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Gaining momentum: popularization of *Epilobium angustifolium* as food and recreational tea on the Eastern edge of Europe

Short title: Gaining momentum

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Highlights

- *E. angustifolium* has long been promoted as a food plant with little success
- Ghost data dates back to the 1800s, and entered ethnographic books in the 1900s
- Many promotion attempts have failed, as they have not been culturally adapted
- Involvement of "mediators" increases the impact potential of the literature
- The right promotional context plays a crucial role in the acceptance of novel uses

Abstract

The local use of wild food plants represents a reservoir for the biocultural diversity of human diet and is therefore being extensively studied; yet the effects of the introduction of novel uses into specific biocultural conditions have been little researched. Rosebay willowherb *Epilobium angustifolium* L. has been intensively promoted in Europe since the mid-18th century. The expert recommendations did not provide any links to local uses thus raising the question of the legitimacy and diffusion of its food use in modern times. To understand if and to what extent those recommendations have influenced local uses, we compared them with the results of our

ethnobotanical field study and the ethnographic literature in Russia, Finland, Estonia, Latvia, Lithuania, Belarus and Ukraine. Of the 599 people interviewed, nine used *E. angustifolium* as a food and 59 as a recreational tea. Thirty-four of those who claimed to use *E. angustifolium* lived in two regions of Russia. The majority of the recorded tea uses were of recent origin, following a popular trend. Few food uses of *E. angustifolium* were recorded in Finland, where a trend towards culinary experimentation coincides with a general trend toward the consumption of healthy wild food; yet these uses are difficult to maintain due to the problems in recognizing the plant during its early stages of growth. The popularization of *E. angustifolium* as a food had more effect in times of hardship, when it was seen as a means of survival and its promotion was advocated. The translation error repeatedly appeared in botanical and later popular literature, whose authors did not clearly differentiate at that time between local uses and suggestions.

Keywords
Knowledge transmission, popularizing literature, *Epilobium angustifolium*, ecocultural context, circumpolar plant use, wild food plants, recreational tea

1. Introduction
The use of wild plants represents a reservoir for the biocultural diversity of the human diet, which can serve as a crucial source for sustainable food consumption (FAO, 2018). The field is also being intensively studied because of a rapid erosion of this knowledge. This is driven in great part by changes in lifestyle which leads to the loss of contact with nature (Pouta, Sievänen, & Neuvonen, 2006; Reyes-García et al., 2015) and also by the stigmatization of wild food (Menendez-Baceta, Pardo-de-Santayana, Aceituno-Mata, Tardío, & Reyes-García, 2017). Lost traditions are rediscovered and re-introduced by interested individuals, who spread them via workshops, media programs, books and blogs (Łuczaj et al., 2012). At the same time, books on wild food plants are making their way to the top of bestseller lists in many post-Soviet countries, which shows the rise of interest in the use of wild food plants. Due to global change and the need to increase human food security, scholars are searching for ways of introducing novel foods into mass use in sustainable ways (see, for example, Torri et al., 2020).

While there are studies demonstrating failures to introduce novel foods through the literature by short-term campaigns in times of hardship, such as the famines of the 19th century (see, for example, Svanberg & Nelson, 1992) or during WWII in Europe (e.g. Hjeltnes, 2018), there are also successful examples from the same time period (e.g. Vorstenbosch et al., 2017). However, to the best of our knowledge, there are no studies addressing long-term promotions. Consumption of wild plants for food indeed represents a domain which is less affected by various influences (Sõukand & Pieroni, 2016), yet recent valorizations in post-Soviet regions have already been documented for the use of wild food plants, see e.g. (Kalle & Sõukand, 2016), as well as for recreational teas (Sõukand & Kalle, 2013).

A plant that has not previously been of cultural importance for food in the study area would be suitable for analyzing the influence of its promotion and possible valorization of its consumption. Therefore, we chose rosebay willowherb *Epilobium angustifolium* L. (syn. *Chamaenerion angustifolium* (L.) Scop., Onagraceae) as a case study. It is a circumpolar species of the Northern hemisphere, common to large parts of boreal forests and mixed deciduous forests. Growing in open areas and pastures, it is also a well-known pioneer species at the sites of forest fires and recently cleared land with sandy-gravelly soils (Mitich, 1999; Pinno, Landhäusser, Chow, Quideau, & MacKenzie, 2013). *E. angustifolium* has been promoted in Northern and Eastern Europe as an excellent food plant and a tea surrogate since

the second half of the 18th century. In the 1930s, Soviet scientists were on the lookout for new valuable plants that could be used in agriculture and forestry. *E. angustifolium* was selected as an important plant for forest cultivation and as a prospective plant for the chemical industry, as well as honey and fodder production (Danilov, 1938). During this time, it was also intensively studied as a potential medicinal and food plant for humans (Sõukand et al., 2020). However, Shikov et al. (2017), who reviewed the scientific literature on traditional and current uses of 70 wild food plants in Russia, referred only to recent sources declaring that *E. angustifolium* has historically been used for making tea. Also, Voronina (2015), who studied the archives and ethnographic literature regarding plant uses in the Russian North during the 19th and beginning of the 20th centuries, did not find any food uses of *E. angustifolium*. Recent trends, however, show its growing importance. For example, in Belarus, where *E. angustifolium* was not used in the past (Łuczaj et al., 2013), tea making from its leaves and flowers has been documented (Sõukand et al., 2017). Tea made from *E. angustifolium* was also recorded in Ukraine during very recent fieldwork (Pieroni & Sõukand, 2018; Sõukand & Pieroni, 2016; Stryamets, Elbakidze, Ceuterick, Angelstam, & Axelsson, 2015). Within the last ten years, because of the growing popularity of *E. angustifolium* as a recreational tea in the Russian Federation, the interest in describing *E. angustifolium*'s "glorious history" has resulted in a rise in pseudo-historical narratives (cf. Sadovskii & Sokolov, 2017).

The aim of our work was to detect and analyze the effect, if any, of various strategies of the introduction of *E. angustifolium* food and recreational tea uses. To this end we: (1) documented the current food use of *E. angustifolium* among different ethnic groups inhabiting the border regions at the Eastern edge of Europe, (2) analyzed the past food and recreational tea uses of *E. angustifolium* described in the scientific and popular literature as well as in ethnographic sources related, to one extent or another, to the territories of interest, and (3) discussed the grounds for success or failure of its promotion. This is the very essence of the article: to question the legitimacy of the food usage of *Epilobium angustifolium*. Despite the fact that it is has low nutritional value, the plant has been continuously popularized in the literature. This is our second study examining the influence of the literature on the local ecological knowledge of literate societies.

2. Materials and Methods

2.1. Study area

In all of our study sites (Fig 1), *E. angustifolium* grows naturally and is abundant. Climatically, the area under study reaches the boreal north and the temperate south, represented by coniferous, mixed and temperate broadleaf forests. Most of the area is flat, although our research area extended to the Carpathian Mountains in the south. The selected case study sites are characterized by rural settlement, a high percentage of forest coverage, a low population density and free access to forests and wild plants; however, the standards of living differ dramatically across cases. All study areas are located in the border regions.

2.2. Field study

In summer 2018, we conducted 526 interviews in six countries including Finland, Russia, Estonia, Belarus, Lithuania and Ukraine. In addition to these 526, 73 interviews were conducted in Latvia during summer 2017. The number of interviewees varied from 60 to 90, depending on the region. The mean age of the interviewees was 66 years and the proportion of men in the sample was 30%, due to the current demographical situation in the rural areas of these countries and the fact that women were sometimes more available for interviews than men.

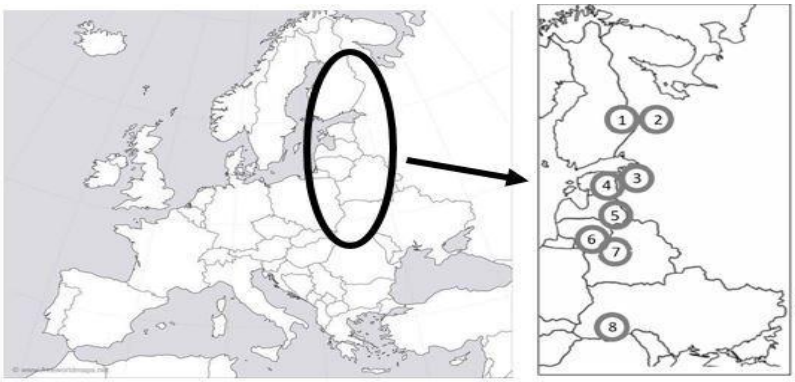


Fig 1. Map of the study area. 1 – North Karelia (Finland); 2 – Republic of Karelia (Russia); 3 - Pskov region (Russia); 4 – Old Võromaa (Estonia); 5 – Dagda region (Latvia); 6 – Šalčininkai district (Lithuania); 7 – Hrodna region (Belarus); 8 – Chernivtsi region (Ukraine).

The field data presented in this study is a part of a larger comparative project. In every region, we interviewed a sample of ethnic or linguistic minorities (Karelians in Russia and Finland, Setos and Võros in South Estonia and in Russia, Latgalians in East Latvia, Poles in Lithuania and Belarus, Russians in Estonia and Latvia, and Hutsuls in Ukraine) as well as representatives of the dominant ethnic groups (respectively, Finns, Russians, Estonians, Latvians, Lithuanians, Belarusians and Ukrainians). The semi-structured interviews consisted of open-ended questions about current and past food and medicinal uses of wild and semi-domesticated plants. The interviewees were pseudo-randomly selected in the street and near their houses, sometimes using a snowball method in order to identify more knowledgeable individuals or when it was otherwise challenging to approach people (as in Finland).

The study was introduced to the participants and oral or written consent was obtained. Interviews were recorded, if permission was given. This study strictly followed the ethical guidelines outlined by the International Society of Ethnobiology (ISE Code of Ethics, 2006). The methodology was approved by the Ethics Committee of Università Ca' Foscari and supported by local institutions in the extra-EU countries where this study was performed. All voucher specimens of dried samples collected from EU countries were stored at the Herbarium of Università Ca' Foscari.

Responses were transcribed and coded using emic categories. All the responses about *E. angustifolium* were extracted and analyzed in depth. As we recorded the local names of all plants, the analysis of the names used for *E. angustifolium* provides interesting insight into the status of the plant in local cultures.

2.3. Literature review

We also reviewed, as exhaustively as possible, all the sources touching on the use of *E. angustifolium* in the regions under study. Inspired by the poststructuralist approach to history introduced by Alan Munslow (2006), we tried to deconstruct the sources that recommend food uses of *E. angustifolium*, thus laying the ground for critical food history studies. We compared the results obtained during our fieldwork with the *E. angustifolium* food uses described in the scientific and ethnographic literature with special attention to the first documented uses, geography, ethnic groups that used *E. angustifolium*, and the motivation behind mentioning *E. angustifolium* use.

Reviewing the literature, we tried to track the potential origins of information. For example, Finland was influenced by Sweden and more broadly by the Nordic countries, while Estonia and Latvia were influenced by Germany through Baltic Germans. In order to determine earlier

existing uses of *E. angustifolium* in a region and its adjacent areas, we must also know how the indigenous peoples of the area used *E. angustifolium*. That is why we also looked at the Finno-Ugric peoples in EU regions (Sámi, Setos) and all the territory of Russia (Votes, Udmurts), as well as indigenous peoples of the Russian Far East (Koryaks, Itelmens, Nivkhs, Buryats, and others), as practices could have been borrowed or transferred artificially through exploratory expeditions to Siberia during the Russian Empire or deportations during the height of Soviet power.

We also reviewed sources that are usually excluded in ethnobotanical research, such as dictionaries and local Floras, in which the origin of the information is more difficult to detect, as these could have potentially influenced the uses of *E. angustifolium*. As biographies and published memoirs can also serve as historical sources, we included those reflecting on times of hardship in the 20th century in our review. As our main goal was to understand the possible influence of popularization, special attention was given to the popular literature (herbals, books, brochures, etc.), which introduces the use of wild plants to ordinary people.

2.3.2. Methodological concerns

To date, traditional plant use has been little addressed in Russian sources in specific works, though some ethnographical and folklore data are scattered over general publications about various ethnic groups. Russian botanists Tkachenko and Lebedeva admitted that since the 1960s botanists have been emphasizing the importance of ethnobotany in the territory of the former Soviet Union, but still not enough attention was paid to this by researchers in the Soviet Union and later in the Russian Federation (Lebedeva & Tkachenko, 2016b). Plant uses were referred to in scientific and especially popular books and articles without proper plant identification. Moreover, the documented uses and recommendations borrowed from other sources are not properly attributed and, therefore, are difficult to distinguish from each other.

The Soviet period laid the ground for future confusion. The field records were selective and sometimes deliberately altered (see, for example, Hirsch, 2005; Slezkine, 1991 on ethnography and Miller, 1980; Panchenko, 2005 about folklore). However, after the 1950s, this situation gradually changed. Further ethnographic and folkloric descriptions focused on remote history and classical subjects rather than on the present, or on the tradition in its classical understanding rather than on practice. Folklore and local traditions were praised as part of a valuable peasant culture but at the same time regarded as remnants of an obsolete social organization. For example, the last faithful descriptions of traditional Buryat culture were claimed to derive from the beginning of the 20th century (Zhambalova, 2013).

However, it should be noted that the fusion of traditional and recommended plant uses in publications had started long before the 20th century and was not unique to Soviet Russia (cf. Svanberg & Nelson, 1992). Popular books on wild plants and cuisine from the late Soviet era inherited or rather reinvented this tradition. Therefore, we treated many of our sources with great caution and circumspection.

3. Results & Discussion

3.1. Current food and recreational tea uses of *E. angustifolium*

The analysis of names reported during our fieldwork showed that Finnish Karelia was the only study area in which a local name for *E. angustifolium*, *maitohorsma*, was predominantly used. In all other researched regions, the plant was mainly referred to by our interviewees by its current Russian common name *Ivan-chai*. In different regions, some other names were also

mentioned, such as *kiprei* and *koporskii chai / koporka* in the Pskov region and the Republic of Karelia, *dymnik* in Ukraine, *gaurometis* in Lithuania, *ugunspuķe* in Latvia, and *põdrakanep, pajulill,* and *jaanihain* in Estonia.

In total, 62 people from our sample mentioned using *E. angustifolium* as food or recreational tea. In five of the seven countries, the use of *E. angustifolium* was very limited and restricted to recreational tea only: one use report from Belarus, four from Ukraine, Lithuania and Latvia, and seven from Estonia. Russia clearly stands out as compared to the other regions due to the extensive reports on the use of *E. angustifolium* tea: 19 from the Republic of Karelia and 13 from the Pskov region. In both regions, one person also mentioned making salad from young leaves. Finland represents an opposite extreme: seven people used *E. angustifolium* to make rather diverse dishes. Three people made only tea. One made salad from the leaves and recalled that his parents also stuffed fish for smoking with it. Three others made salad from the leaves as well as tea, while one made only salad. Two Finnish women reported having cooked young stems like asparagus, and one of them also made tea. The first woman claimed that she had tried to cook the shoots following recommendations in the literature, but she did not like the taste and thought they should be mixed with normal salad leaves.

The majority of our informants from all regions that acknowledged using *E. angustifolium* as food mentioned trying it once or abandoning its use after a short period, unless they had just started to use it.

While a recreational *E. angustifolium* tea is being promoted as a "Russian national drink" within Russia and elsewhere , the majority of our interviewees claimed that it is something they had learned within the last five years from community members or relatives, or read in books or on the Internet. Many reported that for making a good tea they needed to utilize special technology, which varied in detail but always included fermenting *E. angustifolium* leaves and then drying them in the oven or in a special dryer. Some interviewees reported that they had only tried it once and then discontinued the practice because the fermentation process was too cumbersome. A few people reported collecting *E. angustifolium* to sell to tourists.

In Estonia, six people, who reported the present use of *E. angustifolium* tea, collect flowers, leaves or flowering tops and dry them for making tea as one of the many herbal teas that is drunk. The only reference to a past use in Estonia came from a middle-aged man whose mother collected all good-smelling plants for tea, without knowing the names of all of them. Although several people reported the past use of *E. angustifolium* tea in the Russian Federation, no further details on the methods of fermentation were provided. Many of our interviewees said that they are still learning the right way to ferment it or had abandoned this use because they were not able to reproduce the required technological standard and complained about the time-consuming nature of the work. Those few enthusiasts in Estonia and Finland who reported fermenting *E. angustifolium* were either retired (or soon to retire) or younger people highly interested in a healthy lifestyle and herbs; no one, however, had been drinking this tea for more than five years.

Only Russian Old Believers in Lithuania, and both Old Believers and Russian-speaking interviewees in Latvia made tea from *E. angustifolium*. One woman from the Dagda region in Latvia (born in 1957) noted that she had used *E. angustifolium* as a recreational tea in the past, but she no longer did so. The only woman of Latgalian origin who reported this use was married to an Old Believer and she started to ferment *E. angustifolium* after having learned it from her mother-in-law. Notably, Russian ethnographer Dmitrii Zelenin, who studied Slavic folk culture of the end of the 19th and the beginning of the 20th centuries, suggested that Old Believers were not allowed to drink any tea at all (Zelenin, 1991). Though the majority of Old Believers

did not accept novelties like drinking coffee or Chinese tea, some of them did not observe the tea ban as strictly and were actually involved in the tea trade (Sokolov, 2015). The majority of respondents in Ukraine and several people in the Republic of Karelia produced *E. angustifolium* tea for sale. Also, in Estonia, the only person who had fermented *E. angustifolium* tea for longer than two years was a woman who sold medicinal plants from home.

3.2. Scarce evidence of spontaneous *E. angustifolium* consumption

During excavations of late-Neolithic (2300-1800 B.C) graves, Swedish archaeobotanists discovered large amounts of *E. angustifolium* pollen in food containers, concluding that it may have originated from the food put into the grave during burial (Lagerås, 2000). However, we suppose that this pollen could have also derived from contaminated grains, as *E. angustifolium* still blooms during cereal harvest, as well as grows in slash-and-burn fields.

The first known documentation of *E. angustifolium* food and tea use, which derives from the results of the Great Northern Expedition (1733-1743), was recorded among the indigenous peoples of Kamchatka (Ainu, Koryak, and Itelmen). For them, *E. angustifolium* (*alkûtâ* on Bolshaja [Bystraya] river, *alkūsit* on Kamchatka [river]; Steller, 1774) was a valuable vegetable, as its leaves were added to boiled fish or meat and used for making tea. When leaves started to wilt, stems were cut, split in half, and dried in the sun. The resulting inner pith of the stem was considered the most delicious and sweet food which they ate raw, and it was also used in different kinds of dishes. A fermented low-alcohol beverage (dried pith was boiled and fermented) which Russians called *suslo* was particularly valuable. Russian colonists tried to distil alcohol from *E. angustifolium*, but got only vinegar, which the natives did not use as it was too bitter for them (Krasheninnikov, 1755; Steller, 1774).

More than a century after Stepan Krasheninnikov and Georg Wilhelm Steller's expedition, *E. angustifolium* was still an important food in and around Kamchatka. *E. angustifolium* was a component of a traditional pudding-like dish called *tolkusha*, which was eaten by northern Yukaghirs (Argentov, 1862) and neighboring Itelmens (Sliunin, 1900). During the Jesup North Pacific Expedition (1897–1902), anthropologist Waldemar Jochelson noted how Koryaks in Kamchatka made *E. angustifolium* pudding at the beginning of the 20th century:

> Willow-herb, *Epilobium angustifolium*; *ME'nmet* [in Koryak] occupies the first place among edible herbs. The stems of willow-herb are dried in bunches in the sun or the hearth, and are chopped with stone hatchets ... Pieces of seal-blubber or reindeer-fat are dipped into the powder thus obtained, and are thus eaten. The flour is also made into a pudding by grinding the crushed herb with berries and melted 'seal-oil. In Kamchatka the pith is taken from the split stems, dried in the sun, and stored away for winter use. The fresh leaves of willow-herb are used instead of tea, when the latter is lacking (Jochelson, 1908, p.578).

The expedition members also noted that the pudding was used as an offering in a sacrifice ritual (a gift for the white whale). This dish was called pudding (*ĉi'lqaĉil*) and contained roots, stems, berries, and leaves of various wild plants crushed and mixed with seal oil and water (Jochelson, 1908). The same expedition to Kamchatka documented that the Chukchi made tea from *E. angustifolium* leaves when black tea was not available (Bogoras, 1904).

E. angustifolium was also an important wild food for the indigenous peoples of the Far East. For example, the Nivkh people used young leaves, shoots and peeled stalks of *E. angustifolium* (*tschola*) in fish and seal soups; it was eaten especially in the earlier springtime (Schrenck, 1891).

One of the missionaries to the Sámi territories, Swede Petrus Læstadius, described eating *E. angustifolium* (one of the few wild plants he mentioned) in 1828-1832 during a time of food shortage. The plant was boiled and then chopped to be added to bread (Laestadius, 1833). For the Sámi, reindeer milk used to be one of the most important types of food. It was not available in winter, so they preserved it in wooden vessels, in which one of ten different wild plants were added for preservation purposes, *E. angustifolium* among them (Drake, 1918; Itkonen, 1981). The vessels were buried in the ground and could stay there fermenting for several years. The plants, collected at the beginning of their growth, were boiled before being added to the milk vessel. The resulting fermented milk was referred to according to the plant used for fermentation, e.g. in case of *E. angustifolium* the name was *abrek-kombo* (Rautio, 2014). The traditional food of the Sámi also includes *gåmpa*, which consists of a fermented herbal mixture that includes *Angelica archangelica*, *Rumex acetosa*, and *Epilobium angustifolium* (Solberg, Breian, Ansebo, & Persson, 2013). There is no evidence of the eating of *E. angustifolium* or the drinking of *E. angustifolium* tea by Sámi on the Kola Peninsula in Russia (Luk'ianchenko, 1971).

In Western Norway, the records only refer to children eating young *E. angustifolium* shoots as a snack, among other plants, during mountain walks before the 1900s, whereas later archives no longer report such a practice (Danielsen, 2016). Based on a recent field expedition in the 2000s to the Arkhangelsk region, a dictionary by Getsova (2010) provides an example text under the lemma *elka/elochka* which describes *E. angustifolium* and its habitat in detail. It also relates a story about a grandma who was sending girls to collect young *E. angustifolium* as they were edible, without any further description of the preparation and consumption modes, yet specifying that raw stems were also good to eat.

Other records we were able to obtain are even more vague in terms of the origins of the information. Rollov (1908) provides interesting information on the use of young shoots as a condiment for fish soup in the Olonets Governorate (which now corresponds to the Republic of Karelia). Unfortunately, it is not possible to identify the source of this information. Geographically less precise records were available in the botanical dictionary by Nikolai Annenkov from the end of the 19th century. Tatars ate *E. angustifolium* leaves, yet it is not clear which region was referred to (Annenkov, 1878), as at that time Tatars lived across a very large area within the Russian Empire. This dictionary also contains a note that Tungusic peoples ate young leaves 'like cabbage', although the exact region was not specified (Annenkov, 1878); Tungusic peoples live across large areas of Siberia and the Far East. The term 'cabbage' can be attributed to the word 'Kraut' used in the description by Steller (1774), which can be translated from German both as 'cabbage', as in Annenkov's account (*kapusta*, Russian translation for 'cabbage'), and as 'herb' which was meant by Steller (cf. 'Ausser diesem ist ein in ganz Europa und Asien bekanntes Kraut, auf lateinisch, Chamaerium speciosum… Das Kraut davon kochet man mit Fisch oder Fleisch, und giebet ein gutes Gemüss, die grüenen Blätter kochet und trinket man wie Thee…' (Steller, 1774)).

Discovered historical records on the spontaneous recreational tea use of *E. angustifolium* outside Kamchatka date from the 20th century. In an ethnographic description at the beginning of the 20th century, Muslim Bashkirs in some low-income regions made surrogate tea from the flowers and leaves of *E. angustifolium* (Rudenko, 1925). In the middle of the 20th century, Buryats, for whom drinking tea was an important part of their Buddhist culture, still mixed *E. angustifolium* (*batagananaj hushuun*) leaves with green tea, praised its taste and emphasized the importance of collecting *E. angustifolium* before haymaking. The Buryat name for the flower might derive from the words "fly" and "muzzle" (Zhambalova, 2013). The reference to the local name makes this research stand out from all other recent ethnographic work in which

only the Russian names of *E. angustifolium* are mentioned even in cases when its use among ethnic minorities was recorded. There are later references that *E. angustifolium* leaves were used as a tea substitute in Manchuria, both on the Chinese side (Baranov, 1967) and the Russian one (by Evenks of Transbaikal region), but in the latter case only fresh leaves were used in summer (Vasilevich, 1969).

3.3. Early years of introduction: 18th - 19th century

A substantial portion of the suggestions to use *E. angustifolium* for food and as a recreational tea in Europe originates from Steller (1774) and Krasheninnikov (1755; his abridged book was published in German in 1766), who described the nature and the native peoples of Kamchatka. Those books laid the basis for later recommendations on the use of *E. angustifolium* in Germany and other countries where German was used as a literary language by the elite. Since the end of the 18th century, this rather specific information was reproduced in numerous books in various forms and contexts.

The first known reference to Kamchatka can be found in the works of Swedish botanist Carl von Linné, who suggested adding milled *E. angustifolium* roots to bread flour in his booklet on native plants that can be used in the absence of grain (Linnaeus, 1757).

As early as 1799, a book on tea substitutes mentioned that *E. angustifolium* was used in Kamchatka as a black tea substitute as well as in "Kurilischer Thee", which was described as what would now be considered a soup to which flour, butter, salt and other plants were added (Rumpf, 1799).

A *Swedish Flora* suggested in 1803 that *E. angustifolium* spring root-shoots (*rotskott*) are white, quite thick and should be cut from below the ground like asparagus. It can also be cooked like asparagus or added to "famine bread" (Palmstruch, 1803).

In another example, a direct reference to Krasheninnikov was made. Johann Christian Ludwig Wredow wrote in a *Flora of the Duchy of Mecklenburg-Schwerin* (1812) that in Kamchatka, the inner pith of the stem was a delicacy, root shoots (*Wurzelssprossen*, which were actually spring shoots) were cooked as vegetables or prepared like asparagus, leaves were used as vegetables, and leaves, stems and roots were used for making "Kurilischer Thee". Wredow also wrote that in Siberia, young leaves were put in a soup and roots could be dried and boiled into a sweet broth and brewed to make a beer-like drink, and also flour and starch could be made from the roots (Wredow, 1812). Many subsequent authors have reported similar suggestions for *E. angustifolium* in Floras but the regions in which it is used for food were no longer indicated (e.g. Hegi, 1926). We will discuss in the next section how the use of spring shoots was distorted because of widely copied incorrect translations in Russian language sources.

At about the same time, in the Baltic Governorates at the periphery of the German sphere of influence, *E. angustifolium* began to be described as suitable for food and tea in regional Floras written by Baltic Germans in the 19th century (e.g. Friebe, 1805; Wiedemann & Weber, 1852). Yet, those books were written in German and not translated into local languages.

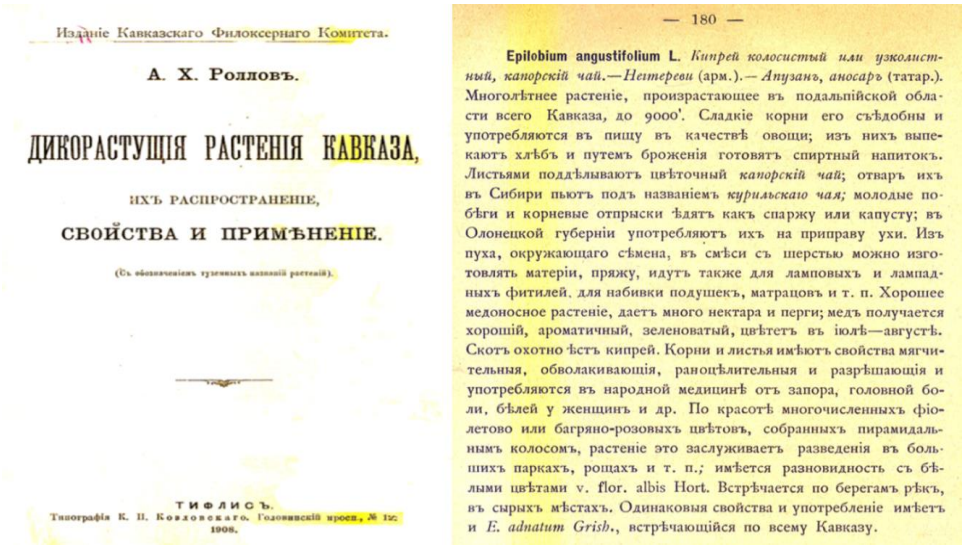
As early as the mid-19th century, Baltic Germans were also promoting the use of wild food plants, *E. angustifolium* among them, in journals published in the Russian Empire (Dietrich, 1864). At that time, the use of wild food plants in the Baltic Governorates was modest, while the consumption of wild species was widespread in Russia (Merkulova, 1967), and both England and France, where they were sold in markets (Dietrich, 1864). As early as 1858, *Gartenflora* magazine, dedicated to German-Russian-Swiss gardeners, stated that although English and French garden magazines recommended growing *E. angustifolium* as a food plant,

it was recognized that this plant had no prospect of becoming a vegetable in Russia and Germany (Regel, 1858). Saint Petersburg markets at that time were rich in exotic fruit and vegetables (such richness was marveled by Western European travel books; Plath, 2012), so the elite lacked the need to use wild food plants and peasants were not aware of this new knowledge.

3.4. Translation gone wrong: Promotion of *E. angustifolium* roots as a vegetable

Svanberg (2012) describes the phenomenon of *ghost data* (erroneous records repeated from book to book) on wild plant use that made its way into popular books and even folklore archives in Sweden after WWII. *E. angustifolium* offers an extreme example of a simple translation error that has been propagated for several centuries. It may have an even earlier origin, but we could only trace it to the beginning of the 19th century, when the Saint Petersburg Flora (in Russian) suggested eating white *E. angustifolium* roots, and not spring shoots (*Wurzelsprossen*, as above), with oil, vinegar and salt (Sobolevskii, 1801). This translation error influenced 19th century Russian botanical literature, which reproduced this information, and it persisted until the 21st century. A Flora of the USSR, first published in 1949, continued to state: "Roots are edible and are used as a sweet-tasting vegetable. The sweet roots are processed by fermentation into a special kind of beverage. The roots can also be used for preparing flour suitable for biscuits and, when added to dough, give a sweetish taste to the bread" (Shishkin & Bobrov, 1974). Many subsequent Soviet and Russian authors have repeated this in their popular books for a wide audience (for example: Iurkevich & Mishenin, 1975; Korsun, Viktorov, Korsun, & Dan'shin, 2013; Koshcheev, 1981; Litvintsev & Koshcheev, 1988; Maksimova, 2001; Veretennikova, 1973). This mistake even entered the local editions of *Flora of the USSR*, cf. e.g. entries for *E. angustifolium* in the Estonian (Eichwald et al, 1959), Belarusian (Dorozhkin & Tomin, 1950), and Lithuanian (Natkevičaitė-Ivanauskienė, 1971) editions.

Many 20th century books suggesting the use of *E. angustifolium* roots (including those published during WWII) referred to cooking roots as a tradition of the Caucasus. Indeed, in 1908, Adolf Rollov, director of the Botanical Garden of Tbilisi, provides thorough instructions on eating roots in a book about wild plants of the Caucasus, published in Tbilisi in Russian (Rollov, 1908). Several Russian authors have pointed out that "the sweet root is cooked in the Caucasus like a vegetable" (e.g. Verzilin, 1946; Keller 1941, who refers to Znamenskii, 1932, who in turn referred to Rollov, 1908; see also Reva, 1981). One of the authors, Bernatskii, tested the roots and noted that even though the root of *E. angustifolium* might be boiled like a vegetable in the Caucasus, "the root of our *horma* is not suitable for that and has an unpleasant taste" (Bernatskii, 1923). Yet, it is more likely that the information on eating *E. angustifolium* roots in the Caucasus has become "ghost data" (an erroneous recommendation originating from Rollov's book (1908). Rollov says in the introduction that the people of the Caucasus know many useful plants but surely not all, and therefore he not only relied on his own expeditions and those of his collaborators but also listed a wide variety of publications of Russian and foreign origin at the end of the book. He also repeatedly referred to locals (*tuzemtsy*) in his book, but not in the chapter on *E. angustifolium* (Fig 2), which contained a combination of elements encountered in earlier works (e.g. Linnaeus, 1757; Wredow, 1812).



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А. Х. Ролловъ.

ДИКОРАСТУЩІЯ РАСТЕНІЯ КАВКАЗА,

ИХЪ РАСПРОСТРАНЕНІЕ,

СВОЙСТВА И ПРИМѢНЕНІЕ.

(Съ обозначеніемъ грузинскихъ названій растеній).

ТИФЛИСЪ.
Типографія К. П. Ковалевскаго. Головинскій просп., № 132.
1908.

— 180 —

Epilobium angustifolium L. *Кипрей колосистый или узколистный, канорскій чай.—Нетереви* (арм.).— *Апузанъ, аносаръ* (татар.). Многолѣтнее растеніе, произрастающее въ подальпійской области всего Кавказа, до 9000'. Сладкіе корни его съѣдобны и употребляются въ пищу въ качествѣ овощи; изъ нихъ выпекаютъ хлѣбъ и путемъ броженія готовятъ спиртный напитокъ. Листьями поддѣлываютъ цвѣточный *канорскій чай*; отваръ ихъ въ Сибири пьютъ подъ названіемъ *курильскаю чая;* молодые побѣги и корневые отпрыски ѣдятъ какъ спаржу или капусту; въ Олонецкой губерніи употребляютъ ихъ на приправу ухи. Изъ пуха, окружающаго сѣмена, въ смѣси съ шерстью можно изготовлять матеріи, пряжу, идутъ также для ламповыхъ и лампадныхъ фитилей. для набивки подушекъ, матрацовъ и т. п. Хорошее медоносное растеніе, даетъ много нектара и перги; медъ получается хорошій, ароматичный, зеленоватый, цвѣтетъ въ іюлѣ—августѣ. Скотъ охотно ѣстъ кипрей. Корни и листья имѣютъ свойства мягчительныя, обволакивающія, раноцѣлительныя и разрѣшающія и употребляются въ народной медицинѣ отъ запора, головной боли, бѣлей у женщинъ и др. По красотѣ многочисленныхъ фіолетово или багряно-розовыхъ цвѣтовъ, собранныхъ пирамидальнымъ колосомъ, растеніе это заслуживаетъ разведенія въ большихъ паркахъ, рощахъ и т. п.; имѣется разновидность съ бѣлыми цвѣтами v. flor. albis Hort. Встрѣчается по берегамъ рѣкъ, въ сырыхъ мѣстахъ. Одинаковыя свойства и употребленіе имѣетъ и *E. adnatum Grish.*, встрѣчающійся по всему Кавказу.

Fig 2. Chapter on *E. angustifolium* in a book about wild plants of the Caucasus by Rollov (1908).

3.5. Traces of promotion in ethnographic sources

The latest record from Sweden on eating *E. angustifolium* derives from pre-industrial times in the 19th century, when it was eaten in times of famine (Svanberg, 2012). In his book, *Ville vekster*, Olav Skard mentions that suggestions to use *E. angustifolium* young shoots and roots as an additive to bread flour during times of famine were published in Norway in 1774 (Skard, 2003). A similar use was also recorded in Sweden in 1757 (Svanberg, 2011) and still mentioned in an ethnobotanical compendium of Denmark in the second half of the 20th century (Brøndegaard, 1979). The edible plant encyclopedia also says about Norway: "flour is obtained from the roots which are baked into flat cakes" (Lim, 2012). It is, however, quite likely that the original literary teachings of Swedish botanist Carl von Linné (1757) on the use of roots for food might have been transferred into practice or have been considered by later authors as a traditional use. As is written in the classic popular guide *Food for Free* by Richard Mabey first published in 1972 (Mabey, 2012): "The young shoots have been eaten like asparagus in parts of America and northern Europe, though they are very bitter." Based on our data, we can say with confidence that historically *E. angustifolium* has not been eaten in Northern Europe like asparagus, but instead it has been fermented in reindeer milk or added to flour during times of starvation.

We can also find references to the use of *E. angustifolium* root flour in ethnographic sources. An analysis of ethnographic reports of the famine of 1877–1879 in the Transbaikal region (near the Unda River) published at the end of the Soviet period (Lebedeva, 1988) describes adding milled *E. angustifolium* roots to rye bread which makes the bread sweet (the wording reminds us of the *Flora of the USSR*, see the citation of (Shishkin & Bobrov, 1974) above). The author claimed to have collected the data during several years of fieldwork in this region. However, after analyzing the historical records on *E. angustifolium*, it is quite plausible that it is the author's summary of the knowledge and recommendations on the uses of *E. angustifolium*, which started with Koshcheev (1981). Moreover, Lebedeva (1988) could have imported into the Transbaikal region (close to present day Mongolia) such names of *E. angustifolium* as *mel'nichnik* (from *melnitsa* - 'windmill' in Russian) and *khlebitsa* (from *khleb* - 'bread' in Russian), which were known, according to Annenkov (1878), in regions adjacent to modern day Saint Petersburg (ca. four thousand kilometers away; both authors refer to the end of the 19th century). In addition, in the record by Lebedeva (1988), the name *petushkovy iabloki*

appears, which had previously been recorded in the Kostroma region (Annenkov, 1878) a few hundred kilometers to the west of Moscow. We did not find any evidence from other sources that *E. angustifolium* roots were added to bread, apart from von Linné's suggestion (Linnaeus, 1757). The recommendation to store the flour for a month in order to remove the bitterness (Virnes, 1941) seriously questions the "sweet taste" of the bread made in times of need.

More recent sources introduce new misinterpretations related to the use of *E. angustifolium* as recreational tea, claiming that it originates from a Finno-Ugric tradition. In 2004, an expedition by Estonian researchers conducted in the Votic area recorded how a new identity of Votes was being created, in part, with the help of food. Namely, the cultural elite actively promoted and presented the leaves of fermented *E. angustifolium* tea as an ancient Votic tradition based on the Russian plant name *koporskii chai*, which allegedly comes from the village of Koporye in the middle of the Votic area (Västrik & Võsu, 2010). Yet Subbotin (1892) claimed that the tea was not made in the Koporye village itself but in the vicinity. Therefore, we can say that more recent research most likely encountered mainly neoteric knowledge presented as tradition. An ethnographic report based on data from 1979 to 2017 described a detailed technology of *E. angustifolium* tea fermentation and a glorious history of tea production in the Koporye village, which was presented as field results (Kon'kova, 2017).

At the same time, Russian botanists Lebedeva and Tkachenko (2016a), who conducted fieldwork from 1996 to 2012 in the North-West of the Russian Federation among the Finno-Ugric people (Setos, Ingrians, Votes, Vepsians, Karelians), found that only Vepsians were actually using *E. angustifolium* leaves in some way, which was not specified. Vepsians live close to Lake Onega in the Karelian Republic and Votes near the Gulf of Finland, and the two groups have no direct contact. Therefore, we can say that Kon'kova probably either recorded neoteric knowledge presented as authentic or did not distinguish literary data from a local tradition. Anton Bernatskii, an advocate of wild food plant use, reported that in the beginning of the 20th century local people around Petrozavodsk had no interest in the use of *E. angustifolium*, which was growing there in great quantities. Only after he taught them to use it in 1912, did some people start to make tea from *E. angustifolium* (Bernatskii, 1923).

Other Finno-Ugric ethnic groups in the Russian Federation have also begun to embrace *E. angustifolium* tea as a part of their ethnic identity. A recent Udmurt national cookbook (Singurt, 2014) and several food culture websites highlight non-fermented *E. angustifolium* leaves and flowers as an important herbal tea for Udmurt culture. We consulted all important 19th century sources, to which this book and other (e.g. Pimenov, 1993) contemporary ethnographic books refer, for mention of *E. angustifolium* tea, but were not able to confirm even the fact that Udmurts made any kind of herbal tea before the 20th century. Also, earlier books on Udmurt cuisine do not contain any mention of *E. angustifolium* (see, for example, Sokovnin, 1975). Some authors go even further suggesting that Udmurts added *Mentha* sp. and *Origanum vulgare* aerial parts to *E. angustifolium* leaves during fermentation in order to improve the taste of *E. angustifolium* tea (Litvintsev & Koshcheev, 1988). In our opinion, this last case is a clear misinterpretation of historical sources. Only one source from the end of the 20th century stated that strong tea water (which is later diluted) can be made from *E. angustifolium* leaves and that poor people, who could not afford black tea, did so in the past (1968, 1979, 1980 fieldwork results presented by Trofimova, (1983)).

Use of roots as vegetables has also now entered people's narratives. Upon seeing a researcher's interest in *E. angustifolium*, a middle-aged woman (b. 1966) interviewed in the Republic of Karelia recounted: "I was told that *Ivan-chai* [*E. angustifolium*] could be made… grandma told, that it was possible to make everything of *Ivan-chai*. To cook soup, to boil the roots like potatoes, and to infuse tea. Grandma was Karelian. If you are very hungry – you may wash it

in a creek and chew it". As our interviewees did not witness such *E. angustifolium* uses themselves, we cannot consider them properly documented and thus we did not include them in our research results. Later this interviewee added that her grandmother was fascinated by popular literature which listed new recipes and plant uses. That "it was possible to make everything of *Ivan-chai*" likely tells us not about an actual use but about the possibility of use that was learned from such literature.

Descriptions of the use of roots can also be found in recent ethnographic publications. For example, a recently published recipe in an ethnographic review of Vytegorskii (near Lake Onega) food culture covering the years 1978-2010, presented by a woman born in 1922, describes baking *E. angustifolium* roots in ashes like potatoes (Mitroshkina, 2015).

From the perspective of literary influence, the description of the use of roasted *E. angustifolium* roots for making a coffee surrogate, along with roots of *Taraxacum officinale* and *Arctium sp.*, is also quite interesting (Mitroshkina, 2015). It is very likely that this is a result of a recent adaptation of literary teachings, starting with the book by Koshcheev, who suggested *E. angustifolium* as a coffee substitute along with all three plants listed above as well as a few others (Koshcheev, 1981). While the coffee culture in the Russian Federation is a growing trend, twenty-five years ago the consumption of coffee was less than 20 liters per capita per year in the whole territory, while tea consumption was between 80 and 99 liters per capita (Grigg, 2002). Therefore, making a coffee substitute may be an attempt to try the suggestions presented in recent publications (for example, Gorbunova, 1995; Koshcheev, 1981) rather than an old use.

3.6. Moments of success

3.6.1. Estonia: long history of promotion a temporary success

The first suggestions written in Estonian to make *E. angustifolium* tea were published at the end of the 19th century in a newspaper (Spuhl-Rotalia, 1891), while its food uses were introduced only after World War II in translations of Russian-language books (e.g. Verzilin, 1949). During the Soviet period, a few articles with *E. angustifolium* food and recreational tea recommendations were published in Estonian, for example in a Year-book of the Estonian Naturalists' Society (Põntson, 1980) and a pocket guide to hiking (Rääk & Treial, 1970), although the latter had no effect on *E. angustifolium* uses (Sõukand & Kalle, 2016). The mass migration of Soviet workers to the Baltic countries after WWII brought a wide variety of journals in Russian to the Baltic region. For example, the annual *Man and forest* (*Les i chelovek*) published an article in which tea (six recipes of *koporskij chaj* fermentation) and food (nine recipes of salads, soups, baked roots, marinated leaves and stems) uses of *E. angustifolium* were enthusiastically described (Koshcheev, 1989).

After Estonian independence in 1991, books translated from Finnish began to appear (e.g. Rautavaara, 1998). However, interest in the use of *E. angustifolium* arose only at the beginning of the 21st century. *E. angustifolium* tea, salad (Łuczaj et al., 2012) and snacks (Kalle & Sõukand, 2013) have been reported since then, yet the number of actual use reports have remained few. While the use of *E. angustifolium* as snacks arose on an ad-hoc basis, its use in salads originated from Maria Treben's book, which has been a bestseller since the early 1990s (starting from Treben, 1991) and was translated and printed massively as *samizdat* (lit. 'self-publishing') on mechanical typewriters, bypassing a publishing house, from the early 1980s.

The earliest teachings did not have any chance of success as there was no mediation between the literature and the potential users due to linguistic barriers (for example, German publications in Estonia) as neither food nor recreational tea is a domain that has a mediator (as

is the case for medicinal plants that are conventionally mediated by a community of experts such as pharmacists and doctors). The reason for little interest in *E. angustifolium* food uses in the Baltic region after this information was published in Estonian may have been related to the short seasonal availability of its shoots and the fact that the time of collection of young shoots coincided with the abundance of synanthrophic garden weeds, which are easier to collect than *E. angustifolium* growing in the forest. On the other hand, the absence of proper preservation techniques in earlier sources and the use of concepts unknown to Estonians limited the attractiveness of the teachings. For example, if there had been a suggestion to lactoferment young leaves like cabbage, it could have been more understandable and acceptable, as such a practice was widespread for cabbage. The absence of any food uses among our field interviews in Estonia indicates that the few records reported earlier (Łuczaj et al., 2012) were temporary and did not enter into wider use. A relatively frequent occurrence of *E. angustifolium* recreational tea in Estonian field studies is directly related to its popularity as a medicinal plant (see Sõukand et al., 2020) and the influence of Russian sources from over the border, translated into Estonian by local bloggers and media.

3.6.2. *E. angustifolium* as a recreational tea in Russia: from being banned (19th century) to a substitute (20th century)

In the 17th century, when the Russian Empire colonized regions around Baikal (modern Buryatia) and in the Far East (Manchuria), the drinking of brick tea made from the fermented leaves of *Camellia sinensis* (L.) O. Kuntze was an everyday practice there (Subbotin, 1892). In the 18th century, Buryats "drank black tea so much, that the teapot almost never left the fire", while Kalmyks "enjoyed the tea with salt and milk" and Tungus "sometimes added acidic milk" to the tea (Rumpf, 1799). Some historians think that due to the influence of Mongolian tea culture, the use of *E. angustifolium* leaves as a tea substitute among Buryats had been known long before the import of Chinese tea, which started in the Russian Empire through the Kyakhta border pass in 1725 (Sadovskii & Sokolov, 2017). Yet in the European part of the Russian Empire, drinking tea became a part of popular culture only during the first half of the 19th century, before which it was an exotic drink of the elite or only used as a medicine (Sokolov, 2013). However, as early as the beginning of the 19th century, *E. angustifolium* was used as an illegal substitute for Chinese tea. Hence, the collection of *E. angustifolium* was prohibited in the entire Russian Empire starting in 1816, and this ban was active until the end of the 19th century (Sadovskii & Sokolov, 2017). Nevertheless, fake tea made with *E. angustifolium* leaves was also exported from Russia to Europe, but most of it was sold domestically. The biggest court hearing on the fraudulent substitution of Chinese tea with *E. angustifolium* took place in 1888 (Subbotin, 1892). There are records that peasants in the Arkhangelsk province were drinking very low quality and badly smelling *E. angustifolium* tea in the 1870s (Efimenko, 1877).

At the beginning of the 20th century, when an intensive search for tea substitutes started in Russia, *E. angustifolium* was proposed as one of many alternatives recommended by numerous popular publications (e.g. Nadson, 1918; Vasil'ev, 1930). It was also sold in shops under the name *Sovetskii chai* [Russian: 'Soviet tea'] (Bernatskii, 1923); however, until WWII there were few recommendations for its use.

Three people seem to have had a major influence on the use of *E. angustifolium* as a recreational tea in the 20th century in Russia. One of them was a forester in the Perm province, Anton Bernatskii, who claimed that his recommendations had prompted people to use *E. angustifolium* (Bernatskii, 1923). Another was Professor of Botany Ivan Palibin, who during the Siege of Leningrad promoted tea making through the fermentation of *E. angustifolium*, and

this practice continued for a short time afterwards (Palibin, 1942, 1944). The one whose influence initiated the current popularity of *E. angustifolium* is Professor of Food Hygiene Arkadii Koshcheev, who developed several recipes with fermented *E. angustifolium* (Koshcheev, 1989; Litvintsev & Koshcheev, 1988).

Our research findings reveal the results of earlier promotions of *E. angustifolium* tea, as some people claimed to have used *E. angustifolium* for tea in the past or it was used by their older relatives. Yet, it is difficult to say which promotion campaign specifically left the observed traces. They could also be the result of an accumulation of several teachings. Our fieldwork showed that the current high level of popularity can be attributed only to the 21st century, with the influence of the Internet and the spread of videos showing the correct method of fermentation.

3.6.3 *E. angustifolium* in Finland: supported by the healthy local food campaign of "The Nordic Cuisine"

The "Nordic Cuisine" movement, which popularizes traditional wild food in modern cuisine as healthy and local, started in Denmark in 2004 and is today common in all Nordic and Baltic countries. It has set itself the goal of promoting Nordic identity by endorsing foraging and the use of wild food in today's modern kitchen (Larsen & Österlund-Pötzsch, 2013). It has influenced *E. angustifolium* use. For example, the restaurant 'Noma', which opened in Denmark in the 2000s, started offering local wild food dishes, setting a new direction for gastronomic tourism in Northern Europe (Mabey, 2012). Similarly, tourist enterprises in Lapland have developed a local product of *E. angustifolium*, Rosebay Herb Juice – Essence of Lapland ("Rosebay willow herb juice – Essense of Lapland," n.d.), and in Norway, *E. angustifolium* use is taught during food courses (Vange, 2008). Top chefs in Denmark now make lemonade from the flowers of *E. angustifolium* and tea from its fermented leaves (Danielsen, 2016). Also, scientists in Finland have tested different fermentation methods for *E. angustifolium* stems during the initial flowering stage (Galambosi et al., 2016).

The wave of popularization of wild plants as food in Nordic countries that began during World War II included just a few recommended uses of *E. angustifolium*. For example, Finns were advised in a war brochure: "Its young leaves can be used in salads and are very tasty. Root-shoots [*juuriversoja*] can also be used like asparagus. The dried rhizomes of the plant can be ground with flour." However, the flour "must stand at least one month before use so as to lose its bitter taste" (Virnes, 1941). In Denmark, *E. angustifolium* was suggested to be used in a soup by a newspaper article (Danielsen, 2016), and a Norwegian book suggested *E. angustifolium* as a tea substitute (Holmboe, 1941). Books published during the war on the use of plants became bestsellers, and the custom of collecting wild food plants continued after the war, but no longer so extensively (Hjeltnes, 2018).

A relatively large number of people (over 10%) mentioned eating *E. angustifolium* in Finnish North Karelia, and the use of *E. angustifolium* in Nordic cuisine may contain historical roots. *E. angustifolium* has been a part of Sámi food culture throughout its history, and it is now considered to be one of their ten most important wild food plants (Qvarnström, 2006). There is no evidence of Finns eating *E. angustifolium* in the past (Vanhanen & Pesonen, 2016), although a Finnish Flora from the mid-19th century indicated that *E. angustifolium* spring root-shoots (*juurivesat*) are edible (Lönnrot, 1860). The greatest impact on today's Finnish wild plant use was made by Professor of Agriculture Toivo Rautavaara who, starting in 1943, recommended eating *E. angustifolium* like asparagus, leaves for salad, roots for making flour for bread and stews, and as a coffee substitute (Rautavaara, 1943). Unlike many other recommending authorities listed in the present article, Rautavaara verified each use by his own experience, so

for instance he claimed that five kilograms of roots can be harvested in one hour and proposed boiling spring shoots in brine. In the following reprinting (Rautavaara, 1976), he also uses sources published in the Soviet Union. He adds the fact that young shoots and leaves contained high amounts of vitamin C and that Russians made tea from fermented *E. angustifolium* leaves. Compare how *E. angustifolium* was represented in illustrations showing the relevant parts of the plant for identification and harvesting: in Koshcheev (1981) only inflorescences are shown, and in Rautavaara (1986) there is the full plant with roots and shoots (Fig 3). Rautavaara further said in his book that the inhabitants of Kaprio parish had a profitable business which involved burning down forests, growing *E. angustifolium* and selling *E. angustifolium* tea to Russian merchants. He also added a personal comment saying that some authors considered *E. angustifolium* tea to be the best substitute for Chinese tea, yet in his own opinion the tea does not have a good taste and it is only suitable when mixed with aromatic plants. Stressing its high vitamin content, Rautavaara ascribed to *E. angustifolium* properties perceived as healthy, which is now heavily promoted in Finnish society, as repeatedly mentioned by our Finnish interviewees.

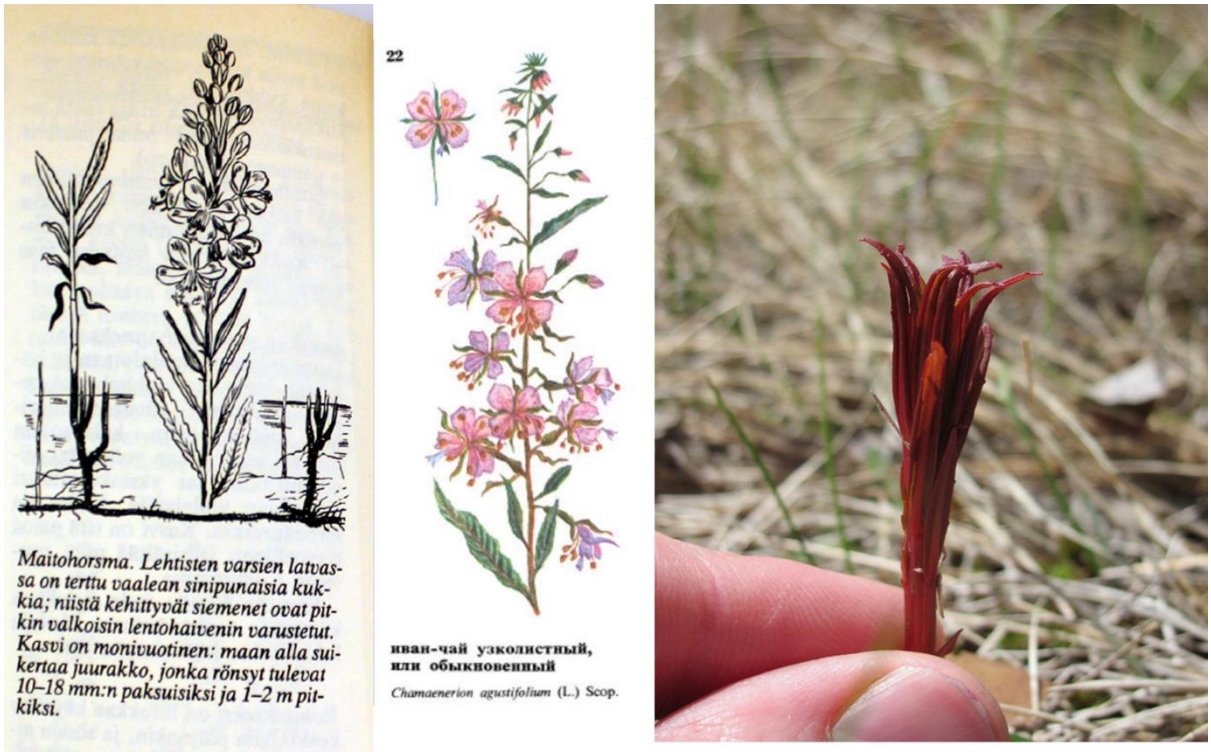

Fig 3. Left: *E. angustifolium* as illustrated in (Rautavaara, 1986); Center: *E. angustifolium* as illustrated in (Koshcheev, 1981); Right: young shoot of *E. angustifolium*, photo courtesy of Kevin Jernigan.

Despite an original local name referring to a food (tea), an intense popularization in books, and its perceived healthiness, our field data did not reveal a consistent regular practice of *E. angustifolium* food use in Finland. One of the reasons for this could be the way in which the recommendations in the books and other written materials are composed. Most plant descriptions start with the height of the plant and the color of its flowers, as the flowering top of *E. angustifolium* is the most characteristic sign of the plant (cf. Sõukand & Kalle, 2010). During an interview in Finnish Karelia, we filmed (with the person's written permission) a field walk where the respondent was searching for *E. angustifolium*, among other plants. *E. angustifolium* was growing everywhere, but it took the person more than five minutes and hints from us to find a non-flowering plant and identify it. Indeed, this interviewee collects *E. angustifolium* only later in the summer, when it flourishes, and uses only flowers for making

tea. Conversely, her sister, who has fermented *E. angustifolium* leaves for tea for some years, was able to find a young plant in her garden very quickly. *E. angustifolium* shoots are edible rather early in the spring when the flowers are not yet developed, and so recommendations, in order to have a chance to be implemented, should be designed to make the plant recognizable during this time of use.

3.6.4. Introduction in times of hardship: 20th century famine food

Biographies discuss the food use of *E. angustifolium* in more obscure contexts hardly touched on by ethnographic sources. For example, traces of *E. angustifolium* use can be found during the Great Famine of 1932-33 (that has affected most of the USSR and known in Ukraine as Holodomor) in an autobiographical story by Vasilii Grossman (1905-1964). Grossman is considered the first non-Ukrainian writer who discussed, despite the suppression of his work in the USSR, the horror of the famine (Holodomor) induced by Soviet authorities on the peasantry in the 1930s. He names *E. angustifolium* as one of many plants eaten during the famine (Przebinda, 2010). However, *E. angustifolium* was little, if at all, promoted in Ukraine, although it was eaten during Holodomor and analyzed according to archival sources in a dissertation on Holodomor history (Stasiuk, 2010).

More biographical examples are related to Soviet detention camps. A repressed Russian dissident, Alexander Solzhenitsyn (1918-2008), reported someone else's experience of eating *E. angustifolium* as the "best dish", along with lichen and wild chamomile, in Gulag prison camps (Solzhenitsyn, 1974). A Gulag prisoner of Norwegian origin, Osvald Harjo (1910-1993), also gave a comprehensive overview of the situation in a Gulag prison in his own memoirs:

> "The only green thing [vegetables] we got was the eternal rosebay willowherb, *ivansjaj* [*E. angustifolium* in Russian]. Rosebay willowherb's soup we ate all the way up to 1948. It was so ferrous that the spoon, teeth and even tongue became completely black. Also civilian Russians ate *ivansjaj*. Once I saw a picture in "Pravda" that showed Stalin where he sat and ate rosebay willowherb soup. The text stated that when the brilliant leader Stalin could eat *ivansjaj*, all Russians had to follow his example. There was nothing on what Stalin's menu was otherwise composed of" (Harjo, 1956, p.80).

Historical research referring to the recently declassified State Archive of the Russian Federation revealed the following:

> "The Northern Railway camp's scientific research laboratory widely distributed leaflets, flyers, and bulletins with information and instructions concerning various health matters, such as the nutritional value and the therapeutic uses of vitamins C and B, wild plants and berries, turnips, and willow herb…" (Alexopoulos, 2016).

Therefore, it is very likely that the use of *E. angustifolium* for food in Gulags was, even if not authoritatively imposed, at least based on suggestions coming from leaflets.

Rim Akhmedov (1933-2017), a writer and later an advocate of wild plant use, wrote about his deportee experiences in the Far East in his biography. He recalled how Nanai, a Tungusic ethnic group which lives along the lower reaches of the Amur River, ate *E. angustifolium* as a snack and made food with it. Deported workers, who lived in closed camps in those areas, suffered extreme hunger, and Akhmedov recalled how Nanai children taught him to distinguish between edible and toxic plants. Without this skill, many of the camp's children ate poisonous species and died. Akhmedov himself believed that he survived because he ate the inner pith of *E. angustifolium* stems in summer (Akhmedov, 2011). He later also promoted *E. angustifolium* as a medicinal plant (Akhmedov, 1999).

The promotion of *E. angustifolium* as food intensified during WWII. In both Leningrad and Moscow, making salads and soups with young *E. angustifolium* shoots and leaves was taught, as well as boiling roots and making bread flour from the roots; preservation for winter in marinades was also suggested (see, for example, Keller, 1941; Nikitin & Pankova, 1944; Pankova & Nikitin, 1943; Tarchevskii, 1942; Tikhomirov, 1942). We were not able to find any records on the actual use of such teachings. Recently published memories of the survivors of the Siege of Leningrad mention that "we did not know we could use for food … rosebay willowherb, etc." (Mazurina, 2009).

Promotion of the virtues of *E. angustifolium* may have also helped people to survive the more recent Bosnian War (1992-1995). During the Siege of Sarajevo, people ate wild plants due to famine. According to Redžić and Ferrier (2014), *E. angustifolium* was one of the four most important food plants, its young shoots were boiled as vegetables and the meaty stalks, leaves, and underground parts were preserved in natural diluted vinegar. While *E. angustifolium* has been found safe to eat, its nutritional value is actually very low compared to other plants. Redžić and Ferrier (2014) concluded that "this indicates that traditional food habits and beliefs were often more important than the actual nutritional value", thus categorizing *E. angustifolium* as a traditional food plant. While we could not find any references to *E. angustifolium* being culturally important in the region, there seems to be a link between this use and suggestions to marinate *E. angustifolium* published in 1943 in Russia (Pankova & Nikitin, 1943). There is also a good likelihood that the great popularity of *E. angustifolium* in post-Soviet space is of military origin, considering that between 1962 and 1986 the SFR Yugoslavian army carried out a military survival camp project (see a detailed description of its parts by Jug-Dujakovic & Łuczaj, 2016), which combined scientific study with practical military experience. While we do not have access to the publications derived from that project, the quantity of vitamin C in the leaves reported in the Soviet Union during WWII (Palibin, 1944) is identical to that provided by Redžić and Ferrier (2014), who referred to a book produced by the military (98 mg for 100 g of leaves in both Palibin (1944) and Redžić and Ferrier (2014)).

4. Conclusion

Attempts to introduce *E. angustifolium* as a wild food plant repeatedly appeared in the botanical and later ethnographic and popular literature. Until recently, the authors of such literature did not clearly differentiate between the documentation of local uses and recommendations from expert botanists, thus calling into question the legitimacy of such uses. These attempts did not leave significant traces in practice, though. Given the linguistic and conceptual barriers, information on the edibility of *E. angustifolium* or its usability for making recreational tea had little chance of entering into popular usage: e.g., teachings in German in the Russian Empire, use of the term *asparagus* which was not understandable to local lay populations, culturally uncommon ways of preparing food, an absence of specific recipes and technological details, etc.

In contrast to domains such as medicine where an educated mediator plays a key role in the popularization of expert knowledge, in the field of wild plant food there were no mediators between literature about edible plants and its readers. For this reason, the information published in foreign languages and not adapted to local culinary customs did not reach the target audience. Later on, in cases when the information had already been introduced in the native language and a mediator seemed not to be needed, the information was sometimes partially misleading or did not fit into the cultural context.

The few actual current food uses, which we recorded mainly in Finland, seemed to be in line with current attempts to incorporate *E. angustifolium* into the diet and coincident with a general

trend of the Nordic Food movement which promotes re-discovering local food uses and the consumption of healthy wild food. Yet, also in line with this trend, acquisition of this knowledge is not easy due to different ecocultural perceptions of the promoters and potential users.

The promotion of *E. angustifolium* as a recreational tea has been more successful, given that among the people we interviewed in Russia over 25% use *E. angustifolium* for recreational tea now or have used it in the past. The majority of the recorded tea uses, however, were of recent origin, following a trend which has only recently boomed in the Russian Federation and which owes its success in great part to online sources.

Targeted promotion during the times of hardship was more effective, not only because of the obvious need, but because of the existence of mediators (for example, Gulag authorities or army instructors). However, the results of such promotions neither lasted beyond the hardship times, nor entered everyday use.

The uses which actually entered into practice were, therefore, not related to a long-lasting promotion but to recent short-term promotions that happened at a time when people were more ready to accept new uses. Future in-depth qualitative and quantitative research is needed in order to better explore the possibilities of online media in the promotion of ecologically and culturally sustainable teachings in practical and long-lasting ways, without diminishing the importance of printed sources, as well as radio and TV broadcasts, as reservoirs of knowledge.

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Authors' contributions

RK and RS designed the study; RK and OB drafted the initial manuscript; VK, OB, NK, RK, RS, JP, PS, NS, BP, AS, and IM carried out the field research; RK conducted a large part of the historical research; JP, OB, NK, VK, RS, GM and AS contributed selected references to the historical research and provided their translation or interpretation; RK and RS drafted the final manuscript; NK and OB made substantial comments on the final manuscript. RS, OB and RK handled the post-review corrections. All authors read and approved the final manuscript.

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