Unity in diversity—food plants and fungi of Sakartvelo (Republic of Georgia), Caucasus

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Abstract

Background: The Republic of Georgia is part of the Caucasus biodiversity hotspot, and human agricultural plant use dates back at least 6000 years. Over the last years, lots of ethnobotanical research on the area has been published. In this paper, we analyze the use of food plants in the 80% of Georgia not occupied by Russian forces. We hypothesized that (1) given the long tradition of plant use, and the isolation under Soviet rule, plant use both based on home gardens and wild harvesting would be more pronounced in Georgia than in the wider region, (2) food plant use knowledge would be widely and equally spread in most of Georgia, (3) there would still be incidence of knowledge loss despite wide plant use, especially in climatically favored agricultural regions in Western and Eastern Georgia.

Methods: From 2013 to 2019, we interviewed over 380 participants in all regions of Georgia not occupied by Russian forces and recorded over 19,800 mentions of food plants. All interviews were carried out in the participants’ homes and gardens by native speakers of Georgian and its dialects (Imeretian, Rachian, Lechkhumian, Tush, Khevsurian, Psavian, Kakhetian), other Kartvelian languages (Megrelian, Svan) and minority languages (Ossetian, Ude, Azeri, Armenian, Greek).

Results: The regional division was based primarily on historic provinces of Georgia, which often coincides with the current administrative borders. The total number of taxa, mostly identified to species, including their varieties, was 527. Taxonomically, the difference between two food plant groups—garden versus wild—was strongly pronounced even at family level. The richness of plant families was 65 versus 97 families in garden versus wild plants, respectively, and the difference was highly significant. Other diversity indices also unequivocally pointed to considerably more diverse family composition of wild collected versus garden plants as the differences between all the tested diversity indices appeared to be highly significant.

The wide use of leaves for herb pies and lactofermented is of particular interest. Some of the ingredients are toxic in larger quantities, and the participants pointed out that careful preparation was needed. The authors explicitly decided to not give any recipes, given that many of the species are widespread, and compound composition—and with it possible toxic effects—might vary across the distribution range, so that a preparation method that sufficiently reduces toxicity in the Caucasus might not necessary be applicable in other areas.

Conclusions: Relationships among the regions in the case of wild food plants show a different and clearer pattern. Adjacent regions cluster together (Kvemo Zemo Racha, and Zemo Imereti; Samegrelo, Guria, Adjara, Lechkhumi and Kvemo and Zemo Svaneti; Meskheti, Javakheti, Kvemo Kartli; Mtiáneti, Kakheti, Khevsureti, Tusheti. Like in the case of

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Background
Georgia is situated between latitudes 41° and 44° N, and longitudes 40° and 47° E, with an area of 69,700 km², with 20% of the country currently occupied by Russian forces (Fig. 1). Georgia politically associates with European Union and takes part in all major programs of European development and cooperation. Georgia can be defined as a transcontinental country on the divide between Asia and Europe, with its larger part located south to this divide (i.e., in Asia) and smaller but strategically important parts (Khevi, Piriketi Khewsureti, etc.) located north of the continent divide (i.e., in Europe) [1].

The uplift of the Georgian Caucasus started in the late Oligocene and shares the same structural characteristics as the younger mountains of Europe. The Greater Caucasus mostly includes Cretaceous and Jurassic rocks, interspersed with Paleozoic and Precambrian formations in higher regions. Hard, crystalline, metamorphosed rocks like schist and gneisses, as well as pre-Jurassic granites are found in the western part, while softer, Early and Middle Jurassic clayey schist and sandstones in the eastern part. The foot of the Greater Caucasus are built of younger limestone, sandstones, and marls. The Lesser Caucasus in contrast is predominantly formed of Paleogene rocks interspersed with Jurassic and Cretaceous formations. The youngest geological structures of Georgia are represented by the vast volcanic plateaus in the southern part of country. These divisions lead to an extremely complex terrain with pronounced climatic gradients: (1) the mountains of the greater Caucasus with peaks over 5000 m (Shkara, Babis Mta, Chanchakhi, etc.); (2) the inter-mountain plains between the Greater and Lesser Caucasus mountains; (3) the mountains of the Lesser Caucasus with peaks rarely exceeding 3000 m (Mepistskaro, Kheva, Shavi Klde, Kanis Mta, Arsiani); (4)

the garden food plants, species diversity of wild food plants mentioned varied strongly. Climate severity and traditions of the use of wild food plants might play role in this variation. Overall food plant knowledge is widely spread all-across Georgia, and broadly maintained.

Keywords: Republic of Georgia, Caucasus, Traditional Knowledge, Knowledge loss, Food plants, Conservation
the Volcanic plateau of the Southern Georgia with elevations from 1300 to 2200 m [2–4].

Georgia’s climate is influenced by its location in the warm temperate zone stretching from the Black to the Caspian Seas, and the complexity of its terrain. Georgia has a coastline of 330 km with warm climate, the mean temperature reaching 4–7 °C in January and 22–23 °C in July, and high precipitation (1500–2000 mm annually). The warm oceanic-subtropical climate can be found only at lower elevations (less than 650 m); in more elevated terrains and to the north and east the climate becomes moderately warm. The Greater Caucasus bars cold air from the north, while warm and moist air from the Black Sea spreads easily into the coastal lowlands until reaching the Likhi range, which partly impedes further westward movement of the warm and moist air. In central Georgia, precipitation in mountains can be twice that in the plains. In the mountains, weather conditions change to cool and wet quite steeply with increasing elevation and above 2100 m the environment becomes sub-alpine and alpine, with permanent snow and ice above 3600 m [2–4].

Plant use history
The Caucasus is regarded as global biodiversity hotspot [5–8]. Botanical has a long history, and the vegetation composition as well as flora are well-known [2, 3].

The territory of modern-day Georgia (Fig. 1) has been inhabited since the early Stone Age, and agriculture was already well-developed during the early Neolithic [9], although human occupation started already in the Early Pleistocene, with the 1.7-Myr-old hominid fossils of Dmanisi in Southern Georgia being the earliest known hominin-site outside of Africa [10–12]. The history of plant and animal use has been documented since the hominid-site outside of Africa [10–12]. The history of plant and animal use has been documented since the hominid-site outside of Africa [10–12]. The history of plant and animal use has been documented since the hominid-site outside of Africa [10–12]. The history of plant and animal use has been documented since the hominid-site outside of Africa [10–12].

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| Family / Scientific name | Local Name (Georgian, if not indicated otherwise in parentheses: Arm. = Armenian; Imr. = Imrebian; Khv. = Khevsurian; Psha. = Pshavi; Rach. = Rachaian; Russ. = Russian; Svan. = Svanetian; Tush. = Tushetian) | Use description (for a short explanation of traditional foods see below) | Location |
|--------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|---------|
| **Actinidiaceae**         |                                                                                                 |                                                                            |         |
| Actinidia callosa Lindl.  | ჯოქ (kvi), აქტინიდია (aktinidia)                                                              | Fruit - Eaten raw, used to distill Alcohol, and make Jam Leaves - Phkhali   | Garden  |
| **Adoxaceae**             |                                                                                                 |                                                                            |         |
| Sambucus ebulus L.        | ახალე (antsili), ახალე (antsili), გინვი (genghli Svan.), ქარდუ (gencia Svan.)               | Fruit - Eaten raw, used to distill Alcohol, and make Jam Leaves - Phkhali   | Wild collected, Garden |
| Sambucus nigra L.         | ფოვაჯია (ofialga), თხოფაჯია (tkhopisa), თხოფაჯია (thophial Svan.)                        | Fruit - Eaten raw, used to distill Alcohol, and to make Jam Leaves - Phkhali | Wild collected |
| Viburnum lantana L.       | უზანი (uzani), თურსა (tursa Tush.), თანდაფახი (tanzof Svan.), ალუდა (alauda Khv.), ურდჰანა (urdzani Khv.), ფრიშზა (frishia Khv.) | Fruit - Eaten raw                                                        | Wild collected, Garden |
| Viburnum opulus L.        | დჰუხაქჰელი (dhakhvili), თანდაფახი (tanzof Svan.), სამხაღვი (santhzep Svan.), ბაფხოფი (ts'aants'ofi Svan.), ალუდა (alauda Khv.) | Fruit - Eaten raw, used to distill Alcohol, and for tea                  | Wild collected |
| **Amaranthaceae**         |                                                                                                 |                                                                            |         |
| Amaranthus cruentus L.    | ლეგიუჯი-ვალვილი (legiuj'evavalvi), ლეგეთი (legeti)                                          | Leaves - Phkhali                                                          | Garden  |
| Amaranthus palmeri S. Watson | ლეგეთი (legeti)                                                                              | Leaves - Phkhali                                                          | Garden, Wild collected, Garden |
| Amaranthus paniculatus L. | ლეგეთი (legeti), თალიელი (talieli legeti), თალიელი (talieli legeti)                         | Leaves, Stem - Phkhali                                                   | Wild collected |
| Amaranthus retroflexius L. | ლეგეთი (legeti), ჩხიჰარილა (chxharil), ჩხარიჰარილა (chxharil), პეელიდი (peelidi) | Leaves, Stem - Phkhali, Khachapuri                                     | Wild collected, Garden |
| Amaranthus spinosus L.     | ლეგიუჯი-ვალვილი (legiuj'evavalvi)                                                            | Stem - Eaten raw, Phkhali                                                 | Garden  |
| Atriplex hortensis L.      | ლეგეთი (legeti), თალიელი (talieli legeti), თალიელი (talieli legeti)                         | Root - Eaten raw                                                          | Garden  |
| Beta vulgaris L.           | ლეგეთი (legeti), ჩხარhz (chxharil), ჩხარhz (chxharil), პეელი (peelidl)                     | Leaves - Pickled (lactofermented), Phkhali                               | Garden  |
| Beta vulgaris L. ssp. cica (L.) | მამიდი (miadi), გოლოგურია (goluguri)                                                       | Leaves - Phkhali                                                          | Garden  |
| Beta vulgaris L. ssp. esculenta (Salisb.) | ჩხარhz (chxharil), ხუჰი (khui)                                                             | Root - Eaten raw and cooked Leaves - Pickled (lactofermented), Phkhali    | Garden  |
| Bittium virgatum L.       | მამიდი (miadi), გოლოგურია (goluguri)                                                       | Leaves, Stem, Seeds - Phkhali                                            | Wild collected |
| Chenopodium album L.       | ნატსარანში (natsaranshi), წართუხილი (zhatuqili)                                          | Leaves, Stem - Phkhali, Khachapuri, Mikhlovana                          | Garden, Wild collected |
| Chenopodium bonus-henricus L. | მამიდი (miadi), გოლოგურია (goluguri)                                                       | Leaves - Pickled (lactofermented), Phkhali                               | Garden  |
| Chenopodium sp.            | მამიდი (miadi), გოლოგურია (goluguri)                                                       | Leaves - Pickled (lactofermented), Phkhali                               | Garden  |
| Spinacia oleracea L.       | პარაჯა (paraja), ნატსარათაში (natsaratsshi)                                               | Leaves - Pickled (lactofermented), Phkhali                               | Garden  |
| **Amaryllidaceae**         |                                                                                                 |                                                                            |         |
| Allium ampeloprasum L.     | ჭილია (prasi), ჭილია (prasi)                                                                  | Leaves, Stem, Whole plant - Phkhali                                       | Garden  |
| Allium ascalonicum L.      | ჭილია (prasi), ჭილია (prasi)                                                                  | Leaves, Stem, Whole plant - Phkhali                                       | Garden  |
| Allium atrovilacaeum Boiss  | ჭილია (prasi), ჭილია (prasi)                                                                  | Leaves, Stem, Whole plant - Phkhali                                       | Garden  |
| Allium cepa L.             | ჭილია (prasi), ჭილია (prasi)                                                                  | Leaves - Eaten raw and cooked, Spice Leaves - Phkhali                     | Garden  |
| Allium fistulosum L.       | ჭილია (prasi), ჭილია (prasi)                                                                  | Bulb, Whole plant, Stem, Leave - Eaten raw and cooked, Spice, Phkhali    | Garden  |
| Allium kundianum Vved.     | ჭილია (prasi), ჭილია (prasi)                                                                  | Leaves - Phkhali                                                          | Wild collected |
| Allium pomlicum Miec.      | ჭილია (prasi), ჭილია (prasi)                                                                  | Bulb - Pickled (lactofermented)                                           | Garden  |
| Allium porrum L.           | ჭილია (prasi), ჭილია (prasi)                                                                  | Bulb - Pickled (lactofermented)                                           | Garden  |
### Table 1 (continued)

| Plant Species | Common Names (in parentheses) | Plant Parts Used | Processing | Market Place | Source |
|---------------|-------------------------------|------------------|------------|--------------|--------|
| Allium rotundum L. | Chinese chives (g'anis nior), wild garlic (chil'akvi), mountain garlic (sorkhi), garlic (g'og's sorkhi) | Stem, Bulb - Eaten raw, Phkhali, Pickled (lactofermented) | Garden |
| Allium sativum L. | Wild garlic (nior), Chinese chives (rurula nior) | Bulb, Flowers, Leaves, Whole plant | Eaten raw, Cooked, Phkhali | Garden |
| Allium sp. | | Stem - Eaten raw | Wild collected |
| Allium ursinum L. | Wild garlic (ghanziili), wild garlic (mits ghanzili), onion (olenia), onion (sobo), mountain garlic (nihanhandzi Svan.) | Leaves, Whole plant - Phkhali, Pickled (lactofermented) | Wild collected, Garden |
| Allium victorialis L. | Wild garlic (ghanziili), wild garlic (mits ghanzili), onion (olenia), onion (sobo), mountain garlic (mits ghanzili), firtsilla | Leaves, Stem, Bulb, Whole plant - Phkhali, Pickled (lactofermented) | Wild collected, Garden |
| Gaianthus woronowii Losinsk. | Stunning color (voronovis tetra'vavila), green (endzelia) | Bulb - Eaten raw (NOTE - in other regions regarded as toxic) | Wild collected |
| Narcissus sp. | Lilies (nargizil), needle (niora mtenere) | Flower - Eaten raw (NOTE - in other regions regarded as toxic) | Wild collected |
| **Annonaceae** | | | |
| Annona cherimola Mill. | Anon (anona) | Fruit - Eaten raw | Garden |
| **Aplaceae** | | | |
| Aethusa cynapium L. | Aethusa (marazmazara) | Leaves - Phkhali | Wild collected |
| Agastis filliolata (Bieb.) Boiss. | Aethusa (duts), Aethusa (lagi Khev.), Dast (gheh Svan.), Dast (gel Svi.) | Stem, Leaves, Root - Phkhali, Pickled (lactofermented), Chave, Khachapuri | Wild collected |
| Anethum graveolens L. | Anethum (k'ma), Anethum (tsretso didi k'ma), Anethum (tsretso) | Leaves, Seeds, Stem, Whole plant - Spice, ingredient of Svan salt, Eaten raw | Garden |
| Angelica tatarica Boltz. | Angelica (angeloca) | Stem - Pickled (lactofermented) | Wild collected |
| Anthriscus cerefolium (L.) Hoffm. | Anthriscus (ch'tima-pkhali) | Leaves - Stem - Phkhali | Garden |
| Anthriscus nemorosus (M. Bieb.) Spreng. | Anthriscus sylvestris L. | Leaves (limi), Anthriscus (ch'qm), Anthriscus (matsara), Anthriscus (g'mis deda), (Mandag Arm.) | Leaves, Seeds, Stem - Pickled (lactofermented), Eaten raw | Wild collected, Garden |
| Apium graveolens L. | Apium (niakhrure), Apium (vidi niakhrure), Apium (sona) | Stem, Root, Leaves - Eaten raw, Pickled (lactofermented), Spice, Phkhali | Garden |
| Carum carvi L. | Carum (zira), Carum (k'lvi), Carum (k'lvi), Carum (k'lvi), Carum (k'lvi), Carum (k'lvi), Carum (k'lvi), Carum (k'lvi), Carum (k'lvi) | Seeds - Spice, ingredient of Svan salt, Eaten raw, Khinkali, Chave, Pickled (lactofermented) | Garden, Wild collected |
| Chaerophyllum aureum L. | Chaerophyllum (dzrents'k'la), Chaerophyllum (g'mi'ora), Chaerophyllum (khuz), Chaerophyllum (g'mi'ora), Chaerophyllum (ghvag Svan.), Chaerophyllum (ch'imi Tush.) | Stem, Root - Pickled (lactofermented) | Wild collected |
| Chaerophyllum bulbosum L. | Chaerophyllum (g'mi), Chaerophyllum (a'oi), Chaerophyllum (khi'khola), Chaerophyllum (ch'imi Tush.) | Stem, Leaves, Seeds, Pickled (lactofermented), Khachapuri | Wild collected |
| Chaerophyllum caucasicum (Fisch.) B. Schischk | Chaerophyllum (k'iq), Chaerophyllum (k'iq), Chaerophyllum (k'iq), Chaerophyllum (k'iq), Chaerophyllum (khvshuris d'qil), Chaerophyllum (ok'k'na), Chaerophyllum (k'ma) | Leaves, Stem, Root - Phkhali, Pickled (lactofermented), Khachapuri, Pickled (lactofermented) | Wild collected |
| Conium maculatum L. | Conium (matut), Conium (k'onio), Conium (mata) | Leaves, Stem - Phkhali, Pickled (lactofermented) (NOTE - in other regions regarded as highly toxic) | Wild collected |
| Coriandrum sativum L. | Coriander (kindzi) | Seeds, Leaves, Stem - ingredient of Svan salt, Phkhali, Spice | Garden |
| Daucus carota L. ssp. sativus | Daucus (st'apa), Daucus (teriisvai'a), Daucus (ka'la), Daucus (marovkii), (Markova Arm.) | Root, Leaves, Whole plant - Phkhali, Eaten raw | Garden |
| Falcaria vulgaris Benth. | Falcaria (zepirokhi'hla), Falcaria (bat'pe'ka) | Leaves, Stem, Pickled (lactofermented) | Wild collected |
| Foeniculum vulgare Mill. | Foeniculum (tsretso), Foeniculum (didi k'ma), Foeniculum (ok'k'na), Foeniculum (k'ma) | Stem, Leaves, Seeds, Leaves - Eaten raw, Phkhali, ingredient of Svan salt, Spice | Garden |
| Heracleum asperum M. Bieb. | Heracleum (shu'p'a) | Stem, Leaves - Pickled (lactofermented) | Wild collected |
| Heracleum esculentum Grossh. | Heracleum (shu'p'a) | Stem, Leaves - Pickled (lactofermented), Sats'ebai, Phkhali | Wild collected |
| Heracleum sect. villosum | Heracleum (digi), Heracleum (khevshuris d'qil), Heracleum (dio'na), Heracleum (ch'ed'ka) | Stem, Leaves, Seeds, Stem - Pickled (lactofermented), Phkhali, Sats'ebai, Chave | Wild collected, Garden |
| Heracleum sosnowskyi Manden | Heracleum (shu'p'a) | Stem, Leaves - Pickled (lactofermented), Sats'ebai, Phkhali | Wild collected |
| Scientific Name                              | Common Name          | Preparation Method                          | Collection Method     |
|---------------------------------------------|----------------------|---------------------------------------------|-----------------------|
| Heracleum sp.                               | Stem (leškhi)        | Stem - Pickled (lactofermented)             | Wild collected        |
| Heracleum sp.                               | Leaves (Pkhali)      | Wild collected                              |                       |
| Heracleum sp.                               | Leaves - Pkhali      | Wild collected                              |                       |
| Heracleum sp.                               | Leaves - Pkhali      | Wild collected                              |                       |
| Heracleum sp.                               | Leaves - Pkhali      | Wild collected                              |                       |
| Heracleum wilhelmsii Fisch. & Avé-Lal       | Stem - Pickled (lactofermented) | Wild collected     |                       |
| Hippomarathrum crispum (Pers.) Boiss.       | Leaves, Stem - Pkhali| Pickled (lactofermented)                   | Wild collected        |
| Levisticum officinale W.D.J. Koch            | Leaves, Stem - Pkhali| Chave, Sats'ebai, Pickled (lactofermented) | Wild collected, Garden|
| Ligusticum alatum Spreng. (Mill.) Fuss      | Leaves - Pkhali      | Wild collected                              | Garden                |
| Xanthogalum purpurascens Avé-Lal. A.                                   | Stem - Eaten raw     | Wild collected                              |                       |
| Arum italicum subsp. abisoothum (Stevens ex Ledeb.) Prime               | Leaves - Pkhali      | Wild collected                              |                       |
| Arum orientale M. Bieb.                     | Leaves - Pkhali      | Wild collected                              |                       |
| Arum sp.                                    | Leaves - Pkhali      | Wild collected                              |                       |
| Arum sp.                                    | Leaves - Pkhali      | Wild collected                              |                       |
| Arum sp.                                    | Leaves - Pkhali      | Wild collected                              |                       |
| Arum sp.                                    | Leaves - Pkhali      | Wild collected                              |                       |
| Asarum asaroides L.                         | Asarum (aralia)      | Flower (hallun), Honey source (Bees)        | Garden                |
| Asparagus officinalis L.                    | Asparagus officinalis| Human Food, Human Food                       | Garden, Wild collected|
| Asparagus sp.                               | Human Food           | Wild collected                              |                       |
| Asparagus sp.                               | Human food           | Wild collected                              |                       |
| Muscari comosum Schol.                      | Human Food           | Wild collected                              |                       |
| Ophiorhizus convolutus Kashch                | Human Food           | Wild collected                              |                       |
| Polygonatum glabrumum C. Koch               | Human Food           | Wild collected                              |                       |
| Ruscus colchicus Yeo                        | Stem - Eaten raw     | Wild collected                              |                       |
| Ruscus hypophyllum L.                       | Stem - Eaten raw     | Wild collected                              |                       |
| Scilla sp.                                  | Stem - Eaten raw     | Wild collected                              |                       |
| Asaraceae                                   |                      |                                             |                       |
| Achillea grandiflora M. Bieb.               | Leaves - Pkhali      | Wild collected                              |                       |
| Achillea millefolium L.                     | Whole plant, Leaves - Tea, Khachapuri | Wild collected     |                       |
| Arctium lappa L.                            | Leaves - Pkhali      | Wild collected                              |                       |
| Artemisia absinthium L.                     | Leaves, Stem - Pkhali| Eaten raw, Pickled (lactofermented)         | Wild collected        |
| Artemisia dracunculus L.                    | Leaves - Pkhali      | Wild collected                              |                       |
| Artemisia vulgaris L.                       | Leaves, Root, Stem - Pkhali, Spicy, Eaten raw, Beverage | Wild collected     |                       |
| Bidentis tripartita L.                      | Leaved - Pkhali, Sats'ebai | Wild collected     |                       |
| Cichorium intybus L.                        | Seeds - Eatn raw     | Wild collected                              |                       |
| Cirsiun arvense (L.) Scop.                  | Roots, Coffee replacement | Wild collected     |                       |
| Cirsiun sp.                                 | Leaves - Pkhali      | Wild collected                              | Garden, Wild collected|
| Cirsiun vulgar (Savi) Ten.                   | Leaves - Sats'ebai   | Wild collected                              |                       |
| Crepis sp.                                  | Flower (hallun), Honey source (Bees) | Wild collected     |                       |
| Cynara cardunculus L.                       | Leaves - Pkhali      | Wild collected                              |                       |
| Echinops sp.                                | Flower - Eaten raw   | Wild collected                              | Garden                |
| Eruca vesicaria (L.) Cav.                    | Seeds - Eatn raw     | Wild collected                              |                       |
| Helianthus annuus L.                        | Leaves - Pkhali      | Wild collected                              | Garden                |
| Helianthus tuberosus L.                     | Leaves, Roots - Pkhali, Eaten raw | Wild collected     |                       |
| Lactuca salvia L.                           | Roots - Cooked       | Wild collected                              |                       |
| Lactuca salvia L.                           | Leaves - Pkhali      | Wild collected                              |                       |
| Lactuca semper L.                           | Leaves - Pkhali      | Wild collected                              | Garden                |
| Lapsana communis L.                         | Leaves - Pkhali      | Wild collected                              |                       |
| Lapsana grandiflora M. Bieb                | Leaves - Pkhali      | Wild collected                              |                       |
| Matricaria chamomilla L.                    | Leaves - Pkhali      | Wild collected                              |                       |

(Continued)
### Table 1 (continued)

| Species | Common Name | Part Used | Collection Method |
|---------|-------------|-----------|-------------------|
| Petasites albus (L.) Gaertn. | Buena (buera), ēlōna (dılma), dūndul (buur'gū) | Leaves - Phkhali | Wild collected |
| Petasites hybridus (L.) G. Gaertn., B. Mey. & Scherb. | Buena (buera), dūndul gurassh, gurgh (gurghīl gurash), dūndul (dılmia), buerog (buruhīl Svan.), buerog (baranmī Ajar.), ēlōna (ēlona) (Gurī) | Leaves - Phkhali, Chave, Pickled (lactofermented) | |
| Serratula quinquefolia Bieb. ex Willd. | Levhul (šahīl), ēlōna (dılmia), ēlahul (ēlona), ēlahul (ēlona), ēlahul (ēlona), ēlahul (ēlona) | Leaves - Phkhali, Chave, Pickled (lactofermented) | |
| Solidago canadensis L. | ḍēvīlī (dēvīlī) (quavis'se'rla) | Flower - Eatn raw | Wild collected |
| Sonchus asper (L.) Hill. | ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī) | Leaves - Phkhali | Wild collected, Garden |
| Stevia sp. | ḍēvīlī (dēvīlī) | Leaves - Sweetener | Garden |
| Tagetes patula L. | ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī) | Flowers, Leaves - Spice, ingredient of Svan salt | Garden, Wild collected |
| Taraxacum confusum Schischk. | ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), (Burushshīla Tush.), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī) | Leaves - Phkhali, Chave, Root - Phkhali | Wild collected |
| Taraxacum officinale Wigg. | ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī) | Leaves - Phkhali, Chave, Tea, Sweetener, Eaten raw | |
| Tragopogon sp. | ḍēvīlī (dēvīlī) (pampa'pa), (Śindz Arm.) | Root, Stem, Leaves, Latex - Eaten raw, Pickled (lactofermented), Phkhali | Wild collected, Garden |
| Tussilago farfara L. | ḍēvīlī (dēvīlī) (virīltar'pa) | Leaves - Tea | Wild collected |
| Xanthium strumarium L. | ḍēvīlī (dēvīlī) (gūrīs birk'a), ḍēvīlī (dēvīlī) | Leaves - Phkhali | Garden, Wild collected |
| Begoniaceae | Begonia rex Putz. | Seeds | Garden |
| Berberidaceae | Berberis vulgaris L. | Fruit, Leaves, Root - Phkhali, Tkemali, Phkhali | Wild collected |
| | | Leaves - Compote | |
| | | | |
| Betulaceae | Alnus glutinosa C.A. Mey. | ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī) | Leaves - Tea | Wild collected |
| Betula albofusca Dolch. | ḍēvīlī (dēvīlī) | Juice - Drunk raw | Wild collected |
| Betula sp. | ḍēvīlī (dēvīlī) | Juice - Drunk raw | Wild collected |
| Corylus avellana L. | ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), (shakhī Svan.), (khaka Svan.), (mema Svan.) | Fruit - Eaten raw | Garden, Wild collected |
| Corylus colurna L. | ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī) | Fruit - Eaten raw | Garden, Wild collected |
| Corylus pontica K. Koch. | ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), (shakhī Svan.), (khaka Svan.), (mema Svan.) | Fruit - Eaten raw | Garden, Wild collected |
| Fagus orientalis Lipsky | ḍēvīlī (dēvīlī) | Leaves - Phkhali | Wild collected |
| Boraginaceae | Myosotis sp. | Leaves - Phkhali, Khachapuri | Wild collected |
| Symphytum grandiflorum DC. | ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), (shakhī Svan.), (khaka Svan.), (mema Svan.) | Leaves - Phkhali, Khachapuri | Wild collected, Garden |
| Brassicaceae | Armoracia rusticana G. Gaertn., B. Mey. & Scherb. | ḍēvīlī (dēvīlī) (pīrshshukhīl), ḍēvīlī (khe'ten) | Root, Leaves - Phkhali, Eaten raw | Garden |
| Brassica juncea (L.) Czern. | ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), (shakhī Svan.), (khaka Svan.), (mema Svan.) | Leaves - Phkhali | Garden |
| Brassica montana Pourr. | ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), (shakhī Svan.), (khaka Svan.), (mema Svan.) | Leaves - Phkhali | Garden |
| Brassica oleracea L. | ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), (shakhī Svan.), (khaka Svan.), (mema Svan.) | Leaves - Phkhali, Eaten raw, Pickled (lactofermented) | Garden, Wild collected |
| Brassica oleracea L. var. botrytis | ḍēvīlī (dēvīlī), (shakhī Svan.), (shakhī Svan.), (shakhī Svan.) | Leaves - Phkhali, Pickled (lactofermented) | Garden |
| Brassica oleracea L. var. gemmifera | ḍēvīlī (dēvīlī), (shakhī Svan.), (shakhī Svan.), (shakhī Svan.), (shakhī Svan.), (shakhī Svan.) | Leaves - Phkhali | Garden |
| Brassica oleracea L. var. gongylodes | ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), (shakhī Svan.), (khaka Svan.), (mema Svan.) | Leaves - Phkhali | Garden |
| Brassica oleracea L. var. Italica | ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), ḍēvīlī (dēvīlī), (shakhī Svan.), (khaka Svan.), (mema Svan.) | Leaves - Phkhali | Garden |
| Brassica rapa subsp. campestris (L.) C. Meissn. | ḍēvīlī (dēvīlī) | Leaves - Phkhali | Wild collected |
| Brassica rapa subsp. oleifera (DC) Meissn. | ḍēvīlī (dēvīlī) | Leaves - Phkhali, Sats'ēs Island, Pickled (lactofermented), Eaten raw | Wild collected |
Table 1 (continued)

| Species                                      | Parts Used                  | Collection Method       |
|----------------------------------------------|-----------------------------|-------------------------|
| *Brassica rapa* L. subsp. *rapifera* Metzger | Root, Leaves - Pickled      | Garden                  |
| *Bunias orientalis* L.                      | Seeds - Eaten raw           | Garden                  |
| *Capsella bursa-pastoris* L.                 | Leaves, Flowers - Eaten raw | Wild collected          |
| *Cardamine hirsuta* L.                      | Leaves, Stem - Pickhilai    | Wild collected          |
| *Erysimum cheiri* L.                        | Leaves - Pickhilai          | Garden                  |
| *Lepidium sativum* L.                       | Leaves, Stem - Pickhilai    | Wild collected          |
| *Raphanus raphanistrum* subsp. *sativus* L.  | Root, Leaves - Pickhilai    | Garden                  |
| *Sinapis arvensis* L.                       | Stem, Leaves, Root - Pickhilai | Wild collected, Garden |
| *Campanulaeae*                               |                             |                         |
| *Campanula allianifolia* Wild.               | Leaves - Pickhilai          | Wild collected          |
| *Campanula biebersteiniana* Roem. & Schult.  | Flower - Eaten raw          | Wild collected          |
| *Campanula glomerata* L.                     | Leaves, Stem - Pickhilai    | Wild collected          |
| *Campanula raphanistrum* L.                  | Leaves, Root - Sats'ebai    | Wild collected          |
| *Gadellia lactiflora* (M. Bieb.) Shulikina   | Leaves, Stem - Pickhilai    | Wild collected          |
| *Humulus lupulus* L.                        | Seeds - ingredient of Svan salt, Eaten raw, Oil | Garden, Wild collected, Garden |
| *Lonicera caucasia* Pall.                    | Flower, Leaves - ingredient for Beer, Pickhilai, |                         |
| *Caryophyllaceae*                            |                             |                         |
| *Melandrium divaricatum* Boiss.              | Leaves - Pickhilai          | Wild collected          |
| *Melandrium sp.*                             | Leaves, Stem - Pickhilai    | Wild collected          |
| *Obemna acora Sims*                          | Leaves, Stem - Pickhilai    | Wild collected          |
| *Obemna wallichiana* Ikonn.*                 | Leaves, Stem - Pickhilovana | Wild collected, Garden  |
| *Silene sibirica* (L.) Pers.*                | Leaves, Stem - Pickhilai    | Wild collected          |
| *Stellaria media* (L.) VIII.                 | Leaves - Khachapuri        | Wild collected          |
| *Convulvulus arvensis* L.                    |                             |                         |
| *Cornaceae*                                  |                             |                         |
| *Cornus mas* L.                              | Fruit - Eaten raw, Jam, Juice, Compote | Garden, Wild collected |
| *Swida australis* (C.A. Mey.) Pojark ex Grosh.|                          |                         |
| *Crassulaceae*                               |                             |                         |
| *Sedum caucasicum* Boriss.                   | Leaves - Pickhilai          | Wild collected          |
| *Sempervivum caucasicum* Rupr. ex Boiss.     | Leaves - Pickhilai          | Wild collected          |
| *Cucurbitaceae*                              |                             |                         |
| *Bryonia dioica* Jacq.                       | Leaves - Pickhilai          | Wild collected          |
| *Citrus lanatus* (Thunb.)                     | Fruit - Pickled (lactofermented), Eaten raw | Garden, Garden          |
| *Fuss. & Naikai*                              | Fruit - Eaten raw            | Garden                  |
| *Cucurbita maxima* L.                        | Fruit, Flowers - Salad, eatten raw, Pickled (lactofermented), Dye for pickles | Garden |
| Family                | Genus                        | Species                        | Common Names | Habitat                  | Collection Method         | Notes                        |
|-----------------------|------------------------------|--------------------------------|--------------|--------------------------|---------------------------|------------------------------|
| Cucurbitaceae         | Cucurbita pepo L.            |                                  |              |                          |                           |                              |
|                       |                               |                                 |              |                          | Fruit, Seeds, Leaves - Pickled |                              |
|                       |                               |                                 |              |                          | (lactofermented), Phkhali, Eaten raw |                              |
|                       |                               |                                 |              |                          | Gardan                    |                              |
| Cucurbitaceae         | Cucurbita pepo L. var. giromonta |                               |              |                          | Fruit, Flowers - Eaten raw, cooked |                              |
|                       |                               |                                 |              |                          | Gardan                    |                              |
| Cucurbitaceae         | Cucurbita pepo L. var. pattison |                               |              |                          | Fruit - Eaten raw, cooked |                              |
|                       |                               |                                 |              |                          | Gardan                    |                              |
| Cucurbitaceae         | Lagenaria siceraria (Molina Standl.) |                               |              |                          | Fruit - Eaten raw, cooked |                              |
|                       |                               |                                 |              |                          | Gardan                    |                              |
| Cucurbitaceae         | Cupressaceae                 | Juniperus sabina L.             |              |                          | Stem, Root - Eaten raw as famine food | Wild collected |
|                       |                               |                                 |              |                          | NOTE - in other regions regarded as toxic |                              |
| Dipsacaceae           | Cephaleria gigantea (Ledeb.) | Bobrov                         |              |                          | Stem - Eaten raw          | Wild collected               |
| Dryopteridaceae       | Dryopteris flex-mas (L.) Schott. |                               |              |                          | Leaves - Phkahli, Pickled (lactofermented) | Wild collected |
|                       |                               |                                 |              |                          | (NOTE - in other regions regarded as toxic) |                              |
| Ebenaceae             | Diospyros lotus L.           |                                  |              |                          | Fruit - Eaten raw and dried | Gardan, Wild collected     |
| Ebenaceae             | Diospyros sp.                |                                  |              |                          | Gardan                    |                              |
| Ebenaceae             | Diospyros virginiana L.      |                                  |              |                          | Fruit - Eaten raw and dried | Gardan, Wild collected     |
| Ebenaceae             | Elaeagnus sp.                |                                  |              |                          | Gardan                    |                              |
| Ebenaceae             | Hippophae thomsonioides L.    |                                  |              |                          | Fruit - Eaten raw and dried | Wild collected               |
| Ebenaceae             | Shepherdia argentea Nutt.    |                                  |              |                          | Fruit - Eaten raw and dried | Wild collected               |
| Ebenaceae             | Shepherdia sp.               |                                  |              |                          | Leaves - Phkahli           | Gardan, Wild collected     |
| Ericaceae             | Empetrum hermaphroditum      |                                  |              |                          | Fruit - Eaten raw          | Wild collected               |
| Oxyccoccus quadripetalus Gilib. |                               |                                |              |                          | Wild collected             |                              |
| Vaccinium arctostaphylos L. |                               |                                |              |                          | Wild collected             |                              |
| Vaccinium myrtillus L. |                               |                                |              |                          | Wild collected             |                              |
| Vaccinium vitis-idaea L. |                               |                                |              |                          | Wild collected             |                              |
| Euphorbiaceae         | Aleurites moluccanus L.      | Wild                            |              |                          | Seeds - Oil               | Gardan                      |
| Fabaceae              | Astragalus caudatus Pall.     |                                  |              |                          | Seeds - Eatened cooked     | Wild collected               |
| Fabaceae              | Cicer arietinum L.           |                                  |              |                          | Leaves - Tea              | Wild collected               |
| Fabaceae              | Coronilla varia L.           |                                  |              |                          | Leaves - Khachapuri       | Wild collected               |
| Fabaceae              | Galega orientalis Lam.       |                                  |              |                          | Leaves, Stem - Pickled     | Wild collected               |
| Fabaceae              | Glycine max (L.) Merr.       |                                  |              |                          | Seeds, Phkahli             | Wild collected               |
| Fabaceae              | Glycyrhiza glabra L.         |                                  |              |                          | Seeds - eaten cooked       | Wild collected               |
| Fabaceae              | Lathyrus roseus Steven       |                                  |              |                          | Root - Sweetener          | Wild collected               |
| Fabaceae              | Lathyrus tuberosus L.        |                                  |              |                          | Leaves, Stem - Phkahli     | Wild collected               |
| Fabaceae              | Lathyrus sphaericus L.       |                                  |              |                          | Tuber - Eaten cooked       | Wild collected               |
| Fabaceae              | Lathyrus villosus L.         |                                  |              |                          | Wild collected             |                              |
Table 1 (continued)

| L. corsicana L. | Seeds - Eaten cooked | Garden |
|-----------------|----------------------|--------|
| Phaseolus sativus L. | Fruit, Seeds - eaten cooked | Garden |
| Pisum sativum L. | Seeds - Eaten cooked | Garden |
| Robinia pseudoacacia L. | Flower - Honey source (Bees), Eaten raw Flowers, Young Stem - Pickled (lactofermented) | Wild collected, Garden |
| Thymus colchicus Bieb. | Leaves - Tea | Wild collected |
| Trigonella caerulea (L.) Ser. | Leaves, Flowers - Phikhal | Wild collected |
| Vicia faba L. | Seeds - Eaten cooked | Garden |
| Vicia sativa L. | Leaves - Satsabal | Garden |
| Vigna angularis (Willd.) Ohwi & H. Ohashi | Seeds - Eaten cooked | Garden |

**Fabaceae**

| Castanea sativa Mill. | Seeds, Leaves - Phikhal, Eaten cooked | Wild collected, Garden |
| Fagus orientalis Lipsky | Seeds, Leaves - Phikhal, Eaten cooked | Wild collected |
| Quercus iberica M. Bieber | Seeds - Eaten cooked | Wild collected |

**Gentianaceae**

| Gentiana lutea Fisch & C.A. Mey. | Leaves - Chave | Wild collected |

**Geraniaceae**

| Erodium cicutarium (L.) L'Hérit. ex Aiton | Leaves, Stem - Phikhal | Wild collected |
| Geranium robertianum L. | Leaves - Phikhal | Wild collected |
| Geranium sp. | Leaves, Stem - Phikhal | Wild collected |

**Grossulariaceae**

| Grossularia reclinata (L.) Mill. | Fruit - Eaten raw, Compote | Garden, Wild collected |
| Ribes biebersteinii Berl. ex DC | Fruit - Eaten raw, Jam | Wild collected |
| Ribes grossularia L. | Fruit - Eaten raw, Compote | Garden, Wild collected |
| Ribes nigrum L. | Fruit - Eaten raw, Jam | Wild collected |
| Ribes orientale Desf. | Fruit - Eaten raw, Jam, Compote, Jam | Garden, Wild collected |
| Ribes rubrum L. | Fruit - Eaten raw, Jam | Garden, Wild collected |
| Ribes sp. | Fruit - Eaten raw, Jam | Garden, Wild collected |
| Ribes uralensis L. | Fruit - Eaten raw, Jam | Garden, Wild collected |

**Guttiferae**

| Hypericum perforatum L. | Flowers, Leaves - Tea, ingredient for beer | Wild collected, Garden |

**Indet.**

| Acaena (acara) | Fruit - Eaten raw | Garden |
| Brasidiz (brassidiz) | Fruit - Eaten raw | Garden |
| Draba (ts'hahul) | Fruit - Eaten raw | Garden |
| Draba (ts'hahul) (dedehala Svan.) | Fruit - Eaten raw | Wild collected |
| Draba (ts'hahul) (dedehala Khevi) | Leaves - Phikhal | Wild collected |
| Draba (nesnval Svan.) | Leaves - Phikhal | Wild collected |
| Draba (ts'hahul Svan.) | Leaves - Phikhal | Wild collected |
| Draba (ts'hahul Khevi) | Leaves - Phikhal | Wild collected |
| Draba (hainer Svan.) | Leaves - Phikhal | Wild collected |
| (Achali Arm.) | Fruit - Eaten raw | Wild collected |
| (Tatjarana Arm.) | Stem - Pickled (lactofermented) | Wild collected |
| (Teteri Arm.) | Fruit - Eaten raw | Wild collected |
| (Urenee Arm.) | Fruit - Eaten raw | Wild collected |
| (Vertishk Arm.) | Leaves - Phikhal | Wild collected |
| (ch'harehi) | Leaves - Phikhal | Wild collected |
| (bril) | Fruit - Eaten raw | Wild collected |
| (barishindi) | Leaves - Phikhal | Wild collected |
| (k'ak'la) | Leaves, Stem - Phikhal | Wild collected |
| Family               | Genus                     | Species | Common Name                  | Part(s) Used          | Preparation              | Source             |
|---------------------|---------------------------|---------|------------------------------|-----------------------|--------------------------|--------------------|
| Iridaceae           | Crocos sativus L.         |         |                               | Flowers - Eaten raw   | Garden                   |                    |
| Juglandaceae        | Juglan mandshurica Maxim. |         |                               | Fruits - Tea          | Garden                   |                    |
| Juglan regia L.     |                           |         |                               | Seeds - Eaten raw, Phkhali | Garden, Wild collected    |                    |
|                    |                           |         |                               |                        | Churkholha, Svan         |                    |
| Pterocarya pterocarpa (Michx.) |                 |         |                               | Fruit - Tea, Spice, Jam | Garden                   |                    |
| Kunth ex Iljinik.   | Lamiaceae                |         |                               | Seeds - Eaten raw     | Garden                   |                    |
| Lamium album L.     |                           |         |                               | Whole plant, Leaves - Phkhali | Wild collected      |                    |
| Leontis leonurus (L.) R. Br. |             |         |                               | Leaves - Ster, Phkhali | Wild collected            |                    |
| Mentha aquatica L.  |                           |         |                               | Leaves - Ster, Phkhali, Chuvelevi | Wild collected, Garden  |                    |
| Mentha longifolia (L.) L. |           |         |                               | Tea, Spice, Tkhmali   | Garden                   |                    |
| Mentha pulegium L.  |                           |         |                               | Leaves - Ster, Phkhali, Sulpugani | Garden               |                    |
| Mentha sp.          |                           |         |                               | Tea, Spice             | Garden                   |                    |
| Mentha x piperita L. |                           |         |                               | Leaves - Ster, Phkhali, Sulpugani | Garden               |                    |
| Nepeta mussini Spreng. |                         |         |                               | Human Food - Tea       | Garden                   |                    |
| Ocimum basilicum L.  |                           |         |                               | Leaves - Ster, Phkhali, Svan salt, Eaten raw  | Wild collected      |                    |
| Ocimum basilicum var. |                         |         |                               | Leaves - Ster, Phkhali, Svan salt, Eaten raw  | Wild collected      |                    |
| Purpurasum Benth.   |                           |         |                               |                        | Garden                   |                    |
| Origanum vulgare L. |                           |         |                               | Leaves - Ster, Tea, ingredient of Svan salt, Spice sold | Wild collected, Garden |                    |
| Salvia verticillata |                           |         |                               | Leaves - Ster, Phkhali, Tea, ingredient of Svan salt, Spice, Eaten raw | Wild collected, Garden |                    |
| Satureja hortensis L. |                         |         |                               |                        | Garden                   |                    |
| Satureja laxiflora K. Koch |                     |         |                               | Leaves - Ster, Phkhali, Eaten raw | Wild collected      |                    |
| Satureja spicigera (C. Koch) Boiss. |              |         |                               |                        | Garden                   |                    |
| Thymus caucasicus Wild. ex Benth. |            |         |                               |                        | Garden                   |                    |
| Thymus collinus Bieb. |                           |         |                               |                        | Garden                   |                    |
| Thymus sp.           |                           |         |                               |                        | Garden                   |                    |
| Thymus transcaucasicus Ronniger |             |         |                               |                        | Garden                   |                    |
| Thymus puschkinii Adams. |                         |         |                               |                        | Garden                   |                    |
| Thymus serpylicasea M. Bieb. |                      |         |                               |                        | Garden                   |                    |
| Lauraceae           | Laurus nobilis L.         |         |                               | Flowers - Eaten raw   | Garden                   |                    |
| Persea americana Mill. |                         |         |                               | Fruit - Eaten raw     | Garden                   |                    |
| Liliaceae           | Fritillaria lutea Mill.  |         |                               | Flowers - Eaten raw   | Garden                   |                    |
| Geaea sp.           | Lilium szovitsianum Fisch. & Ave-Lal. |      |                               | Leaves - Phkhali       | Wild collected            |                    |
| Linaceae            | Linum usitatissimum L.    |         |                               | Seeds - Eaten raw, Cooked, Oil | Garden               |                    |
| Family               | Species/Species Complex | Local Names | Uses/Products                                    | Collection Method          |
|---------------------|-------------------------|-------------|--------------------------------------------------|---------------------------|
| **Lythraceae**      | Punica granatum L.      | Fruit - Eaten raw, Tkhemali | Garden, Wild collected                             |
| Malvaceae           | Alcea rosea L.          | Leaves - Phikhalli | Wild collected                                     |
|                     | Althaea spp.            | Leaves, Stem - Phihkali | Wild collected                                     |
|                     | Malva neglecta Presl.  | Leaves, Stem - Phikhalli, Khachapuri | Wild collected, Garden                             |
|                     | Tilia begonifolia Stev. | Flowers - Tea | Wild collected                                     |
|                     | Tilia cordata (Clos.)   | Flowers - Tea, Honey source (Bees) | Wild collected                                     |
|                     |                        | Leaves - Phihkali | Wild collected                                     |
| **Melanthiaceae**   | Veratrum lobelianum Borr. | Leaves - Phikhalli | Wild collected                                     |
| Moraceae            | Ficus carica L.         | Fruit - Jam, Eaten raw, to distill Alcohol | Garden, Wild collected |
|                     | Morus alba L.           | Fruit - Jam, Eaten raw, to distill Alcohol | Garden, Wild collected |
|                     | Morus nigra L.          | Fruit - Jam, Eaten raw, to distill Alcohol | Garden, Wild collected |
| **Musaceae**        | Musa x paradisiaca L.   | Fruit - Eaten raw | Garden                                             |
|                     | Acca sellowiana (O. Berg.) | Fruit - Eaten raw | Garden                                             |
|                     | Bureen                  | Fruit - Eaten raw | Garden                                             |
| Oleaceae            | Fraxinus excelsior L.   | Leaves - Phikhalli | Wild collected                                     |
|                     | Ligustrum vulgare L.    | Fruit - Eaten raw | Wild collected                                     |
| Onagraceae          | Chamaener angustifolium (L.) Holub. | Leaves - Khachapuri | Wild collected                                     |
| Onocleaceae         | Matteuccia struthiopteris (L.) Tod. | Leaves - Ster, Pickled (lactofermented), Phihkali | Garden                                             |
|                     | Orobanchaceae           | Leaves - Phikhalli | Wild collected                                     |
|                     | Paeiculcus sp.          | Fruit - Eaten raw | Garden                                             |
|                     | Oxalidaceae             | Leaves - Phikhalli | Wild collected                                     |
|                     | Averrhoa carambola L.   | Fruit - Eaten raw | Garden                                             |
|                     | Oxalis acetosella L.    | Leaves - Phihkali | Wild collected                                     |
|                     | Oxalis corniculata L.   | Leaves - Phihkali | Wild collected                                     |
| Papaveraceae        | Papaver somnifemum L.   | Whole plant, Buds, Flowers, Seeds, Leaas, Stem - Khinkali, Phihkali | Garden, Wild collected |
| Phyllolaccaeanae    | Phyllotacca amercana L. | Fruit - Wine Leaves, Stem Pickled (lactofermented), Phihkali | Wild collected, Garden |
| Pinaceae            | Abies nordmanniana (Steven) Spach | Branches, leaves - Tea, Phihkali | Wild collected                                     |
|                     | Cedrus sp.              | Young Cones - Jam Resin - Masticant | Garden, Wild collected |
|                     | Picea orientalis (L.) Petern. | Leaves, Young Cones - Phihkali, Young Cones - Jam Bark - Famine food | Garden, Wild collected |
|                     | Pinus kochiana Klotzsch ex K Koch | Leaves, Young Cones - Phihkali, Young Cones - Jam Bark - Famine food | Garden, Wild collected |
| Piperaceae          | Piper nigrum L.         | Seeds - ingredient of Svan salt | Bought                                             |
| Plantaginaceae      | Plantago major L.       | Leaves, Stem - Phihkali | Wild collected                                     |
|                     | Valeriiana officinalis L. | Leaves - Tea | Wild collected                                     |
| Poaceae             | Avena sativa L.         | Seeds - Eaten raw and cooked Young Cones - Pickled (lactofermented) | Garden, Wild collected |
|                     | Bambusa sp.             | Seeds - Eaten cooked, Pheveer, Ghomli, Flour Leaves, Stem - Salad Seeds - Beer, to distill Alcohol, Flour | Garden, Wild collected |
|                     | Digitaria milianana (Rondile) Stafp. | Leaves, Stem - Salad Seeds - Beer, to distill Alcohol, Flour | Garden, Wild collected |
|                     | Echinocloa crus-galli L. | Seeds - Eaten raw and cooked Young Cones - Pickled (lactofermented) | Garden, Wild collected |
|                     | Hordeum vulgare L.      | Seeds - Eaten cooked, Pheveer, Ghomli, Flour Leaves, Stem - Salad Seeds - Beer, to distill Alcohol, Flour | Garden, Wild collected |

**Notes:** The table lists various plants and their uses in the context of ethnobotany. The uses include food, medicine, and traditional practices. The plants are primarily found in the context of the Svan region. The collection methods range from wild collection to cultivation. The uses are often associated with specific cultural practices and traditional knowledge.
| Scientific Name | Common Name | Use | Region |
|----------------|-------------|-----|--------|
| Hondeum vulgare L. ssp. vulgare var. coelestrotum | Kershveili | Seeds - Flour | Garden |
| Secale cereale L. | Malt, Malti | Seeds - Beer, to distill Alcohol | Garden |
| Setaria italica (L.) P. Beauv. | Gomi, Flour | Seeds - Gomi, Flour | Garden |
| Sorghum bicolor (L.) Moench | Mamal, Dik'ka | Seeds - Flour | Garden |
| Triticum aestivum L. | Flour | Seeds - Flour | Garden |
| Triticum carthlicum Neve | Dik'ka | Seeds - Flour | Garden |
| Triticum dicoccum Schrank ex Schübel | Flour | Seeds - Flour | Garden |
| Zea mays L. | Kobai | Seeds - Flour | Garden |
| Polygonaceae | | | |
| Pogonurus tataricicum (L.) | Tsatsuka, Yupka | Seeds - Eaten cooked | Garden |
| Koenigia alpina (All.) | Stem - Prickhi, Pickled | Leaves, Stem - Prickhi, Wild collected |
| Schust. & Reve | Khachapuri, Pickled | Leaves - Prickhi, Wild collected |
| Koenigia paniculata (Krarkev.) T.M. Schust & Reve | Stem - Eaten raw | Leaves - Prickhi, Wild collected, Garden |
| Polygonum aviculare L. | Leaves, Stem - Prickhi | Leaves - Prickhi, Wild collected |
| Polygonum campanum Koch | Leaves, Stem - Prickhi | Leaves - Prickhi, Wild collected |
| Polygonum sp. | Leaves, Stem - Prickhi | Leaves - Prickhi, Wild collected, Garden |
| Rheum habbaranum L. | Leaves, Stem - Prickhi | Leaves, Stem - Prickhi, Pickled (lactofermented), Sat'k'bai |
| Rumex acetosa L. | Mazauna, Kvetian | Leaves, Stem - Prickhi, Chave, Pickled (lactofermented) | Garden |
| Rumex acetosella L. | Mazauna, Chomake (Kok'omhava) | Leaves - Prickhi, Khachapuri, Wild collected, Garden |
| Rumex alpinus L. | G'holo, G'holo, Khovash (g'holo, G'holo, G'holo) | Leaves, Stem - Prickhi, Prickled (lactofermented) |
| Rumex crispus L. | G'holo (Avelug Arm.) | Leaves, Stem - Prickhi, Pickled (lactofermented) |
| Rumex scutatus L. | Lahk'ara, Kevish (Kviishis mazhavia), Zhamsh' Laz. | Leaves, Stem - Prickhi, Pickled (lactofermented) |
| Rumex sp. | G'holo (G'holo), Mts' G'holo (Mts' G'holo), G'ol (G'ol Ossetian) | Leaves, Stem - Prickhi, Pickled (lactofermented) |
| Rumex tuberosus L. | Mavauna | Leaves - Spice | Garden |
| Polyplodiaceae | | | |
| Polypodium vulgare L. | Dzartz'k'ba, Kvitomira (Kitamor) | Root - Sweetener, Eaten raw | Garden |
| Portulacaceae | | | |
| Portulaca oleracea L. | Danduri, Sukana, Kafkat'ka | Leaves, Stem - Prickhi | Wild collected |
| Primulaceae | | | |
| Cyclamen vernalum Sweet | Chuvahvaria | Root - Pickled (lactofermented) | Wild collected |
| Primula latifolia Rupe | Vashisulsa Tush | Leaves - Sats'ebai | Wild collected |
| Primula sp. | Purisula, Purisula (Purisula), Sats'ebai (Purisula) | Leaves - Sats'ebai | Wild collected |
| Primula vulgaris subsp. rubra | Purisula, Sats'ebai (Purisula) | Leaves, Flowers - Prickhi | Wild collected |
| Primula venus subsp. macrocaulis | Purisula, Vashisulsa Tush | Leaves, Stem - Pickled | Wild collected |
| Primula waronowiolowensis | Fiks purisula, Vashisulsa Tush | Leaves, Stem - Pickled, Prickhi, Chave | Wild collected |
| Ranunculaceae | | | |
| Adonis aestivula L. | Mek'endzali, Tserifafu (Sats'ebai) | Leaves, Stem - Prickhi | Wild collected |
| Clematis vitalba L. | Kholi, Sats'ebai (Sats'ebai) | Leaves, Stem, Branches - Prickhi | Wild collected |
| Ranunculus repens L. | Noxhura, Ts'qili niakhura | Whole plant - Prickhi | Wild collected |
| Rhhamnaceae | | | |
| Crambe foliosa (Booth, Petz. & Kirch.) W. Vent. | Kholi, Gogosa | Fruit - Eaten raw | Wild collected |
| Ziziphus jujuba Mill. | Unabi, Unabi | Fruit - Eaten raw | Garden, Wild collected |
| Rhododendraceae | | | |
| Rhododendron caucasicum Pall. | Dik'ka, Shgver (Shgver Svan) | Branches, Leaves, Flowers - ingredient for Beer, Tea, Sats'ebai | Wild collected |
| Rhododendron yuletum Sweet | Ieli, Ieli, Dik'ka (Dik'ka) | Leaves - Tea, Prickhi | Wild collected |
| Rhododendron ponticum L. | Shk'eri, Shk'eri (Shk'eri), Shgver (Shgver Svan) | Leaves - Tea, Prickhi | Wild collected |
| Table 1 (continued) |
|---------------------|
| **Rosaceae**        |
| Amygdalus communis L. | Frukt - Eaten raw | Garten |
| Aruncus vulgans Raf. | Blätter, Zweige, Blüten, Stengel - Wild collected, Garten |
| Cotoneaster multiflorus Bunge | Frucht - Eaten raw | Wild collected |
| Crataegus curvipespala Lindm. | Frucht, Blätter, Zweige, Getrocknet (Chinesischer Svan.) | Wild collected |
| Crataegus pentagyna Waldst. | Blüten (Kernfrucht), Beere (Sahv Kurnel), Frucht (Tsentsi Svan.) | Wild collected |
| Crataegus sp. | Frucht, Blätter, Zweige - Wild collected |
| Cynonia oblonga L. | Frucht, Blätter, Zweige - Wild collected |
| Fragaria indica Andrews | Frucht - Eaten raw | Garten |
| Fragaria vesca L. | Frucht - Eaten raw, Jam, Pickled, Tkhermai |
| Fragaria vesca L. Alibaba | Frucht - Eaten raw | Garten |
| Fragaria virginiana Mill. | Frucht - Eaten raw | Garten |
| Fragaria x ananassa | Frucht, Blätter, Zweige - Wild collected |
| Duchesne ex Rozier | Frucht, Blätter, Zweige - Wild collected |
| Malus orientalis Uglitz. | Frucht - Eaten raw, to distill Alcohol, \(\text{ingredient}\) of Svan salt, Jam, Thlapai |
| Malus domestica (Suckow) Borkh. | Menschenfutter (samo tikhsis vashil). |
| Mespilus germanica L. | Frucht - Eaten raw | Garten |
| Prunus armeniaca L. | Frucht - Eaten raw, Jam, Compote, Garten |
| Prunus avium (L.) L. | Frucht - Eaten raw, to distill Alcohol, Garten |
| Prunus cerasus L. | Frucht - Eaten raw, to distill Alcohol, Compote, Jam, Leaves - Pickhali |
| Prunus divaricata Ladeb. | Frucht - Eaten raw, to distill Alcohol, Tkhermai, Wine, Jam, Compote, Thlapai |
| Prunus insititia L. | Frucht - Eaten raw, to distill Alcohol, Wild collected |
| Prunus laurocerasus L. | Frucht - Eaten raw, Wine Leaves - Pickhali |
| Prunus padus L. | Frucht - Eaten raw, Jam, Leaves - Pickhali |
| Prunus persica (L.) Batsch | Frucht - Eaten raw, Jam, Compote, to distill Alcohol |
| Prunus sp. | Frucht - Eaten raw, Chave, to distill Alcohol |
| Prunus spinosa L. | Frucht - Eaten raw, Knoblauch (kwanthar), Knoblauch (fëlis muraki) |
| Prunus vachshchilli Bregase | Frucht - Eaten raw, Thlapai |
| Pyracantha coccinea M. Roem. | Flower - Tea, Wild collected |
| Pyrus caucasicus Fed. | Frucht - Eaten raw, Jam, to distill Alcohol, Pickled, Compote, Syrup, Spice |
| Pyrus communis L. | Frucht - Eaten raw, Jam, to distill Alcohol, Leaves - Pickhali |
| Raphiolepis bifas (Lour.) Galasso & Banfi | Frucht - Eaten raw, Wild collected |
| Rosa canina L. | Frucht, Blüten, Stengel (japonuri) - Wild collected |
| Rosa pimpinellifolia Boiss. | Frucht, Blüten, Stengel (shavi askhill), Knoblauch (askhili) |
| Rosa sp. | Frucht, Blüten, Stengel (japonuri) - Wild collected |
| Rubus caesius L. | Frucht - Eaten raw, Wild collected |
Table 1 (continued)

| Species                      | Common Names | Uses                                                                 | Location |
|------------------------------|--------------|----------------------------------------------------------------------|----------|
| Rubus fruticosus L.          | Red raspberry | Fruit - Eaten raw, to distill Alcohol, Jam, Compost                  | Garden   |
|                              |              | Batik, (bariti)                                                       |          |
| Rubus idaeus L.              | Blackberry   | Fruit - Eaten raw, Jam, Compost                                      | Garden   |
|                              |              | Leaves - Tea                                                          |          |
| Rubus saxatilis L.           | Blackberry   | Fruit - Eaten raw, ingredient of Chave                                | Wild     |
|                              |              | Wild collected                                                        |          |
| Rubus sp.                    |              | Fruit - Eaten raw, to distill Alcohol, Jam                           | Wild     |
| Sorbus aucuparia K. Koch     | Red elderberry| Fruit - Eaten raw, to distill Alcohol, Jam                           | Wild     |
| Sorbus boissieri C.K. Schmid.|              | Fruit - Eaten raw, to distill Alcohol, Jam                           | Wild     |
| Sorbus caucasi gera Kom.     | Red elderberry| Fruit - Eaten raw, to distill Alcohol, Jam                           | Wild     |
| Sorbus terminialis (L.) Crantz. | Red elderberry| Fruit - Eaten raw, to distill Alcohol, Jam                           | Wild     |
| Rutaceae                     |              |                                                                      |          |
| Citrus limon (L.) Burm. f.   | Lemon        | Fruit - Eaten raw, Jam, Compost                                      | Garden   |
| Citrus reticulata Blanco     | Mandarin     | Fruit - Eaten raw, Jam, Compost                                      | Garden   |
| Citrus sinensis Osbeck       | Mandarin     | Fruit - Eaten raw, Jam, Compost                                      | Garden   |
| Citrus unshiu Marcov.        | Satsuma      | Fruit - Eaten raw, Jam, Compost                                      | Garden   |
| Salicaceae                   |              |                                                                      |          |
| Salix caprea L.              | Willow       | Seeds - Beverage (coffee)                                            | Garden   |
| Sapindaceae                  |              |                                                                      |          |
| Acer pseudoplatanus L.       | Siberian Elm | Flower - Tea                                                          | Wild     |
| Smilacaceae                  |              |                                                                      |          |
| Smilax excelsa L.            | Tarragon     | Leaves, Young Stem - Phkhali                                         | Wild     |
| Solaraceae                   |              |                                                                      |          |
| Allium giganteum Moenchel    | Garlic       | Fruit, Leaves - Phkhali                                              | Wild     |
| Capsicum annuum L.           | Capsicum     | Fruit, Seeds - Eaten raw, Pickled (lactofermented)                   | Garden   |
| Capsicum annuum L. Sweet     |              |                                                                      |          |
| Bulgarian                    |              | Fruit - Eaten raw, ingredient of Svan salt                          | Garden   |
| Lycopersicum esculentum L.   | Tomato       | Fruit - Eaten raw, Pickled (lactofermented)                         | Garden   |
| Solarium melongena L.        | Longan        | Fruit, Leaves, Human Food - Phkhali                                 | Garden   |
| Solarium pseudo capsicum L.  |              |                                                                      |          |
| Solarium tuberosum L.        |              |                                                                      |          |
| Staphyleaceae                |              |                                                                      |          |
| Staphylea colchica Steven    | Chervenleigh  | Flower, Young Fruits, Young Stem - Pickled (lactofermented)         | Wild     |
| Taxaceae                     |              |                                                                      |          |
| Taxus brevifolia L.          | Yew           | Fruit - Jam                                                           | Wild     |
| Theaceae                     |              |                                                                      |          |
| Camellia sinensis L.         | Tea Plant     | Leaves - Tea                                                          | Garden   |
| Tropaeolaceae                |              |                                                                      |          |
| Tropaeolum majus L.          | Indian Smoke | Leaves - Phkhali                                                      | Garden   |
| Ulmaceae                     |              |                                                                      |          |
| Ulmus glabra Huds.           | Horse Chestnut| Bark - Cooked as famine food                                          | Wild     |
| Urticaceae                   |              |                                                                      |          |
| Urtica dioica L.             | Devil's Bit  | Leaves - Stem - Phkhali, Khinkali, Khachapuri, Tea                  | Wild     |
| Violaceae                    |              |                                                                      |          |
| Viola arvensis L.            | Pansy         | Leaves - Phkhali (NOTE - in other regions regarded as toxic)        | Wild     |
| Viola sp.                    |              |                                                                      |          |

* Depiction of the image content is not possible.*
| Table 1 (continued) |
|---------------------|
| **Vitaceae**        |
| Vitis labruscana L.  |
| Vitis vinifera L.    |
| Zingiberaceae       |
| *Eleutherocaridanum* (L.) Maton |
| Leaves - Khachapuri |
| Leaves, Stern, Whole plant - Phichali |
| (NOTE - in other regions regarded as toxic) |
| Fruit - Eaten raw Garden |
| Fruit - Eaten raw Wild collected |
| Fruit - Wine, Eaten raw, Khardali Garden, Wild collected |
| Leaves - Phkichal |
| Seeds used as Spice Garden |
| **FUNGI**           |
| *Agaricaceae*       |
| *Agaricus arvensis* Schaeff.  |
| *Agaricus campesstri* L.  |
| *Agaricus tabularis* Peck  |
| *Bovista sp.*       |
| *Bovista gigantea* (Batsch) Gray  |
| *Coprinus comatus* (O.F. Müll.) Pers.  |
| *Lycopodium* perlatum Pers.  |
| *Macrolepiota* procera (Scop.) Springer  |
| *Amanita caesarea* (Scop.) Pers.  |
| *Amanita muscaria* (L.) Lam.  |
| *Auricularia auricula-judae* (Bull.) Quél.  |
| *Bankeraceae*       |
| *Hydnum repandum* L.  |
| *Sarcodon imbricatus* (L.) P. Karst.  |
| *Boletaceae*        |
| *Boletus edulis* Bull.  |
| *Leccinum scabrum* (Bull.) Gray  |
| *Neoboletus* erythropus (Pers.) C. Hahn.  |
| *Cantarellaceae*    |
| *Cantarellus* cibarius Fr.  |
| *Clavariadelphaceae* |
| *Clavariadelphus platyphyllus* (L.) Donk  |
| *Cortinariaceae*    |
| *Cortinarius violaceus* (L.) Fr. Gray  |
| *Fistulina* hepatica (Schaeff.) Witt.  |
| *Fungi indet.*      |
| Anthracina (kojuba)  |
| Cephalophyllum (tetrisoko)  |
| *Cercopagispora* (trana solko)  |
| *Dactyloidea* (rostreilla Russ.)  |
| *Armillaria* (archekali Khv.)  |
| *Boletus* (bukthmisoko)  |
| *Gigaspora* (gigacharxa)  |
| *Gloeopleretrium* (viteili)  |
| *Lactarius* (talicha)  |
| *Lactarius* (tashki)  |
| *Lactarius* (theliasoko)  |
| *Lactarius* (tvinineli)  |
| *Lactarius* (tianasoko)  |
| Fruiting body cooked as food Wild collected |
| Fruiting body cooked as food Wild collected |
| Fruiting body cooked as food Wild collected |
| Fruiting body cooked as food Wild collected |
| Fruiting body cooked as food Wild collected |
| Fruiting body cooked as food Wild collected |
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| Fruiting body cooked as food Wild collected |
| Fruiting body cooked as food Wild collected |
| Fruiting body cooked as food Wild collected |
| Plant Family | Species | Common Name | Description | Collection Method |
|-------------|---------|-------------|-------------|------------------|
| Gomphaceae  | Ramia flava (Schaeff.) Quel. |  | Fruiting body cooked as food | Wild collected |
| Hericaceae  | Hericium erinaceus Bull. Pers. |  | Fruiting body cooked as food | Wild collected |
| Leptotrichaceae | Macroplectra procera (Scop.) Springer |  | Fruiting body cooked as food | Wild collected |
| Marasmiaceae | Marasmius oreades (Bolton) Fr. |  | Fruiting body cooked as food | Wild collected |
| Morchellaceae | Morchella conica Pers. |  | Fruiting body cooked as food | Wild collected |
| Physaliaceae | Pterygotaella meles (Vahl) P. Kumm |  | Fruiting body cooked as food | Wild collected |
| Pleurotaceae | Pleurotus componia (Poulet) Rolland |  | Fruiting body cooked as food | Wild collected |
| Pleurotaceae | Pleurotus ostreatus (Jacq. ex Fr.) P. Kumm |  | Fruiting body cooked as food | Wild collected |
| Pluteaceae | Pluteus cervinus (Schaeffer ex Fr.) P. Kumm |  | Fruiting body cooked as food | Wild collected |
| Polyporaceae | Polyporus squamosus (Huds.) Fr. |  | Fruiting body cooked as food | Wild collected |
| Phallaceae | Coprinopsis atramentaria (Bull.) Redhead, Vilgalys & Moncalvo |  | Fruiting body cooked as food | Wild collected |
| Russulaceae | Ramia flava (Schaeff.) Quel. |  | Fruiting body cooked as food | Wild collected |
| Russulaceae | Lactarius deliciosus (L. ex Fr.) S.F. Grey |  | Fruiting body cooked as food | Wild collected |
| Russulaceae | Lactarius piparius (L.) Roussel |  | Fruiting body cooked as food | Wild collected |
| Russulaceae | Lactarius volesius (Fr.) Kuntze |  | Fruiting body cooked as food | Wild collected |

Table 1 (continued)
and samples in which we had no more details about the purpose of usage of plants, i.e., in cases where plants were used as human food, but we did not know exactly for which kind of food. We considered regions and five altitudinal ranges (0–500 m, 501–1000 m, 1001–1500 m, 1501–2000 m, 2001–2500 m) as factors within our ordinations. We conducted non-metric multidimensional scaling (NMDS) followed by a permutational multivariate analysis of variance (PERMANOVA) with Euclidean distance and 999 permutations using the “RVAideMemoire” package [72].

Results

The total number of taxa, mostly identified to species, was 527 (Tables 1 and 2, Appendix Tables 5, 6). Ninety-five species of fungi were consumed. Trees contributed 71 species (13.47%), Shrubs—43 (8.1%), Herbs—333 (60.32%), Climbers -5 (0.09%), and Fungi—95 (18.02%). Of all species 388 were wild, i.e., not cultivated, although some of them occurred on ruderal places and as weeds in gardens. In case of 20 vascular plants and 45 fungal species, the collected material did not allow a certain identification, and these species are thus indicated as “indet.” in Table 1. Taxonomically, the difference between two food plant groups—garden versus wild (“forest”)—was strongly pronounced even at family level. Only one plant species (*Piper nigrum* with four mentions) was bought in markets. Over 62% of the mentions (12,255) referred to cultivated plants, 7352 (37%) to wild collections, and some plants were found both collected in the wild and in gardens; however, this was a very small percentage (189 mentions, less than 1%). The great majority of mentions (> 99%) were either from families found either in gardens (62%) or in the wild (37%). Over 41% of all mentions referred to the use of fruits, 21% to leaves, about 7% to seeds, and 5% to fruiting bodies, leaves/stems and stems. Whole plants were only used very infrequently. Of all the families, Rosaceae, Apiaceae, Lamiaceae, Amaryllidaceae and Solanaceae showed the highest importance. At a generic level, *Allium*, *Pyrus*, *Malus* and *Brassica* received the highest number of use report. Only 30 species (6% of the total) represented 46% of all use mentions, but only *Malus orientalis* (3.5%), *Pyrus communis* (3.2%),

Table 1 (continued)

| Rhusa cemtica (Schaaff.) Pers. | დამუხვა (bahgavana) | Fruiting body cooked as food | Wild collected |
| Rhusa rosea Pers. | ლიერი (ts'tliio) | Fruiting body cooked as food | Wild collected |
| Rhusa virescens (Schaaff.) Fr. Strophariaceae | ვირჯაკი (khaliwlio) | Fruiting body cooked as food | Wild collected |
| Hymenoloma fasciulare (Huds.) P. Kumm. | რამრამი (mat'ahtrqu) | Fruiting body cooked as food | Wild collected |
| Suillus granulatus (L.) Roussel | ლულო თონუ (duma soko), Mazaria (Mastiata Russ.) | Fruiting body cooked as food | Wild collected |
| Suillus luteus (L.) Roussel | ზეთთანა (zethiana) | Fruiting body cooked as food | Wild collected |
| Tricholomataceae | | | |
| Leptota sordida (Schumach.) Singer | მწვარინგი (ghrubelia), ლუროენაში (melnisdiaza), ძირცნობე (melano) | Fruiting body cooked as food | Wild collected |
| Tricholoma aurantium (Schaaff.) Ricken | მწვარინგი (ghrubelia), ლუროენაში (melnisdiaza), ძირცნობე (melano) | Fruiting body cooked as food | Wild collected |
| Tricholoma portentosum (Fr.) Quel. | შარბუმი (shavohokha), თათგუშ (taguna) | Fruiting body cooked as food | Wild collected |

Table 2: Regions of our fieldwork and number of food plant mentions recorded

| Region | Number of mentions |
|--------|--------------------|
| Guria  | 2125 |
| Khevsureti | 2012 |
| Zemo Svaneti | 1942 |
| Adjara | 1866 |
| Tori | 1750 |
| Tusheti | 1633 |
| Kvemo Svaneti | 1406 |
| Kakheti | 1085 |
| Lechkhumi | 1017 |
| Samegrelo | 853 |
| Meskheti | 776 |
| Kvemo Racha | 708 |
| Javakheti | 699 |
| Kvemo Kartli | 678 |
| Zemo Imereti | 631 |
| Mtianeti | 342 |
| Zemo Racha | 277 |

Chavre: made of dried herbs by boiling them, adding flour, fat (with or without meat) and salt; Dolma: grape leaves and others filled with herbs and meat; Mkhlovana: bread filled with beetroot leaves, spinach, herbs; Khachapuri: bread filled with cheese and herbs; Khinkali: dumplings with herbs and meat; Phkhali: minced herbs, sometimes mixed with walnuts, eaten as spread or cooked in pie; Sats’ebal: fresh herbs dipped in sour milk, Thlapi: fruit lather
Georgia than in the wider region, (2) food plant use knowledge would be widely and equally spread in most of Georgia, (3) there would still be incidence of knowledge loss despite wide plant use, especially in climatically favored agricultural regions in Western and Eastern Georgia.

Materials and methods
Ethnobotanical interviews
From 2013 to 2019, we interviewed over 380 participants in all regions of Georgia not occupied by Russian forces on their general plant use, recording over 32,000 individual uses. The analyses of all uses have been published in a variety of papers [41–50]. However, of all uses over 19,800 mentions were of food plants, which is why we regarded it as prudent to present a separate analysis of these. Interviews using semi-structured questionnaires were conducted after obtaining the oral prior informed consent of the participants, which were selected by snowball sampling, trying to reach gender balance and representing different age groups. Most participants were however over 50 years old, as interviews targeted remote villages where only very few younger people remain. All interviews were carried out in the participants’ homes and gardens by native speakers of Georgian and its dialects (Imeretian, Rachian, Lechkhumian, Tush, Khevsurian, Psavian, Kakhetian), other Kartvelian languages (Megrelian, Svan) and minority languages (Ossetian, Ude, Azeri, Armenian, Greek). The languages in which a plant was mentioned are indicated in Table 1. Interviews were subsequently translated into English. Plants grown in home gardens were used as prompts, while wild-collected species were free listed. We classified species as “garden” when they were grown/collected in cultivated areas, and as “forest/wild-collected” when growing and

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**Table 3** Plant family diversity assessed by various indices

| Index                  | Garden | Wild  | P-value |
|------------------------|--------|-------|---------|
| Dominance, D           | 0.096  | 0.053 | 0.0001  |
| Shannon H              | 2.709  | 3.525 | 0.0001  |
| Evenness e^H/S         | 0.227  | 0.346 | 0.0001  |
| Simpson index, 1—D     | 0.904  | 0.947 | 0.0001  |
| Equitability J         | 0.647  | 0.769 | 0.0001  |
| Fisher alpha           | 9.168  | 15.9  | 0.0001  |
| Berger–Parker, BP      | 0.219  | 0.166 | 0.0001  |

P-values are calculated using randomization tests (or Permutation test, software PAST 4.2)
harvested in the wild. We maintained the distinction of "forest" and "garden" because it was used in our previous publications from the region [50], to maintain consistency. In contrast to many other countries Georgia benefits from a complete flora [65–69] and a broad inventory of vernacular names in all languages [68]. Species were identified directly in the field, using this literature, and vouchers collected and deposited in the National Herbarium of Georgia (TBI). The nomenclature of all species follows www.tropicos.org, under APGIII [70]. Collection permits were provided through the Institute of Botany, Ilia State University, Tbilisi.

Data analysis
Data were tabulated using excel sheets and a combined matrix was constructed with plant entries in rows and plant data in columns including date, place, participant’s age and gender, interviewer, plant identity (Latin, Georgian vernacular, local names), the use category, which parts were used, and the source (garden or forest). We compared species diversity among groups of species (forest versus garden, various provinces) using sample-based rarefaction as well as widely used diversity indices: Dominance \( (D) \), Shannon \( (H) \), Evenness \( (e^H/S) \), Simpson index, \( (1 - D) \), Equitability \( (J) \), Fisher alpha, Berger–Parker (BP), given that no single index may sufficiently show the importance of certain species. Similarity of species composition among groups of plants were analyzed using non-metric multidimensional scaling (nMDS). All these analyses were performed using software PAST4.02 [71].

Test if the usage of plants based on family and genus, plant system used, and general and specific plant parts differ between regions and different altitudinal ranges. I predict that these components will be different, since there will be a different plant composition among regions and along an altitudinal gradient, and that different human communities have their own ethnobotany knowledge, even though they are from the same country.

We compared the usage of plants based on their (i) family and (ii) genus, (iii) system (root, shoot, or both), and (iv) general (vegetative, reproductive, or both) and (v) more specific (bark, branches, buds, bulb, cones, flowers, fruit, latex, leaves, resin, roots, seeds, shoots, silk, stem, timber, tuber, whole plant) parts used between regions and altitudinal ranges. We also compared (vi) for what purpose plants are used between regions and altitudinal ranges. We removed from our analyses any data that was not possible to make any further identification, such as plants identification above family, and uncertain plant parts. We also removed fungi from our analyses.
and *Vitis vinifera* (2.7%) had over 2% of mentions, and *Chenopodium album* and *Urtica dioica* were the only not cultivated plants reaching over 1% of mentions. In most regions at all altitudinal ranges, the aboveground parts were mist frequently used (Fig. 2),

Most plants (65%) were eaten without complicated preparation, either raw (55%), or fried/cooked (e.g., 8% that were fungi). A full 5% of all mentioned plant-uses were for pickles / lactofermented (often stems), and a full 18% of all use reports were for *Phkhali* (boiled herb pie, especially in spring), 4% were used as spices, and around 2% for the distillation of alcohol. All other use categories (35) had much fewer mentions.

The richness of plant families was 66 in garden versus 97 families of wild plants, respectively, and the difference was highly significant. Other diversity indices also unequivocally pointed to a considerably more diverse family composition of wild versus garden plants as the differences between all the tested diversity indices appeared to be highly significant (Table 3).

The regions of Georgia could be divided into three groups by the similarity of garden food plants as can be seen on the nMDS ordination graph (Fig. 3). This ordination seems to be influenced on the presence of large markets: Adjara, Samegrelo, Guria, and Kakheti which are lowland regions with large cities are joined by minimum distance versus Tori, Zemo Svaneti, Khevsureti, Tusheti and Javakheti, which are the most remote places. Kvemo Svaneti, Lechkhumi, Meskheti, Kvemo Kartli, Zemo Imereti, Zemo and Kvemo Racha, Mtianeti are moderately remote from large markets. The grouping of the regions closer to large markets might however have another distinct reason: Adjara, Samegrelo, Guria, and Kakheti are also the climatically warmest regions in Georgia, with the longest growing seasons. This allows the production of food plants almost all year round, and greatly reduces the dependency on foraging wild species.

For comparison, we assessed the usage of plants between regions based on their family, genus, specific parts used (root, shoot, or both) used, reproductive stages used (vegetative, reproductive, or both) and their specific parts used (bark, branches, buds, bulb, cones, flowers, fruit, latex, leaves, resin, roots, seeds, shoots, silk, stem, timber, tuber, whole plant), but at regional level and within different altitudinal ranges through non-metric dimensional scaling (NMDS) followed by permutational multivariate analysis of variance (PERMANOVA) with 999 permutations and Euclidean distance. The detailed results are given in Table 4 and Appendix Tables 7, 8, 9, 10 and 11.

The regions varied strongly in their species richness, based on species used (Fig. 4). These differences also might reflect the remoteness from large markets and severity of local climate.

Relationships among the regions in the case of wild food plants show a different and clearer pattern (Fig. 5). Adjacent regions in particular cluster together (Kvemo Zemo Racha, and Zemo Imereti; Samegrelo, Guria, Adjara, Lechkhumi and Kvemo and Zemo Svaneti; Meskheti, Javakheti, Kvemo Kartli; Mtianeti, Kakheti, Khevsureti, Tusheti). Like in the case of the garden food

| Table 4 | Pairwise comparisons with FDR p-value adjustment method of the different variables evaluated (plant family, plant genus, system used, general plant parts used, specific plant parts used, the usage) between altitudinal ranges after significant PERMANOVA analysis (Table Permanova) |
| Plant family | 0–500 | 1001–1500 | 1501–2000 | 2001–2500 |
| 1001–1500 | 0.0013 | 0.0013 | 0.0013 | 0.0013 |
| 1501–2000 | 0.0013 | 0.0013 | 0.0013 | 0.0013 |
| 2001–2500 | 0.0013 | 0.0013 | 0.0013 | 0.0013 |
| 0–500 | 0.0049 | 0.0044 | 0.0013 | 0.0013 |
| Plant genus | 0–500 | 1001–1500 | 1501–2000 | 2001–2500 |
| 1001–1500 | 0.0011 | 0.0011 | 0.0011 | 0.0011 |
| 1501–2000 | 0.0011 | 0.0011 | 0.0011 | 0.0011 |
| 2001–2500 | 0.0011 | 0.0011 | 0.0011 | 0.0011 |
| 0–500 | 0.0018 | 0.0011 | 0.0011 | 0.0011 |
| General plant parts used | 0–500 | 1001–1500 | 1501–2000 | 2001–2500 |
| 1001–1500 | 0.0300 | 0.0300 | 0.0300 | 0.0300 |
| 1501–2000 | 0.3550 | 0.0300 | 0.3550 | 0.3550 |
| 2001–2500 | 0.4144 | 0.0300 | 0.3550 | 0.3550 |
| 0–500 | 0.0420 | 0.6270 | 0.0833 | 0.0300 |
| General plant parts used | 0–500 | 1001–1500 | 1501–2000 | 2001–2500 |
| 1001–1500 | 0.0017 | 0.0017 | 0.0017 | 0.0017 |
| 1501–2000 | 0.0722 | 0.0017 | 0.0017 | 0.0017 |
| 2001–2500 | 0.0017 | 0.0017 | 0.0017 | 0.0017 |
| 0–500 | 0.0271 | 0.6840 | 0.0288 | 0.0017 |
| Specific plant parts used | 0–500 | 1001–1500 | 1501–2000 | 2001–2500 |
| 1001–1500 | 0.0017 | 0.0017 | 0.0017 | 0.0017 |
| 1501–2000 | 0.0225 | 0.0017 | 0.0017 | 0.0017 |
| 2001–2500 | 0.0017 | 0.0017 | 0.0017 | 0.0017 |
| 0–500 | 0.0222 | 0.6670 | 0.0025 | 0.0017 |
| Usage | 0–500 | 1001–1500 | 1501–2000 | 2001–2500 |
| 1001–1500 | 0.0133 | 0.0133 | 0.0133 | 0.0133 |
| 1501–2000 | 0.0050 | 0.0957 | 0.0050 | 0.0957 |
| 2001–2500 | 0.0050 | 0.0840 | 0.3020 | 0.3020 |
| 0–500 | 0.0450 | 0.2833 | 0.0917 | 0.1750 |

Analyses were based on Euclidean distance and 999 permutations
plants, species diversity of the wild food plants mentioned varied strongly (Fig. 6). Climate and the need for of the use of wild food plants (especially in high altitude villages) play a role in this variation. As we already showed in various previous publications, language, cultural group, ethnicity, education, or gender of the participants had no impact on the main use of food plants, nor any other uses [41–50].

**Phkali and Pickles—emblematic foods of the Caucasus**

Of all food preparations the use of plants as ingredient of boiled herb preparations (mostly as გაზაფხული ფქალი —gazapkhuli pkhali = Spring Pkhkali, as the first vitamin source after winter), and as lacto-fermented or vinegar-based pickles are probably the most emblematic ones in the Caucasus, given that almost 50% of all food mentions were for phkhali, and almost 12% for pickled plants, and 8% for teas.

While the overall distribution of families, genera and their uses were similar between regions, overall most species were used in Guria. However, the knowledge distribution was most uneven for these food categories (Fig. 7). The altitudinal range between 1001 and 1500 m, followed by 1501–2000 m were clearly predominant when it came to diversity of plants used as well as uses (Fig. 8). This very unequal distribution of the most important families/genera, as well as their respective uses is reflected in Fig. 9. The altitudinal differences do not necessarily indicate however that the respective species did not grow also at lower altitudes. They simply indicate that at lower altitudes the participants rather preferred other food plants, and due to a lack of necessity were not interested in wild harvesting greens.

Only 60% of participants reported making pickles / lactofermented preparations. Of these, over 16% each came from Zemo Imereti and Khevsureti, and 12% each from Zvemo Svaneti, the Javakheti-Plateau, and Guria. The first regions represent all high altitude—short growing season areas, where the population does need to preserve food for winter. Guria is relatively warm—but very wet and snow-rich, which also might explain the prevalence of pickles. No participants whatsoever from Adjara, Samegrelo (the most subtropical regions) and Mtianeti (close to the capital Tbilisi) reported making pickles. Unsurprising, Kakhetians were also not enthusiastic about this form of preparation, because Kakheti...
is also a region famous for its large agricultural production. In contrast, in Tori and Tusheti there are simply less products that can be pickled. Preferred species (of a total of 79) for pickles were mostly Amaranthaceae (*Amaranthus, Chenopodium*), Apiaceae (especially the stems of *Anthriscus, Chaerophyllum* and *Heracleum* were picked, but also, stems of *Conium maculatum*), Amarilloidaceae (all *Allium* species), and Polygonaceae (*Polygonum* and *Rumex*). In addition, *Aruncus vulgaris* (Rosaceae), *Stapyla colchica* (Staphyleaceae). All of these were more important as pickles than "traditional European style species (*Cucumis sativus, Capsicum* etc.). The fermentation of the ferns *Mattheucia struthiopteris* (Onocleaceae) and *Dryopteris filix-mas* (Dryopteridaceae) was similar to what we observed, e.g., in the Himalayas.

The participants clearly indicated that some plants (e.g., *Conium maculatum, Dryopteris filix-mas, Galanthus* sp., *Narcissus* sp.) needed careful preparations, due to possible toxicity. However, given that these species might have even higher toxicity in other regions, e.g., Central Europe, the authors decided to not elaborate any further on preparation methods, given that these might not be sufficient to remediate toxicity of the same species outside the Caucasus.

In case of Pkhali, over 93% of all participants—from all regions—reported to use such boiled herbs, normally in Spring. This was surprising, as we had expected much more limited use in the climatically favorable regions. Nevertheless, Zemo Imereti (19% of all Pkhali preparations), Tori and Kvemo Racha (16% each), Tusheti (15%) and Khevsureti (14%)—all mountain regions with long winters, stood out as the real "herb eater" areas. In contrast to the pickled species, essentially only young leaves were used for phkhali, with great emphasis on the same families indicated in pickles. (All pickled plant species were also used for phkhali.) The overall number of species fused or phkhali was however much higher (197). The elaboration of phkhali often involves many steps to reduce the toxicity of species used, and in most cases a wide variety of herbs are included in each preparation. Interesting examples for the use of toxic species included the leaves of *Solanum tuberosum, Veratrum lobelianum* and *Viola* sp. *Solanum tuberosum* leaves for example are regarded as toxic worldwide, but are being eaten in the Caucasus and Albania [48]. *Veratrum album* (closely

![Fig. 5 nMDS ordination of regions by wild food plant species composition](image-url)
related to *Veratrum lobelianum*, and growing especially in Europe, is highly toxic), and *Viola* sp. (although especially the flowers are widely used in gastronomy) contains toxic Saponins. In all cases careful preparation was mentioned to make these species palatable. The authors explicitly decided to not give any recipes, given that many of the species are widespread, and compound composition—and with it possible toxic effects—might vary across the distribution range, so that a preparation method that sufficiently reduces toxicity in the Caucasus might not necessary be applicable in other areas.

**Discussion**

The use of food plant in Georgia while varied showed distinct overlap with other studies. However, the number of food plant species used—both cultivated and foraged in this rather small territory—was far higher than in most published studies from either wider region or the Mediterranean and Eurasia. Of all species, 388 were wild/wild collected, although a few of them also occurred as weeds in gardens. Even when deducting the fungal species (95), the remaining 293 vascular plant species are a mostly a much higher number than found in any other study in the wider region [73–106] (73:148 species; 74:87 species; 75:41 species; 76:40 species; 77:276 species; 78:119 species; 79:84 species; 80:68 species; 81:30–100 species for different European regions; 82:112 species; 83:139 species; 84:49 species; 85:15 species (although focusing on weeds only); 86:78 species; 87:419 species for all of Spain; 88:36; 89:77 species; 90:40 species; 91:11 species; 92:48 species; 93:83 species; 94:105 species; 95:73 species; 96:47 species; 97:115 species; 98:67 species; 99:78 species; 100:79 species; 101:35 species; 102:52 species; 103:63 species; 104:80 species; 105:88 species; 106:51 species).

Interestingly, even studies conducted in pastoralist cultures well-known for their use of wild foraged plants for food, e.g., in relatively close-by Kurdistan [107, 108] (107:54 species; 108:65 species), and Turkey [109] with 74 species showed a much more limited use of plants for food, even when not considering the 20% of taxa found in Georgia that were fungi. In many areas of the same cultural space, e.g., Dagestan [110] with 24 species, Azerbaijan [111, 112] (111:72 species; 112:73 species).
and Amenia [113] with 66 species) the use of wild plants for food has been shown as in steep decline, although a strong signature of food plant use could still be found in markets of the Armenian capital Yerevan [114] with 148 species.

Outside the region, e.g., in China, it has been shown that typical agricultural communities use a very large number of wild species [115–117] (115: 185 vascular plant species and 17 fungal folk taxa; 116: 224 species; 117: 168 species). In many cases, however, wild plant use fell far short from the species numbers found in the Caucasus, e.g., [118–120] (118: 81 species; 119: 59 species; 120: 54 vascular plant species and 22 fungi).

The use of food species was not closely related to different vegetation zones in Georgia. This is a specific feature of food plants and differs from the use of plants in other categories, as has been previously shown [38–50].

The large number of species used in comparison with other areas confirmed our first hypothesis that given the long tradition of plant use, and the isolation under Soviet rule, plant use both based on home gardens and wild harvesting would be more pronounced in Georgia than in the wider region. In addition, the very large number of wild vegetables in Georgia might underline the hypothesis that the use of such wild "greens" is a byproduct of

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**Fig. 7** Relationship between families, genera and usage within regions
the Neolithic revolution, given that the region is indeed a cradle of agriculture as indicated previously [9, 13, 14]. We found a rather widespread use of foodplants across Georgia, which can partly be explained by mixture of populations from varied regions through migration and Soviet population moves, which also confirmed our hypothesis that food plant use knowledge would be widely and equally spread in most of Georgia.

Finally, we indeed found that in the very fertile agricultural regions in Eastern (Kakheti) and Western (lower Ajara, Samegrelo) Georgia, plant use knowledge was indeed more limited. However, this does not explicitly confirm our third hypothesis that such regions would show knowledge loss, as the limited use of plants may already have persisted a long time, and historic comparative data are not available.

Conclusions
This study reported on 535 plant and fungal taxa used in Georgia as food. As many mountain regions all over the world, the rural areas of the Georgian Caucasus have suffered a constant population decline for decades, due to harsh economic conditions and lack of modern infrastructure [1, 24, 121–124]. While this has greatly

Fig. 8 Relationship between families, genera and usage within the altitudinal gradients
accelerated the loss of traditional agricultural practices, it seems to have affected the use of wild gathered food plants as well as species grown in home gardens to a much more limited extent in Georgia. The home gardens in Georgia clearly continue serving as socio-ecological memory, and an irreplaceable part of Georgian culture, rather than the widely growing popularity of gardening and foraging found all over Europe [125]. The great variety of food plant species used in the Georgian Caucasus provides a reservoir for food security for the region, as well as a source of important food plant germplasm for international agriculture. This greatly underlines the importance of Georgia as an ancient center of crop domestication and diversification, making Georgia clearly one of the most diverse food plant cultures in wider Eurasia, and the center of what we would like to coin as "Caucasus—Asia Minor—Balkans cultural complex."

**Appendix**

See Tables 5, 6, 7, 8, 9, 10 and 11.
Table 5  Species of identified food plants and fungi and the number of their mentions recorded

| Plant / Fungal family | Plant / Fungal species | Mentions |
|-----------------------|-------------------------|----------|
| Actinidiaceae         | Actinidia callosa Lindl | 28       |
| Adoxaceae             | Sambucus ebulus L       | 83       |
| Adoxaceae             | Sambucus nigra L        | 9        |
| Adoxaceae             | Viburnum lantana L      | 21       |
| Adoxaceae             | Viburnum opulus L       | 21       |
| Agaricaceae           | Agaricus arvensis Schaeff | 165   |
| Agaricaceae           | Agaricus campestris L   | 4        |
| Agaricaceae           | Agaricus tabularis Peck | 1        |
| Agaricaceae           | Bovista sp.             | 12       |
| Agaricaceae           | Bovista sp. / Lycoperdon sp. | 4   |
| Agaricaceae           | Clavatia gigantea (Batsch) Rostk | 14 |
| Agaricaceae           | Coprinus comatus (O.F. Müll) Pers | 2   |
| Agaricaceae           | Lycoperdon perlatum Pers. / Lycoperdon pyriforme Schaeff | 2   |
| Amanitaceae           | Amanita caesarea (Scop.) Pers | 15   |
| Amanitaceae           | Amanita muscaria (L.) Lam | 1    |
| Amanitaceae           | Amananthus palmeri S. Watson | 16  |
| Amanitaceae           | Amananthus paniculatus L | 24    |
| Amanitaceae           | Amananthus retrofitus L | 132     |
| Amanitaceae           | Amananthus speciosus L  | 1        |
| Amanitaceae           | Amananthus spinosus L   | 3        |
| Amanitaceae           | Atriplex hortensis L    | 35       |
| Amanitaceae           | Beta vulgaris L         | 311      |
| Amanitaceae           | Beta vulgaris L. ssp. cicla (L.) Moq | 36 |
| Amanitaceae           | Beta vulgaris L. ssp. esculenta (Salsib.) Gürke var. altissima Rössig = Beta vulgaris saschanfiera Alef | 3   |
| Amanitaceae           | Chenopodium album L     | 203      |
| Amanitaceae           | Chenopodium bonus-henicicus L | 1  |
| Amanitaceae           | Chenopodium filosum (Moench) Asch | 35 |
| Amanitaceae           | Chenopodium sp.         | 1        |
| Amanitaceae           | Spinacia oleracea L     | 44       |
| Amaryllidaceae        | Allium ampeloprasum L   | 3        |
| Amaryllidaceae        | Allium ascalonicum L    | 7        |
| Amaryllidaceae        | Allium atrovialaceum Boiss | 10   |
| Amaryllidaceae        | Allium cepa L           | 309      |
| Amaryllidaceae        | Allium fistulosum L     | 97       |
| Amaryllidaceae        | Allium junthianum Vved  | 2        |
| Amaryllidaceae        | Allium ponticum Miscz  | 5        |
| Amaryllidaceae        | Allium porum L          | 56       |
| Amaryllidaceae        | Allium rotundum L       | 20       |
| Amaryllidaceae        | Allium sativum L        | 340      |
| Amaryllidaceae        | Allium sp.              | 3        |
| Amaryllidaceae        | Allium ursinum L        | 54       |
| Amaryllidaceae        | Allium victorialis L    | 231      |
| Amaryllidaceae        | Galanthus sp.           | 10       |
| Amaryllidaceae        | Galanthus waronowii Losinsky | 3  |
| Amaryllidaceae        | Narcissus sp.           | 5        |
| Annonaceae            | Annona cherimola Mill   | 1        |
| Apiaceae              | Aethusa cynapium L      | 1        |
| Apiaceae              | Agasaylis latifolia (Bieb.) Boiss | 91  |
| Apiaceae              | Anethum graveolens L    | 301      |
| Apiaceae              | Angelica tataricae Bordz | 2        |
| Apiaceae              | Anthriscus cerefolium (L.) Hoffm | 4   |
| Apiaceae              | Anthriscus nemorosus (M. Bieb.) Spreng | 16  |
| Apiaceae              | Anthriscus sylvestris L | 15       |
| Plant / Fungal family | Plant / Fungal species | Mentions |
|-----------------------|------------------------|---------|
| Apiaceae              | Apium graveolens L     | 128     |
| Apiaceae              | Carum carvi L          | 60      |
| Apiaceae              | Chaerophyllum aureum L | 16      |
| Apiaceae              | Chaerophyllum bulbosum L | 10     |
| Apiaceae              | Chaerophyllum caucasicum (Fisch.) B. Schischk | 95 |
| Apiaceae              | Conium maculatum L     | 10      |
| Apiaceae              | Conium salebrosum L    | 348     |
| Apiaceae              | Daucus carota L. ssp. sativus | 251 |
| Apiaceae              | Falcana siodes Asch    | 1       |
| Apiaceae              | Falcana vulgaris Bernh | 25      |
| Apiaceae              | Foeniculum vulgare Mill | 79    |
| Apiaceae              | Heracleum asperum M. Bieb | 30 |
| Apiaceae              | Heracleum leskovi Grossh | 5     |
| Apiaceae              | Heracleum sect. villosum | 2     |
| Apiaceae              | Heracleum sosnowskyi Manden | 59 |
| Apiaceae              | Heracleum sp.           | 36      |
| Apiaceae              | Heracleum wilhelmsii Fisch. & Ave-Lall | 30 |
| Apiaceae              | Hippomarathrum crispum (Pers.) Bosss | 4 |
| Apiaceae              | Hippomarathrum microcarpum Petrov | 1 |
| Apiaceae              | Levisticum officinale W.D.J. Koch | 2 |
| Apiaceae              | Libanotis transcaucasica Schischk | 15 |
| Apiaceae              | Ligusticum alatum Spreng | 4 |
| Apiaceae              | Petroselinum crispum (Mill.) Fuss | 268 |
| Apiaceae              | Xanthogalum purpurascens Ave-Lall | 3 |
| Araceae               | Anum albispatum Stev. ex Lebed | 2 |
| Araceae               | Anum orientale M. Bieb  | 7       |
| Araceae               | Anum sp.                | 20      |
| Araliaceae            | Aralia spinosa L        | 1       |
| Asparagaceae          | Asparagus officinalis L | 30      |
| Asparagaceae          | Asparagus sp.           | 4       |
| Asparagaceae          | Muscari sosnowskyi Schchian | 2 |
| Asparagaceae          | Ornithogalum woronowii Kasch | 2 |
| Asparagaceae          | Polygonatum glaberrimum C. Koch | 13 |
| Asparagaceae          | Ruscus colchicus Yeo   | 1       |
| Asparagaceae          | Ruscus hypophyllum L    | 2       |
| Asparagaceae          | Scilla siberica Andrews | 6 |
| Asparagaceae          | Scilla sp.              | 6       |
| Asteraceae            | Achillea grandiflora M. Bieb | 1 |
| Asteraceae            | Achillea millefolium L | 5       |
| Asteraceae            | Arctium lappa L        | 32      |
| Asteraceae            | Artemisia absinthium L | 8       |
| Asteraceae            | Artemisia dracunculus L | 125    |
| Asteraceae            | Artemisia vulgaris L   | 3       |
| Asteraceae            | Bidens tripartita L    | 4       |
| Asteraceae            | Cichorium intybus L    | 11      |
| Asteraceae            | Cinium incanum (S.G. Gmel.) Fisch. ex M. Bieb | 13 |
| Asteraceae            | Cinium sp.             | 5       |
| Asteraceae            | Cinium vulgare L      | 3       |
| Asteraceae            | Crepis sp.             | 3       |
| Asteraceae            | Cynara cardunculus L   | 6       |
| Asteraceae            | Echinops sp.           | 2       |
| Asteraceae            | Eruca sativa Mill      | 12      |
| Asteraceae            | Helianthus annuus L    | 17      |
| Plant / Fungal family | Plant / Fungal species | Mentions |
|-----------------------|------------------------|----------|
| Asteraceae            | Helianthus tuberosus L | 17       |
| Asteraceae            | Lactuca sativa L       | 165      |
| Asteraceae            | Lactuca sativa L "greek" | 1     |
| Asteraceae            | Lactuca serriola       | 17       |
| Asteraceae            | Lapsana communis L     | 9        |
| Asteraceae            | Lapsana grandiflora M. Bieber | 2 |
| Asteraceae            | Matricaria chamomilla L | 5     |
| Asteraceae            | Petasites albus (L.) Gaertn | 14 |
| Asteraceae            | Petasites hybridus (L.) G. Gaert, B. Mey. & Scherb | 51 |
| Asteraceae            | Senatula quinqueloba Bieber. ex Wild | 20 |
| Asteraceae            | Solidago canadensis L  | 4        |
| Asteraceae            | Sonchus asper (L.) Hill | 7        |
| Asteraceae            | Stevia sp.             | 2        |
| Asteraceae            | Tagetes patula L       | 114      |
| Asteraceae            | Tanaxacum confusum Schischk | 2 |
| Asteraceae            | Tanaxacum officinale Wigg | 41   |
| Asteraceae            | Tragopogon sp.         | 19       |
| Asteraceae            | Tussilago farfara L    | 1        |
| Asteraceae            | Xanthium strumarium L  | 3        |
| Auriculariaceae       | Auricula auricula-juda (Bull.) Quél | 10 |
| Bankenaceae           | Hydnum repandum Fr     | 2        |
| Bankenaceae           | Sarcodon imbricatus (L.) P. Karts | 8 |
| Begoniaceae           | Begonia rex Putz       | 10       |
| Berberidaceae         | Berberis vulgaris L    | 54       |
| Betulaceae            | Alnus barbata C.A. Mey | 1        |
| Betulaceae            | Betula litwinowi Doluch | 3    |
| Betulaceae            | Betula sp.             | 2        |
| Betulaceae            | Corylus avela (L.) C. pontica K. Koch | 200 |
| Betulaceae            | Corylus iberica L      | 4        |
| Boletaceae            | Boletus edulis Bull    | 16       |
| Boletaceae            | Neoboletus erythropus (Pers.) C. Hahn | 2 |
| Boletaceae            | Leccinum scabrum (Bull.) Gray | 3 |
| Boraginaceae          | Myosotis sp.           | 2        |
| Boraginaceae          | Symphyrum graniflorum DC | 14 |
| Boraginaceae          | Trachysternon orientalis (L.) G. Don | 6 |
| Brassicaceae          | Armoracia rusticana (G. Gaertn.) B. Mey. & Scherb | 33 |
| Brassicaceae          | Brassica campestris L  | 1        |
| Brassicaceae          | Brassica campestris L. ssp. oleifera DC | 9 |
| Brassicaceae          | Brassica juncea (L.) Czern | 3   |
| Brassicaceae          | Brassica montana Pouri | 36      |
| Brassicaceae          | Brassica oleracea L    | 361      |
| Brassicaceae          | Brassica oleracea L. red | 9    |
| Brassicaceae          | Brassica oleracea L. var. botrytis cauliflower | 25 |
| Brassicaceae          | Brassica oleracea L. var. gynmifera Brussles Sprouts | 1 |
| Brassicaceae          | Brassica oleracea L. var. gynoglydes | 47  |
| Brassicaceae          | Brassica oleracea L. var. italicca | 21 |
| Brassicaceae          | Brassica rapa L. subsp. rapifera Metzger | 67 |
| Brassicaceae          | Brassica rapa var. rapa L | 45  |
| Brassicaceae          | Bunias orientalis L    | 27       |
| Brassicaceae          | Cappella bursa-pastoris L | 26 |
| Brassicaceae          | Cardamine hirsuta L    | 10       |
| Brassicaceae          | Chorisanthus cheri L   | 1        |
| Brassicaceae          | Lepidium sativum L     | 52       |
| Plant / Fungal family | Plant / Fungal species | Mentions |
|-----------------------|------------------------|----------|
| Brassicaceae          | *Raphanus raphanistrum* subsp. *sativus* (L.) Domin | 17       |
| Brassicaceae          | *Raphanus sativus* L. var. *major* | 179      |
| Brassicaceae          | *Raphinastrum rugosum* L. All | 13       |
| Brassicaceae          | *Sinapis arvensis* L. | 15       |
| Campanulaceae         | *Campanula alliariifolia* Wild | 2        |
| Campanulaceae         | *Campanula biebersteiniana* Roem. & Schult | 1        |
| Campanulaceae         | *Campanula glomerata* L | 7        |
| Campanulaceae         | *Campanula lactiflora* M. Bieb | 70       |
| Campanulaceae         | *Campanula latractifolia* L | 11       |
| Campanulaceae         | *Campanula rapunculosoides* L | 20       |
| Cannabaceae           | *Cannabis sativa* L | 30       |
| Cannabaceae           | *Humulus lupulus* L | 22       |
| Cannabaceae           | *Cannabina sativa* L | 36       |
| Caprifoliaceae        | *Lonicera caucasica* Pall | 3        |
| Caryophyllaceae       | *Melandrum balansae* Boiss | 5        |
| Caryophyllaceae       | *Melandrum boissianum* Schischk | 9       |
| Caryophyllaceae       | *Oberea wallachiana* (Klotzsch) Ikonn | 3       |
| Caryophyllaceae       | *Silene lacera* Steven | 15       |
| Caryophyllaceae       | *Silene sibirica* (L.) Pers | 2        |
| Caryophyllaceae       | *Silene wallachiana* Klotzsch | 9        |
| Caryophyllaceae       | *Stellaria media* (L.) Vill | 9        |
| Clavariadelphaceae    | *Clavariadelphus pistillaris* (L.) Donk | 5        |
| Convolvulaceae        | *Convolvulus arvensis* L | 17       |
| Cornaceae             | *Svidia australis* (C.A. Mey.) Pojark ex Geosch | 5        |
| Cotoniariaceae        | *Cotinus oviolatus* (L.) Fr. Gray | 1        |
| Crassulaceae          | *Sedum caicivus* Boriss | 8        |
| Crassulaceae          | *Sedum oppositifolium* Sims | 5        |
| Crassulaceae          | *Sedum stoloniferum* Gmel | 5        |
| Crassulaceae          | *Sempervivum caucasicum* Rupe ex Boiss | 14       |
| Cucurbitaceae         | *Bryonia dioica* Jacq | 3        |
| Cucurbitaceae         | *Citrus lanatus* (Thunb.) Matsum. & Nakai | 16       |
| Cucurbitaceae         | *Cucumis melo* L | 4        |
| Cucurbitaceae         | *Cucumis sativus* L | 363      |
| Cucurbitaceae         | *Cucurbita maxima* L | 14       |
| Cucurbitaceae         | *Cucurbita pepo* L | 201      |
| Cucurbitaceae         | *Cucurbita pepo* L. var. *giromontis* | 39       |
| Cucurbitaceae         | *Cucurbita pepo* L. var. *patisson* | 9        |
| Cucurbitaceae         | *Cucurbita sp.* | 14       |
| Cucurbitaceae         | *Lagenaria siciana* (Molina) Standl | 2        |
| Cupressaceae          | *Juniperus sabina* L | 2        |
| Dipsacaceae           | *Cephalania gigantea* (Lede.) Bobrov | 1        |
| Dryopteridaceae       | *Dryopteris filix-mas* (L.) Schott | 35       |
| Ebenaceae             | *Diospyros lotus* L | 54       |
| Ebenaceae             | *Diospyros sp.* | 4        |
| Ebenaceae             | *Diospyros virginiana* L | 5        |
| Elaeagnaceae          | *Elaeagnus sp.* | 3        |
| Elaeagnaceae          | *Hippophae rhamnoides* L | 3        |
| Elaeagnaceae          | *Shepherdia argentea* Nutt | 1        |
| Elaeagnaceae          | *Shepherdia sp.* | 3        |
| Ericaceae             | *Empetrum hermaphroditum* Hagenup | 21       |
| Ericaceae             | *Oxyccocus quinquepelta* Gilib | 1        |
| Ericaceae             | *Vaccinium arctostaphylos* L | 190      |
| Plant / Fungal family | Plant / Fungal species          | Mentions |
|-----------------------|---------------------------------|----------|
| Ericaceae             | Vaccinium myrtillus L           | 209      |
| Ericaceae             | Vaccinium sp.                   | 4        |
| Ericaceae             | Vaccinium uliginosum L          | 2        |
| Ericaceae             | Vaccinium vitis-idaea L         | 49       |
| Euphorbiaceae         | Alnus moluccanaus (L.) Willd    | 1        |
| Fabaceae              | Astragalus caucasisus Pall      | 1        |
| Fabaceae              | Cicer arietinum L               | 25       |
| Fabaceae              | Coronilla vana L                | 5        |
| Fabaceae              | Galega orientalis Lam           | 9        |
| Fabaceae              | Glycine max (L.) Merr           | 35       |
| Fabaceae              | Glycyrrhiza glabra              | 1        |
| Fabaceae              | Lathyrus roseus Steven          | 42       |
| Fabaceae              | Lathyrus tuberosus L            | 3        |
| Fabaceae              | Lens comicularis L             | 16       |
| Fabaceae              | Phaseolus sativus L             | 86       |
| Fabaceae              | Phaseolus vulgaris L            | 66       |
| Fabaceae              | Pisiurn sativum L               | 6        |
| Fabaceae              | Robinia pseudoacacia L          | 45       |
| Fabaceae              | Triticum sp.                    | 5        |
| Fabaceae              | Trigonella caerulea (L.) Ser    | 56       |
| Fabaceae              | Vicia faba L                    | 54       |
| Fabaceae              | Vicia sativa L                  | 1        |
| Fabaceae              | Vigna angularis (Willd.) Ohwi & H. Ohashi | 1 |
| Fagaceae              | Castanea sativa Mill           | 79       |
| Fagaceae              | Fagus orientalis Lipsky         | 53       |
| Fagaceae              | Quercus ibex M. Bieb           | 9        |
| Fistulinaceae         | Fistulina hepatica (Schaeff.) With | 6 |
| Fungi                 | Unidentified fungus            | 227      |
| Gentianaceae          | Swertia iberica Fisch & C.A. Mey | 1 |
| Geraniaceae           | Erodium cicutarium (L.) L'Héř. ex Alton | 4 |
| Geraniaceae           | Geranium robertianum L          | 3        |
| Geraniaceae           | Geranium sp.                    | 6        |
| Grossulariaceae       | Grossularia reclinata (L.) Mill | 27       |
| Grossulariaceae       | Ribes brambertini Berl. ex DC  | 59       |
| Grossulariaceae       | Ribes grossularia L             | 22       |
| Grossulariaceae       | Ribes nigrum L                  | 73       |
| Grossulariaceae       | Ribes orientale Desf            | 4        |
| Grossulariaceae       | Ribes rubrum L                  | 103      |
| Grossulariaceae       | Ribes sp.                       | 24       |
| Grossulariaceae       | Ribes uva-crispa L              | 13       |
| Guttiferae            | Hypericum perforatum L          | 22       |
| Hencicineae           | Hencicum renaceae (Buill.) Pers | 1        |
| Iridaceae             | Crocus sativus L                | 9        |
| Juglandaceae          | Juglans mandshurica Maxim       | 7        |
| Juglandaceae          | Juglans regia L                 | 235      |
| Juglandaceae          | Pterocarya pterocarpa (Michx.) Kunth ex Iljin | 7 |
| Lamiaceae             | Lamium album L                  | 32       |
| Lamiaceae             | Lamium purpureum L              | 6        |
| Lamiaceae             | Leonotis leonurus (L.) R. Br    | 1        |
| Lamiaceae             | Mentha aquatica L               | 3        |
| Lamiaceae             | Mentha longifolia (L.) L        | 158      |
| Lamiaceae             | Mentha pulegium L               | 81       |
| Lamiaceae             | Mentha sp.                      | 8        |
### Table 5 (continued)

| Plant / Fungal family | Plant / Fungal species | Mentions |
|-----------------------|-------------------------|----------|
| Lamiaceae             | Mentha x piperita L     | 143      |
| Lamiaceae             | Nepeta mugunv Spreng   | 2        |
| Lamiaceae             | Ocimum basilicum L      | 198      |
| Lamiaceae             | Ocimum basilicum var. purpurascens Benth | 8 |
| Lamiaceae             | Origanum vulgare L      | 50       |
| Lamiaceae             | Salvia verticillata L   | 3        |
| Lamiaceae             | Satureja hortensis L    | 92       |
| Lamiaceae             | Satureja laxiflora K. Koch | 7  |
| Lamiaceae             | Satureja spicigera Boiss | 31 |
| Lamiaceae             | Thymus caucasicus Willd. ex Benth | 30 |
| Lamiaceae             | Thymus cohnus Bieb      | 21       |
| Lamiaceae             | Thymus sp.              | 29       |
| Lamiaceae             | Thymus transcaucasicus Ronninger | 17 |
| Lamiaceae             | Zoilphia puschkini Adams | 18 |
| Lamiaceae             | Zoilphia serpyacea M. Bieb | 16 |
| Lauraceae             | Laurus nobilis L        | 25       |
| Lauraceae             | Persea americana Mill   | 2        |
| Lepiotaceae           | Macrolepiota procera (Scop.) Springer | 51 |
| Liliaceae             | Fritillaria lutea Mill  | 11       |
| Liliaceae             | Gagea sp.               | 3        |
| Liliaceae             | Lilium sp.              | 1        |
| Liliaceae             | Lilium zovitsianum Fisch. & Avé-Lall | 11 |
| Liliaceae             | Omithogalum woronowii Kasch | 6   |
| Linaceae              | Linum usitatissimum L   | 7        |
| Lythraceae            | Punica granatum L       | 32       |
| Malvaceae             | Alcea rosea L           | 1        |
| Malvaceae             | Althaea spp.            | 11       |
| Malvaceae             | Malva neglecta L        | 38       |
| Malvaceae             | Malva sylvestris L      | 10       |
| Malvaceae             | Malva sylvestris L / M. neglecta L | 59 |
| Malvaceae             | Tilia begonfolia Stev   | 2        |
| Malvaceae             | Tilia caucasicus Rupr   | 49       |
| Marasmiaceae          | Marasmius oreades (Bolton) Fr | 12 |
| Melanthiaceae         | Veratum lobelianum Bieb | 5        |
| Moraceae              | Ficus carica L          | 142      |
| Moraceae              | Morus alba L            | 99       |
| Moraceae              | Morus nigra L           | 7        |
| Morchellaceae         | Morchella conica Pers   | 1        |
| Morchellaceae         | Morchella esculenta (L.) Pers | 12 |
| Musaceae              | Musa x paradisiaca L    | 3        |
| Myrtaceae             | Acca sellowiana (O. Berg.) Burret | 11 |
| Oleaceae              | Fraxinus excelsior L    | 5        |
| Oleaceae              | Ligustrum vulgare L     | 2        |
| Onagraceae            | Chamaenerion angustifolium (L.) Holub | 1 |
| Onocleaceae           | Mattheuccia struthiopteris (L.) Todd | 35 |
| Orobanchaceae         | Pedicularis sp.         | 5        |
| Oxlidaceae            | Avenhoa carambola L     | 1        |
| Oxlidaceae            | Oxalis acetosella L     | 1        |
| Oxlidaceae            | Oxalis corniculata L    | 1        |
| Papaveraceae          | Papaver somniferum L    | 32       |
| Physalacriaceae       | Ammianella mellea (Vahl) P Kumm | 93 |
| Phytolaccaceae        | Phytolaccia americana L | 12       |
| Pinaceae              | Abies nordmanniana (Steven) Spach | 7 |
Table 5 (continued)

| Plant / Fungal family | Plant / Fungal species | Mentions |
|-----------------------|------------------------|---------|
| Pinaceae              | Cedrus sp.              | 3       |
| Pinaceae              | Picea orientalis (L.) Peterm | 17      |
| Pinaceae              | Pinus kochiana Klotzsch ex K. Koch | 10    |
| Pinaceae              | Pinus sibirica Nakai   | 8       |
| Piperaceae            | Piper piperitum L.     | 4       |
| Plantaginaceae        | Plantago major L.      | 2       |
| Plantaginaceae        | Valeriana officinalis L. | 1     |
| Pleurotaceae          | Pleurotus cornicopiae (Paulet) Rolland | 4   |
| Pleurotaceae          | Pleurotus ostreatus (Jacq. ex Fr.) P. Kumm | 90 |
| Pluteaceae            | Pluteus cervinus (Schaeffer ex Fr.) P. Kumm | 28 |
| Poaceae               | Avena sativa L.        | 42      |
| Poaceae               | Hordeum vulgare L.     | 97      |
| Poaceae               | Hordeum vulgare L. ssp. vulgare L. var. coelestre L. | 5 |
| Poaceae               | Panicum miliaceum Rendle | 38    |
| Poaceae               | Secale cereale L.      | 65      |
| Poaceae               | Setaria italica (L.) P. Beauv | 16  |
| Poaceae               | Sorghum bicolor (L.) Moench | 2   |
| Poaceae               | Triticum aestivum L.   | 144     |
| Poaceae               | Triticum carthlicum Nevski | 4   |
| Poaceae               | Triticum dicoccum Schrank | 2   |
| Poaceae               | Triticum sp.           | 2       |
| Poaceae               | Zea mays L.            | 195     |
| Polygonaceae          | Fagopyrum tataricum (L.) Gaertn | 9   |
| Polygonaceae          | Polygonum alpinum All | 57      |
| Polygonaceae          | Polygonum aviculare L | 9       |
| Polygonaceae          | Polygonum carneum C. Koch | 74   |
| Polygonaceae          | Polygonum panjutini Kharkev | 5 |
| Polygonaceae          | Polygonum sp.          | 6       |
| Polygonaceae          | Rheum rhabarbarum L.   | 3       |
| Polygonaceae          | Rumex acerosa L.       | 77      |
| Polygonaceae          | Rumex acerosella L.    | 19      |
| Polygonaceae          | Rumex alpinus L.       | 84      |
| Polygonaceae          | Rumex crispus L.       | 44      |
| Polygonaceae          | Rumex icturnus L.      | 6       |
| Polygonaceae          | Rumex sp.              | 20      |
| Polygonaceae          | Rumex tuberosus L.     | 1       |
| Polyopodiumaceae      | Polyopodium vulgare L. | 10      |
| Polyopodiumaceae      | Polyopodium squamosus (Huds.) Fr | 9 |
| Portulacaceae         | Portulaca oleracea L.  | 85      |
| Primulaceae           | Cyclamen vernalum Sweet | 5    |
| Primulaceae           | Primula leuka Rupr     | 1       |
| Primulaceae           | Primula macrocalyx Bunge | 24  |
| Primulaceae           | Primula sp.            | 4       |
| Primulaceae           | Primula vulgaris subsp. rubra (Sm.) Arcang | 3  |
| Primulaceae           | Primula warzowii Losinsk | 18 |
| Psathyrellaceae       | Coprinus atramentarius (Bull.) Redhead, Vilgalys & Moncalvo | 24 |
| Rhamnaceae            | Rhamnas flava (Schaeff) Quél | 18  |
| Ranunculaceae         | Adonis aestivalis L.   | 2       |
| Ranunculaceae         | Clematis vitalba L.    | 11      |
| Ranunculaceae         | Ranunculus repens L.   | 2       |
| Rhamnaceae            | Rhamnas dementia Booth, Petz. & Kirchn | 1  |
| Plant / Fungal family | Plant / Fungal species | Mentions |
|-----------------------|------------------------|----------|
| Rhamnaceae            | Ziziphus jujuba Mill   | 2        |
| Rhododendraceae       | Rhododendron caucasicum Pall | 79 |
| Rhododendraceae       | Rhododendron luteum Sweet | 15 |
| Rhododendraceae       | Rhododendron ponticum L | 27 |
| Rosaceae              | Amelanchier vulgaris Lam | 2 |
| Rosaceae              | Aruncus vulgaris Raf    | 31 |
| Rosaceae              | Cornus mas L           | 133 |
| Rosaceae              | Cotoneaster multiflorus Bunge | 4 |
| Rosaceae              | Crataegus curvipespal L | 34 |
| Rosaceae              | Crataegus pentagyna Waldst | 48 |
| Rosaceae              | Crataegus sp.          | 13 |
| Rosaceae              | Cydonia oblonga L      | 80 |
| Rosaceae              | Dicranus indica (Andrews) Teschem | 6 |
| Rosaceae              | Enkبوتia japonica (Thunb.) Lindl | 27 |
| Rosaceae              | Fraxinella veica L     | 74 |
| Rosaceae              | Fraxinella veica L "Albaba" | 1 |
| Rosaceae              | Fraxinella virginiana Mill | 12 |
| Rosaceae              | Fraxinella x ananassa Duschesne ex Rozier | 35 |
| Rosaceae              | Malus orientalis Uglizk | 685 |
| Rosaceae              | Malus pumila Mill var. paradisica C.K. Schneid | 3 |
| Rosaceae              | Malus germanica L      | 81 |
| Rosaceae              | Prunus racemosa (Lam.) Gilib | 27 |
| Rosaceae              | Prunus luscinus Batsch  | 1 |
| Rosaceae              | Prunus armeniaca L     | 30 |
| Rosaceae              | Prunus avium (L.) L L  | 187 |
| Rosaceae              | Prunus cerasus L       | 78 |
| Rosaceae              | Prunus divaricata Ledeb | 282 |
| Rosaceae              | Prunus ritisit L       | 62 |
| Rosaceae              | Prunus laurocerasus L  | 63 |
| Rosaceae              | Prunus padus L         | 2 |
| Rosaceae              | Prunus persica (L.) Batsch | 74 |
| Rosaceae              | Prunus sp.             | 33 |
| Rosaceae              | Prunus spinosa L       | 41 |
| Rosaceae              | Prunus vachusinitii Bregaze | 20 |
| Rosaceae              | Prunus vulgaris Mill   | 4 |
| Rosaceae              | Prunus x domestica L   | 296 |
| Rosaceae              | Pyracantha coccinea M. Roem | 3 |
| Rosaceae              | Pyrus caucasicus Fed   | 232 |
| Rosaceae              | Pyrus communis L       | 628 |
| Rosaceae              | Rosa canina L         | 11 |
| Rosaceae              | Rosa pimpinellifolia Boiss | 13 |
| Rosaceae              | Rosa sp.              | 140 |
| Rosaceae              | Rubus caesius L        | 27 |
| Rosaceae              | Rubus fruticosus L     | 104 |
| Rosaceae              | Rubus idaeus L         | 268 |
| Rosaceae              | Rubus saxatilis L      | 19 |
| Rosaceae              | Rubus sp.             | 60 |
| Rosaceae              | Sorbus aucuparia K. Koch | 18 |
| Rosaceae              | Sorbus boissieri C.K. Schneid | 2 |
| Rosaceae              | Sorbus caucasicena Kom | 57 |
| Rosaceae              | Sorbus terminalis C.Crantz | 20 |
| Rubiaceae             | Coffea arabica L       | 1 |
| Russulaceae           | Lactarius deliciosus (L. ex Fr.) S.F. Grey | 31 |
### Table 5 (continued)

| Plant / Fungal family | Plant / Fungal species                  | Mentions |
|-----------------------|-----------------------------------------|----------|
| Russulaceae           | *Lactarius piperatus* (L.) Pers         | 27       |
| Russulaceae           | *Lactifluus piperatus* (L.) Roussel     | 18       |
| Russulaceae           | *Lactifluus volvatus* (Fr.) Kuntze      | 14       |
| Russulaceae           | *Russula adusta* Pers. Fr               | 6        |
| Russulaceae           | *Russula emetica* (Schaeff.) Pers       | 6        |
| Russulaceae           | *Russula rosea* Pers                    | 23       |
| Russulaceae           | *Russula virens* (Schaeff.) Fr          | 2        |
| Rutaceae              | *Citrus limon* (L.) Burm. f             | 15       |
| Rutaceae              | *Citrus recticulata* Blanco             | 5        |
| Rutaceae              | *Citrus sinensis* Osbeck               | 8        |
| Rutaceae              | *Citrus unshiu* Marcov                 | 4        |
| Rutaceae              | *Citrus x paradisi* Macfald             | 2        |
| Salicaceae            | *Salix caprea* L                       | 1        |
| Sapindaceae           | *Acer pseudoplatanus* L                 | 2        |
| Smilacaceae           | *Smilax excelsa* L                     | 91       |
| Solanaceae            | *Capsicum annuum* L                    | 204      |
| Solanaceae            | *Capsicum annuum* L *"Sweet Bulgarian"* | 100      |
| Solanaceae            | *Lycopersicum esculentum* L            | 316      |
| Solanaceae            | *Physalis alkekengi* L                 | 7        |
| Solanaceae            | *Solanum melongena* L                  | 63       |
| Solanaceae            | *Solanum pseudocapsicum* L             | 2        |
| Solanaceae            | *Solanum tuberosum* L                  | 347      |
| Sparassidaceae        | *Sparassis crispa* Wulfen              | 6        |
| Staphyleaceae         | *Staphylea colchica* Steven            | 116      |
| Strophariaceae        | *Hypholoma fasciculare* (Huds.) P. Kumm | 6        |
| Suillaceae            | *Suillus granulatus* (L.) Roussel      | 14       |
| Suillaceae            | *Suillus luteus* (L.) Roussel          | 17       |
| Taxaceae              | *Taxus baccata* L                      | 12       |
| Theaceae              | *Camellia sinensis* L                  | 2        |
| Tricholomataceae      | *Lepista sordida* (Schumach.) Singer   | 18       |
| Tricholomataceae      | *Tricholoma aurantium* (Schaeff.) Ricken | 1        |
| Tricholomataceae      | *Tricholoma portentosum* (Fr.) Quél     | 17       |
| Tropaeolaceae         | *Tropaeolum majus* L                   | 1        |
| Ulmaceae              | *Ulmus globra* Huds                    | 3        |
| Unidentified          | Unidentified species                   | 153      |
| Urticaceae            | *Urtica dioica* L                      | 289      |
| Violaceae             | *Viola arvensis* L                     | 1        |
| Violaceae             | *Viola sp.*                            | 41       |
| Vitaceae              | *Vitis labrusca* L                     | 26       |
| Vitaceae              | *Vitis sylvestris* W. Bartram          | 2        |
| Vitaceae              | *Vitis vinifera* L                     | 538      |
| Zingiberaceae         | *Elattaria cardamomum* (L.) Maton      | 4        |

### Table 6

Distribution of mentions in plant families between garden and wild plants

| Families          | Garden | Wild | Families          | Garden | Wild |
|-------------------|--------|------|-------------------|--------|------|
| Actinidiaceae     | 28     | 0    | Liliaceae         | 6      | 39   |
| Adoxaceae         | 6      | 128  | Linaceae          | 0      | 1    |
| Agaricaceae       | 6      | 225  | Lythraceae        | 19     | 13   |
| Amanitaceae       | 0      | 16   | Malvaceae         | 14     | 157  |
| Amaranthaceae     | 497    | 350  | Marasmiaceae      | 0      | 12   |
| Families            | Garden | Wild | Families            | Garden | Wild |
|---------------------|--------|------|---------------------|--------|------|
| Amaryllidaceae      | 853    | 302  | Melanthiaceae       | 0      | 5    |
| Annonaceae          | 1      | 0    | Moraceae            | 237    | 11   |
| Apiaceae            | 1422   | 490  | Morchellaceae       | 0      | 13   |
| Araceae             | 10     | 19   | Musaceae            | 3      | 0    |
| Araliaceae          | 1      | 0    | Myrtaceae           | 11     | 0    |
| Asparagaceae        | 7      | 52   | Oleaceae            | 0      | 7    |
| Asteraceae          | 492    | 252  | Onagraceae          | 0      | 1    |
| Auriculatiaceae     | 0      | 10   | Onocleaceae         | 4      | 31   |
| Bankeraceae         | 0      | 10   | Orobancheace        | 0      | 5    |
| Begoniaceae         | 10     | 0    | Oxalidaceae         | 2      | 1    |
| Berberidaceae       | 10     | 42   | Papaveraceae        | 4      | 28   |
| Betulaceae          | 81     | 127  | Physalacriaceae     | 0      | 93   |
| Boletaceae          | 0      | 21   | Phytolaccaceae      | 0      | 12   |
| Boraginaceae        | 2      | 20   | Pinaceae            | 3      | 44   |
| Brassicaceae        | 899    | 99   | Plantaginaceae      | 1      | 2    |
| Campanulaceae       | 1      | 110  | Pleurotaceae        | 2      | 92   |
| Cannabaceae         | 39     | 13   | Pluteaceae          | 0      | 28   |
| Cantharellaceae     | 0      | 36   | Poaceae             | 609    | 9    |
| Caprifoliaceae      | 0      | 3    | Polygonaceae        | 29     | 385  |
| Caryophyllaceae     | 7      | 50   | Polypodaceae        | 0      | 10   |
| Clavariadelphaceae  | 0      | 5    | Polyoporusaceae     | 0      | 9    |
| Convolvulaceae      | 15     | 2    | Portulacaceae       | 6      | 79   |
| Cornaceae           | 22     | 117  | Prunulaeceae        | 0      | 55   |
| Cortinariaceae      | 0      | 1    | Psathyrellaceae     | 0      | 24   |
| Corylaceae          | 1      | 3    | Ramariaece          | 0      | 12   |
| Crassulaceae        | 0      | 32   | Ranunculaceae       | 5      | 22   |
| Cucurbitaceae       | 662    | 3    | Rhamnaceae          | 1      | 2    |
| Cupressaceae        | 0      | 2    | Rhododendraceae     | 1      | 120  |
| Dipsacaceae         | 0      | 1    | Rosaciae            | 2683   | 1249 |
| Dryopteridaceae     | 0      | 35   | Rubiacaceae         | 1      | 0    |
| Ebenaceae           | 53     | 10   | Russulaceae         | 3      | 124  |
| Elaeagnaceae        | 1      | 9    | Rutaceae            | 34     | 0    |
| Ericaceae           | 4      | 472  | Salicaceae          | 0      | 1    |
| Euphorbiaceae       | 1      | 0    | Sapindaceae         | 0      | 2    |
| Fabaceae            | 738    | 101  | Smilacaceae         | 0      | 91   |
| Fagaceae            | 11     | 128  | Solanaceae          | 1020   | 19   |
| Fiscinulaceae       | 0      | 6    | Sparassidaceae      | 0      | 6    |
| Fungi               | 2      | 225  | Staphylocaceae      | 29     | 87   |
| Gentianaceae        | 0      | 1    | Strophariaceae      | 0      | 6    |
| Geraniaceae         | 0      | 13   | Suilaceae           | 0      | 31   |
| Gomphaceae          | 0      | 6    | Taxaceae            | 0      | 12   |
| Grossulariaceae     | 226    | 99   | Theaceae            | 2      | 0    |
| Guttiferae          | 1      | 11   | Tricholomataceae    | 0      | 36   |
| Hencricaceae        | 0      | 1    | Tropaeolaceae       | 1      | 0    |
| Indet               | 24     | 126  | Ulmaceae            | 0      | 3    |
| Iridaceae           | 9      | 0    | Urticaceae          | 31     | 258  |
| Juglandaceae        | 222    | 27   | Violaceae           | 0      | 42   |
| Lamiaceae           | 550    | 403  | Vitaceae            | 553    | 8    |
| Lauraceae           | 23     | 4    | Zingiberaceae       | 4      | 0    |
| Lepiotinae          | 0      | 24   |                     |        |      |
Table 7  Pairwise comparisons with FDR p-value adjustment method of plant family usage between regions after significant PERMANOVA analysis (Table Permanova)

|               | Adjara | Guria | Javakheti Plateau | Kakheti | Khevsureti | Kvemo Kartli | Kvemo Racha | Kvemo Svaneti | Lechkhumi | Meskheti | Mtianeti | Samegrelo | Tori | Tusheti | Zemo Imereti | Zemo Racha |
|---------------|--------|-------|-------------------|---------|------------|--------------|-------------|---------------|-----------|----------|----------|-----------|------|---------|--------------|-----------|
| Guria         | 0.0019 |       |                    |         |            |               |             |               |           |          |          |           |      |         |              |           |
| Javakheti Plateau | 0.0019 | 0.0031 |                   |         |            |               |             |               |           |          |          |           |      |         |              |           |
| Kakheti      | 0.0019 | 0.0019 | 0.0159            |         |            |               |             |               |           |          |          |           |      |         |              |           |
| Khevsureti   | 0.0019 | 0.0019 | 0.0044            | 0.0019  |            |               |             |               |           |          |          |           |      |         |              |           |
| Kvemo Kartli | 0.0019 | 0.0072 | 0.0019            | 0.0370  | 0.0031     |               |             |               |           |          |          |           |      |         |              |           |
| Kvemo Racha  | 0.0117 | 0.0362 | 0.0019            | 0.0019  | 0.0019     | 0.0019       |             |               |           |          |          |           |      |         |              |           |
| Kvemo Svaneti| 0.0209 | 0.0031 | 0.0019            | 0.0044  | 0.0019     | 0.0019       | 0.0019      |               |           |          |          |           |      |         |              |           |
| Lechkhumi    | 0.0608 | 0.0031 | 0.0019            | 0.0019  | 0.0019     | 0.0019       | 0.0019      | 0.0019        |           |          |          |           |      |         |              |           |
| Meskheti     | 0.0209 | 0.0378 | 0.0019            | 0.0031  | 0.0031     | 0.0082       | 0.0159      | 0.0126        | 0.0019    |          |          |           |      |         |              |           |
| Mtianeti     | 0.0290 | 0.1400 | 0.0019            | 0.0290  | 0.0044     | 0.0544       | 0.0209      | 0.0095        | 0.1068    | 0.0019  |          |           |      |         |              |           |
| Samegrelo    | 0.0019 | 0.0019 | 0.0019            | 0.0019  | 0.0019     | 0.0019       | 0.0019      | 0.0019        | 0.0019    | 0.0019  | 0.0019  |           |      |         |              |           |
| Toli         | 0.0107 | 0.0299 | 0.0019            | 0.0019  | 0.0019     | 0.0031       | 0.0117      | 0.0031        | 0.0019    | 0.0393  | 0.0107  | 0.0019    |      |         |              |           |
| Tusheti      | 0.0019 | 0.0019 | 0.0031            | 0.0019  | 0.0019     | 0.0019       | 0.0019      | 0.0019        | 0.0019    | 0.0031  | 0.0019  | 0.0019    |      |         |              |           |
| Zemo Imereti | 0.0031 | 0.0685 | 0.0019            | 0.0290  | 0.0019     | 0.0038       | 0.0019      | 0.0019        | 0.0126    | 0.0032  | 0.0019  | 0.0019    |      |         |              |           |
| Zemo Racha   | 0.0044 | 0.0710 | 0.0082            | 0.0229  | 0.0019     | 0.0366       | 0.0159      | 0.0019        | 0.0117    | 0.0561  | 0.0019  | 0.0031    | 0.0126 |         |              | 0.0181    |
| Zemo Svaneti | 0.0299 | 0.0019 | 0.0019            | 0.0019  | 0.0019     | 0.0058       | 0.0082      | 0.0031        | 0.0474    | 0.0181  | 0.0019  | 0.0209    | 0.0019 | 0.0031  | 0.0019             |           |

Analyses were based on Euclidean distance and 999 permutations.
|                  | Adjara | Guria | Javakheti Plateau | Kakheti | Khevsureti | Kvemo Kartli | Kvemo Racha | Kvemo Svaneti | Ledkhumi | Meskheti | Mtiantei | Samegrelo | Tori | Tusheti | Zemo Imereti | Zemo Racha |
|------------------|--------|-------|-------------------|---------|------------|--------------|-------------|---------------|----------|----------|-----------|------------|------|--------|---------------|------------|
| Guria            | 0.0012 |       |                   |         |            |               |             |               |          |          |           |            |      |        |               |            |
| Javakheti Plateau| 0.0012 | 0.0012|                   |         |            |               |             |               |          |          |           |            |      |        |               |            |
| Kakheti          | 0.0012 | 0.0012| 0.0012            |         |            |               |             |               |          |          |           |            |      |        |               |            |
| Khevsureti       | 0.0012 | 0.0012| 0.0012            | 0.0012  |            |               |             |               |          |          |           |            |      |        |               |            |
| Kvemo Kartli     | 0.0012 | 0.0012| 0.0012            | 0.0012  | 0.0012     |               |             |               |          |          |           |            |      |        |               |            |
| Kvemo Racha      | 0.0012 | 0.0022| 0.0012            | 0.0012  | 0.0012     | 0.0012        |             |               |          |          |           |            |      |        |               |            |
| Kvemo Svaneti    | 0.0012 | 0.0012| 0.0012            | 0.0012  | 0.0012     | 0.0012        | 0.0012      |               |          |          |           |            |      |        |               |            |
| Lechkhumi        | 0.0012 | 0.0065| 0.0012            | 0.0012  | 0.0012     | 0.0012        | 0.0012      | 0.0012        |          |          |           |            |      |        |               |            |
| Meskheti         | 0.0012 | 0.0022| 0.0012            | 0.0012  | 0.0012     | 0.0012        | 0.0012      | 0.0012        | 0.0012  |          |           |            |      |        |               |            |
| Mtiantei         | 0.0055 | 0.0670| 0.0012            | 0.0153  | 0.0012     | 0.0022        | 0.0073      | 0.0073        | 0.0012  | 0.0264   |           |            |      |        |               |            |
| Samegrelo        | 0.0012 | 0.0012| 0.0012            | 0.0012  | 0.0012     | 0.0012        | 0.0012      | 0.0012        | 0.0012  | 0.0012   |           |            |      |        |               |            |
| Tori             | 0.0012 | 0.0022| 0.0012            | 0.0012  | 0.0012     | 0.0012        | 0.0012      | 0.0012        | 0.0012  | 0.0012   | 0.0012    |            |      |        |               |            |
| Tusheti          | 0.0012 | 0.0012| 0.0012            | 0.0012  | 0.0012     | 0.0012        | 0.0012      | 0.0012        | 0.0012  | 0.0012   | 0.0012    | 0.0012    |      |        |               |            |
| Zemo Imereti     | 0.0012 | 0.0073| 0.0012            | 0.0022  | 0.0012     | 0.0012        | 0.0012      | 0.0012        | 0.0012  | 0.0083   | 0.0012    | 0.0012    |      |        |               |            |
| Zemo Racha       | 0.0033 | 0.0584| 0.0012            | 0.0073  | 0.0012     | 0.0022        | 0.0065      | 0.0012        | 0.0012  | 0.0103   | 0.0012    | 0.0012    | 0.0033 |        |               |            |
| Zemo Svaneti     | 0.0012 | 0.0012| 0.0012            | 0.0012  | 0.0012     | 0.0012        | 0.0012      | 0.0012        | 0.0012  | 0.0012   | 0.0012    | 0.0012    | 0.0012 | 0.0012 |               |            |

Analyses were based on Euclidean distance and 999 permutations.
Table 9: Pairwise comparisons with FDR p-value adjustment method of different plant system used (root, shoot, or both) between regions after significant PERMANOVA analysis (Table Permanova)

|                  | Adjara | Guria | Javakheti Plateau | Kakheti | Khevsureti | Kvemo Kartli | Kvemo Racha | Kvemo Svaneti | Lechkhumi | Meskheti | Mtianeti | Samegrelo | Tori | Tusheti | Zemo Imereti | Zemo Racha |
|------------------|--------|-------|-------------------|---------|------------|--------------|-------------|---------------|-----------|----------|----------|-----------|------|--------|---------------|-----------|
| Guria            |        | 0.0065|                   |         |            |               |             |               |           |          |          |           |      |        |               |           |
| Javakheti Plateau| 0.0187 | 0.0038|                   |         |            |               |             |               |           |          |          |           |      |        |               |           |
| Kakheti          | 0.4754 | 0.2596|                   | 0.5112  |            |               |             |               |           |          |          |           |      |        |               |           |
| Khevsureti       | 0.4093 | 0.0038| 0.0121            | 0.4054  |            |               |             |               |           |          |          |           |      |        |               |           |
| Kvemo Kartli     | 0.4093 | 0.0139| 0.0865            | 0.9340  | 0.4054     |               |             |               |           |          |          |           |      |        |               |           |
| Kvemo Racha      | 0.0038 | 0.1808| 0.0038            | 0.0139  | 0.0038     | 0.0065        |             |               |           |          |          |           |      |        |               |           |
| Kvemo Svaneti    | 0.5393 | 0.0038| 0.0231            | 0.7329  | 0.5763     | 0.6930        | 0.0038      |               |           |          |          |           |      |        |               |           |
| Lechkhumi        | 0.2596 | 0.2546| 0.0038            | 0.1539  | 0.0744     | 0.0544        | 0.0252      | 0.0415        |           |          |          |           |      |        |               |           |
| Meskheti         | 0.5393 | 0.1396| 0.0038            | 0.3965  | 0.3660     | 0.1808        | 0.0065      | 0.2546        | 0.2343    |           |          |           |      |        |               |           |
| Mtianeti         | 0.7807 | 0.2720| 0.0038            | 0.5731  | 0.5139     | 0.4038        | 0.0691      | 0.4871        | 0.2629    | 0.6245    |           |           |      |        |               |           |
| Samegrelo        | 0.0038 | 0.0038| 0.0065            | 0.0209  | 0.0038     | 0.0038        | 0.0038      | 0.0038        | 0.0038    | 0.0038    | 0.0038    |           |      |        |               |           |
| Tori             | 0.0038 | 0.5112| 0.0038            | 0.0038  | 0.0038     | 0.2343        | 0.0038      | 0.0139        | 0.0038    | 0.0358    | 0.0038    |           |      |        |               |           |
| Tusheti          | 0.4054 | 0.0038| 0.0647            | 0.7222  | 0.7025     | 0.6091        | 0.0038      | 0.7323        | 0.0375    | 0.2629    | 0.4559    | 0.0065    |      |        |               |           |
| Zemo Imereti     | 0.0774 | 0.7439| 0.0038            | 0.0680  | 0.0139     | 0.0340        | 0.2125      | 0.0321        | 0.0301    | 0.1104    | 0.2510    | 0.0038    | 0.4334 | 0.0163 |               |           |
| Zemo Racha       | 0.6609 | 0.4054| 0.0038            | 0.5273  | 0.4054     | 0.4038        | 0.1247      | 0.4054        | 0.6800    | 0.6800    | 0.7444    | 0.0065    | 0.1060 | 0.4054 | 0.4054        |           |
| Zemo Svaneti     | 0.3660 | 0.1060| 0.0038            | 0.1554  | 0.1396     | 0.1168        | 0.0038      | 0.1248        | 0.7108    | 0.6622    | 0.6887    | 0.0038    | 0.0095 | 0.1168 | 0.2149        | 0.7807    |

Analyses were based on Euclidean distance and 999 permutations
Table 10  Pairwise comparisons with FDR p-value adjustment method of different general plant parts used (vegetative, reproductive, or both) between regions after significant PERMANOVA analysis (Table Permanova). Analyses were based on Euclidean distance and 999 permutations.

|                | Adjara | Guria | Javakheti Plateau | Kakheti | Khevsureti | Kvemo Kartli | Kvemo Racha | Kvemo Svaneti | Ledkhumi | Meskheti | Mtkianeti | Samegrelo | Tori | Tusheti | Zemo Imereti | Zemo Svaneti |
|----------------|--------|-------|-------------------|---------|------------|--------------|-------------|---------------|----------|----------|-----------|-----------|------|--------|--------------|--------------|
| Guria          | 0.0020 |       |                   |         |            |               |             |               |          |          |           |           |      |        |              |              |
| Javakheti Plateau | 0.0020 | 0.0054|                   |         |            |               |             |               |          |          |           |           |      |        |              |              |
| Kakheti        | 0.0020 | 0.0086| 0.4630            |         |            |               |             |               |          |          |           |           |      |        |              |              |
| Khevsureti     | 0.0020 | 0.0115| 0.0115            | 0.3372  |            |               |             |               |          |          |           |           |      |        |              |              |
| Kvemo Kartli   | 0.0020 | 0.0071| 0.6074            | 0.6437  | 0.1026     |               |             |               |          |          |           |           |      |        |              |              |
| Kvemo Racha    | 0.0020 | 0.3166| 0.0020            | 0.0020  | 0.0020     |               |             |               |          |          |           |           |      |        |              |              |
| Kvemo Svaneti  | 0.6074 | 0.0071| 0.0020            | 0.0101  | 0.0020     | 0.0020        |             |               |          |          |           |           |      |        |              |              |
| Lechkhumi      | 0.0020 | 0.0054| 0.0020            | 0.0020  | 0.0020     | 0.0020        |             |               |          |          |           |           |      |        |              |              |
| Meskheti       | 0.0302 | 0.3671| 0.0020            | 0.1709  | 0.1593     | 0.0158        | 0.0158      | 0.0517        | 0.0020   |          |           |           |      |        |              |              |
| Mtkianeti      | 0.0915 | 0.4792| 0.0020            | 0.5124  | 0.6437     | 0.1560        | 0.0666      | 0.0915        | 0.0020   | 0.7760    |           |           |      |        |              |              |
| Samegrelo      | 0.0020 | 0.0020| 0.0020            | 0.0020  | 0.0020     | 0.0020        | 0.0020      | 0.0020        | 0.0020   | 0.0020    |           |           |      |        |              |              |
| Tori           | 0.0020 | 0.1593| 0.0020            | 0.0020  | 0.0020     | 0.0020        | 0.4439      | 0.0020        | 0.0020   | 0.0020    | 0.0038    | 0.0020    |      |        |              |              |
| Tusheti        | 0.0020 | 0.0038| 0.1885            | 0.3411  | 0.0857     | 0.5533        | 0.0020      | 0.0020        | 0.0020   | 0.0130    | 0.1676    | 0.0020    | 0.0020 |        | 0.0020       | 0.3992       |
| Zemo Imereti   | 0.0020 | 0.5440| 0.0038            | 0.0783  | 0.0260     | 0.0558        | 0.0920      | 0.0020        | 0.0020   | 0.0915    | 0.1916    | 0.0020    | 0.0020 | 0.0508 |              |              |
| Zemo Racha     | 0.0020 | 0.2997| 0.0526            | 0.3309  | 0.0915     | 0.2964        | 0.0535      | 0.0054        | 0.0020   | 0.0581    | 0.1511    | 0.0020    | 0.0020 | 0.4792 | 0.3992        |              |
| Zemo Svaneti   | 0.2802 | 0.0260| 0.0020            | 0.0020  | 0.0020     | 0.0020        | 0.0086      | 0.1119        | 0.0020   | 0.0250    | 0.0645    | 0.0020    | 0.0101 | 0.0020 | 0.0038        | 0.0020       |
Table 11  Pairwise comparisons with FDR p-value adjustment method of specific plant parts used (bark, branches, buds, bulb, cones, flowers, fruit, latex, leaves, resin, roots, seeds, shoots, silk, stem, timber, tuber, whole plant) between regions after significant PERMANOVA analysis (Table Permanova)

| Region 1 | Adjara | Guria | Javakheti Plateau | Kakheti | Khevsureti | Kvemo Kartli | Kvemo Racha | Kvemo Svaneti | Lechkhumi | Meskheti | Mtianeti | Samegrelo | Tori | Tusheti | Zemo Imereti | Zemo Racha |
|----------|--------|-------|--------------------|---------|------------|--------------|-------------|---------------|------------|---------|----------|-----------|------|--------|--------------|-----------|
| Guria    | 0.0018 |       |                    |         |            |               |             |               |            |         |          |           |      |        |              |           |
| Javakheti Plateau | 0.0018 | 0.0018 |                    |         |            |               |             |               |            |         |          |           |      |        |              |           |
| Kakheti  | 0.0018 |       | 0.0018             | 0.0267  |            |               |             |               |            |         |          |           |      |        |              |           |
| Khevsureti | 0.0018 |       | 0.0018             | 0.0033  | 0.0697     |               |             |               |            |         |          |           |      |        |              |           |
| Kvemo Kartli | 0.0018 |       | 0.0018             | 0.0033  | 0.0697     |               | 0.3999      | 0.0057        |            |         |          |           |      |        |              |           |
| Kvemo Racha | 0.0018 |       | 0.01692            | 0.0018  | 0.0018     | 0.0018        | 0.0033      | 0.0018        | 0.0018    |         |          |           |      |        |              |           |
| Kvemo Svaneti | 0.2045 | 0.0018 | 0.0018             | 0.0018  | 0.0018     | 0.0018        | 0.0018      | 0.0018        | 0.0018    |         |          |           |      |        |              |           |
| Lechkhumi | 0.0057 | 0.0057 | 0.0018             | 0.0018  | 0.0018     | 0.0018        | 0.0018      | 0.0018        | 0.0018    |         |          |           |      |        |              |           |
| Meskheti | 0.0046 | 0.1608 | 0.0018             | 0.0603  | 0.0018     | 0.0018        | 0.0046      | 0.0173        | 0.0018    |         |          |           |      |        |              |           |
| Mtianeti | 0.0267 | 0.3522 | 0.0018             | 0.3078  | 0.0096     | 0.0057        | 0.0324      | 0.0537        | 0.0018    |         | 0.0018  |           |      |        |              |           |
| Samegrelo | 0.0018 | 0.0018 | 0.0018             | 0.0018  | 0.0018     | 0.0018        | 0.0018      | 0.0018        | 0.0018    |         | 0.0018  | 0.0018    |      |        |              |           |
| Tori     | 0.0018 | 0.0355 | 0.0018             | 0.0018  | 0.0018     | 0.0018        | 0.1349      | 0.0018        | 0.0018    |         | 0.0018  | 0.0018    |      |        |              |           |
| Tusheti  | 0.0018 | 0.0018 | 0.0148             | 0.0633  | 0.0433     | 0.0714        | 0.0018      | 0.0018        | 0.0018    |         | 0.0018  | 0.0018    |      |        |              |           |
| Zemo Imereti | 0.0018 | 0.2145 | 0.0018             | 0.0870  | 0.0033     | 0.0109        | 0.0222      | 0.0018        | 0.0018    |         | 0.0222  | 0.1272    | 0.0018 |        |              |           |
| Zemo Racha | 0.0018 | 0.1711 | 0.0018             | 0.2492  | 0.0083     | 0.1305        | 0.0267      | 0.0018        | 0.0018    | 0.0324  | 0.0668   | 0.0018    |      |        |              |           |
| Zemo Svaneti | 0.0083 | 0.0057 | 0.0018             | 0.0018  | 0.0018     | 0.0018        | 0.0787      | 0.0046        | 0.0018    |         | 0.0018  | 0.0018    |      |        |              |           |

Analyses were based on Euclidean distance and 999 permutations.
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Authors’ contributions
RWB, NYPZ, SS, ZK, DK, MK, DT, and KB designed the study; RWB, NYPZ, SS, ZK, DT, MK, and KB conducted the fieldwork, ZK and IUR conducted the main statistical analysis; RBU, NYPZ, and ZK analyzed the data and wrote the manuscript; all authors read, corrected and approved the manuscript.

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Availability of data and materials
The anonymized raw data are deposited under Open Science Network: https://osf.io/9kdtw/?view_only=93a8748c003f4770bc4a2bb332b647429

Declarations

Ethics statement
Before conducting interviews, prior informed consent was obtained from all participants. No further permissions or ethics approval were required.

Consent for publication
This manuscript does not contain any individual person’s data, and further consent for publication is not required.

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

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