auct. (coll.) LE 01063498 | RU manzhetka | S manzhetka (RU) | 2 | 3 | 1 | |
| Aerial parts | Female problems | Infusion | 1 | 2 | |
| | Good for health | | 1 | | |
| | Headache | | 1 | | |
| | Thyroid gland problems | | | 1 | |
| Family/taxon, voucher specimen, local names/part | Medicinal use | Mode of use | Russians, UI N = 36 | Setos, UI N = 26 |
|-----------------------------------------------|---------------|-------------|---------------------|-----------------|
| Aronia melanocarpa (Michx.) Elliott* LE 01063477 | Fruit | Heart problems | Jam, jam infusion | Past: 3 Present: 1 |
| | | High blood pressure | | Past: 1 Present: 2 |
| Comarum palustre L. | Aerial parts | Joint problems | Tincture: oral or topical | Past: 3 Present: 2 |
| | Root | Joint problems | Tincture: topical | Past: 1 Present: 1 |
| Crataegus spp. (including C. submollis Sarg. LE 01063511) | Fruit | Coronary heart disease | Tincture | Past: 1 Present: 1 |
| | | Heart problems | Infusion, tincture | Past: 1 Present: 1 |
| | | Medicine | Infusion | Past: 1 Present: 1 |
| Filipendula ulmaria (L.) Maxim | Aerial parts | Good for heart | Infusion | Past: 1 Present: 1 |
| | Flowers | Instead of aspirin | | Past: 1 Present: 1 |
| | | Kidney stones | | Past: 1 Present: 1 |
| | | Tonic | | Past: 1 Present: 1 |
| Fragaria vesca L. LE 01063496 | Flowers | Heart problems | Infusion | Past: 1 Present: 1 |
| | Fruit | Cough | Tincture | Past: 1 Present: 1 |
| | | Cough in children | | Past: 1 Present: 1 |
| | | Immunity | Frozen, raw snack | Past: 2 Present: 1 |
| | Leaves | Cold | Infusion | Past: 1 Present: 1 |
| | | Cough | | Past: 1 Present: 1 |
| Malus domestica Borkh.† | Fruit | Headache | Apple vinegar, topical application | Past: 1 Present: 1 |
| | | Tonic | Apple vinegar | Past: 1 Present: 1 |
| Potentilla argentea L. dsPCH19-016 | Aerial parts | Nerve restoring | Infusion | Past: 1 Present: 1 |
| Potentilla erecta (L.) Raeusch. LE 01063425 | Root | Bile expelling | Infusion, tincture | Past: 2 Present: 1 |
| | | Female problems | Tincture | Past: 1 Present: 1 |
| | | Heart problems | | Past: 1 Present: 1 |
| | | Menorrhagia | | Past: 1 Present: 1 |
| | | Medicine | | Past: 1 Present: 1 |
| | | Rheumatism | Decoction | | Past: 1 Present: 1 |
| | | Stomach problems | Infusion, tincture | Past: 7 Present: 1 |
| | | Tonsillitis, gum problems | Rinse | | Past: 1 Present: 1 |
| | | Upset stomach | Tincture | Past: 1 Present: 1 |
| Prunus padus L. | Flowers | RU cheremukha | S cheremukha (RU) | Past: 4 Present: 2 |
| | Fruit | Wounds | Tincture, topical application | Past: 1 Present: 1 |
| | | Diarrhea | Dried, snack, or infusion | Past: 4 Present: 1 |
| | | Sudanific | Snack | Past: 1 Present: 1 |
| Rosa sp. dsPCH19-014, dsPCH19-030 | RU shipovnik | S shipovnik (RU) | Past: 1 Present: 1 |
| Family/taxon, voucher specimen, local names/part | Medicinal use | Mode of use | Russians, UI N = 36 | Setos, UI N = 26 |
|-------------------------------------------|--------------|-------------|---------------------|------------------|
|                                           |              |             | Past | Present | Past | Present |
| Fruit                                     | Good for health | Infusion | 1 | 1 | 1 |
|                                           | Medicine | Infusion | 1 | | 1 |
| Root                                      | Kidney stones | Infusion | 1 | 1 | 1 |
| Rubus chamaemorus L.                       | RU moroshka | Infusion | 1 | 1 | 1 |
| Sepals                                    | Male diseases | Infusion | 1 | 1 | 1 |
| *Rubus idaeus L.*                         | RU malina, vabarnat (S), vanik (S) | S malina (RU), vabarnas, varikkas | 18 | 16 | 9 | 5 |
| Aerial parts with leaves and fruit        | Blood dilution | Infusion | 1 | 1 | 1 |
|                                          | Cold | Infusion | 1 | 2 | 1 |
|                                          | High blood pressure | Infusion | 1 | 1 | 1 |
|                                          | Instead of aspirin | Infusion | 1 | 1 | 1 |
|                                          | Sudorific | Infusion | 1 | 1 | 1 |
| Fruit                                     | Blood dilution | Jam | 2 | | 2 |
|                                          | Cold | Frozen, infusion, (raw) jam, jam infusion | 9 | 6 | 3 | 2 |
|                                          | Cold prophylactic | Infusion | 1 | 1 | 1 |
|                                          | Diuretic | Infusion | 1 | 1 | 1 |
|                                          | Fever | Jam | 1 | | 1 |
|                                          | Instead of aspirin | Infusion | 1 | 1 | 1 |
|                                          | Sudorific | Infusion | 1 | 1 | 1 |
| Root                                      | Diarrhea in children | Infusion | 1 | 1 | 1 |
| Twigs (in winter)                         | Anti-inflammatory | Infusion | 1 | | |
|                                          | Cold | Infusion | 1 | 1 | 1 |
|                                          | Sudorific | Infusion | 1 | 1 | 1 |
| Sorbus aucuparia L. LE 01063446           | RU riabina | S riabina (RU) | 4 | 3 | 2 | 2 |
| Fruit                                     | Cholesterol balance | Dried and parboiled snack | 1 | | 1 |
|                                          | Cold | Snack, raw jam, infusion | 2 | | 2 |
|                                          | Good for health | Infusion | 2 | | 2 |
|                                          | Headache | Raw jam | 1 | | 1 |
|                                          | Laxative | Wine, infusion | 1 | | 1 |
|                                          | Medicine | Dried | 1 | | 1 |
| Rutaceae                                  |              |             | 2 | | 2 |
| *Citrus limon (L.) Osbeck*                | RU limon |             | | | |
| Fruit                                     | High blood pressure | Raw | 1 | | 1 |
| Peels                                     | Hangover | Infusion | 1 | | 1 |
| Salicaceae                                |              |             | 1 | 2 | 2 | 2 |
| Salix alba Willd. LE 01063470             | RU verba |             | 1 | 1 | 1 | 1 |
| Flowers                                   | Good for health | Eaten on Easter | 1 | | 1 |
| Twigs                                     | Leg pain | Whip | 1 | | 1 |
| *Salix caprea L. LE 01063469*             | RU iva |             | 1 | 1 | 1 | 1 |
| Leaves                                    | Wounds | Topical application | 1 | | 1 |
| Sapindaceae                               |              |             | 7 | 2 | 2 | 2 |
| Acer platanoides L. LE 01063411           | RU klon | S klon (RU) | 1 | 1 | 1 | 1 |
| Sap                                       | Diuretic | Raw | 1 | | 1 |
| Twigs                                     | Leg vein problems | Decoction | 1 | | 1 |
| Aesculus hippocastanum L.                 | RU kashtan | S kashtan (RU) | 6 | 1 | 1 | 1 |
| Family/taxon, voucher specimen, local names/part | Medicinal use | Mode of use | Russians, UI N = 36 | Setos, UI N = 26 |
|-----------------------------------------------|--------------|-------------|---------------------|------------------|
|                                               |              |             | Past                | Present          |
|                                               |              |             | Past                | Present          |
| Flowers                                       | Joint problems | Tincture, topical application | 1 | |
|                                               | Vein problems | Tincture, topical application | 1 | |
| Seeds                                         | Back pain     | Put in pocket | 1 | |
|                                               | Knee pain     | Tincture, topical application | 1 | |
|                                               | Leg pain      | Tincture, topical application | 1 | |
|                                               | Sinusitis     | Topical application | 1 | |
|                                               | Vein problems | Tincture, topical application | 1 | |
|                                               |              |             |                     |                 |
| Saxifragaceae                                 |              |             |                     |                 |
| Bergenia sp.                                  |              |             |                     |                 |
|                                               | Aerial parts  | Bruises | Topical application | 1 | |
| Solanaceae                                    |              |             |                     |                 |
| Capsicum annuum L. †                          | RU perets krasnyi | S perets (RU) | 1 | 2 |
|                                               | Fruit | Cold  | Tincture | 1 | 1 |
|                                               |       |       |           |                 |                 |
|                                               | Solanum tuberosum L. † | RU kartofel’ kartoshka | S kartofel’ (RU), kartoshka (RU) | 3 | 4 | 1 | 1 |
|                                               | Shoots | Diabetes     | Infusion | 1 | |
|                                               |       | Eye irritation | Infusion or soft tincture, drops | 1 | |
|                                               | Tubers | Abscessed wound | Raw, topical application | 1 | |
|                                               |       | Burns | Raw, topical application | 1 | |
|                                               |       | Cold | Boiled unpeeled, vapor | 1 | 1 |
|                                               |       | Cough | Boiled unpeeled, vapor | 1 | |
|                                               |       | Hemorrhoids | Raw, suppository | 1 | |
|                                               |       | Joint problems | Raw, compress | 1 | |
| Sphagnaceae                                   |              |             |                     |                 |
| Sphagnum sp.                                  |              | RU mokh |                     | 1 | |
|                                               | Aerial parts  | Wounds | Topical application | 1 | |
| Theaceae                                      | Camellia sinensis (L.) Kuntze ‡ | RU chai, zelenyi chai | 5 | |
|                                               | Leaves | Diarrhea | Infusion | 1 | |
|                                               |       | Diarrhea in children | Infusion | 1 | |
|                                               |       | Diuretic | Infusion | 1 | |
|                                               |       | Eye irritation | Infusion, drops | 1 | |
|                                               |       | High blood pressure | Infusion | 1 | |
|                                               | Urtica dioica L. LE 01063436 | RU kropiva | S kropiva (RU) | 2 | 1 | 2 |
|                                               | Aerial parts  | Arm pain | Whip | 1 | |
|                                               |       | Back pain | Dried, within steam bath whisk | 1 | |
|                                               |       | Good for health, organism cleansing | Infusion | 2 | |
|                                               |       | Joint problems | Parboiled, steam bath whisk, topical application | 1 | |

No mark = wild, * = wild or cultivated, † = cultivated, ‡ = purchased
They [parents] didn’t have time once they entered the kolkhoz. It was Estonia there, so I remember kolkhozes [collectivization]. I was born in ’42. I remember, when I was in 1st grade they herded them—as we then called it—into kolkhoz. So... and in the kolkhoz they worked so much that they could not [celebrate] any holiday, [take] any day off. If you don’t show up at work, then... and my parents were not really poor before the kolkhoz, but quite the contrary. We thought they would even de-kulakize us, deport us somewhere. We were ready for that, so all the more reason why they could not miss a day (Russian woman, b. 1942).

The history of family use and the level of education appear to be culturally specific in the Seto and local Russians. When we look at the cross-cultural distribution, the difference between those with a history of family use and those without it becomes more evident in the Russian group and much less in the Seto group. The correspondence between plant use and education also seems to vary, especially due to the uneven distribution of interviewees across cohorts. In the Russian group, the highest average number of plants was used by college graduates, followed by those with a secondary education. In the Seto group, however, the interviewees with a secondary education reported the highest number of plants, followed by those with a college education. In both groups, those with a vocational education reported the least number of medicinal plants.

**Reading about plants**

Some medicinal uses were learned from the literature, but the participants could rarely refer to particular books, unlike the immigrating population who were more aware of the books that influenced them. Obviously, it is not always possible to identify the uses that were driven by recent literature recommendation and then spread via oral transmission. Nevertheless, we asked our interviewees whenever possible to signal the literature that guided some of their plant uses.

Those who could remember the source of the information referred to the Vestnik ZOZh newspaper (‘Bulletin of Healthy Lifestyle’ from Russian: ЗОЖ, здоровый образ жизни’). Eight of our interviewees mentioned recipes that they learned from this newspaper. Two Russian women (b. 1954 and 1933) referred to Vestnik ZOZh describing the use of the leaves of Arctium tomentosum for pain in the knees and arthrosis in the feet. Another Russian woman (b. 1960) cited the use of Pinus sylvestris shoots for alleviating cough and asthma. A Seto woman (b. 1968) mentioned the roots of Rosa sp. for treating kidney stones. Another Russian woman (b. 1941) recommended putting Dryopteris filix-mas leaves under the
bed sheets to help with sleeplessness. The list of plants linked to published sources is provided in Table 7.

_Vestnik ZOZh_ was founded in 1992 as an appendix to _Sovetskii sport_ (Russian ‘Soviet sports’) and became an independent edition in 1998. The newspaper gained a dubious reputation among the general public for mixing the advice of medical doctors for a healthy lifestyle together with letters from subscribers offering anecdotal evidence for the use of home cures that were not supported by scientific research [55, 56]. The ironic perception of these cures can be illustrated in a phrase from the humor column of one of the newspapers shown to us by one of the participants: ‘Folk medicine is when 70-year-olds are treated using the recipes of those who lived for 30 years.’ The main readership of the newspaper is retired people who suffer from chronic diseases and at the same time cannot access qualified medical advice [56]. The name has become
the epitome of poor-quality home cures that are used as a last resort for chronic illnesses. Figure 3 demonstrates recipes sent by readers to the various self-care newspapers.

Some interviewees described literature-driven plant uses as potential but unimplemented. For example, a Russian woman born in 1942 discussed with us several recipes that she indicated for personal use and even made the preparations but had not yet tried them, such as *Allium cepa* L. peels boiled in water and used for vein dilatation or joint pain. However, a tincture that was prepared following another recipe and forgotten about for three years was eventually used to a beneficial end: *I read that the flowers of dandelion can be infused in vodka and then [used] for pain in the small of the back. ... Then it sat for three years maybe. Then I had liver pain and [when I used the remedy] everything ceased to hurt all at once.*

### Diachrony of disease categories

The majority of ailments treated by herbs are spread over the respiratory, digestive, and general (fever) disease categories. The category of skin diseases contains the large majority of abandoned uses, which can be explained by improvements in hygiene. In contrast, the cardiovascular category features an important number of newly acquired remedies. Although a significant number of the uses in this category were recorded from only two people (15 and 8 UI), they can nevertheless be a sign of increased vigilance toward these types of diseases. Each category, however, contains a number of recently abandoned uses that is proportional to the total number of uses in their respective categories.

In several disease categories, such as digestive, musculoskeletal, general, psychological, and respiratory, interviewees reported uses from long ago, i.e., the generation of their grandparents. The distribution of disease categories over time is presented in Fig. 4.

The diachronic distribution of disease categories in the two ethnic groups is uneven (Fig. 5), demonstrating a developing tradition in the case of Russians and a conservative and eroding one in the case of Setos. In the Russian group, the majority of uses belong to the ‘all time’ use category and each disease category contains a number of newly acquired uses. In the Seto group, all categories demonstrate a number of abandoned uses, while new ones are limited. The majority of permanent uses among Setos belong to the general and cardiovascular disease categories, but most uses in the respiratory and digestive categories were abandoned.

### Cross-border analysis

The cross-border comparison reveals more similarity between Estonians and both Seto groups than between Russians and Setos. Indeed, the Jaccard Similarity Index is highest between Estonians and Estonian Setos (0.52) and Estonians and Russian Setos (0.45), while the highest dissimilarity is observed between Russians and Estonian Setos. At the same time, the Seto intraethnic similarity index is quite low (0.44). The Russian group clearly stands out for the number of plants utilized: 55 in the Russian group, 39 in the Estonian group, 34 in the Seto group from Estonia, and only 28 in the Seto group from Russia (Fig. 6).

The analysis of the use of plants by type (wild, cultivated, purchased) revealed a strong preference for wild plants in Russia among both Setos (86%) and Russians (80%) (Table 8). Both studied groups on the Estonian side of the border seem to have a greater predisposition for remedies from cultivated plants (more than 30% in each group), although the proportion of wild medicinal plants is still high (more than 60%).

The picture becomes more nuanced when we look at the more detailed plant categories (Table 8). The cross-border division in species selection and uses is evident. Yet, for all groups, from about 30 to 40% of medicinal plants that occur in the garden are wild. In each ethnic group, the proportion of wild plants that occur in the garden is comparable to the plants sourced in other habitats: in particular forests and meadows. The Seto groups in Russia and Estonia reported slightly higher numbers of wild plants that are found in the garden.

**Table 7** Plants and uses suggested by *Vestnik ZOZh* and similar publications mentioned during interviews

| Plant                          | Ethic group | Use                  |
|-------------------------------|-------------|----------------------|
| *Allium cepa* L.              | RU          | Vein problems        |
| Aloe sp.                      | Seto        | Runny nose           |
| Aloe sp.                      | RU          | Vision, cataracts    |
| *Arctium tomentosum* Mill.    | RU          | Knee pain, foot pain, headache |
| *Calanchea* sp.               | Seto        | Runny nose           |
| *Calendula officinalis* L.    | Seto        | Liver problems       |
| *Cichorium intybus* L.        | RU          | Liver problems       |
| *Dryopteris fixon-mas* (L.) Schott | Seto      | Sleeplessness        |
| *Hypericum perforatum* L.     | Seto        | Panacea              |
| *Pinus sylvestris* L.         | RU          | Cough, asthma        |
| *Rosa* sp.                    | Seto        | Kidney stones        |
| *Salix sp.* (Rus. *verba*)    | RU          | Leg pain             |
| *Taraxacum officinale* (L.) *Weber ex F.H.Wigg.* | RU | Back pain |

Total UI's for genera and taxa are presented in bold

As the most popular wild plants that occur in the garden and were frequently reported by at least three groups included: *Plantago major* L., *Betula* sp., *Achillea*...
Both Estonian groups frequently mentioned Picea abies (L.) H.Karst. Both groups in Russia also reported Tussilago farfara L., Arctium tomentosum Mill., and Che-lidonium majus L. The wild plants that occur in cultivation were Tilia cordata Mill. (in all four ethnic groups), Mentha sp., Rubus idaeus L., and Viburnum opulus L. (the last two mostly in Russia). The Russian group also frequently mentioned Leonurus quinquelobatus Gilib. which, according to Efimov and Konechnaia [30], was dispersed throughout the Pskov region after large scale cultivation. The most common cultivated plants were Brassica oleracea L., Allium cepa L. (mostly in Estonia), Solanum tuberosum L., and Calendula officinalis L.

Both Seto groups rely more than their immediate neighbors on the wild plants that grow next to their houses, and at the same time use fewer medicinal plants from the wild, indicated as ‘other’ (Fig. 7, bottom). The four species from this category that overlap among Setos are also frequently used by Estonians and Russians: Plantago major L., Hypericum discoeida DC., and Arctium tomentosum Mill.

**Diachronic comparison**

When compared to the historical data collected in the region in the 1930s, both Russian and Estonian Setos appear to be quite disparate: Jaccard Similarity Indexes range from 0.34 for Estonian Setos to 0.32 for Russian Setos in the 3+ taxa comparison and remain at roughly the same level for both groups in the comparison of all taxa (Fig. 8). The Russian group demonstrates similar
Diachrony of disease categories

Fig. 4 Disease categories distributed over time

Fig. 5 Cross-cultural comparison of the diachronic distribution of disease categories. Percentage of all UIs within an ethnic group. Acquired = adulthood, only now.
level of dissimilarity, being 0.33 in the 3+ taxa comparison and 0.27 in the all taxa comparison.

The level of Seto interethnic similarity is low, varying from 0.37 to 0.43. The highest similarity is observed between historical Seto uses and those of the Russian group—0.41 for the 3+ taxa and increasing up to 0.61 for the all taxa comparisons. This could mean that although the set of key plants is preserved in Russian Setos in the same volume as in Setos across the border, they borrow the new singular plant uses from the neighboring local Russians.

**Discussion**

**Seto medicine: stones, springs, and ether**

The data on traditional Seto medicine is scarce. The materials gathered during the ethnographic expedition of Leonid Zurov and Boris Vilde in 1937–1938 provide information about spiritual landscape objects such as stones, springs, and trees that were involved, among other things, in magical practices aimed at improving health [41, 57]. For example, Zurov mentions a stone that was used by Seto women to treat infertility (Ibid.). Others were used to help with leg pain and vertebral column problems, as it was believed that St. John or St. Peter had sat on them [41]. The stones were usually associated with the appearance of Christian saints. In Russian tradition, water from the depressions in these stones, so-called god’s footprints, was considered to be able to heal diseases like arthritis, wounds, or sprains [58, 59].

Springs and berry patches were the domain of female ecological knowledge [57]. The two main spiritual centers of Pechorsky District, Pskov-Pechory Monastery (Fig. 9) and Maly churchyard, were built on the springs whose waters are believed to have beneficial properties. Our field data contain references to ‘eye springs’ made by a Russian woman (b. 1933) and a Seto woman (b. 1960, see in a quote below).

*For the eyes... for the eyes, they kept telling us when we were kids that there is an eye spring. ‘Go wash your eyes’ (Seto woman, b. 1960).*

Another Russian woman remembered using the water from such a spring herself:

*If I tell you, you will laugh. I went to that Nikander poustyn [70 km from Pskov], still going there, there is an eye well. ... There are many wells, and this one is for the eyes. A Kazan Mother of God icon is hang-
ing there. ... I went there on foot [about 7 km], over the swamp... And then I took this water. It really [helped]. Or maybe I was still young enough so that it helped me. So I washed my eyes then and could read without glasses (Russian woman, b. 1945).

The public availability of ether made it the most popular folk remedy among Setos, for which they were notoriously known even by the first ethnographers [42]. Two of our Seto informants, a man born in 1971 and a woman born in 1965, remembered using ether in treating high fever in their childhood.

Patterns of plant use
The comparison of the top families and taxa used revealed interesting details, even though the overall set of taxa seems to be uniform across Russians and Setos.

The top families are distributed evenly in the Seto group, while in the Russian group Asteraceae (107 UI, 17 taxa) far outnumber Rosaceae, the second most common family (84 UI). The same preference for the Asteraceae family in the medicinal domain has been recorded for other Slavic communities: those living along the Ukraine–Poland border in the nineteenth century [60], modern day Hutzuls [61], and Slovenes historically
Fig. 8  Plant list comparison: Historical Seto uses obtained in [45] = Seto Hist, Seto and Russian uses—field data. 3 + taxa = plants mentioned more than three times in each group are included in the analysis.

Fig. 9  Left: Holy spring in a chapel in the yard of Pskov-Pechory Monastery. Right: Slovenskiye springs in Izborsk, Pechory District.
residing in Italy [62]. Indeed, Asteraceae contains the largest number of taxa that are included in the ethnobotanies of various cultures. At the same time, Asteraceae is the most numerous family of northwestern Russia, containing 392 species (including 95 species of *Taraxacum* genus) and being much larger than second-largest Poaceae with 207 species [63].

We compared our field data with the records made by Lebedeva [64, 65] who worked in the region in several previous years. Although a different methodology was applied during her fieldwork, we could nevertheless compare the lists of plants. She described 15 taxa that coincide with our data: *Alnus incana* (L.) Moench, *Arctium minus* (Hill) Bernh. (in our data *Arctium tomentosum* L.), *Artemia* sp., *Betula* sp., *Equisetum* sp., *Juniperus communis* L., *Lepidotricha suaveolens* (= *Matricaria matricarioides*, most likely the same ethnotaxon as *Matricaria discoidea* DC in our data), *Mentha arvensis* L., *Oxyccocus* spp., *Pinus sylvestris* L., *Plantago major* L., *Plantago media* L., *Quercus robur* L., *Rubus idaeus* L., *Vaccinium myrtillus* L., and *Vaccinium vitis-idaea* L. (fruit and leaves). The medical applications also coincided (e.g., *J. communis* bath whisk for radiculitis, *P. sylvestris* shoots with honey for tonsillitis), although Lebedeva provides some interesting details; for example, the leaves of *Plantago* spp. should be rubbed with the one-day cream (that accumulates on the top of milk during 24 h) before topical application.

*Viburnum opulus, Vaccinium oxyccocus, and Juniperus communis* are the only species that are more intensively used in the Seto group than in the Russian group. While *Juniperus communis* is traditionally used in the region, *Viburnum opulus* seems to be borrowed from Russians. The presence of *Vaccinium oxyccocus* is interesting because unlike the other two species it was absent from the list of medicinal plants of Estonia of the nineteenth century [66], and it seems that the collection (and medical use) of this berry was popularized in Estonia during Soviet times [67]. However, one use of *V. oxyccocus* had already been recorded by Vilbaste in 1930. Thus, the Seto population might have acquired this plant by that time. Historically in Russia, cranberry juice with honey was used to alleviate fever and crushed cranberries were used to treat impetigo [68].

The use of *Viburnum opulus* was the most significant in the Russian Seto group (19 UI, 7.5% of all Seto uses), while being absent from the data for Estonian Setos. It was also present in the Russian (15 UI, 4%) and Estonian (6 UI, 1.6%) groups. In the 1950s, a medicinal use of *Viburnum* fruits was recorded [69]: Steamed with honey or in the form of juice they were used in the treatment of whooping cough. The juice was applied topically to treat scrofula in children. The use of *Viburnum* against cough and skin problems was recommended in the local newspaper [70].

The most salient difference in the Russian group is *Potentilla erecta*, which has been present in traditional Russian medicine since the nineteenth century and was actively popularized in Soviet wild medicinal flora guides. In Estonia, the use of this plant was recorded in Setomaa (Värska) as early as the 1930s [45], but in our field materials it was only recorded among Estonians and not among Estonian Setos. The Russian field data uses focused around digestive disorders and gynecological bleeding (15 UI), whereas the four Estonian UI mention skin bleeding, inducing childbirth, and toenail fungus. *Potentilla* is known in Estonia by local names (tedrema-ran) as well as by its Russian name (*kalgan*). At the end of the nineteenth century, *Potentilla* tincture was considered by Russians to be a powerful remedy for cholera [71].

**Diachrony of disease categories: cardiovascular diseases**

The landscape of diseases, that is, diseases recognized on the emic level and cured by local herbal medicine, has changed over time, partly due to improvements in hygiene and the more widespread availability of medical aid. Indeed, the proportion of skin diseases has decreased and the fever ailments in the general category is mostly linked to respiratory diseases. While respiratory and digestive cures are the most frequently applied, there are some new ailments, such as cardiovascular diseases, that reflect the health concerns of the local population.

Cardiovascular diseases are the main cause of death (61%) in Pskov Oblast, which is in line with the global trend, although the proportion and absolute numbers are quite high. As of 2018, the coverage of outpatient clinics by cardiologists in Pskov Oblast was only 25% [72]. The fact that the majority of the rural population live in isolated farmsteads contributes to the reduced accessibility of emergency medical care. Only 77% of patients with acute myocardial infarction and just 30% of patients with ischemic stroke were hospitalized within the therapeutic window (Ibid.). In 2019, a regional program was launched aiming to decrease mortality from circulatory diseases from 1050 to 825 per 100 thousand, at a minimum, by 2024 (Ibid.), while across Russia this number does not exceed 585 per 100 thousand [73].

**Family as an agent of knowledge transmission and the role of formal education**

Early plant knowledge acquisition and vertical knowledge transmission play key roles in ethnobotanical knowledge resilience [74, 75]. While traditional gender and family roles can pose certain limitations on access to plant knowledge, learning by doing is the most important part of knowledge acquisition and, just like with language
learning, interruptions and delays at this stage can be detrimental to a person’s relationship with plants in the future. However, the precise list of learned medicinal plants can vary and is susceptible to change, adapting to a person’s constitution, habits, accessible habitats, and set of health problems.

As the majority of ethnobotanical studies are carried out in communities with limited education, their observations only discuss the presence or absence of one. They report, more or less unanimously, that education is a negative factor in the preservation of LEK [15]. However, there is an opinion that the contents of education might play a role. Other studies oppose the established point of view claiming that the volume of LEK does not depend on education [18]. Also, it can play a role in knowledge hybridization when patients with a higher education seek remedies in both the pharmaceutical and ethnobotanical domains [76]. Our study was carried out in a highly literate community, where the great majority of inhabitants have at least a secondary education [77]. According to our results, the highest number of plants was used by participants with a secondary (~11 UI) or college education: 15.6 UI in the Russian group and 9.8 in the Seto group (Table 6). In contrast, despite the frequently reported use of wild flora guides, people with a higher education provided 6 to 9 UI on average. The most obvious cross-cultural difference is measured at the level of college and higher education where the Russian group demonstrated the use of a wider variety of plants.

The greatest number of plant uses was recorded among people whose occupations included librarian, teacher, local historian, agronomist, and accountant, of which only one, an agronomist, used to be professionally involved with plants but later also worked as a school director. It is tempting to conclude that the largest number of plants was reported by members of the local intelligentsia whose outlook was guided by publications on useful plants that flooded libraries starting in the 1970s. Indeed, the myth of the Soviet reader and the most active reading nation was created in the 1930s, only to be reinforced after WWII [78]. Yet, the importance of books and reading was unquestionable, books were readily accessible and the library network was extensive. Until 1974, for those who worked in a kolkhoz, reading and receiving an education was the only way to gain admission to a college or university and to obtain a passport [79, 80]. Lovell notes that the most widely published magazines of that time (for example, Nauka i zhizn’, Russian ‘Science and life’) were devoted to science popularization. They not only described the latest advancements in technological progress but also advised readers on various practical household issues. Similarly, publications on plants varied from direct calls to action for contributors to collect medicinal herbs to more subdued lists of medicinal plant properties, appearances, and habitats. Being the co-creators of the reading nation myth, teachers and librarians were the most aware of popularizing books, including those on practical botany. Childhood exposure to plants, inevitable in a village or small town, combined with access to useful plants guides proved to be especially beneficial to the local intelligentsia.

In all likelihood, the lack of the second component, namely the effective influx of one-to-many book knowledge, rendered the numbers in the Seto group more uniform and, at the same time, the set of plants more stable. Vertical transmission provided a more unified repertoire of plants, more similarity among various levels of education, as well as more uniformity among those who referred to a family model of plant use and those who did not. Moreover, the access of Setos to literature in Estonian was limited. While educational instruction was conducted in Estonian using Estonian textbooks, local libraries and bookshops did not offer any literature in Estonian. Nevertheless, several families mentioned subscribing to Estonian magazines for women, while the border still was only administrative, which provided more information on knitting patterns than on self-medication. One of our interviewees, however, referred to Estonian radio for a medicinal remedy using Fragaria vesca L. After 1991, subscribing to Estonian newspapers and magazines was no longer an option. Currently, the Seto community in Russia seems to be dissimilated: Seto presence in each village does not number more than 2–3 people who only have the opportunity to meet during celebrations several times a year, such as the Dormition of the Mother of God on 28 August or Maly (Estonian Mõla) Sunday in July. Seto families keep in contact with their relatives in Estonia, sometimes more than with their physical neighbors in the next village. None of our Seto interviewees discussed medicinal plants acquired from the current practice in Estonia, neither from relatives nor from other sources of information.

**Preference for synanthropic plants across the border**

The balance between wild and cultivated medicinal plants in a given community can also indicate important tendencies on various levels. Although cultivation seems to be the most logical choice, it is not always possible due to the ecological properties of certain plants [81]. On the other hand, wild plant harvesting itself can be valued as an identity-building or recreational practice with potential health benefits rooted in maintained contact with nature as well as sourcing useful wild plants [82–84]. While some traditions, over time, tend to choose more easily accessible cultivated plants over the wild ones [66],...
as in the example of Estonia, other traditions, like that in Belarus, retain a preference for wild flora [85]. Recent studies have shown that the traditional medicine of Russia might prefer wild plants as well [20, 86]. However, what is important for our analysis is not the distinction between wild and cultivated plants, but more the ability of the chosen plants to cohabit with humans. Our cross-border comparison revealed a stronger preference for wild plants among Russians and Setos residing in Russia compared to Estonians and Setos residing in Estonia. Our finding corresponds to the historical observations made in Estonia indicating that synanthropic plants started to be used more frequently for medicinal purposes at the end of nineteenth century [66]. Field data from neighboring Belarus, however, stress the importance of wild plants over cultivated ones [85]. Globally, the proportion of traditionally used cultivated medicinal plants is reported to be around 20% [87–89]. According to our data, Estonia is above (33–35%) and Russia is below (13–15%) this figure.

Although wild plants constitute the majority of medicinal uses in all studied cultures, almost all of them use the shortcut of choosing the readily available wild plants that occur next to their house, in the garden, or by the side of the road. Indeed, the illnesses that appear as we get older are the pretext for turning to medicinal plants, but the same illnesses may prevent someone from accessing remote habitats. Nevertheless, Setos in both Estonia and Russia spoke more frequently about the easily accessible wild plants growing next to their houses.

Several considerations might help delineate the importance of wild medicinal plants. First, this preference can be linked to their presence in published sources: see, for example, Table 7, listing the plants cited by the interviewees from various publications. Moreover, the publications emphasized the importance of conveniently available anthropophytes, while claiming that it is wild plants whose medicinal properties are more expressed [90]. Although it was not stressed in the first popular Soviet publications on medicinal plants [91], the immediate availability of medicinal plants in the form of weeds became more important later [92], having developed into a separate subcategory in contemporary Russian guides to wild plants [93, 94] and many others.

On the other hand, immediate access of rural inhabitants to the forest, as well as plant literacy preserved by family transmission, enables increased wild plant use. Those who do not have such access, however, can profit from the wild plants sold in pharmacies (at a much lower price than pharmaceuticals), at the local market, or supplied by their network of contacts. Take, for example, the evidence from our Seto interviewee (born 1960) who does not collect herbs but who was able to identify and collect Hypericum for her relative. Despite claiming that she does not generally collect herbs, she was able to correctly identify Hypericum perforatum L. thanks to its properties that she learned as a child: The red pigment produced by its flowers was used to paint nails by young girls during her childhood:

I do not collect herbs. Well, only one year I collected zveroboi [St. John’s wort]. I read somewhere, [that you need] to macerate it in olive oil and put it on joints. So, I did and gave it to the mother of my daughter-in-law, she has knee pain (Seto woman, b. 1960).

Conclusion
The case study demonstrated cross-cultural as well as cross-border differences among the four studied groups: Setos residing in Russia and in Estonia, and Russians and Estonians living in Russia and Estonia, respectively. By the number of used plants, Russian Setos are similar to Estonian Setos and Estonians, while the set of plants is similar among all four groups. Russian Setos and Russians exhibited a preference for wild plants over cultivated and purchased plants, which is inspired by the overall plant literacy, access to nature, as well as one-to-many knowledge transfer favoring wild plants.

Our data revealed that nature mediators play an important role in LEK transmission and retention. In our case, grandparents rather than parents played the role of mediators, which has helped to maintain the link between generations. The role of education is not that straightforward for LEK. In our sample, apart from the children of herbophilic families, the rural intelligentsia including librarians and teachers reported the highest number of medicinal plants, representing knowledge learned not only from published sources but also from the family. It seems that the academic formalization of knowledge helps to secure the disembodied knowledge obtained in a family.

For Russians, herbal self-medication is an important cultural trait that was partly inspired by the preexisting traditional plant use and partly by the limited access to official medicine and pharmaceuticals caused by the turbulent history of the region. For both groups, Setos and Russians, reading about plants and formalization of the ecological knowledge supported the initial interest sparked in the family. In the case of Setos, however, the absence of books and print media in Estonia prevented their LEK from evolving. Setos of Pechorsky district reported a more narrow and homogenous set of medicinal plants than that of Setos in Estonia. However, due to fragmentation of the Seto community in Russia and the
erosion of horizontal links, their medicinal practice has started to diverge on the individual level and thus be homogenized with the Russian one (see Fig. 8).

We encourage studies focusing on the transformation of local herbal practices in relation to various ethnic and geographic contexts to document current practices and to estimate the persistence of traditional uses and their transformation over time in the context of differing habitats. We also encourage further studies regarding different forms and levels of education in relation to LEK in literate societies to identify successful strategies.

Abbreviations
C: Cultivated plants; CO: Carbon monoxide; COVID-19: Coronavirus disease 2019; CP: Cultivated or purchased plants; CW: Cultivated plants that easily escape into the wild; EE: Estonian; F: Female; LEK: Local ecological knowledge; M: Male; N: Number of participants; P: Purchased plants; RU: Russian; S: Seto; SSR: Soviet Socialist Republic; U: Use instance; UTI: Urinary tract infection; W: Wild plants; WC: Wild plants introduced into cultivation on private plots; WHO: World Health Organization; WWII: Second World War.

Acknowledgements
We are immensely grateful to all study participants who kindly shared their knowledge with us. Thanks is also due to Kira Kovalchenko who volunteered as a field assistant and to Denis Melnikov who identified the voucher specimens. We are thankful to Olga Kaukhchan for some of the visual materials for this article. We are thankful to Romain Simenel for his comments on the draft of this article. The fieldwork was made possible thanks to the support of the Institute for Linguistic Studies, Russian Academy of Sciences.

Author contributions
RS and OB designed the study. OB collected the data, analyzed and visualized it, and drafted the manuscript. RS edited the manuscript. RK and VK collected the data and reviewed and commented on the manuscript. All authors read and approved the final manuscript.

Funding
This research was financed by the European Research Council (ERC) under the European Union’s Horizon 2020 research and innovation programme (DiGe, grant agreement No 714874).

Availability of data and materials
The datasets used and/or analyzed during the current study will be made available after the project ends (2023).

Declarations
Ethics approval and consent to participate
ISE Code of Ethics Guidelines (2006) were strictly followed. Ethical approval was granted by the Ca’Foscari University Ethics Committee.

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

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