



An ethnobotany of Kakheti and Kvemo Kartli, Sakartvelo (Republic of Georgia), Caucasus

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Research

Abstract

Background: Kakheti and Kvemo Kartli are historical provinces of Georgia located on the south-facing macro-slope of the eastern part of the Greater Caucasus (Kakheti) and east of the Lesser Caucasus (Kvemo Kartli). In this study we documented traditional plant use in Kakheti and Kvemo Kartli.

Methods: Fieldwork was conducted in August–November 2018. Interviews using semi-structured questionnaires were conducted with 40 participants (26 women and 14 men), with oral prior informed consent.

Results: We encountered 215 plant species belonging to 157 genera of 114 vascular plant families, and 3 fungal species and 5 undetermined fungi of at least 5 genera, belonging to at least 3 fungal families being used in the research region. Of these 114 vascular species were exclusively wild collected, 88 were grown in homegardens, and 18 were both grown in gardens and collected in the wild. Plants and their uses mostly overlapped among the areas within the region, with a slightly wider divergence in uses than in plants. The environmental fit analysis showed that a large degree of this variation was explained by differences among participant communities. The elevation of the participant community significantly fit the ordination in plant-space and explained a large degree of the variation in plant species reported but not in use-space. Gender was not significant in plant-space but was important in use space.

Conclusions: The lack of forest plant use, and both forest and garden plant-use knowledge in Kakheti

and Kvemo-Kartli might be traced to the fact that both regions are close to large markets in the region, which make it less necessary to grow or forage many species. In addition, Kakheti is easily one of the most fertile regions in Georgia, with a very short winter and there is essentially no need for foraging wild species e.g. for Phkhali. Lagodekhi, with its almost subtropical climate, is an extreme example of that, with almost no recorded forest plant use.

Key words: Caucasus, ethnobotany, plant use, traditional knowledge, post-soviet development

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Background

Georgia harbors a tremendous diversity of crops and crop wild relatives, and plant use for medicine and other purposes is very common (Akhalkatsi et al. 2018a,b), and can often be traced back millennia (McGovern et al. 2018). Plant use is indeed widely shared among different ethnic and religious communities (Kordzakhia and Javakhishvili 1971, Söderlind 2015). In this study we focused on the

regions Kakheti and Kvemo-Kartli (Fig. 1). The vegetation of the region includes montane forest, subalpine, alpine, subnival and nival zones and corresponds to the East Caucasian, i.e. Iberian, type of the vegetation vertical zonation (Gagnidze and Davidadze 2000; Zazanashvili et al. 1999). Most inhabitants speak Georgian, although small groups speak Azeri, Lak, Ude, Ossetian and Chechen (Beridze et al. 2003).



Fig. 1. Study area.

Kakheti (კახეთი) was formed as administrative region in 1991 after independence from the USSR, in eastern Georgia from the historical province of Kakheti and the small, mountainous province of Tusheti. In this paper we focus only on the traditional Kakheti region. Kakheti has a strong linguistic and cultural identity, since its ethnographic subgroup of Kakhetians speak the Kakhetian dialect of Georgian.

Traditionally, Kakheti has been subdivided into four areas: *Shida Kakheti* (შიდა კახეთი, *Shida Kakheti*) to the east of Tsiv-Gombori mountain range, along the right bank of the Alazani River; *Gare Kakheti* (გარე კახეთი, *Gare Kakheti*) along the middle Iori River basin; *Kiziq'i* (ქიზიყი) between the Alazani

and the Iori; *Gaghma Mkhari* (გაღმა მხარი, *Gaghma Mkhari*) on the left bank of the Alazani.

The Kingdom of Kakheti-Hereti was an early Medieval monarchy in eastern Georgia, centered at the province of Kakheti, with its capital first at Telavi. It emerged in c. 1014 AD, under the leadership of Kvirike III the Great. At the beginning of the twelfth century did Georgian King David the Builder (c.1089–1125) incorporate Kakheti permanently into the Greater Georgian Kingdom. After the disintegration of the Georgian Kingdom, Kakheti became an independent Kingdom in the 1460s. From the early 16th century till the early 19th century, Kakheti and its neighboring Kartli came under intermittent Iranian rule. In 1762, the Kakhetian Kingdom was united with the neighboring Georgian

Kingdom of Kartli into the Kingdom of Kartli-Kakheti under King Heraclius II. Following the Treaty of Georgievsk and the sack of Tbilisi by Agha Mohammad Khan, in 1801 the Kingdom of Kartli-

Kakheti was annexed to the Russian Empire. Kakheti is home to ancient Georgian Orthodox Christian sites like Bodbe Monastery (Fig. 2), and the ancient center of wine production in Georgia (Fig. 3).



Fig. 2. Bodbe monastery complex, Kakheti



Fig. 3. Pheasants Tears vineyards, Kakheti, with view of the Greater Caucasus.

Kvemo Kartli (ქვემო ქართლი) is a historic province and current administrative region in southeastern Georgia, originally part of the Kakhetian Kingdom. Kvemo Kartli has been settled by humans for millions

of years. Especially the Dmanisi area (Fig. 4), is known for its hominid fossils of *Homo georgicus*, with an age between 1.6 and 1.8 million years, and the region has been settled by hominids ever since.



Fig. 4. Dmanisi landscape, Kvemo Kartli, from the *Homo georgicus* excavation site.

The region is one of the most economically developed in Georgia. After Tbilisi, the region is ranked second in industrial production. Apart from Georgians, Kvemo Kartli also hosts a large Azeri and Armenian population, and from the early 19th century to the second world war was home to a large number of Caucasus Swabians (a population of German origin), who had considerable influence especially on local agricultural production. In the early 19th century, 2629 Swabian radical Pietists immigrated to Georgia on invitation of Tsar Alexander I. Around 500 large families founded eight colonies near Tbilisi in 1818, supported by the Russian government. In colloquial language they were soon called the “Schwabendörfer”. The largest village was Katharinenfeld, where initially 95 families, later 116 families lived. The name should honor the Württemberg Queen Catherine, the sister of Tsar Alexander I. The other villages, Marienfeld, Elisabeththal, Alexandersdorf and Petersdorf made a name for themselves because of their straight, cobbled streets. In 1918 there were more than 20 villages founded by Caucasian Germans in Georgia. After the occupation of Georgia and Azerbaijan by the Soviet Union in 1921, Katharinenfeld was renamed in Luxembourg and in 1944 in Bolnisi. Marienfeld became Sartischala, Elisabeththal became

Asureti and Helenendorf became Xanlar. In 1941 there were over 24,000 German colonists in Georgia. In the same year, Stalin relocated all Caucasian Germans who were not married to locals to Kazakhstan and Siberia. The houses of the German settlers were given to migrants from other regions of Transcaucasia. Only a few Caucasian Germans returned to the Caucasus in the post-war period. In 2002 there were about 30 older women of German origin in Bolnisi.

Flora and vegetation

The Caucasus region contains an amazing variety of vascular plants, with about 6300 described species (Gagnidze (2002). The number of endemic taxa known for the Caucasus region is set at 2791 (Schatz et al., 2009).

The Botanical exploration of the Caucasus started in the 17th century. Jean-Baptiste Chardin (1686), described the gardens in Tiflis, Georgia, as well as the surrounding areas as result of a journey in 1672-1673. Joseph Delaporte published similar impressions in 1768 (Gogolishvili & Skhiereli, 1986). Botanist Joseph Pitton de Tournefort, published a large treatment of the Caucasus flora and

vegetation in 1717. Johann Christian Buxbaum published a five-volume treatment of the region in (1728-1740). The first real flora of the Caucasus region was however prepared by Adolf Marschall von Bieberstein (1808-1819). In the 20th century most of the Caucasus region formed part of the former Soviet Union, and botanically well studied in that time (Grossheim, 1928-1934, 1939-1967; Takhtajan, 2003-2012). A large number of detailed treatments of the Caucasus flora were compiled by Alexander Grossheim, who published the most complete Flora of the Caucasus (1928-1934). Starting in the 1940s, Grossheim produced also a series of volumes on human plant use for Armenia, Azerbaijan and Georgia (Grossheim, 1942, 1943, 1946, 1949, 1952). Especially his Manual of the Caucasian Plants (Grossheim, 1949) is still a standard reference today. Nakhutsrishvili (1999) produced the most comprehensive vegetation description for the Caucasus.

The high biodiversity in the Caucasus is found in a wide variety of vegetation types. A large portion of the region is covered by broad-leaved and coniferous forests (Galushko, 1978-1980; Doluchanov, 1989; Nakhutsrishvili, 1999; Zazanashvili et al., 1999, 2000). In the northern Caucasus, forests are mostly found in the western part, while moving further east forested areas are more and more restricted to areas along streams, and in in Dagestan, steppe and shrub formations are prevalent (Litvinskaya and Murtazaliev, 2009). The forest cover was estimated to be 36% in Georgia (Doluchanov, 1989), and forest cover has diminished from 35% to 11% in Azerbaijan. (Schatz et al, 2009). However, usage change, especially a reduction of sheep in the Northern Caucasus, as led the timberline to extend upwards in many areas (Bussmann et al., 2014, 2016a-d, 2017a-b).

In this study we documented traditional plant use in Kahketi and Kvemo Kartli and hypothesized that (1) plant use knowledge in general would lower in these regions than in the rest of Georgia, that (2) most plant use would center on home gardens (3) that the consumption of herbs as "*Pkhali*" (herb pie), very prevalent in other regions of Georgia, would be limited, and that (4) there would essentially be no trace of Swabian traditional knowledge in the region.

Materials and Methods

Ethnobotanical interviews

Fieldwork was conducted in August-November 2018. Interviews using semi-structured questionnaires were conducted with 40 participants (26 women and 14 men), with oral prior informed consent (Fig. 5).

The participants were selected by snowball sampling, trying to reach gender balance and represent members of different age groups (37–85 years). However, most participants were over 45 years old, because only very few younger people remain in remote Georgian villages. All interviews were carried out in the participants' homes and gardens by native speakers of Georgian and its local dialects, and then translated into English. Plants grown in the home gardens were used as prompts, while wild-collected species were free listed. Wild-collected and garden species were identified directly in the field, as well as using literature (Flora of Georgia Committee 1971-2011; Makashvili 1952-1953), and voucher collections deposited in the National Herbarium of Georgia (TBI). The nomenclature of all species follows www.tropicos.org, under APGIII (Angiosperm Phylogeny Group 2009). The spelling of vernacular names was standardized using Makashvili (1991). Fungal nomenclature follows MycoBank (<http://www.mycobank.org>).

Statistical analysis

Distance among informants was calculated for two matrices: one in which columns represented plant species reported, and one in which columns represented uses reported. We calculated distance with the Bray-Curtis method and used the metaMDS function in the R package *vegan* (Oksanen et al. 2018) to implement nonmetric multidimensional scaling. The resulting ordinations plot individuals more closely together who report similar plants (in the case of the first matrix) or similar uses (in the case of the second matrix). We then fit different continuous variables (elevation of community and age of individual) and categorical variables (gender of individual, community, and district) using to test whether each variable explains the location of informants in the ordination, also using *vegan* (Oksanen et al. 2018). We compared these fits to 999 randomized shuffles of the environmental variables to calculate significance. We calculated informant consensus for a given use category as the number of use reports minus the number of taxa over the number of use reports minus one:

$$Nur-Nt / Nur-1$$

We ranked species by three metrics: cultural importance value, the sum within species across all plant-uses of the number of informants reporting a plant-use over the number of informants reporting the plant; use diversity, the Shannon Index of uses (calculated with *vegan*, Oksanen et al. 2018); and use value, the number of reports of a species over total number of informants asked in a region (Philips and Gentry 1993).



Fig. 5. Interview, Kakheti, Georgia. Note plant amples in the foreground.

Results

We encountered 215 plant species belonging to 157 genera of 114 vascular plant families, and 3 fungal species and 5 undetermined fungi of at least 5 genera, belonging to at least 3 fungal families being used in the research region. Of these 114 vascular

species were exclusively wild collected, 88 were grown in homegardens, and 18 were both grown in gardens and collected in the wild (Table 1).

The most important use categories were food, and medicinal. For the demographics of all participants see Table 2.

Table 1- Plants used in Kahketi and Kvemo Kartli

Plant family	Scientific name	Georgian Name and (Transliteration)	Name other language and (Transliteration) (Lak, Ude, Ossetian and Tushetian)	Use description	Part used	Location
Actinidiaceae	<i>Actinidia callosa</i> Lindl.	კივი (k'ivi)		Human Food	Fruit	Garden
Adoxaceae	<i>Sambucus ebulus</i> L.	ანწლი (ants'li), ანწილი (ants'ili)		Human Food (Raw and Alcohol), Medicinal (Tincture),	Fruit	Forest
Adoxaceae	<i>Sambucus nigra</i> L.	ანწლი (ants'li), ანწილი (ants'ili)		Human Food, Medicinal	Fruit	Forest
Adoxaceae	<i>Viburnum opulus</i> L.	ძახველი (dzakhvelia), წორო (ts'oro)		Medicinal (Cough), Utensils and Tools (Tools)	Fruit, Stem	Forest
Agaricaceae	<i>Agaricus arvensis</i> Schaeff.	ქამა (k'ama)		Human Food	Fruiting body	Forest
Amaranthaceae	<i>Amaranthus paniculatus</i> L.	წითელი ჯიჯლაყა (ts'iteli jijlaq'a), თათრულა ფხალი (tatrula pkhali)		Human Food (Phkhali)	Leaves, Stem	Forest
Amaranthaceae	<i>Amaranthus retroflexus</i> L.	ჩვეულეზრივი ჯიჯლაყა (chveulebrivi jijlaq'a), წოწნარა (ts'ots'nara), თეთრი მხალი (tetri mkhali), თვითმავალა (tvitmavala), მხალი-ბალახი (mkhali-balakhi), წოწნარა (ts'ots'nara), წრიანტელი (ts'riant'eli)	ხალე (khale - Lak)	Human Food (Phkhali)	Leaves, Stem	Forest
Amaranthaceae	<i>Amaranthus speciosus</i> L.	ჯიჯლაყა-ყვავილი (jijlaq'a-q'vavili)	ლერტაგიჭი (lertagich'i - Ossetian)	Human Food (Phkhali, raw)	Leaves, Root	Garden
Amaranthaceae	<i>Beta vulgaris</i> L.	ჭარხალი (ch'arkhali)		Human Food	Root	Garden
Amaranthaceae	<i>Beta vulgaris</i> L. ssp. <i>cicla</i> (L.) Moq.	მანგოლდი (mangoldi)		Human Food (Phkhali)	Leaves	Garden
Amaranthaceae	<i>Chenopodium album</i> L.	ნაცარქათამა (natsarkatama), მხალი (mkhali)	ფუტაყ (futaq' - Ossetian)	Human Food (Phkhali)	Leaves, Stem	Forest
Amaranthaceae	<i>Chenopodium bonus-henricus</i> L.	ნაცარქათამა (natsarkatama)		Human Food (Phkhali)	Leaves	Garden

Amaranthaceae	<i>Chenopodium foliosum</i> (Moench) Asch.	ნაცარქათამა (natsarkatama)	Human Food (Phkhali)	Leaves	Forest
Amaranthaceae	<i>Spinaca oleracea</i> L.	ისპანახი (isp'anakhi)	Human Food	Leaves, Stem	Garden
Amaryllidaceae	<i>Allium cepa</i> L.	ხახვი (khakhvi)	Human Food (Phkhali, raw), Medicinal (Blood pressure)	Leaves, Bulb	Garden
Amaryllidaceae	<i>Allium sativum</i> L.	ნიორი (niori)	Human Food (Phkhali, pickled, raw), Utensils and Tools (Dye)	Leaves, Bulb, Stem	Garden
Amaryllidaceae	<i>Allium ursinum</i> L.	მთის ღანძილი (mtis ghandzili), ღანძილი (g'andzili), სოზო (sobo)	Human Food (Pickled, raw)	Leaves	Forest
Apiaceae	<i>Anethum graveolens</i> L.	კამა (k'ama), ცერცო დიდი კამა (tseretso didi k'ama)	Human Food (Spice, Condiment), Medicinal (Infusion)	Leaves, Stem, Dry Seeds	Garden
Apiaceae	<i>Anthriscus sylvestris</i> L.	ჭყიმი (ch'q'imi), ღიმის დედა (g'imis deda)	Human Food (Phkhali)	Leaves	Forest
Apiaceae	<i>Apium graveolens</i> L.	ნიახური (niakhuri)	Human Food (Phkhali, spice)	Leaves, Stem	Garden
Apiaceae	<i>Chaerophyllum aureum</i> L.	ყინტორა (q'int'ora), ხოზო (khozo)	Human Food	Buds	Forest
Apiaceae	<i>Chaerophyllum bulbosum</i> L.	ღიმი (g'imi), ატოლი (at'oli)	Human Food (Pickled)	Leaves, Stem	Forest
Apiaceae	<i>Chaerophyllum caucasicum</i> (Fisch.) B. Schischk	ღიმი (g'imi), ატოლი (at'oli)	Human Food (Phkhali)	Leaves, Stem	Forest
Apiaceae	<i>Coriandrum sativum</i> L.	ქინძი (kindzi)	Human Food (Phkhali, Spice)	Leaves, Stem	Garden
Apiaceae	<i>Daucus carota</i> L. ssp. <i>sativus</i>	სტაფილო (st'apilo)	Human Food	Root, Leaves	Garden, Forest
Apiaceae	<i>Falcaria vulgaris</i> Bernh.	კოფრჩხილა (k'oprchkhila), ბატიფეხა (bat'ipekha)	Human Food (Phkhali, pickled)	Leaves, Stem	Forest
Apiaceae	<i>Heracleum sosnowskyi</i> Manden	დიყი (diq'i), ხევსურის დიყი (khevsuris diq'i), დიყინა (diq'ina)	Human Food (Pickled)	Lower part of Stem, Seeds	Forest

Apiaceae	<i>Heracleum</i> sp.	დიყი (diq'i)		Human Food (Pickled)	Leaves, Lower part of Stem	Forest
Apiaceae	<i>Hyppomarathum crispum</i> (Pers.) Boiss.	ბურბურა (burbura), ქარქვეტა (karkvet'a)		Human Food (Phkhali), Medicinal	Leaves	Forest
Apiaceae	<i>Petroselinum crispum</i> (Mill.) Fuss	ოხრაზუმი (okhrakhushi), მადდანოზი (mag'danozi)		Human Food (Spice)	Leaves, Stem	Garden
Apocynaceae	<i>Vinca major</i> L.	გველის სურო (gvelis suro)		Medicinal (Blood pressure)	Leaves	Garden
Araliaceae	<i>Hedera colchica</i> (K. Koch) K. Koch	სურო (suro)		Medicinal	Leaves	Garden
Asparagaceae	<i>Asparagus officinalis</i> L.	სატატური (sat'atsuri)		Human Food (Phkhali, cooked)	Leaves, Stem	Forest, Garden
Asparagaceae	<i>Yucca filamentosa</i> L.	იუკა (iuk'a)		Utensils and Tools (Ropes and strings)	Leaves	Garden
Asphodelaceae	<i>Aloe barbadensis</i> Mill.	ალოე (aloe)		Medicinal	Whole Plant	Garden
Asteraceae	<i>Achillea millefolium</i> L.	ფარსმანდუკი (parsmanduk'i), მელაგუნდა (melagunda)		Medicinal	Leaves	Forest
Asteraceae	<i>Arctium lappa</i> L.	ოროვანდი (orovandi), ძირხვენა (dzirkhvena)		Human Food (Phkhali)	Leaves	Forest
Asteraceae	<i>Artemisia dracunculus</i> L.	ტარხუნა (t'arkhuna)		Human Food (Phkhali, Beverage)	Leaves, Stem, Seeds	Garden
Asteraceae	<i>Bidens tripartida</i> L.	ორკბილა (ork'bila), ჩერედა (chereda)		Medicinal (Bath)	Leaves, stem	Forest
Asteraceae	<i>Calendula officinalis</i> L.	გულყვითელა (gulq'vitela), კალენდულა (k'alendula)		Medicinal	Flower	Garden
Asteraceae	<i>Cichorium intybus</i> L.	ვარდკაჭაჭა (vardk'ach'ach'a , ტიტა (t'it'a)	ხათალდიდნყ (khataldiding'- (Ossetian)	Human Food (Phkhali, Coffee replacement), Medicinal (Diarrhea)	Buds, Leaves, Stem, Root	Forest
Asteraceae	<i>Cirsium incanum</i> (S.G. Gmel.) Fisch. ex M. Bieb.	თეთრი ნარი (tetri nari), ნარი (nari)		Medicinal (Urinary, Kindey)	Root young	Forest
Asteraceae	<i>Erigeron canadensis</i> L.			Medicinal	Leaves	Garden
Asteraceae	<i>Helianthus tuberosus</i> L.	მიწავაშლა (mits'avashla), მიწის ვაშლი (mits'is vashli)		Human Food, Medicinal	Root	Garden

Asteraceae	<i>Matricaria chamomila</i> L.	გვირილა (gvirila)	Medicinal	Leaves, Flower	Garden
Asteraceae	<i>Pyrethrum</i> sp.	გვირილა (gvirila), მინდვრის გვირილა (mindvris gvirila)	Medicinal	Whole plant	Forest
Asteraceae	<i>Serratula quinquefolia</i> Bieb. ex Willd.	ირმისმხალა (irmismkhala), საფურცქნელა (sapurtskvnela)	Human Food (Phkhali)	Leaves, Stem	Forest
Asteraceae	<i>Silybum marianum</i> (L.) Gaertn.	ყვითელი ყვავილი (qhvitheli qh'avili), იმერული ზაფრანა (imeruli zaphrana), იაყაქუ (yaq'aaku)	Medicinal (Liver)	Seed	Forest
Asteraceae	<i>Tagetes patula</i> L.		Human Food (Spice)	Petals	Garden
Asteraceae	<i>Taraxacum officinale</i> Wigg.	ბაბუაწვერა (babuats'vera)	Human Food (Phkhali), Medicinal (Cold)	Leaves, Stem, Root, Flower	Garden, Forest
Asteraceae	<i>Tragopogon</i> sp.	ფამფარა (pampara)	Human Food (Phkhali)	Leaves	Forest
Asteraceae	<i>Tussilago farfara</i> L.	ვირისტერფა (virist'erpa)	Medicinal (Infusion)	Leaves	Forest
Asteraceae	<i>Xanthium strumarium</i> L.	ლორის ბირკა (g'oris birk'a), ბირკა (birk'a), ცეცხლეკალა (tsetskhle'ala), კუტეკალა (კუტეკალა)	Human Food (Phkhali), Medicinal	Leaves	Forest
Berberidaceae	<i>Berberis vulgaris</i> L.	კოწახური (k'ots'akhuri)	Human Food	Fruit	Forest
Betulaceae	<i>Carpinus caucasica</i> Grossh.	რცხილა (rtskhila)	ფოტყაად (fpt'q'aad - Ossetian)	Stem	Forest
Betulaceae	<i>Alnus barbata</i> C.A. Mey.	მურყანი (murq'ani), ნახო (nakho)		Stem	Forest
Betulaceae	<i>Betula litwinowii</i> Doluch.	არყი (arq'i)		Stem	Forest
Betulaceae	<i>Betula pendula</i> Roth	არყი (arq'i)		Stem	Forest
Betulaceae	<i>Carpinus caucasica</i> Grossh.	შავი რცხილა (shavi rtskhila)		Stem	Forest
Betulaceae	<i>Carpinus orientalis</i> Mill.	ჯაგრცხილა (jagrtskhila), თეთრი რცხილა (tetri rtskhila)		Stem	Forest
				Stem	Forest
				Stem	Forest

Betulaceae	<i>Corylus avellana</i> L.	თხილი (tkhili)		Human Food	Fruit	Garden
Betulaceae	<i>Corylus pontica</i> K. Koch.	თხილი (tkhili)		Human Food	Fruit	Forest
Boletaceae	<i>Boletus edulis</i> Bull.	დათიკა სოკო (datik'a sok'o)		Human Food	Fruiting body	Forest
Boraginaceae	<i>Symphytum caucasicum</i> M. Bieb.	ლამქარა (lashkara), წუწწელა (ts'uts'nela)		Human Food (Phkhali), Medicinal	Leaves, Root	Forest, Garden
Brassicaceae	<i>Brassica oleracea</i> L.	კომბოსტო (k'ombost'o)		Human Food	Leaves	Garden
Brassicaceae	<i>Brassica oleracea</i> L. var. <i>italica</i>	კომბოსტო (k'ombost'o), ბროკოლი (brok'oli)		Human Food	Leaves	Garden
Brassicaceae	<i>Capsella bursa-pastoris</i> L.	წიწმატურა (ts'its'mat'ura), რეკეზოს (rek'ebos), ხარიკბილა (kharik'bila)	ხწ (khts' - Ossetian)	Human Food (Phkhali)	Leaves	Forest
Brassicaceae	<i>Lepidium sativum</i> L.	წიწმატი (ts'its'mat'i)		Human Food (Phkhali)	Leaves	Garden
Brassicaceae	<i>Raphinastrium rugosum</i> L. All.	ბოლოკა (bolok'a), ბოლოკას კოტი (bolok'as k'ot'i)		Human Food	Root	Garden
Campanulaceae	<i>Campanula latifolia</i> L.	ალოშა (aloshia)		Human Food (Phkhali)	Leaves, Stem	Forest
Campanulaceae	<i>Campanula rapunculoides</i> L.	მაჩიტა (machit'a)		Human Food	Leaves	Forest
Cannabaceae	<i>Humulus lupulus</i> L.	სვია (svia), სვე (sve)		Human Food (Beer, Phkhali), Medicinal (Urinary - Prostate)	Flower, Leaves, Stem	Forest, Garden
Cannaceae	<i>Canna indica</i> L.	, Medicinal		Ornamental	Whole Plant	Garden
Caryophyllaceae	<i>Stellaria media</i> (L.) Vill.	ჟუნჟრუკი (zhunzhruk'i), ჟუნჟრუკა (zhunzhruk'a)		Animal Food (Geese), Human Food (Khachapuri)	Whole plant, leaves	Garden
Cornaceae	<i>Cornus mas</i> L.	შინდი (shindi), შულდი (shuldi)	შემ (shem - Ossetian)	Human Food (Raw, Jam), Medicinal, Utensils and Tools (Tools)	Fruit	Forest, Garden
Cornaceae	<i>Swida australis</i> (C.A. Mey.) Pojark ex Grossh.	შინდანწლა (shindants'la),		Utensils and Tools (Axe handles), Huma Food	Stem, Fruit	Forest, Garden
Corylaceae	<i>Carpinus caucasica</i> Grossh.	რცხილა (rtskhila)		Utensils and Tools (Tools)	Stem	Forest
Corylaceae	<i>Corylus iberica</i> L.	დათვითხილა (datvitkhila), დათვთხილა (datvtkhila)		Human Food	Fruit	Forest, Garden

Crassulaceae	<i>Sempervivum caucasicum</i> Rupr. ex Boiss.		კლდის დუმა (k'ldisduma Tushetian)	Medicinal (Impotence, Wounds)	Leaves	Garden
Cucurbitaceae	<i>Bryonia dioica</i> Jacq.	ლემურა (leshura), ადამის ძირი (adamis dziri)		Human Food (Phkhali), Medicinal	Leaves	Forest
Cucurbitaceae	<i>Citrullus lanatus</i> (Thunb.) Matsum. & Nakai	საზამთრო (sazamthro)		Human Food (Pickled)	Fruit	Garden
Cucurbitaceae	<i>Cucumis sativus</i> L.	კიტრი (k'it'ri)		Human Food	Fruit	Garden
Cucurbitaceae	<i>Cucurbita pepo</i> L.	გოგრა (gogra)		Human Food (Cooked, Pickled)	Fruit	Garden
Cucurbitaceae	<i>Citrullus lanatus</i> (Thunb.) Matsum. & Nakai			Human Food	Fruit	Garden
Cucurbitaceae	<i>Cucurbita</i> sp.	გოგრა (gogra), ყაბაყი (q'abaq'i)		Human Food	Fruit	Garden
Cupressaceae	<i>Juniperus depressa</i> Raf. ex M'Murtrie	ღვია (g'via)		Fuel for smoking ham	Stem	Forest
Cupressaceae	<i>Juniperus sabina</i> L.		ჭყერო (tchqhero - Svan)	Medicinal (Urinary - Kindey)	Leaves	Garden
Cupressaceae	<i>Thuja</i> sp.	ტუია (t'uia)		Medicinal	Leaves	Garden
Dryopteridaceae	<i>Dryopteris filix-mas</i> (L.) Schott.	ჩადუნა (chaduna), ჩადი (chadi)		Human Food (Phkhali), Utensils and Tools (Filter for Wine)	Leaves, Stem	Forest
Ebenaceae	<i>Diospyros lotus</i> L.	კარალიოკი (k'araliok'i), ხურმა (khurma)		Human Food	Fruit	Garden
Elaeagnaceae	<i>Elaeagnus</i> sp.	ფშატი (pshati)		Human Food	Fruit	Forest
Equisetaceae	<i>Equisetum hyemale</i> L.	შვიტა (shvit'a), ცხენისკუდა (tskhenisk'uda)		Medicinal	Leaves	Forest
Ericaceae	<i>Vaccinium myrtillus</i> L.	მთის მოცვი (mtis motsvi), მოცვი (motsvi), შალშავი (shalshavi)		Human Food	Fruit	Forest
Fabaceae	<i>Gleditsia</i> sp.	გლედიჩია (gledichia), მურმანის ეკალი (murmanis ek'ali)		Medicinal, Utensils and Tools (Tools)	Leaves, Stem	Forest
Fabaceae	<i>Lathyrus roseus</i> Steven	არჯაკელი (arjak'eli)		Human Food (Phkhali)	Leaves, Stem	Forest
Fabaceae	<i>Phaseolus sativus</i> L.	ლობიო (lobio)		Human Food	Seeds, Fruit	Garden

Fabaceae	<i>Pisum sativum</i> L.	ბარდა (barda)		Human Food, Animal Food (Cows)	Seeds	Garden
Fabaceae	<i>Robinia pseudoacacia</i> L.	აკაცია (ak'atsia), ლობიოს ხე (lobios khe)		Human Food (Pickled), Utensils and Tools (Poles)	Flower, Stem	Forest
Fabaceae	<i>Trigonella caerulea</i> (L.) Ser.	ულუმბო (ulumbo), უცხო სუნელი (utskho suneli)		Human Food (Spice)	Seeds	Garden
Fabaceae	<i>Vicia faba</i> L.	ცერცვი (tsertsvi)		Human Food, Animal Food (Cows)	Seeds	Garden
Fagaceae	<i>Castanea sativa</i> Mill.	წაბლი (ts'abli), ჭიფერ (ch'iper)		Human Food, Utensils and Tools (Tools)	Fruit, Stem	Forest
Fagaceae	<i>Fagus orientalis</i> Lipsky	წიფელი (ts'ipeli), წიფელა (ts'ipela)	თარსი ბალოს (tarsi-balos - Ossetian), ფუ'ფ უდინური (pu'p - Udin)	Human Food, Utensils and Tools (Tools), Construction (Timber), Animal Food (Fodder), Fuel (Firewood)	Fruit, Seeds, Stem	Forest
Fagaceae	<i>Quercus iberica</i> M. Bieb	მუხა (mukha), ქართული მუხა (kartuli mukha), წალი მუხა (ts'ali mukha), ნილე (nile)	კვრკო (k'vrk'o - Ossetian), მახ (ma'kh in - Udin)	Utensils and Tools (Tools), Construction (Timber), Fuel (Firewood), Animal Food (Fodder), Human Food, Medicinal	Stem, Fruit, Leaves	Forest
Fagaceae	<i>Quercus macranthera</i> Fisch. & C.A. Mey. ex Hohen.	კავკასიური მუხა (k'avk'asiuri mukha), მუხა (mukha), ფატარი მუხა (patari mukha)		Utensils and Tools (Tools)	Stem	Forest
Fungi		მილიგაუმაჩი (miligaumachi)		Human Food	Fruiting body	Forest
Fungi		წიანასოკო (tsianasoko)		Human Food	Fruiting body	Forest
Geraniaceae	<i>Pelargonium</i> sp.			Medicinal	Leaves	Garden
Grossulariaceae	<i>Ribes</i> sp.	მოცხარი (motskhari)		Human Food	Fruit	Forest
Guttiferae	<i>Hypericum perforatum</i> L.	კრაზანა (k'razana)		Medicinal, Utensils and Tools (Dye)	Leaves, Flowers, Stem, Root	Forest

Juglandaceae	<i>Juglans regia</i> L.	კაკალი (k'ak'ali), ჰეკე (heke)	უც უდინური (u'q' - Udin)	Utensils and Tools (Tools), Human Food, Utensils and Tools (Dye)	Stem, Fruit, Seeds, Root	Forest, Garden
Juglandaceae	<i>Pterocarya pterocarpa</i> (Michx.) Kunth ex Iljinsk.	ლაფანი (Iapani)		Utensils and Tools (Tools)	Stem	Forest
Lamiaceae	<i>Lamium album</i> L.	ჭინჭრის დედა (ch'inch'ris deda)	ფსრამოთ (psramot - Ossetian)	Human Food (Phkhali)	Leaves, Stem	Forest
Lamiaceae	<i>Lamium purpureum</i> L.	ბებრისკონკა (bebrisk'onk'a), ბებრიკონკა (bebrik'onk'a)		Human Food (Phkhali)	Leaves	Forest
Lamiaceae	<i>Leonurus cardiaca</i> L.	შავბალახა (shavbalakha)		Medicinal	Leaves	Garden
Lamiaceae	<i>Mentha pulegium</i> L.	პიტნა (p'it'na), ტყის პიტნა (t'q'is p'it'na)		Human Food (Raw, Tea), Medicinal	Leaves, Stem	Garden
Lamiaceae	<i>Ocimum basilicum</i> L.	რეჰანი (rehani), სამკულავი (sashk'ulavi)		Human Food (Phkhali, Spice), Medicinal (Infusion)	Leaves, Stem	Garden
Lamiaceae	<i>Satureja hortensis</i> L.	ქონდარი (kondari)		Human Food (Spice)	Leaves, Stem	Garden
Lamiaceae	<i>Satureja spicigera</i> (C. Koch) Boiss.	ტყის ქონდარი (t'q'is kondari)		Human Food	Leaves, Stem	Forest
Lamiaceae	<i>Thymus</i> sp.	ბეგკონდარა (begkondara), ველური ქონდარი (veluri kondari), მინდვრის ქონდარი (mindvris kondari)		Human Food (Phkhali), Medicinal (Infusion)	Leaves	Forest
Lamiaceae	<i>Ziziphora serpyllacea</i> M. Bieb.	ურტი (urtsi)		Medicinal	Leaves	Forest
Lauraceae	<i>Laurus nobilis</i> L.	დაფნა (dapna)		Human Food (Phkhali)	Leaves	Garden
Liliaceae	<i>Polygonatum glaberrimum</i> C. Koch.	სვინტრი (svint'ri)		Human Food (Phkhali)	Leaves	Forest
Lythraceae	<i>Punica granatum</i> L.	ბროწეული (brots'euli)		Human Food (Raw, Tkhemali), Utensils and Tools (Dye)	Fruit, Stem	Garden
Malvaceae	<i>Althaea</i> spp.	ტუხტი (t'ukht'i)		Human Food (Phkhali)	Leaves	Forest
Malvaceae	<i>Malva neglecta</i> L.	ბალბა (balba)		Human Food (Phkhali), Medicinal	Leaves, stem	Forest, Garden
Malvaceae	<i>Malva sylvestris</i> L.	ბალბა (balba)	ფუმფულ უდინური (pumpul - Udin)	Human Food (Phkhali)	Leaves, stem	Forest, Garden

Malvaceae	<i>Tilia caucasica</i> Rupr.	ცაცხვი (tsatskhvi), ჰადას (hadas)		Medicinal (Infusion), Utensils and Tools (Tools)	Leaves, Stem	Forest
Moraceae	<i>Ficus carica</i> L.	ლეღვი (leg'vi)		Human Food, Medicinal	Fruit	Forest
Moraceae	<i>Morus alba</i> L.	თუთა (tuta), შავი (shavi)		Human Food, Medicinal, Animal Food (Silkworms)	Fruit, Leaves	Garden
Musaceae	<i>Musa x paradisiaca</i> L.	ბანანი (banani)		Human Food	Fruit	Garden
Nyctaginaceae	<i>Mirabilis jalapa</i> L.	გულისაბა (gulisaba)		Medicinal, Ornamental	Stem, Whole Plant	Garden
Oleaceae	<i>Fraxinus excelsior</i> L.	იფანი (ipani)	ზიდ (zid - Udin), იფან (ipan - Ossetian)	Utensils and Tools (Tools Tool handles)	Stem	Forest
Oleaceae	<i>Syringia vulgaris</i> L.	იასამანი (iasamani)		Medicinal	Leaves	Forest
Onocleaceae	<i>Mattheuccia struthiopteris</i> (L.) Todd.	ჩადუნა (chaduna), ჩადი (chadi)		Human Food (Phkhali)	Leaves	Forest
Oxalidaceae	<i>Oxalis corniculata</i> L.			Human Food (Phkhali)	Leaves	Garden
Papaveraceae	<i>Chelidonium majus</i> L.	ქრისტესისხლა (krist'esiskhla)		Medicinal, Utensils and Tools (Dye)	Flower, Leaves, Stem	Forest
Papaveraceae	<i>Papaver somniferum</i> L.	ყაყაჩო (q'aq'acho)	სოხდიდინა (sokhdidina - Ossetian)	Human Food (Seeds, Phkhali)	Seeds, Young Leaves and Stems	Forest, Garden
Paulowniaceae	<i>Paulownia imperialis</i> Sieb.	პავლონია (pavlonia)		Utensils and Tools (Tools)	Stem	Forest
Physalacriaceae	<i>Armillariella mellea</i> (Vahl) P. Kumm	მანჭკვალა (mantchkvala)		Human Food	Fruiting body	Forest
Pinaceae	<i>Picea orientalis</i> (L.) Peterm.	ნადვი (nadzvi)		Human Food, Utensils and Tools (Tools)	Cone young, Stem	Forest
Pinaceae	<i>Pinus sosnowskyi</i> Nakai	ფიჭვი (pich'vi)		Human Food, Utensils and Tools (Tools)	Cone young, Stem	Forest
Plantaginaceae	<i>Plantago major</i> L.	მრავალმარღვა (mravaldzarg'va)		Human Food (Phkhali), Medicinal	Leaves	Forest, Garden
Poaceae	<i>Avena sativa</i> L.	შვრია (shvria)		Human Food	Seed	Garden
Poaceae	<i>Hordeum vulgare</i> L.	ქერი (keri)		Human Food	Seed	Garden
Poaceae	<i>Secale cereale</i> L.	ჭვავი (ch'vavi)		Animal Food (Cows)	Seed	Garden
Poaceae	<i>Setaria italica</i> (L.) P. Beauv.	ფეტვი (pet'vi)		Human Food	Seed	Garden

Poaceae	<i>Triticum dicoccum</i> Schrank	ასლი (asli)		Human Food	Seed	Garden
Poaceae	<i>Zea mays</i> L.	სიმინდი (simindi)		Human Food, Medicinal	Seeds, Stigmata	Garden
Polygonaceae	<i>Polygonum aviculare</i> L.			Human Food (Phkhali)	Leaves	Forest
Polygonaceae	<i>Rheum rhabarbarum</i> L.			Human Food (Phkhali)	Leaves	Garden
Polygonaceae	<i>Rumex acetosa</i> L.	მჟაუნა (mzhauna)		Human Food (Phkhali)	Leaves	Forest
Polygonaceae	<i>Rumex scutatus</i> L.	ლახტარა (lakht'ara)	ჟამღ (zhamg' - Lak))	Human Food (Khachapuri, Phkhali)	Leaves	Forest
Polygonaceae	<i>Rumex</i> sp.	ღოღო (g'olo)	ღოლ (g'ol - Ossetian)	Human Food (Phkhali, Pickled), Medicinal, Utensils and Tools (Dye)	Leaves, Young Stems, Root	Forest
Polypodiaceae	<i>Polypodium vulgare</i> L.	კილამურა (k'ilamura), ძირტკბილა (dzirt'k'bila)		Medicinal (Cough), Utensils and Tools (Tools)	Root	Forest
Portulacaceae	<i>Portulaca oleracea</i> L.	დანდური (danduri), კატკატო (k'at'k'at'o)		Human Food (Phkhali), Medicinal	Leaves, Stem	Forest, Garden
Rhamnaceae	<i>Paliurus spina-christi</i> Mill.	ძეძვი (dzedzvi), ჯაგი (jagi)		Utensils and Tools (Fences), Medicinal (Infusion)	Stem, Leaves	Forest
Rhamnaceae	<i>Ziziphus jujuba</i> Mill.	უნაბი (unabi), ურნაბი (urnabi)		Human Food	Fruit	Forest
Rhododendraceae	<i>Rhododendron caucasicum</i> Pall.	დეკა (dek'a)		Medicinal (Infusion)	Leaves	Forest
Rosaceae	<i>Crataegus curvisepala</i> Lindm.	თეთრი კუნელი (tetri k'uneli), კვინელი (k'vineli)		Human Food (Raw, Tea), Medicinal	Fruit, Flowers, Leaves	Forest
Rosaceae	<i>Crataegus pentagyna</i> Waldst.	შავი კუნელი (shavi k'uneli), კვინელი (k'vineli)		Human Food (Raw, Tea), Medicinal	Fruit, Flowers, Leaves	Forest
Rosaceae	<i>Crataegus</i> sp.	კუნელი (k'uneli), კუნელი (q'avisperi k'uneli)	ბია-ბია (bia-bia - Udin)	Human Food (Raw, Tea, Compote), Medicinal (Infusion)	Fruit, Flowers, Leaves	Forest
Rosaceae	<i>Cydonia oblonga</i> L.	კომში (k'omshi)	ფუშა (pusha - Udin)	Human Food, Utensils and Tools (Tools), Medicinal (Infusion)	Fruit, Stem	Garden
Rosaceae	<i>Eriobotrya japonica</i> (Thunb.) Lindl.	მუშმულა (mushmula), ბუშმალა (bushmala)		Medicinal	Fruit	Garden

Rosaceae	<i>Fragaria vesca</i> L.	მარწყვი (marts'q'vi)		Human Food	Fruit	Garden
Rosaceae	<i>Fragaria x ananassana</i> Duchesne ex Rozier	მარწყვი (marts'q'vi)		Human Food	Fruit	Garden
Rosaceae	<i>Malus orientalis</i> Uglizk.	ვაშლი (vashli), მაჟალო (mazhalo)		Human Food (Phkhali, Raw)	Fruit	Garden, Forest
Rosaceae	<i>Mespilus germanica</i> L.	ზღმარტლი (zg'mart'li), ყირიპ (q'irip')	მონტლე (mont'le - Ossetian)	Human Food	Fruit	Forest
Rosaceae	<i>Prunus amygdalus</i> Batsch	ვაშლატამა (vashlat'ama)		Human Food	Fruit	Garden
Rosaceae	<i>Prunus avium</i> (L.) L. var. <i>silvestris</i>	ბალამწარა (balamtsara)		Human Food	Fruit	Forest
Rosaceae	<i>Prunus cerasus</i> L.	ალუბალი (alubali)		Human Food (Raw, Phkhali)	Fruit, Leaves	Garden
Rosaceae	<i>Prunus divaricata</i> Ledeb.	ტყემალი (t'q'emali), ტიყი (t'i'q'i)		Human Food (Raw, Tkhemali)	Fruit	Forest
Rosaceae	<i>Prunus dulcis</i> Mill. D.A. Webb.	ნუში (nushi)		Medicinal	Fruit	Garden
Rosaceae	<i>Prunus insititita</i> L.	ღოდნოშო (g'og'nosho), მურაკი (murak'i)		Human Food	Fruit	Forest
Rosaceae	<i>Prunus padus</i> L.			Human Food	Fruit	Garden
Rosaceae	<i>Prunus persica</i> (L.) Batsch	ატამი (at'ami)		Human Food	Fruit	Garden
Rosaceae	<i>Prunus spinosa</i> L.	კვრინჩხი (k'vrinchkhi), ტყის მურაკი (t'q'is murak'i)		Human Food	Fruit	Forest
Rosaceae	<i>Prunus vachuschtii</i> Bregaze	ალუჩა (alucha)		Human Food	Fruit	Garden
Rosaceae	<i>Prunus x domestica</i> L.	ქლიავი (kliavi), ჭანჭური (ch'anch'uri)		Human Food	Fruit	Garden
Rosaceae	<i>Pyrus caucasica</i> Fed.	პანტა (p'ant'a)		Human Food	Fruit	Forest
Rosaceae	<i>Pyrus communis</i> L.	მსხალი (mskhali)		Human Food	Fruit	Garden
Rosaceae	<i>Rosa</i> sp.	ასკილი (ask'ili), ვარდი (vardi)		Human Food (Raw, Jam), Medicinal	Fruit, Flowers	Forest
Rosaceae	<i>Rubus fruticosus</i> L.	მაყვალი (maq'vali)		Human Food (Raw, Jam)	Fruit	Forest
Rosaceae	<i>Rubus ideaus</i> L.	ჟოლო (zholo), ჟოლი (zholi)	მალინა (malina - Ossetian)	Human Food, Medicinal	Fruit, Leaves	Garden, Forest
Rosaceae	<i>Rubus</i> sp.	მაყვალი (maq'vali)		Human Food	Fruit	Forest
Rosaceae	<i>Sorbus aucuparia</i> K. Koch	ჭნავი (ch'navi), ცირცელი (tsirtseli)		Medicinal (Infusion), Utensils and Tools	Fruit, Stem	Forest

Rosaceae	<i>Sorbus torminalis</i> C.Crantz.	თამელი (tameli)	(Tools), Utensils and Tools (Tools)		
Rubiaceae	<i>Rubia tinctorum</i> L.	ენდრო (endro)	Human Food	Fruit	Forest
Russulaceae	<i>Lactarius deliciosus</i> (L. ex Fr.) S.F. Grey	ჭადა (chada)	Utensils and Tools (Dye)	Stem	Garden
Rutaceae	<i>Citrus limon</i> (L.) Burm. f.	ლიმონი (limoni)	Human Food	Fruiting body	Forest
Salicaceae	<i>Populus pyramidalis</i> Rozier	ალვის ხე (alvis khe)	Utensils and Tools (Tools)	Fruit	Garden
Salicaceae	<i>Populus</i> sp.	ვერხვი (verkhvi)	Utensils and Tools (Tools)	Stem	Forest
Salicaceae	<i>Salix alba</i> L.	წნორი (ts'nori)	Utensils and Tools (Tools)	Stem	Forest
Salicaceae	<i>Salix babylonica</i> L.	ძეწნა (dzets'na), ტატწნურა (t'at'ts'nura)	Utensils and Tools (Tools)	Stem	Forest
Salicaceae	<i>Salix caprea</i> L.	მდგნალი (mdgnali), პოლპალა (p'olp'ala), ტირიფი (t'iripi)	Medicinal, Utensils and Tools (Tools)	Leaves, Stem	Forest
Santalaceae	<i>Viscum album</i> L.	ფითრი (pitri)	Veterinary	Whole Plant	Garden, Forest
Sapindaceae	<i>Acer campestre</i> L.	ნეკერჩხალი (nek'erchlali)	Utensils and Tools (Tools)	Stem	Garden
Sapindaceae	<i>Acer cappadocicum</i> Gled.	ქორაფი (korapi)	Utensils and Tools (Tools)	Stem	Forest
Sapindaceae	<i>Acer trautvetteri</i> Medw.	მაღალმთის ბოკვი (mag'almtis bok'vi)	Utensils and Tools (Tools)	Stem	Forest
Scrophulariaceae	<i>Verbascum</i> sp.	ქერიფკლა (keripkla)	Medicinal (Hemorrhoids)	Leaves	Garden
Simaroubaceae	<i>Ailanthus altissima</i> (Mill.) Swingle	ხემერალი (khemo'rali), გველის ხე (gvelis khe), მერალი ხე (mq'rali khe)	Medicinal (Insect repellent), Utensils and Tools (Tools)	Leaves, Stem	Garden
Smilacaceae	<i>Smilax excelsa</i> L.	ეკალიჭი (ek'algi'ich'i), ეკალა (ek'ala), მაყალ (maq'al), ღიჭი (g'ich'i)	Human Food (Phkhali)	Leaves	Forest
Solanaceae	<i>Capsicum annuum</i> L.	წიწაკა (ts'its'ak'a), მწარე წიწაკა (mts'are ts'its'ak'a)	Human Food (Pickled, Raw)	Fruit	Garden

Solanaceae	<i>Capsicum annuum</i> L. ssp. <i>bulgari</i>	წიწაკა ბულგარული (titzaka bulgaruli), ტკბილი წიწაკა (t'k'bili ts'its'ak'a)		Human Food (Pickled, Raw)	Fruit	Garden
Solanaceae	<i>Lycium barbarum</i> L.	თეთრეკალა (tetrek'ala), ქაცვი (katsvi)		Medicinal, Utensils and Tools (Fences)	Fruit, Stem	Forest
Solanaceae	<i>Lycopersicum esculentum</i> L.	პომიდორი (p'omidori)		Human Food (Pickled, Raw)	Fruit	Garden
Solanaceae	<i>Nicotiana rustica</i> L.	თამბაქო (tambako)		Cultural (Snuff)	Leaves	Garden
Solanaceae	<i>Nicotiana tabacum</i> L.	თამბაქო (tambako)		Cultural (Smoking tobacco)	Leaves	Garden
Solanaceae	<i>Physalis alkekengi</i> L.	ონტკოფა (ont'k'opa)		Human Food	Fruit	Garden
Solanaceae	<i>Solanum melogena</i> L.	ბადრიჯანი (badrijani)		Human Food	fruit	Garden
Solanaceae	<i>Solanum pseudocapsicum</i> L.			Human Food	Fruit	Garden
Solanaceae	<i>Solanum tuberosum</i> L.	კარტოფილი (k'artopili)		Human Food (Phkhali, cooked)	Leaves, Tuber	Garden
Staphyleaceae	<i>Staphylea colchica</i> Steven	ჯონჯოლი (jonjoli), ჯონჯოლა (jonjola)		Human Food (Pickled)	Flowers, Young shoots	Forest, Garden
Taxaceae	<i>Taxus baccata</i> L.	ურთხელი უთხოვარი (urtkheli utkhovari)		Construction (Timber)	Stem	Forest
Tropaeolaceae	<i>Tropaeolum majus</i> L.			Human Food (Phkhali)	Leaves	Garden
Ulmaceae	<i>Ulmus</i> sp.	თელა (Tela), ქალითელა (ch'alitela)	სველჯ (svelj - Ossetian)	Utensils and Tools (Tools), Medicinal (Fractures)	Stem, Root	Forest
Urticaceae	<i>Urtica dioica</i> L.	ჭინჭარი (ch'inch'ari)	ფსრა (psra - Ossetian)	Human Food (Phkhali, Kinkali)	Leaves, Stem	Forest
Violaceae	<i>Viola</i> sp.	ია (ia), იაია (iaia)		Human Food (Phkhali)	Leaves, Stem	Forest
Vitaceae	<i>Vitis sylvestris</i> W. Bartram	უსურვაზი (usurazi)		Human Food, Ornamental	Fruit	Forest
Vitaceae	<i>Vitis vinifera</i> L.	ყურძენი (q'urdzeni)		Human Food	Fruit	Garden

Table 2. Participants in Kakheti and Kvemo Kartli

informant code	gender	age	community	elevation m	district
256	F	80	Verona	1260	Sagarejo
257	M	68	Verona	1260	Sagarejo
258	F	73	Verona	1260	Sagarejo
259	F	80	Sig'nag'i	790	Sig'nag'i
260	M	80	Nukriani	970	Sig'nag'i
261	F	80	Nukriani	970	Sig'nag'i
262	F	60	Kvemo Magaro	550	Sig'nag'i
263	M	60	Kvemo Magaro	550	Sig'nag'i
264	F	49	Kedeli	720	Sig'nag'i
265	M	60	Kedeli	720	Sig'nag'i
266	F	45	Kedeli	720	Sig'nag'i
267	F	50	Kedeli	720	Sig'nag'i
268	F	55	Kedeli	720	Sig'nag'i
269	F	45	Kedeli	720	Sig'nag'i
270	F	50	Kedeli	720	Sig'nag'i
271	F	55	Kedeli	720	Sig'nag'i
272	M	72	Zinobiani	600	Kvareli
273	M	70	Lagodekhi	450	Lagodekhi
274	F	40	Akhalsopeli	460	Kvareli
275	F	50	Akhalsopeli	460	Kvareli
276	F	55	Akhalsopeli	460	Kvareli
277	F	55	Akhalsopeli	460	Kvareli
278	F	66	Satskhene	775	Kvareli
279	M	62	Chantlikure	400	Kvareli
280	F	60	Chantlikure	400	Kvareli
281	F	42	Pona	400	Kvareli
282	M	63	Sagrasheni	1180	Tetritskaro
283	M	60	Sagrasheni	1180	Tetritskaro
284	M	60	Asureti	720	Tetritskaro
285	M	78	Sagrasheni	350	Tetritskaro
286	F	74	Sagrasheni	350	Tetritskaro
287	F	40	Chkhikvta	893	Tetritskaro
288	M	37	Chkhikvta	893	Tetritskaro
289	M	79	Tetritskaro	1120	Tetritskaro
290	F	65	Sagrasheni	350	Tetritskaro
291	F	65	Sagrasheni	350	Tetritskaro
292	F	70	Sagrasheni	350	Tetritskaro
293	F	70	Sagrasheni	350	Tetritskaro
294	F	70	Sagrasheni	350	Tetritskaro
295	F	70	Sagrasheni	350	Tetritskaro
296	F	70	Sagrasheni	350	Tetritskaro
297	F	55	Sagrasheni	350	Tetritskaro
298	M	82	Didi magareti	1098	Tetritskaro
299	F	85	Didi magareti	1098	Tetritskaro
300	F	55	Kvemo Magaro	500	Sig'nag'i

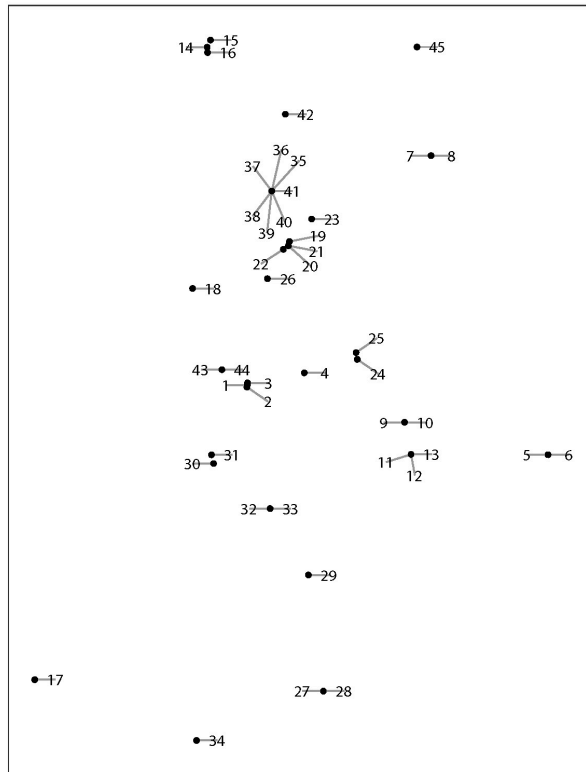
Participants were little differentiated by plant species reported, and age was not a distinctive factor for species knowledge differences (Fig. 6 A,B). However, in case of different plant uses, some clear differences were visible (Fig. 6 D,E). The location of the participant community significantly fit the ordination in plant-space (C, $r^2 = 0.261$) and in use-space (E, $r^2=0.373$) (Fig. 6 C,F). Overall, the elevation of the study community and the community location were the main separating variables for differences in both plant-space, with the community location being the most explicative factor ($r^2=0.6763$,

$P=0.001$; Table 3) and use-space $r^2=0.6628$, $P=0.001$; Table 4), although in the latter gender and age also were highly significant in explaining differences in use, with women and older participants showing a higher knowledge of different plant uses. The number of plant species used in the research area, as well as their uses were much lower than reported from other areas of Georgia, with a mean of 41.1 plants known by participant (versus 58.1 in other areas), and a mean of 42.4 uses (versus 62.7 in other areas) (Figs. 7 and 8). The trend to know fewer species was less evident for cultivated species

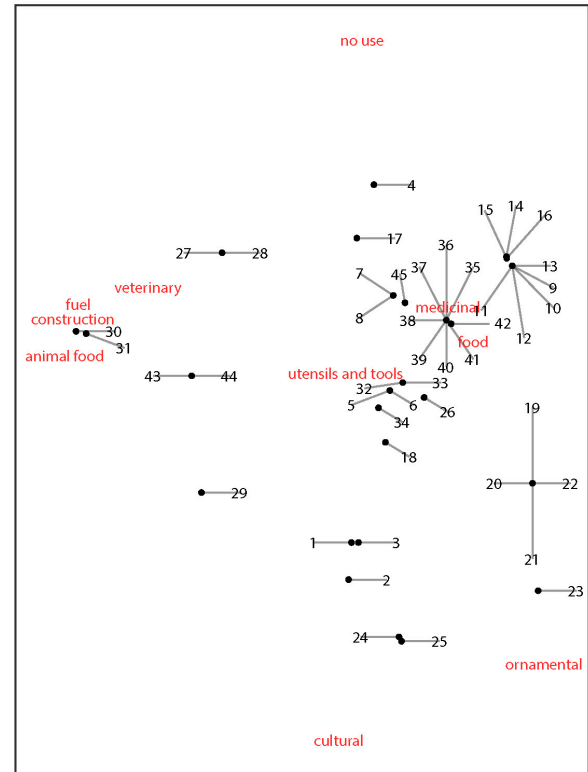
than for forest plants (Fig. 9). However, when observing plant uses, the lack of knowledge, as

compared to other regions, was as significant for forest and garden species (Fig. 10).

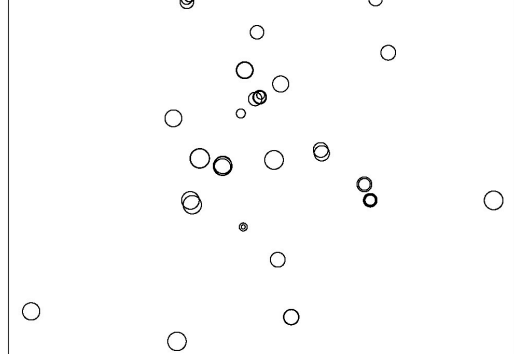
A Informants in plant-space



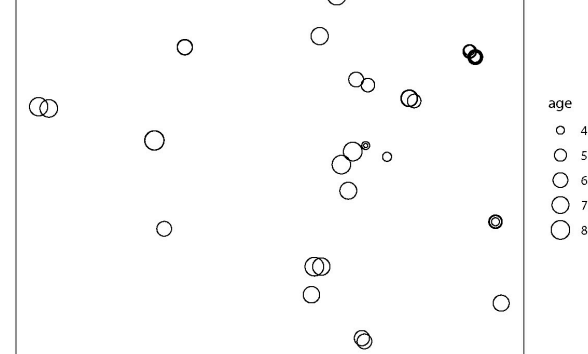
D Informants in use-space



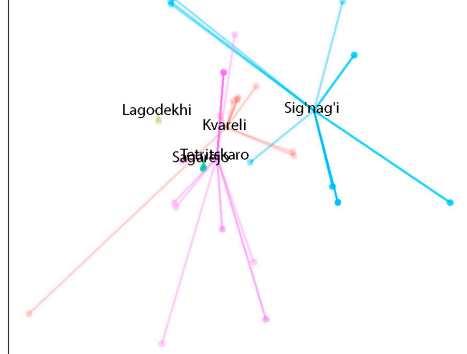
B not significant



E $r^2 = 0.29$



C $r^2 = 0.261$



F $r^2 = 0.373$

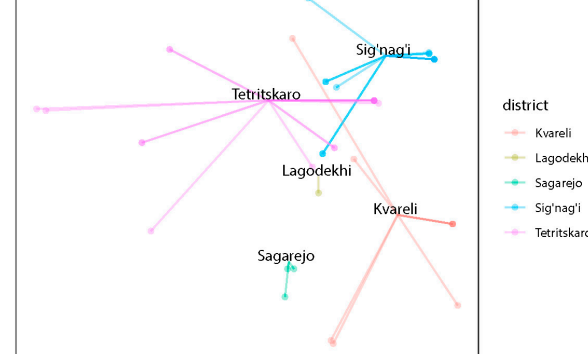


Fig. 6. Participants ordered by their distance in plants reported (A,B,C) and in uses reported (D,E,F). Participants are more differentiated by plant species reported (A, participants shown but plant species hidden for visual clarity) than by use reported (D, participants and uses shown).

Table 3. Environmental fit on ordination of individuals in plant-space

	r^2	p-value
Age	0.0475	0.347
Elevation	0.2843	0.001 ***
Gender	0.1021	0.009 **
Community	0.6763	0.001 ***
District	0.2632	0.004 **

Table 4. Environmental fit on ordination of individuals in use-space

	r^2	p-value
Age	0.2897	0.001 ***
Elevation	0.0880	0.146
Gender	0.1797	0.001 ***
Community	0.6628	0.001 ***
District	0.3732	0.001 ***

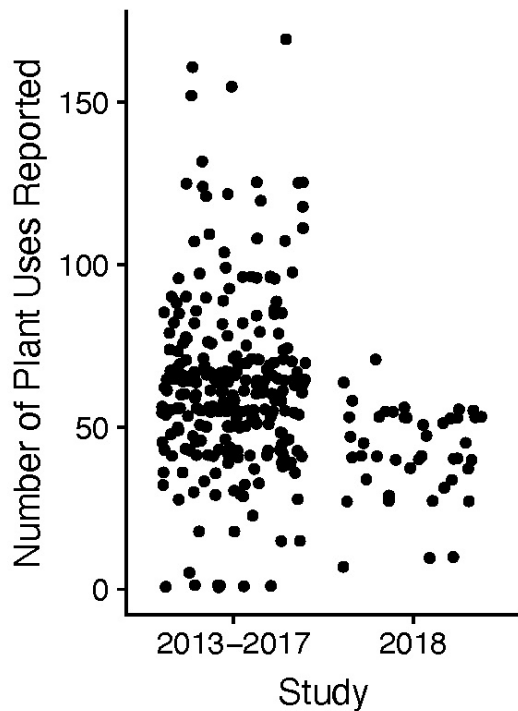


Fig. 7. Number of plant uses reported by each participant in this study (2018) in comparison to previous studies in Georgia (2013-2017).

Discussion

As we hypothesized, the number of plant species used in the research area, as well as their uses were much lower than reported from other areas of Georgia, with a mean of 41.1 plants known by participant (versus 58.1 in other areas), and a mean of 42.4 uses (versus 62.7 in other areas), equally for Svaneti-Lechkumi-Khevsureti (Bussmann et al. 2014, 2016a), Samtskhe-Javakheti (Bussmann et al. 2017a,b), and high altitude Tusheti-Khevsureti (Bussmann et al. 2016b, 2017c), and thus lower than

species numbers and use reports than other areas in the wider Georgia (Bussmann et al. 2016c, Bussmann 2017; Zenderland et al. 2019). This might well be explained by the fact that Kakheti and Kvemo Kartli have fertile soils and short winters, and thus agricultural production is possible almost all year round. For this reason, foraging for wild vegetables is simply not a necessity, and expectedly herbal dishes like *Pkhali* are rarely found.

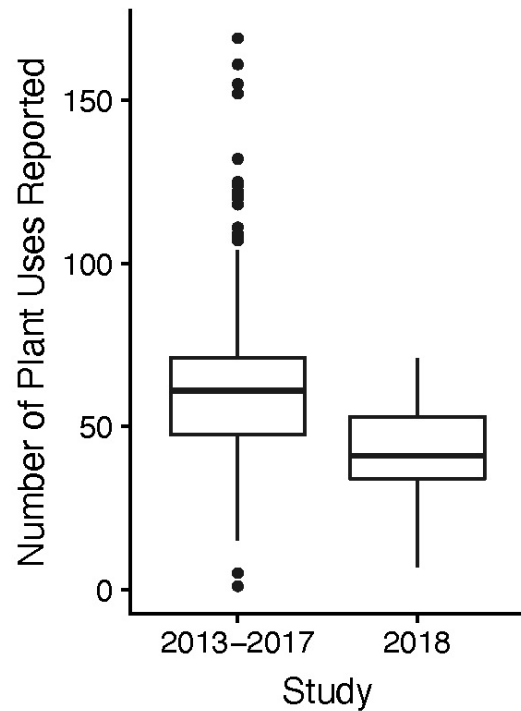


Fig. 8. Number of plant-uses reported by each participant in this study (2018) in comparison to previous studies in Georgia (2013-2017).

In addition, the entire region has easy access major markets, which again reduces the need for foraging. Likewise, the closeness to major health centers with well-functioning public health infrastructure reduces greatly the need to use herbal medicines.

The prevalence of wild collected species for medicinal applications, and garden species for food, was very similar in other regions (Bussmann et al. 2017a; Pieroni and Söukand 2017).

Most species and uses were widely spread across the region. Overall participants showed a high informant consensus in all use-categories. The large exceptions where Lagodekhi and Sagarejo, with very few species used, and Lagodekhi with a very low informant consensus (Table 5). This might be explained by the fact that both regions harbor large numbers of immigrants from other areas of Georgia, which all have different plant use traditions.

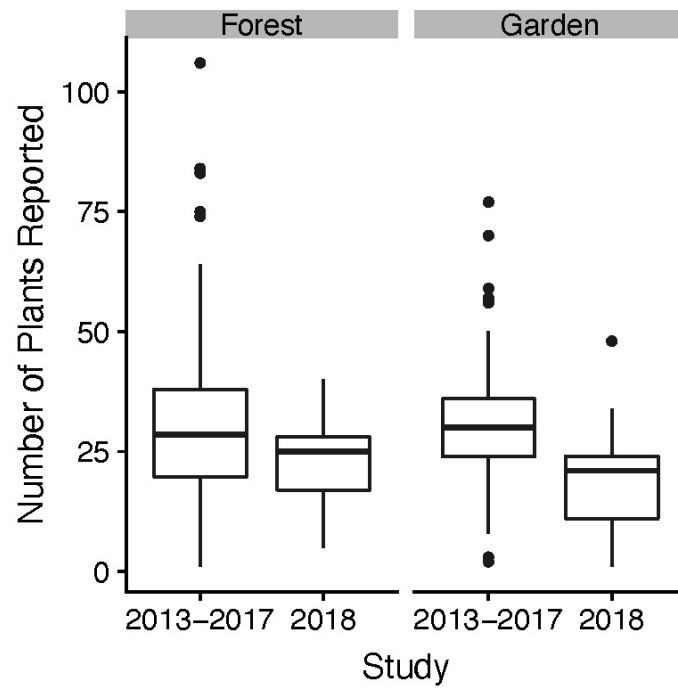


Fig. 9. Number of plant species known by each participant for forest and garden species.

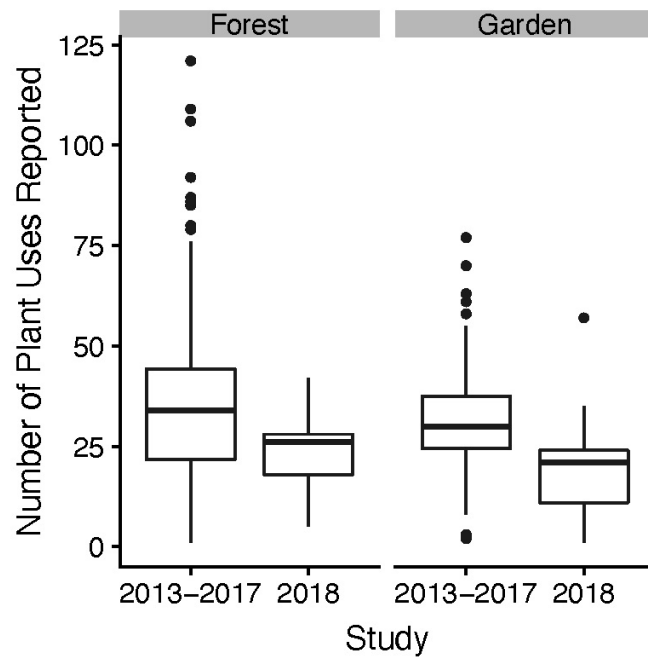


Fig. 10. Number of use reports by each participant for forest and garden species.

Table 5. Mean informant consensus across use categories among informant districts, with total number of use reports and taxa.

District	N Use Categories	Total Use Reports	Total Taxa	ICF mean	ICF sd
Kvareli	5	463	127	0.61	0.19
Lagodekhi	3	68	58	0.1	0.14
Sagarejo	4	123	42	0.76	0.16
Sig'nag'i	4	534	145	0.64	0.15
Tetritskaro	8	887	145	0.79	0.14

While many houses in some regions of Kvemo-Kartli still clearly show their Swabian heritage, no traces whatsoever of plant knowledge or plant names that might trace back to that heritage could be found, which indicates that after their deportation to Kazakhstan and Siberia during the 1940s, very few Swabians returned to the Caucasus, and their original contribution to local knowledge was completely erased.

Overall the research region showed a lower species number in comparison to a wide variety of studies published from other parts of Europe. The number of food species was low in comparison to other areas in the wider Mediterranean and Caucasus (Carvalho 2016; Dolina et al. 2017; Hajdari et al. 2018; Kasper-Pakosz et al. 2016; Korkmaz et al. 2016; Łuczaj et al. 2017, 2019; Mattalia et al. 2020; Melián et al. 2017; Mustafa et al. 2020; Nedelcheva et al. 2017; Öztürk et al. 2018; Polat et al. 2017; Pawera et al. 2017; Pieroni and Cattero 2018; Pieroni and Sökand 2017, 2019; Pieroni 2017; Pieroni et al. 2018, 2019, 2020; Savo et al. 2019; Sökand et al. 2017, 2019, 2020; Yeşil et al. 2019), and the number of medicinal species also was lower than in comparative studies (Pieroni and Sökand 2017; Nedelcheva et al. 2017; Melián et al. 2017; Sökand et al. 2017; Carvalho 2016; Polat et al. 2017; Kasper-Pakosz et al. 2016; Korkmaz et al. 2016a; Dolina et al. 2017; Korkmaz et al. 2016b; Hajdari et al. 2018; Öztürk et al. 2018; Pawera et al. 2017; Pieroni 2017; Pieroni et al. 2018). The low variety of fungal species used as food was astonishing, especially when compared to other adjacent areas in Georgia, e.g. Racha, where fungal use was found to be very common (Kupradze et al. 2015; Bussmann et al. 2018).

Our results confirmed our hypothesis that (1) plant use knowledge in general would lower in these regions than in the rest of Georgia, that (2) most plant use would center on home gardens (3) that the consumption of herbs as "*Pkhali*" (herb pie), very prevalent in other regions of Georgia, would be limited, and that (4) there would essentially be no trace of Swabian traditional knowledge in the region.

Conclusions

The lack of forest plant use, and both forest and garden plant-use knowledge in Kakheti and Kvemo-Kartli might be traced to the fact that both regions are close to large markets in the region, which make it less necessary to grow or forage many species. In addition, Kakheti is easily one of the most fertile regions in Georgia, with a very short winter and there is essentially no need for foraging wild species e.g. for *Pkhali*. Lagodekhi, with its almost subtropical climate, is an extreme example of that, with almost

no recorded forest plant use. Overall the results on plant use in the Kakheti region need to be taken with a grain of salt, because a large part of the population of the region is actually not original from Kakheti. Many Imeretians and Ossetians moved to the region since independence and brought their plant knowledge with them. Thus, this study might be regarded as a snapshot of intercultural plant knowledge, which is however not equal to these plants actually being used in everyday life.

Declarations

List of abbreviations: Not applicable.

Ethics approval and consent to participate: Oral informed consent was obtained from all participants before conducting interviews.

Consent for publication: No personal information is disclosed, any person shown in an image gave their consent for publication.

Conflict of interests: The authors declare that they have no conflict of interests.

Competing financial interests: The authors declare that they have no competing financial interest.

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Author contributions: RWB, NYPZ, SS, ZK, DK, DT and KB designed the study; RWB, NYPZ, SS, ZK, DT and KB conducted the fieldwork, RHE conducted the main statistical analysis; RBU, NYPZ and RHE analyzed the data and wrote the manuscript; all authors read, corrected and approved the manuscript.

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