

Traditional medicinal plant knowledge among Albanians, Macedonians and Gorani in the Sharr Mountains (Republic of Macedonia)

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Abstract A medico-ethnobotanical study was conducted among Albanians, Macedonians, and Gorani in forty-one villages located in the Sharr Mountains in western Macedonia. The survey was conducted by interviewing local people of each community about the medicinal plants and their uses and properties. Seventy-six mainly wild taxa were found to represent the remaining folk medical heritage of the area. The large majority of the recorded plants are used in form of teas, and mainly for minor dysfunctions of the respiratory system. Among the findings, the uncommon uses of *Ballota nigra* L. (leaves) tea as a

digestive, *Convolvulus arvensis* L. (aerial parts) tea against hypertension, *Chenopodium urbicum* L. leaves (topically applied) for treating hemorrhoids, and *Cornus sanguine* L. (leaves and fruits) tea against stomachaches could be of interest for further phyto-pharmacological studies. A significant portion of study participants raised concerns regarding the possibility of over-exploitation of a few species due to collecting practices serving both local and outside (pharmaceutical) markets. Most of the uses reported by Macedonians and Gorani were also recorded among Albanians, while a significant portion of plants quoted by Orthodox Macedonians showed an idiosyncratic use. This may be explained by the fact that the Gorani lived very close to the Albanian communities in the study area over the last century, with marriages between the two communities being commonplace and facilitated by their shared (Muslim) faith.

Keywords Albanians · Ethnobotany · Macedonia · Medicinal plants · Sharr Mountain

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Introduction

In recent years, the entire Balkan region (the European region south of the Danube-Sava-Kupariver systems) has become the focus of an impressive number of ethnobotanical studies (Ivancheva and Stantcheva

2000; Hanlidou et al. 2004; Ploetz and Orr 2004; Pieroni et al. 2005, 2012; Jarić et al. 2007; Karousou et al. 2007; Nedelcheva et al. 2007; Redžić 2007; Pieroni 2008, 2010; Kültür and Sami 2009; Nedelcheva and Dogan 2009, 2011; de Boer 2010; Redžić 2010; Šarić-Kundalić et al. 2010a, b, 2011; Menković et al. 2011; Mustafa et al. 2012a, b). Nevertheless, in the Republic of Macedonia, no field studies concerning the relationship between plants and humans have been conducted thus far. Moreover, only one study has addressed an ethnobotanical cross-cultural comparison in the region (Pieroni et al. 2011), despite the fact that this area is a hot-spot not only for biodiversity, but also for cultural diversity in Europe.

On the other hand, the Western herbal market's interest in this geographical area has been historically crucial. Indeed, the Balkans have served as the primary European "sanctuary" of wild and cultivated medicinal and aromatic plants for a few centuries, and this is a tradition that continues today. Balkan plants are traded for use in both the herbal and pharmaceutical markets (Kathe et al. 2003). Issues concerning sustainability of the wild plant trade become increasingly important as the scale and demand for particular species rises with larger market trends.

One issue, which has emerged as a point of interest to modern ethnobiologists, is that such uses of local genetic resources need to be culturally sensitive. In other words, perspectives of the local populations regarding natural and biological resources must be respected in order to successfully implement biological conservation initiatives. In order to accomplish this, local perceptions of plants and other biota require documentation if a truly sustainable management of local resources is to be achieved. Moreover, ethnobotanical studies in this area of Europe are also relevant with regards to the protection of local cultural heritage, the development of eco-tourism and any affiliated new local herbal or niche food products.

The intent of the present study was to explore the medicinal perceptions of local plants among three ethnic groups (Albanians, Macedonians, and Gorani) living in the villages of the Sharr Mountain by recording the folk names and detailed uses of these botanicals and comparing these findings. Not only are the floristic aspects of the Sharr Mountains considered one of the richest areas in the Balkan Peninsula, the same can also be said for the cultural diversity; this area is home to three ethnic groups: (Muslim)

Albanians (the majority of the population), (orthodox) Macedonians, and a minority (two villages) of Muslim Gorani.

Gorani people represent a tiny ethnic South-Slavic minority of Muslim faith, spread among a few dozen mountainous villages in Albania, Kosovo, and Macedonia. The Gorani speak a unique dialect, defined as "našinski", which is a Torlakian transitional dialect between the Bulgarian/Macedonian language group and the Serbo-Croatian language. Both Albanians and Gorani are bilingual in Macedonian; Macedonian and Gorani communities understand each other in their own languages, given their similarity, while Albanians—especially the elderly and mid-generation—are bilingual in Macedonian.

Many socio-political changes have occurred in this region over the last decades and these have caused a rapid decline in the number of farmers and a massive phenomenon of migration to urban centers. However, there are still a small number of local people who pursue a traditional way of life and currently reside in mountainous villages located at elevations greater than 1,000 m a.s.l.

The objective of this study was twofold: (1) to document the ethnobotanical knowledge related to the use of plants in local folk medical practices and of local wild plants used in the diet; and (2) to compare the collected data with those found in a few other ethnobotanical surveys recently conducted in the Western Balkans in order to assess commonalities and disparities in current patterns of plant use.

Methods

Study area

The Sharr Mountains are marked by their hilly-mountainous terrain, and are situated in the north-western part of the Republic of Macedonia (Fig. 1). The mountainous system is about 80 km long and 25 km wide. The overall area of this mountainous massif is 1,607, 840.2 km² of which are situated in the Republic of Macedonia and 693.9 km² are situated at an altitude of 1,000 m a.s.l. Approximately 1,588 km² (18.9 % of the overall area of the mountain) are situated at elevations over 2,000 m a.s.l. representing the highest percentage among all of the high mountains in the Republic of Macedonia.

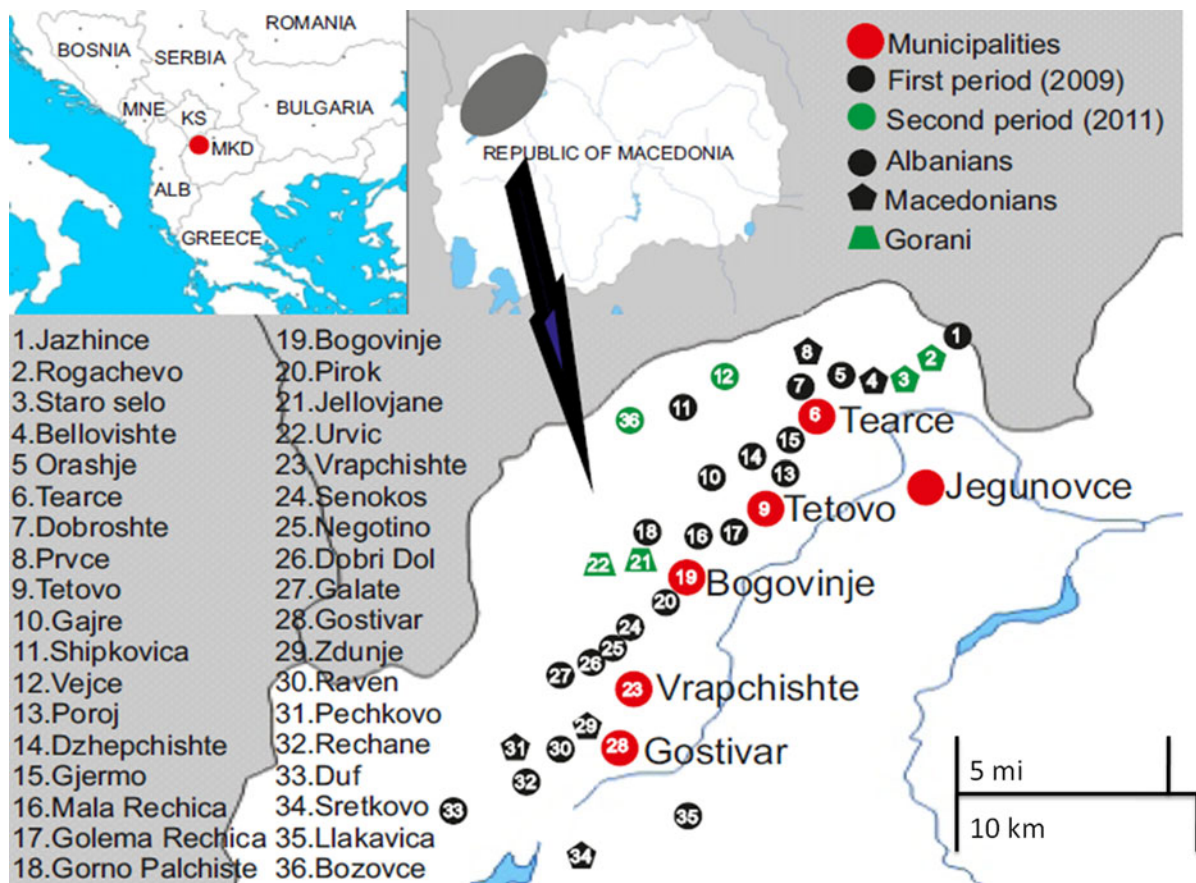


Fig. 1 The study area and villages

Field study

The field study was conducted by selecting participants from among local farmers, healers, and elderly people who still retain traditional knowledge concerning medicinal plants. The majority of the youngest and mid-aged population has already left the villages due to difficult economic situations and has either settled into larger towns or gone abroad. The study was carried out over two periods: the first field work was undertaken from March to September 2009 and interviews were conducted in thirty-five villages (Fig. 1), each of which is home to a few hundred inhabitants. The survey was conducted by administering a questionnaire to 221 locals over 55 years old and of diverse ethnicity: 160 were (Muslim) Albanians, 35 (Orthodox) Macedonians, and 26 were (Muslim) Gorani (Annex 1). The number of the participants reflected the proportion of the three ethnic groups in

the study area. However, in order to compare the plant knowledge of the three communities, a second field study took place in 2011 in six villages and was conducted by performing 30 in-depth interviews with 10 members of the (Muslim) Albanian community, 10 (orthodox) Macedonians, and 10 Gorani. In both studies, approximately one-third of the selected villages are located in the higher elevations of the mountains.

Informants were asked about their age and ethnicity, while for each quoted plant, local names and exact details about its preparation and local medicinal uses were recorded. Moreover, informants were asked about food uses of wild species, as well as their perceived vulnerability (i.e. informants were asked if they thought that the plant was endangered or threatened due to over collection), and the eventual occurrence of a trade of the plants in local or larger markets.

Prior informed consent was obtained for all interviews and the field studies followed the Code of Ethics of the International Society of Ethnobiology (ISE 2008). Taxonomic identification of plants follows standard references for the Macedonian Flora and mushrooms (Micevski 1985–2005; Karadelev 2001). Plant family assignments follow the current guidelines of the Angiosperm Phylogeny Group (III). Voucher specimens were collected, deposited, and entered into a database at the State University of Tetova (Republic of Macedonia).

Data analysis

The collected field data were compared with the ethnobotanical literature of the Western Balkans, in particular with recent studies conducted in Bosnia Herzegovina (Redžić 2006, 2007; Šarić-Kundalić et al. 2010a, 2011), Serbia (Jarić et al. 2007; Pieroni et al. 2011), Montenegro (Menković et al. 2011), Kosovo (Mustafa et al. 2012a, b), and Albania (Pieroni et al. 2005; Pieroni 2008).

Results and Discussion

Medicinal plant uses in the Sharr Mountain

The medicinal plants quoted by the study participants are reported in Table 1. Seventy-six species (belonging to 34 families), mainly wild, were found. Of these, a couple dozen (*Achillea millefolium* L., *Castanea sativa* Mill., *Centaureum umbellatum* Gilib., *Cornus mas* L., *Fragaria vesca* L., *Hypericum perforatum* L., *Helianthus tuberosus* L., *Juglans regia* L., *Juniperus communis* L., *Malva sylvestris* L., *Matricaria recutita* L., *Mentha piperita* L., *Morus nigra* L., *Ocimum basilicum* L., *Origanum vulgare* L., *Rosa canina* L., *Rubus ulmifolius* Schott., *Sambucus nigra* L., *Sideritis scardica* Griseb., *Tilia cordata* Mill., *Urtica dioica* L. and *Vaccinium myrtillus* L.) were cited by more than the half of the informants. The most-frequently cited families were Lamiaceae (15.7 %), Asteraceae (14.4 %), Rosaceae (5.2 %), Malvaceae (5.2 %) and Fabaceae (5.2 %). The most frequently cited medicinal uses referred to treatment of respiratory system conditions (46 %). This is relevant as the most common ailments (cold, flu bronchitis) here are related to the harsh winter climate of this region.

A few wild or semi-domesticated medicinal plants were also quoted for food purposes. Among these findings, the uncommon uses of *Ballota nigra* L. (leaves) tea as a digestive, *Convolvulus arvensis* L. (aerial parts) tea for hypertension, *Chenopodium urbicum* L. leaves (topically applied) for treating hemorrhoids, and *C. sanguine* L. (leaves and fruits) tea against stomach-aches could be of interest for further phytopharmacological studies.

A large majority of medicinal plants in the Sharr Mountains are used in the form of teas/infusions (85 %), thus probably confirming the crucial role played by the period of Ottoman domination in spreading the use of “home-made teas”. These “home-made teas” were used as a substitute for the imported black tea used by the upper classes, whose consumption spread throughout Turkey especially in the second half of the 19th Century (Aylangan 2011). If we compare this figure with what we recorded among ethnic Albanians who migrated to Southern Italy in the fifteenth and sixteenth centuries (Pieroni et al. 2002), we could postulate that decoctions of mixtures of dried medicinal plants were the common medicinal beverages in the domestic arena a few centuries ago, while the Ottoman influences tended to enhance the shift from decoctions to teas (çaj).

The overexploitation of local plants for making home-made teas, many of which are often traded to local city markets, may raise serious concerns in a few cases. For example, the endemic species *S. scardica* Griseb. can be found today growing only in the territory near two villages: Rogachevo and Staro Selo. Locals perceive also that the ecological availability of *Gentiana lutea* L., *H. perforatum* L. and *Thymus serpyllum* L. has also remarkably decreased over the last decades. Furthermore, a significant portion of the study participants (28 %) claimed that medicinal species are under threat, mainly due to the uncontrolled collection devoted to both the local and external (pharmaceutical) markets.

The observation that only the elder members of these communities are able to identify and use medicinal plants also confirms a negative impact of migration and erosion of Traditional Knowledge (TK). Moreover, the transmission of TK to younger generations does not appear to be commonplace. Thus, TK concerning plants may be crucial for serious attempts to implement biological conservation initiatives and environmental education frameworks.

Table 1 Traditional medicinal plant uses recorded in the study area

Botanical taxon/taxa, family and voucher specimen	Local name(s)	Status	Used parts(s)	Preparation and administration	Local medical use(s)	Village(s) where the information was collected
<i>Achillea millefolium</i> L. (Asteraceae) MSHACMI055	Barpezmi ^{AL} Ајучка рена (Ajdučka treva) ^{MK} Petorka ^{GO}	Wild	Aerial parts, dried	I: Tea E: Directly to wound as hemostyptic powder for hemorrhoids	E: Wound healing (ulcers); Internal and external hemorrhoids	1–35
<i>Allium ursinum</i> L. (Amaryllidaceae) MSHALUR111	Hudhra arusha, qepë të egra, lërthia ^{AL} / Меќини .ијк (Meckin luk) ^{MK} / Mečkin luk ^{GO}	Cultivated	Leaf and flower	I: Macerated in Raki	Cardio-vascular system (to improve blood flow)	1–6
<i>Althaea officinalis</i> L. (Malvaceae) MSHALOF211	Mullanjadhe e bardhë ^{AL} / Бел слез (Bel slez) ^{MK} / Slez ^{GO}	Wild	Aerial parts, dried	I: Tea	Respiratory system problems (fever, cold, influenza)	1–6
<i>A. rosea</i> (L.) Cav. (Malvaceae) MSHALRO115	Mullanjolla ^{AL} / Црвен слез) ^{MK} / No information ^{GO}	Wild	Aerial parts, fresh	I: Tea	For respiratory system problems (bronchitis and asthma)	1–3,10,15,24,31
<i>Arcium lappa</i> L. (Asteraceae) MSHARLA311	Lule llapushe, lule që ngjet ^{AL} / Цицек (Cicek) ^{MK} / Golem čučok ^{GO}	Wild	Leaf, stem root, seed	I: Prepared in mixed dishes with fruits and meat	To improve health in general, urinary tract disorders	1,2,5,6
<i>Brassica nigra</i> L. (Lamiaceae) MSHBANI065	Hithra e zezë ^{AL} / No information ^{MK} / No information ^{GO}	Wild	Leaves, Fresh	I: Tea	Vomiting and digestive problems (gastritis)	1–35
<i>Bellis perennis</i> L. (Asteraceae) MSHBEPE411	Lule shqerash, luledhensh ^{AL} / Рајобелиа (Radobela) ^{MK} / No information ^{GO}	Wild	Flower	I: Tea, E: directly applied to stop bleeding	Antitussive	1,2,5,6
<i>Brassica nigra</i> (L.) W.D.J. Koch (Brassicaceae) MSHBRNI511	Lakra e zezë ^{AL} / No information ^{MK} / No information ^{GO}	Wild	Flower	I: Paste is prepared	To help body in general	1

Table 1 continued

Botanical taxon/taxa, family and voucher specimen	Local name(s)	Status	Used parts(s)	Preparation and administration	Local medical use(s)	Village(s) where the information was collected
<i>Calamintha grandiflora</i> Pursh (Lamiaceae) MSHCAGR611	Kalaminta lulemadhe, čaj mali ^{AL/} No information ^{MK/} No information ^{GO}	Wild	Leaf	I: Tea	Antitussive and febrifuge	1
<i>Capsella bursa-pastoris</i> (L.) Medik. (Brassicaceae) MSHCABUP405	Bisht mace, strajc e çobanit, lule kam skam ^{AL} Овчарска торбичка (Ovčarska torbicka) ^{MK} Овчарска torba ^{GO}	Wild	Aerial parts, dried	I: Tea	To treat hypertension and also for respiratory problems (cough, influenza)	1–35
<i>Carlina acaulis</i> L. (Asteraceae) MSHCAAC711	Lulequmëshiti, ushujzë, roshetkë ^{AL/} Вилино, вилино сито (Vilino, vilino sito) ^{MK/} No information ^{GO}	Wild	Flower, root stem	E: decoction	E: To treat eczema and acne	2
<i>Castanea sativa</i> Mill. (Fagaceae) MSHCASA125	Gëshenja, kështaja ^{AL/} Кестен(Кестен) ^{MK/} Ćesten ^{GO}	Wild, cultivated	Leaf and fruits	I: Tea	Antitussive	1,2,4–14,16,19,20–35
<i>C. umbellatum</i> Giib. (Gentianaceae) MSHCAUM435	Lulegakëkuçe, njëmjiftëshatri, kantarioni i kuq ^{AL/} Црвен кантарион (Crven kantarion) ^{MK/} Kantarion ^{GO}	Wild	Aerial parts, dried	I: Tea	Digestive system problems and to treat anemia	4,7,8,12–14,16,25,26,28,34,35
<i>Chelidonium majus</i> L. (Papaveraceae) MSHCHMA811	Lule mos më prek, qumshiti i gjarprit, qumshitore ^{AL/} Русска трева (Rusa treva) ^{MK/} No information ^{GO}	Wild	Aerial parts, dried	E: extract applied directly to wound	E: Skin infections	1–4

Table 1 continued

Botanical taxon/taxa, family and voucher specimen	Local name(s)	Status	Used parts(s)	Preparation and administration	Local medical use(s)	Village(s) where the information was collected
<i>Chenopodium urbicum</i> L. (Amaranthaceae) MSHCUR911	Labod, minuer i qytetit ^{AL} /Зелен лабод ^{AL} (Zelen labod) ^{MK} / No information ^{GO}	Wild	Leaf	E: directly to wound	E: Used to heal external hemorrhoids	1,2,6
<i>Cichorium intybus</i> L. (Asteraceae) MSHCIIIN007	Çikore, ujthithse ^{AL} / Чыкopiя (Cukorija) ^{MK} / No information ^{GO}	Wild	Aerial parts, fresh and dried	I: Tea	Abdominal pain (Stomach ache)	1–35
<i>Clematis vitalba</i> L. (Ranunculaceae) MSHCLVI1011	Kërpajin, kulpër, kulp, hardhi e bardhë ^{AL} / No information ^{MK} / Belaloza ^{GO}	Wild	Leaf	E: directly to wound	E: Skin infections	2,5
<i>Convolvulus arvensis</i> L. (Convolvulaceae) MSHCOAR485	Dredhja e arave ^{AL} / No information ^{MK} / No information ^{GO}	Wild	Aerial parts, fresh	I: Tea	For hypertension and to strengthen immunity	3,7,14,29,35
<i>Coriandrum sativum</i> L. (Apiaceae) MSHCOSA1111	Koriandri ^{AL} / Копиантуп (Koriandar) ^{MK} / No information ^{GO}	Cultivated	Leaf	I: eaten	To improve health in general	2
<i>Cornus mas</i> L. (Cornaceae) MSHCOMA010	Dreni, thana ^{AL} / No information ^{MK} / No information ^{GO}	Wild, cultivated	Fruit	I: Juice (hoshaf)	To treat diarrhea in children and to increase appetite	1,2,4,14,15,19–23,27–30,33
<i>C. sanguinea</i> L. (Cornaceae) MSHCOSA445	Thanukla ^{AL} / Илри дрен (Cm dren) ^{MK} / No information ^{GO}	Wild	Leaf and fruits	I: Tea	Abdominal pain (Stomach ache)	6,15,22,33
<i>Corylus avellana</i> L. (Betulaceae) MSHCOAV135	Lajthia, lethia ^{AL} /лещка (Leska) ^{MK} / No information ^{GO}	Wild, cultivated	Leaf and fruits	I: Strong tea	To reduce menstrual pain	1–35

Table 1 continued

Botanical taxon/taxa, family and voucher specimen	Local name(s)	Status	Used parts(s)	Preparation and administration	Local medical use(s)	Village(s) where the information was collected
<i>Cynara cardunculus</i> L. (Asteraceae) MSHCYCA1211	Ingjinare, hinardh, artiçok, argjinaria e grekuallt ^{AL/} артичока (Articoka) ^{MK/} No information ^{GO}	Cultivated	Aerial parts, fresh	I: Tea	Cardio-vascular system (to treat anemia) and to improve appetite	1,2,6
<i>Daucus carota</i> L. (Apiaceae) MSHDACA006	Karota e egër, lulebereqeti, luleperde ^{AL/} No information ^{MK/} No information ^{GO}	Wild	Root, Flower, steam	I: Tea	To treat gastric ulcers and dysentery	8,9,12–16,19,28,31,33
<i>Equisetum arvense</i> L. (Equisetaceae) MSHEQAR145	Këputja e arave ^{AL/} Конско опашче (Konjsko opashce) ^{MK/} No information ^{GO}	Wild	Herb	I: Tea E: to stop internal bleeding E: Directly to wound	Urogenital disorders and to stop internal bleeding, E: applied directly to wound as hemostatic	3–5,15,23,32
<i>Euphorbia cyparissias</i> L. (Euphorbiaceae) MSHEUCY515	Rrodhëza ^{AL/} No information ^{MK/} No information ^{GO}	Wild	Leaf	E: Directly to warts	To remove warts from eyelid)	5,7,11,12,24,28–35
<i>Fragaria vesca</i> L. (Rosaceae) MSHFRVE155	Dredhëza e malit, lagoda ^{AL/} Шљивка jarojta (Shumska jagoda) ^{MK/} No information ^{GO}	Wild	Fruit and leaf	I: Tea, juice E: directly to inflamed place	Digestive problems (gastritis) E: to treat external hemorrhoids as hemostyptic powder	1–35
<i>Fraxinus angustifolia</i> Vahl (Oleaceae) MSHFRAN495	Frashër, frashëri i zi, frashër polak ^{AL/} No information ^{MK/} No information ^{GO}	Wild	Leaf	E: Directly to wound	Wound healing	10,16,25,30
<i>Galega officinalis</i> L. (Fabaceae) MSHGAE004	Lule brijciji ^{AL/} Здралка (Zdralka) ^{MK/} No information ^{GO}	Wild	Flower	I: Tea	Diabetes	5,11,14,20,21,23,28,29,31,34
<i>Galium verum</i> L. (Rubiaceae) MSHGAVE019	Lule ivaniqe ^{AL/} No information ^{MK/} No information ^{GO}	Wild	Aerial parts, dried	I: Tea	Kidney and urinary problems	8

Table 1 continued

Botanical taxon/taxa, family and voucher specimen	Local name(s)	Status	Used parts(s)	Preparation and administration	Local medical use(s)	Village(s) where the information was collected
<i>Gentiana lutea</i> L. (Gentianaceae) MSHGELU1311	Gentian, gencian, sanëz, lincur, goreç, bar zemre ^{AL/} Lincura ^{GO}	Wild	Root, flower and leaf, dried	I: Tea	To regulate temperature, Respiratory system problems (influenza, cough)	1
<i>Hedera helix</i> L. (Araliaceae) MSHHEHE165	Urthi ^{AL/} бршлен (Brshlen) ^{MK/} No information ^{GO}	Wild	Leaf	E: Applied directly as a compress	E: Rheumatic disorder (Rheumatizms)	1–35
<i>Helianthus tuberosus</i> L. (Asteraceae) MSHHEHU1411	Molla e dheut, molla e egër, artiçoke ^{AL/} No information ^{MK/} No information ^{GO}	Cultivated	Root	I: cooked dishes	To stimulate appetite and to improve heart contractility (Cardio-vascular system)	1,2
<i>Helleborus odorus</i> Waldst. et Kit. ex Willd. (Ranunculaceae) MSHHEOD1511	Kukurek ^{AL/} Kukurek ^{GO/} No information ^{MK}	Wild	Aerial parts, fresh	I: Juice, E: directly to the wound as a compress	E: Muscular-skeletal system (rheumatism) I: juice to heal wounds in sheep	2
<i>Hypericum perforatum</i> L. (Hypericaceae) MSHHYPE075	Lulegjaku, lulebasami, kantari ^{AL/} кантарион (Kantari ^{on}) ^{MK/} Kantari ^{on} ^{GO}	Wild	Aerial parts, dried	I: Tea, E: powder directly to wound, oil for hemorrhoids	I: General kidney pains (and to remove kidney stones); to treat internal and external hemorrhoids	1–35
<i>Juglans regia</i> L. (Juglandaceae) MSHJUURE175	Arra e butë, arra ^{AL/} Opet (Orev) ^{MK/} No information ^{GO}	Cultivated	Fruit and leaf	I: Tea, E: directly into the wound	I: Anti-anemic, digestive system problems (constipation), E: Dermatological system (eczema, shingles and skin inflammation)	1–35
<i>Juniperus communis</i> L. (Cupressaceae) MSHJUUCO185	Dullaj, Dëllinj e zezë ^{AL/} Смрека ирпиа (Smreka crna) ^{MK/} No information ^{GO}	Wild	Fruit and leaf	I: Tea, E: Directly	I: Renal system (remove kidney stones) E: Rheumatic disorders (Rheumatizms)	1–35

Table 1 continued

Botanical taxon/taxa, family and voucher specimen	Local name(s)	Status	Used parts(s)	Preparation and administration	Local medical use(s)	Village(s) where the information was collected
<i>Juniperus oxycedrus</i> L. (Cupressaceae) MSHJUOX1611	Dëllinja e kuqe, dullaj e kuqe ^{AL/} No information ^{MK/} Crvena smreka ^{GO}	Wild	Fruit	I: Tea, tincture, oil	Dermatological system (skin infections)	1–6
<i>Ligustrum vulgare</i> L. (Oleaceae) MSHLIVU195	Legustërmi ^{AL/} No information ^{MK/} No information ^{GO}	Wild	Aerial parts, dried	I: Tea mixed with chamomile	Respiratory problems (cough and influenza)	8, 14, 19, 26–29, 31, 34
<i>Lythrum salicaria</i> L. (Lythraceae) MSHLYSA205	Barëgjaku ^{AL/} No information ^{MK/} No information ^{GO}	Wild, cultivated	Aerial parts	I: Tea mixed with <i>Hypericum perforatum</i>	Internal Hemorrhoids and to treat anemia	1–6, 8, 9, 12, 18–20, 25–29
<i>Malva sylvestris</i> L. (Malvaceae) MSHMASIO85	Mëllaga e egër ^{AL/} Илри слез (Cm slez) ^{MK/} Slez ^{GO}	Wild	Leaf	I: Tea	Respiratory problems (bronchitis, asthma, emphysema)	1–35
<i>Marrubium vulgare</i> L. (Lamiaceae) MSHMAVU015	Buzorja ^{AL/} No information ^{MK/} No information ^{GO}	Wild	Aerial parts, dried	I: Tea	Appetite stimulant	3, 4, 8, 15, 27, 31–33
<i>Matricaria recutita</i> L. (Asteraceae) MSHMARE057	Kamomila ^{AL/} Камиліца (Kamilica) ^{MK/} No information ^{GO}	Wild	Aerial parts, dried	I: Tea, E: applied directly to the wound as extract form	E: Wound healing (ulcers of the skin and soft tissues) I: abdominal pain (Stomach ache) I: to reduce menstrual pain	1–5, 8, 14, 15, 23, 30, 35
<i>Medicago sativa</i> L. (Fabaceae) MSHMESA020	Jonxhe ^{AL/} Лутерка (Lucerka) ^{MK/} No information ^{GO}	Cultivated	Leaf	I: Tea and tincture	Galactagogue	1–35
<i>Melissa officinalis</i> L. (Lamiaceae) MSHMEOF1711	Lule limoni, bar pselik, bar i bletës ^{AL/} Матичњак (Maticnjak) ^{MK/} No information ^{GO}	Semi-Cultivated	Leaf	I: Tea, oil	Cardio-vascular system (heart problems), Headaches	1–5

Table 1 continued

Botanical taxon/taxa, family and voucher specimen	Local name(s)	Status	Used parts(s)	Preparation and administration	Local medical use(s)	Village(s) where the information was collected
<i>M. longifolia</i> (L.) Huds. (Lamiaceae) MSHMELO003	Nane ^{AL} / Haite (Name) ^{MK} / No information ^{GO}	Wild, cultivated, semi- cultivated	Aerial parts, dried	I: Tea	To strengthen immunity & “health” in general, especially for children and for respiratory problems (cold)	1–35
<i>M. piperita</i> L. (Lamiaceae) MSHMEPI095	Nana e butë ^{AL} / No information ^{MK} / No information ^{GO}	Cultivated	Leaf and fruits	I: Tea	Digestive problems (gastritis and gastric ulcers); respiratory problems (cough)	1,3,11,12,16, 17,20,21–27,32
<i>Morus alba</i> L. (Moraceae) MSHMOAL1811	Mani i bardhë, dud ^{AL} /yM/ бe.и (Dud bel) ^{MK} / No information ^{GO}	Cultivated	Fruit	I: Tea, jam, “pyte”	To treat cough, headache, fever, and hypertension	1–6
<i>M. nigra</i> L. (Moraceae) MSHMONI1911	Mani i zi ^{AL} /лпн /ЛЯА (Cm dud) ^{MK} / No information ^{GO}	Cultivated	Fruit and leaf	I: Tea, jam, E:	To treat anemia, constipation, appetite stimulant	1–6
<i>Ocimum basilicum</i> L. (Lamiaceae) MSHOCBA465	Lul' bosojelek, bosulek, borzulek ^{AL} / foco.tek (Bosolek) ^{MK} / No information ^{GO}	Cultivated	Leaf	I: Tea, E: to heal skin from fire	To strengthen immunity (especially during pregnancy)	1–18,20–27,30–31
<i>Ononis spinosa</i> L. (Fabaceae) MSHONSP215	Gjuhë nusja ^{AL} / No information ^{MK} / No information ^{GO}	Wild	Flower	I: Tea	Abdominal pain (gastritis and gastric ulcers)	3,4,8,9,11–15,21, 22,28,29,30,33
<i>O. vulgare</i> L. (Lamiaceae) MSHORVU475	Rigon, çaj mali, origano ^{AL} / Operaito (Oregano) ^{MK} / No information ^{GO}	Wild	Aerial parts, dried	I: Tea	Respiratory problems (especially cough and bronchitis) and to strengthen the appetite	4,11,26,27,29,32,35
<i>Parietaria officinalis</i> L. (Urticaceae) MSHPAOF265	Karafilagjen ^{AL} / No information ^{MK} / No information ^{GO}	Wild	Leaf	I: Tea, infuse, syrup	Urinary tract problems and kidney inflammations	7,16,29

Table 1 continued

Botanical taxon/taxa, family and voucher specimen	Local name(s)	Status	Used parts(s)	Preparation and administration	Local medical use(s)	Village(s) where the information was collected
<i>Pinus sylvestris</i> L. (Pinaceae) MSHPISY225	Bredhi i bardhë, pisha e bardhë ^{AL/} No information ^{MK/} No information ^{GO}	Wild, cultivated, semi-cultivated	Leaf	I: Tea	Chronic bronchitis	10,11,15,21,25–35
<i>Plantago lanceolata</i> L. (Plantaginaceae) MSHPLLA235	Gjethe dielli mashkull ^{AL/} Машики тегавец (Mashki tegavec) ^{MK/} Tegavec ^{GO}	Wild	Aerial parts, dried	I: Tea, E: to heal skin from fire directly into the wound	I: Abdominal pain (Stomach ache)	1–35
<i>P. major</i> L. (Plantaginaceae) MSHPLMA245	Gjethe dielli femër ^{AL/} , Жетски тегавец (Zhenski tegavec) ^{MK/} Tegavec ^{GO}	Wild	Aerial parts, dried	I: Tea, E: to heal eczema directly into the wound	I: Abdominal pain (Stomach ache)	1–35
<i>Poterium sanguisorba</i> L. (Rosaceae) MSHPOSA255	Sallat burneti ^{AL/} No information ^{MK/} No information ^{GO}	Wild	Leaf	I: Tea	To improve appetite	5
<i>Prunella vulgaris</i> L. (Lamiaceae) MSHBRVU012	Çingla ^{AL/} No information ^{MK/} No information ^{GO}	Wild	Flowers	E: Tea in gargles	Against viral infections	1,4,10,18,30
<i>Rosa canina</i> L. (Rosaceae) MSHROCA275	Trendafilii i egër, kaça ^{AL/} No information ^{MK/} Kaça ^{GO}	Wild	Flower and fruit	I: Tea, E: to heal wounds directly	Respiratory problems (cough, bronchitis and cold)	1–35
<i>R. ulmifolius</i> Schott. (Rosaceae) MSHRUUL285	Manafera ^{AL/} No information ^{MK/} No information ^{GO}	Wild	Leaf and fruits	I: Tea as a substitute for <i>Camellia sinensis</i> and to make syrup	Respiratory problems (especially cough and cold) and to strong appetite	1–35
<i>Sambucus nigra</i> L. (Adoxaceae) MSHSANI295	Shtog ^{AL/} Боже.1 (Bozel) ^{MK/} Bozovina ^{GO}	Wild	Flower	I: Tea mixed with chamomile	Respiratory problems (bronchitis and cold)	1–35

Table 1 continued

Botanical taxon/taxa, family and voucher specimen	Local name(s)	Status	Used parts(s)	Preparation and administration	Local medical use(s)	Village(s) where the information was collected
<i>Saroparia officinalis</i> L. (Caryophyllaceae) MSHSAOF305	Lule saruni, saruniqe ^{AL} / No information ^{MK} / No information ^{GO}	Wild and semi-cultivated	Aerial parts, dried	I: Tea	Respiratory problems (bronchitis, cough), digestive problems (gastritis) and urinary tract infections (cystitis)	1–35
<i>Sideritis scardica</i> Griseb. (Lamiaceae) MSHSISC315	ÇajitMalitSharr ^{AL} / Планински чај (Planinski čaj) ^{MK} / No information ^{GO}	Wild, cultivated	Aerial parts, dried	I: Tea	Abdominal pain (Stomach ache) and against sore throat (viral infections)	2
<i>Sisymbrium officinale</i> (L.) Scop. (Brassicaceae) MSHSIOF325	Lule sisimbre ^{AL} / No information ^{MK} / No information ^{GO}	Wild	Steam, leaf, fruit	I: Tea, infusion	Respiratory system problems (mostly to protect from tuberculosis, cough and asthma)	1–6,14,15,29,34
<i>Tanacetum vulgare</i> L. (Asteraceae) MSHTAVU455	Lulja e artë ^{AL} / No information ^{MK} / No information ^{GO}	Wild	Leaf	I: Tea	To treat rheumatism	1–35
<i>Taraxacum officinale</i> F.H. Wigg. (Asteraceae) MSHTAOF415	Lule verdhë ^{AL} / Г.луваре (Gluvarce) ^{MK} / No information ^{GO}	Wild	Leaf	I: Tea	Cardio vascular problems (to regulate hypertension during pregnancy)	1–35
<i>Thymus serpyllum</i> L. (Lamiaceae) MSHTHLO505	No information ^{AL} / Мјчина лулица (Majcina dushica) ^{MK} / No information ^{GO}	Wild	Leaf	I: Tea	Respiratory system problems (fever, influenza, cold)	4,9,10,13,22,26,29,30,35
<i>T. striatus</i> Vahl (Lamiaceae) MSHTHST525	No information ^{AL} / No information ^{MK} / No name ^{GO}	Wild	Leaf	I: Tea	I: Dermatological system problems (to minimize the effect of edemas)—(to remove fluid)	11,18,27

Table 1 continued

Botanical taxon/fam. family and voucher specimen	Local name(s)	Status	Used parts(s)	Preparation and administration	Local medical use(s)	Village(s) where the information was collected
<i>Tilia cordata</i> Mill. (Malvaceae) MSHTCO335	Vliri, lipi ^{AL} / липа (Lipa) ^{MK} / No information ^{GO}	Wild, cultivated, semi- cultivated	Flower	I: Tea	Sleeping difficulties (insomnia) Abdominal pain (Stomach ache), respiratory problems (cough, fever)	1–6,14,15
<i>Trifolium</i> spp. (Fabaceae) MSHTRSP425	Luleqeni ^{AL} / No information ^{MK} / No information ^{GO}	Wild	Aerial parts, fresh	I: Tea, E: to stop bleeding	Cardio-vascular problems (troubles related to the blood pressure)	1,2,5–12,32–35
<i>Tussilago farfara</i> L. (Asteraceae) MSHTUFA345	Thundermushka ^{AL} / Полюбел (Podbel) ^{MK} / No information ^{GO}	Wild	Leaf	I: Tea	Disambiguation (ulcers), and cardio-vascular problems (to treat open veins)	1–8,13–15,25,31
<i>Urtica dioica</i> L. (Urticaceae) MSHURDI355	Hithra, korajiva ^{AL} / Корива (Koriva) ^{MK} / No information ^{GO}	Wild	Aerial parts, fresh and dried	I: Tea, E: to irritate skin	To improve schedule of the blood and to help people with diabetes	1–35
<i>Vaccinium myrtillus</i> L. (Ericaceae) MSHVAMY365	Botonica, gershika ^{AL} / Боровинки (Borovinki) ^{MK} / No information ^{GO}	Wild	Fruit and leaf	I: Tea, syrup, tonic	Against viral infection as Gargles form (Throat wash) Cardio-vascular problems (to regulate schedule of the blood), Abdominal pain (Stomach ache), against diarrhea	1–35
<i>V. uliginosum</i> L. (Ericaceae) MSHVAUL565	Gjershika qensh ^{AL} / No information ^{MK} / No information ^{GO}	Wild	Fruit and leaf	I: Tea, syrup, tonic	Abdominal pain (Stomach ache), Food poisoning (diarrhea), Cardio-vascular problems (to regulate blood schedule)	1–35
<i>Verbascum phlomoides</i> L. (Scrophulariaceae) MSHVEPH385	Netullë, bapeshku ^{AL} / Молек (Molek) ^{MK} / No information ^{GO}	Wild	Flower	I: Tea	Respiratory system problems (chronic bronchitis, asthma, to prevent from tuberculosis, influenza, cold, fever)	1,5,8,10,15,19,23–35

Table 1 continued

Botanical taxon/taxa, family and voucher specimen	Local name(s)	Status	Used parts(s)	Preparation and administration	Local medical use(s)	Village(s) where the information was collected		
						Albanian	Macedonian	Gorani
<i>Verbena officinalis</i> L. (Verbenaceae) MSHVEOF395	Verben ^{AL} / Mep̄oeti (Merben) ^{MK} / No information ^{GO}	Wild	Flower and leaf	I: Tea	Nervous system (mental problems (against depression), sleeping difficulties, (insomnia), neurological disorder (migraine, headache), respiratory system problems (fever, cold) and to regulate temperature	1–4,8,17,21,26,29,30,34		
Botanical taxon/taxa, family and voucher specimen	Uses as a food plant	Quotation frequency	Vulnerability of species	Pharmaceutical market	Local market	Use(s) recorded among		
<i>Achillea millefolium</i> L. (Asteraceae) MSHACMI055	–	c	–	+	+	+	+	+
<i>Allium ursinum</i> L. (Amaryllidaceae) MSHALUR111	+	a	–	–	+	–	–	+
<i>Althaea officinalis</i> L. (Malvaceae) MSHALOF211	+	c	–	+	+	+	+	+
<i>A. rosea</i> (L.) Cav. (Malvaceae) MSHALRO115	–	a	–	–	–	–	–	+
<i>Arcium lappa</i> L. (Asteraceae) MSHARLA311	+	b	–	–	–	+	+	–
<i>Ballota nigra</i> L. (Lamiaceae) MSHBANI065	–	b	–	–	–	+	–	–
<i>Bellis perennis</i> L. (Asteraceae) MSHBEPE411	–	c	–	–	–	+	+	–
<i>Brassica nigra</i> (L.) W.D.J. Koch (Brassicaceae) MSHBRNI511	–	a	+	–	–	+	–	–

Table 1 continued

Botanical taxon/taxa, family and voucher specimen	Uses as a food plant	Quotation frequency	Vulnerability of species	Pharmaceutical market	Local market	Use(s) recorded among		
						Albanian	Macedonian	Gorani
<i>Calamintha grandiflora</i> Pursh (Lamiaceae)	+	a	+	–	–	+	–	–
MSHCAGR611								
<i>Capsella bursa-pastoris</i> (L.) Medik. (Brassicaceae)	–	b	+	–	+	+	+	+
MSHCABUP405								
<i>Carlina acaulis</i> L. (Asteraceae)	+	a	–	–	–	+	+	–
MSHCAAC711								
<i>Castanea sativa</i> Mill. (Fagaceae)	+	c	–	–	–	+	+	+
MSHCASA125								
<i>Centaurea umbellatum</i> Gilib. (Gentianaceae)	–	c	–	–	+	+	+	–
MSHCAUM435								
<i>Chelidonium majus</i> L. (Papaveraceae)	–	a	–	–	–	+	+	–
MSHCHMA811								
<i>Chenopodium urbicum</i> L. (Amaranthaceae)	+	b	–	–	–	+	+	–
MSHCHUR911								
<i>Cichorium intybus</i> L. (Asteraceae)	+	c	–	–	–	+	–	–
MSHCHIN007								
<i>Clematis vitalba</i> L. (Ranunculaceae)	–	a	–	–	–	+	–	+
MSHCLV11011								
<i>Convolvulus arvensis</i> L. (Convolvulaceae)	–	b	–	–	+	+	–	–
MSHCOAR485								
<i>Coriandrum sativum</i> L. (Apiaceae)	–	a	–	–	–	+	+	–
MSHCOSA1111								
<i>Cornus mas</i> L. (Cornaceae)	+	c	–	–	–	+	–	+
MSHCOMA010								
<i>C. sanguinea</i> L. (Cornaceae)	–	c	+	–	+	+	–	–
MSHCOSA445								
<i>Corylus avellana</i> L. (Betulaceae)	+	c	–	–	–	+	–	+
MSHCOAV135								

Table 1 continued

Botanical taxon/taxa, family and voucher specimen	Uses as a food plant	Quotation frequency	Vulnerability of species	Pharmaceutical market	Local market	Use(s) recorded among		
						Albanian	Macedonian	Gorani
<i>Cynara cardunculus</i> L. (Asteraceae) MSHCYCA1211	+	b	-	-	-	+	+	-
<i>Daucus carota</i> L. (Apiaceae) MSHDACA006	+	c	-	+	+	+	+	+
<i>Equisetum arvense</i> L. (Equisetaceae) MSHEQAR145	-	a	+	-	+	-	+	-
<i>Euphorbia cyparissias</i> L. (Euphorbiaceae) MSHEUCY515	-	b	-	+	+	+	-	-
<i>Fragaria vesca</i> L. (Rosaceae) MSHFRVE155	+	c	+	-	+	+	+	-
<i>Fraxinus angustifolia</i> Vahl (Oleaceae) MSHFRAN495	-	a	-	-	-	+	-	-
<i>Galega officinalis</i> L. (Fabaceae) MSHGAOF004	-	b	-	+	-	+	+	-
<i>Galium verum</i> L. (Rubiaceae) MSHGAVE019	-	b	-	-	+	+	-	-
<i>Gentiana lutea</i> L. (Gentianaceae) MSHGELU1311	-	b	+	+	-	+	-	+
<i>Hedera helix</i> L. (Araliaceae) MSHHEHE165	-	c	+	-	-	+	+	-
<i>Helianthus tuberosus</i> L. (Asteraceae) MSHHEUTU1411	-	c	+	+	+	+	-	-
<i>Helleborus odoratus</i> Waldst. et Kit. ex Willd. (Ranunculaceae) MSHHEOD1511	-	c	-	-	+	-	-	+
<i>Hypericum perforatum</i> L. (Hypericaceae) MSHHYPE075	-	c	-	+	+	+	+	+
<i>Juglans regia</i> L. (Juglandaceae) MSHIURE175	+	c	+	-	+	+	+	+

Table 1 continued

Botanical taxon/taxa, family and voucher specimen	Uses as a food plant	Quotation frequency	Vulnerability of species	Pharmaceutical market	Local market	Use(s) recorded among		
						Albanian	Macedonian	Gorani
<i>Juniperus communis</i> L. (Cupressaceae) MSHUOCO185	+	c	+	+	+	+	-	+
<i>J. oxycedrus</i> L. (Cupressaceae) MSHUOX1611	+	c	+	+	+	+	+	+
<i>Ligustrum vulgare</i> L. (Oleaceae) MSHLJUV195	-	a	+	+	+	+	-	-
<i>Lythrum salicaria</i> L. (Lythraceae) MSHLYSA205	-	a	+	+	+	+	-	-
<i>Malva sylvestris</i> L. (Malvaceae) MSHMASI085	-	c	-	-	-	+	+	+
<i>Marrubium vulgare</i> L. (Lamiaceae) MSHMAVU015	+	a	-	-	+	+	-	-
<i>Matricaria recutita</i> L. (Asteraceae) MSHMARE057	-	c	-	-	-	+	+	+
<i>Medicago sativa</i> L. (Fabaceae) MSHMESA020	-	a	-	+	+	+	+	-
<i>Melissa officinalis</i> L. (Lamiaceae) MSHMEOF1711	+	c	-	-	+	+	+	-
<i>Mentha longifolia</i> (L.) Huds. (Lamiaceae) MSHMELO003	+	b	+	-	-	+	-	+
<i>M. piperita</i> L. (Lamiaceae) MSHMEPI095	+	c	-	+	-	+	-	+
<i>Morus alba</i> L. (Moraceae) MSHMOAL1811	+	c	+	-	+	+	+	+
<i>M. nigra</i> L. (Moraceae) MSHMONI1911	+	c	-	-	+	+	+	+
<i>Ocimum basilicum</i> L. (Lamiaceae) MSHOCBA465	+	c	-	+	-	+	+	+
<i>Ononis spinosa</i> L. (Fabaceae) MSHONSP215	-	a	-	-	+	+	-	-
<i>Origanum vulgare</i> L. (Lamiaceae) MSHORVU475	+	c	-	-	-	+	-	+

Table 1 continued

Botanical taxon/taxa, family and voucher specimen	Uses as a food plant	Quotation frequency	Vulnerability of species	Pharmaceutical market	Local market	Use(s) recorded among		
						Albanian	Macedonian	Gorani
<i>Parietaria officinalis</i> L. (Urticaceae) MSHPAOF265	–	a	+	–	+	+	–	+
<i>Pinus sylvestris</i> L. (Pinaceae) MSHPISY225	–	a	–	–	–	+	–	–
<i>Plantago lanceolata</i> L. (Plantaginaceae) MSHPLLA235	–	b	–	–	+	+	+	+
<i>P. major</i> L. (Plantaginaceae) MSHPLMA245	–	b	–	–	–	+	+	+
<i>Poterium sanguisorba</i> L. (Rosaceae) MSHPOSA255	–	a	–	–	–	+	–	–
<i>Prunella vulgaris</i> L. (Lamiaceae) MSHBRVU012	–	b	–	+	+	+	–	–
<i>Rosa canina</i> L. (Rosaceae) MSHROCA275	+	c	–	–	+	+	–	+
<i>R. ulmifolius</i> Schott. (Rosaceae) MSHRUUL285	+	c	–	–	+	+	–	+
<i>Sambucus nigra</i> L. (Adoxaceae) MSHSANI295	+	c	–	+	–	+	+	+
<i>Saponaria officinalis</i> L. (Caryophyllaceae) MSHSAOF305	–	c	–	–	+	+	–	+
<i>Sideritis scardica</i> Griseb. (Lamiaceae) MSHSISC315	–	c	+	+	+	+	+	–
<i>Sisymbrium officinale</i> (L.) Scop. (Brassicaceae) MSHSIOF325	–	b	–	–	–	+	–	–
<i>Tanacetum vulgare</i> L. (Asteraceae) MSHTAVU455	–	c	–	–	–	+	–	–
<i>Taraxacum officinale</i> F.H. Wigg. (Asteraceae) MSHTAOF415	–	b	–	–	–	+	–	+

Table 1 continued

Botanical taxon/taxa, family and voucher specimen	Uses as a food plant	Quotation frequency	Vulnerability of species	Pharmaceutical market	Local market	Use(s) recorded among		
						Albanian	Macedonian	Gorani
<i>Thymus serpyllum</i> L. (Lamiaceae) MSHTHLO505	–	^c	–	–	–	–	+	+
<i>T. striatus</i> Vahl (Lamiaceae) MSHTHST525	–	^b	–	+	+	–	–	+
<i>Tilia cordata</i> Mill. (Malvaceae) MSHTICO335	–	^c	–	–	+	+	+	+
<i>Trifolium</i> spp. (Fabaceae) MSHTRSP425	–	^a	–	–	–	+	–	–
<i>Tussilago farfara</i> L. (Asteraceae) MSHTUFA345	–	^c	+	–	–	+	+	–
<i>Urtica dioica</i> L. (Urticaceae) MSHURDI355	+	^c	–	–	–	+	–	+
<i>Vaccinium myrtillus</i> L. (Ericaceae) MSHVAMY365	+	^c	+	+	+	+	+	+
<i>V. uliginosum</i> L. (Ericaceae) MSHVAUL565	+	^c	–	+	+	+	–	+
<i>Verbascum philomoides</i> L. (Scrophulariaceae) MSHVEPH385	–	^c	–	+	+	+	+	–
<i>Verbena officinalis</i> L. (Verbenaceae) MSHVEOF395	–	^a	–	–	–	+	–	+

^{AL} recorded folk name in Albanian; ^{MK} recorded folk name in Macedonian; ^{GO} recorded folk name in Gorani (*našinski*); E external use; I internal use; +: yes; –: no; ^a quoted by less than 10 % informants; ^b quoted by more than 10 % and less than 40 % informants; ^c quoted by more than 40 % informants

Cross-cultural comparison among the three ethnic groups inhabiting the Sharr Mountains

The overlap of medicinal plants quoted in the second field study, where an equal number of members of the three communities participated in in-depth interviews concerning plant TK, is illustrated in Fig. 2. These findings reflect that the Gorani seem to share nearly all of their medicinal plants in common with Albanians, while a significant portion of plants quoted by Orthodox Macedonians showed an idiosyncratic use. This may be explained by the fact that the Gorani lived very close to the Albanian communities in the study area over the last century, with marriages between the two communities being commonplace and facilitated by their shared (Muslim) faith.

Comparison with other Western Balkan ethnobotanies

The medicinal taxa that have also been recorded for the same or similar uses in ethnobotanical studies conducted in other Balkan surrounding areas are reported in Table 2 and Fig. 3. More than half of the medicinal plants reported in the current study have been recorded for similar uses in Bosnia and Herzegovina, while remarkable commonalities could be found also in Kosovo, Serbia, and Montenegro. Less than 10 % of the medicinal plants reports agree with those found in Northern Albania. This picture is similar to what has also recently been found in the Kosovar Alps (Mustafa et al. 2012b), and it underlines the importance of the historical role played by the former Yugoslavia in the

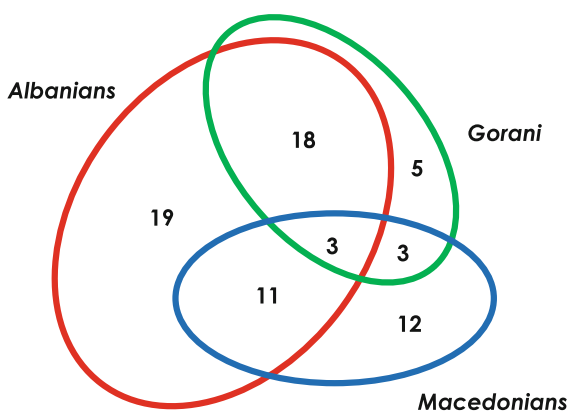


Fig. 2 Comparison among the medicinal plants recorded and used by the three ethnic groups

last Century in “homogenizing” cultural practices of plant use among different ethnic groups. This can be easily understood by tracing the folk heritage in the field of medicine and cuisine within the domestic arena, which was and is managed by women. During the last decades (and especially at the Yugoslavian times) intermarriages between Muslim faith communities (such as Bosniaks, Gorani, and Torbeshi) and Albanians of Muslim faith were quite common, thus resulting with regular exchange of the domestic folk practices managed by the women. This demonstrates that in the Balkans, religious heritage may have played a more crucial role in maintaining or changing folk medical practices within the original communities than linguistic differences. Similarly, a recent study among Orthodox Serbians and Muslim “Bosniakised” Albanians in the Pešter Plateau in Serbia would seem to confirm the same phenomenon (Pieroni et al. 2011). Future studies will have to make a more in-depth assessment of this issue, perhaps considering communities that have lived at historical, religious, and ethnic interfaces in the Balkans (i.e. Muslim Slavs in Albania or Catholic Albanians in the former Yugoslavia).

Conclusions

The traditional knowledge recorded in the Sharr Mountains is demonstrative of a remarkable intangible cultural heritage in an area where local flora has historically been incredibly important to household medicine and food security. This ethnobotanical data provides an interesting basis for further phytotherapeutical studies, especially concerning uncommonly used species (i.e. *B. nigra* L., *C. arvensis* L., *Chenopodium urbicum* L. and *C. sanguinea* L.). The large majority of the recorded plants are used in the form of infusions (locally called “teas”), thus confirming a possible crucial role played in the history by the period of Ottoman domination.

Comparison of three ethnic groups in this study revealed that the Gorani and Albanian communities, who participated in more commonplace intermarriage due to their shared (Muslim) faith, also shared more plant uses in common than with the Orthodox Macedonians. Moreover, comparison with other Western Balkan medicinal plant folk knowledge systems showed that nearly the half of the medicinal plants recorded in the study area also share similar

Table 2 Plant uses recorded in current field study, which have been also recorded in neighboring areas of the Western Balkans

Botanical taxon	Uses recorded in Sharr Mountain (Republic of Macedonia)	Similar use recorded in neighboring countries				
		Kosovo	Albania	Serbia	Bosnia and Herzegovina	Montenegro
<i>A. millefolium</i> L.	Single component for internal and external hemorrhoids but mostly applied directly to wound as hemostyptic powder for external hemorrhoids and as a mixture for gastric ulcers	+	–	+	+	+
<i>A. ursinum</i> L.	Cardio vascular system (to improve blood flow)	–	–	–	+	–
<i>A. officinalis</i> L.	Respiratory system problems (fever, cold and influenza)	–	–	+	–	–
<i>A. rosea</i> (L.) Cav.	Respiratory system problems (bronchitis and asthma)	–	–	+	+	–
<i>A. lappa</i> L.	Urogenital tract (urinary tract disorders-bacterial infection); To strength health in general; Prepared in mixed dishes with fruits and meat	+	–	–	+	–
<i>B. nigra</i> L.	Digestive disorders (gastritis, gas and stomach pain); Emesis (vomiting); Savory pie filling (byrek/pite)	–	–	–	–	–
<i>B. perennis</i> L.	Respiratory system problems (cough); Single component (applied directly to stop external bleeding)	–	–	–	–	–
<i>B. nigra</i> (L.) W.D.J. Koch	Paste for strengthening health in general	–	–	–	–	–
<i>C. grandiflora</i> Pursh	Respiratory system problems (cough and fever)	–	–	–	–	–
<i>C. bursa-pastoris</i> (L.) Medik.	Cardio vascular system (troubles related to the blood pressure; Respiratory system problems (cough and influenza)	+	–	–	–	+
<i>C. acaulis</i> L.	Dermatological problems (mostly for acne end eczema)	–	–	–	–	+
<i>C. sativa</i> Mill.	Respiratory system problems (mixture for cough)	–	–	–	+	–
<i>C. umbellatum</i> Gilib.	Digestive system ailments (bloating and abdominal pain); to treat anemia	–	–	–	+	–
<i>C. majus</i> L.	Dermatological system ailments/skin infections (non specific)	+	–	+	+	+
<i>C. urbicum</i> L.	Applied directly to reduce pain in external hemorrhoids	–	–	–	–	–
<i>C. intybus</i> L.	Abdominal pain (stomach ache)	+	–	+	+	+
<i>C. vitalba</i> L.	Dermatological problems (Applied directly to wounds at skin infections)	–	–	–	–	–
<i>C. arvensis</i> L.	Cardio vascular system (applied for troubles related to the blood pressure); To strengthen immunity in general	–	–	–	–	–
<i>C. sativum</i> L.	Fresh leaf is consumed to strengthen health in general.	–	–	–	–	–
<i>C. mas</i> L.	Applied as juice “hoshaf” to regulate stool in children and to increase appetite	+	–	+	+	–
<i>C. sanguine</i> L.	Abdominal pain (stomach ache)	–	–	–	–	–
<i>C. avellana</i> L.	Single component to reduce pain during the time of menstruation as a strong tea	–	–	+	–	+
<i>C. cardunculus</i> L.	Cardio vascular system (to regulate blood flow); appetite stimulant	–	–	–	–	–
<i>D. carota</i> L.	Inflammatory ailments (dysentery); Disambiguation (stomach ulcers)	+	–	–	+	–
<i>E. arvense</i> L.	Urogenital tract(disorders during pregnancy); Applied directly to wound as hemostatic; to stop internal bleeding in stomach (non specific)	+	–	+	+	+
<i>E. cyparissias</i> L.	Dermatological system (applied to remove warty from eyelid)	+	–	–	–	–
<i>F. vesca</i> L.	Dermatological system (gastritis and gas); Applied to reduce pain of inflamed place caused from external hemorrhoids as a hemostyptic powder	–	–	+	–	+
<i>Fraxin usangustifolia</i> Vahl	Dermatological system (mostly applied directly to wounds to reduce pain and to promote healing	–	–	–	–	–
<i>G. officinalis</i> L.	Single component for metabolic diseases (to decrease blood sugar)	–	–	–	+	–

Table 2 continued

Botanical taxon	Uses recorded in Sharr Mountain (Republic of Macedonia)	Similar use recorded in neighboring countries				
		Kosovo	Albania	Serbia	Bosnia and Herzegovina	Montenegro
<i>G. verum</i> L.	Urogenital tract ailments (kidney and urinary problems)	+	–	–	–	–
<i>G. lutea</i> L.	Respiratory system problems (cough and influenza); Drink as tea to regulate temperature	+	–	+	–	+
<i>H. helix</i> L.	Muscular skeletal system (Externally applied to treat rheumatic ailments/rheumatism as a compress)	–	–	–	+	–
<i>H. tuberosus</i> L.	Cardio vascular system (to help work of the heart) and consumed (cooked in dishes) to stimulate appetite	–	–	–	–	–
<i>H. odoratus</i> Waldst. et Kit. ex Willd.	Muscular skeletal system (rheumatism) and to heal infections in sheep (applied in the ear)	–	–	–	–	–
<i>Hypericum perforatum</i> L.	Internally applied for kidney inflammations and digestive system problems (gas and constipation); externally applied to treat internal hemorrhoids as oil; Also known as anti-anemic	+	–	–	+	+
<i>J. regia</i> L.	Drunk as tea or applied topically for dermatological system ailments (eczema, shingles and skin)	+	–	+	+	–
<i>J. communis</i> L.	Urogenital tract (kidney inflammation); Muscular skeletal system Externally applied to treat rheumatic ailments/rheumatism as a compress	+	+	+	+	+
<i>J. oxycedrus</i> L.	Dermatological system (applied to treat skin infections-non specific use)	–	–	–	+	–
<i>L. vulgare</i> L.	Respiratory system problems (Mixed with <i>M. recutita</i> L. to treat cough and influenza)	–	–	–	–	–
<i>L. salicaria</i> L.	Single component (for internal and external hemorrhoids but mostly applied directly to wound as hemostyptic powder for external hemorrhoids); Tea mixed with <i>Hypericum perforatum</i> L. to treat anemia	–	–	–	–	–
<i>M. sylvestris</i> L.	Respiratory system problems (bronchitis, asthma, emphysema)	–	–	+	+	–
<i>M. vulgare</i> L.	Appetite stimulant	–	–	–	–	–
<i>M. recutita</i> L.	Used to reduce menstrual pains; Gastric ulcers; abdominal pain (stomach ache)	+	+	+	–	+
<i>M. sativa</i> L.	Tea/tincture used as a galactagogue	–	–	–	–	–
<i>M. officinalis</i> L.	Cardio vascular system (heart problems-non specific); neurological disorder (headache)	–	–	+	+	–
<i>M. longifolia</i> (L.) Huds.	Tea used to strengthen immune “health” in general in children; Respiratory system problems (cold); Dermatological system (ulcers)	–	–	–	+	–
<i>M. piperita</i> L.	Respiratory system problems (cough); Gastric ulcers	–	–	+	+	–
<i>M. alba</i> L.	Respiratory system problems (cough); Neurological problems (headache); Applied as tea to regulate temperature; Cardio vascular system (hypertension); Appetite stimulant (in jams and pies)	–	–	–	+	–
<i>M. nigra</i> L.	Cardio vascular system, anemia, constipation; Appetite stimulant (in jams and pies)	–	–	–	+	–
<i>O. basilicum</i> L.	Used to strengthen immunity during pregnancy.	–	–	–	–	–
<i>O. spinosa</i> L.	Abdominal pain (stomach ache); Gastric ulcers	–	–	+	–	–
<i>O. vulgare</i> L.	Respiratory system problems (cough and bronchitis); Appetite stimulant	+	+	+	–	+
<i>P. officinalis</i> L.	Urogenital tract (urinary tract problems and kidney inflammation)	–	–	–	–	–
<i>P. sylvestris</i> L.	Respiratory system problems (Chronic bronchitis)	+	–	+	+	–
<i>P. lanceolata</i> L.	Internally used for abdominal pain (stomach ache); Externally applied directly to heal burn wounds	–	–	–	+	+
<i>P. major</i> L.	Internally used for abdominal pain (stomach ache); Externally applied directly to heal eczema	+	+	+	+	+

Table 2 continued

Botanical taxon	Uses recorded in Sharr Mountain (Republic of Macedonia)	Similar use recorded in neighboring countries				
		Kosovo	Albania	Serbia	Bosnia and Herzegovina	Montenegro
<i>P. sanguisorba</i> L.	Appetite stimulant	–	–	–	–	–
<i>P. vulgaris</i> L.	Throat wash (gargle for viral infections of the throat)	–	–	–	–	–
<i>R. canina</i> L.	Respiratory system problems (cough, bronchitis, cold); Juice as an appetite stimulant; topical applications to wounds	+	+	+	+	+
<i>R. ulmifolius</i> Schott.	Respiratory system problems (especially cough and cold); Appetite stimulant; Used as a substitute for <i>Camellia sinensis</i> L. tea	–	–	–	–	–
<i>S. nigra</i> L.	Respiratory system problems (Mixture with <i>M. recutita</i> L. to treat bronchitis and cold)	+	–	+	+	+
<i>S. officinalis</i> L.	Respiratory system problems (bronchitis, cough); Digestive system (gastritis); Urogenital tract(cystitis)	–	–	–	+	–
<i>S. scardica</i> Griseb.	Abdominal pain (stomach ache); Used against viral inflammation on throat	–	–	–	–	–
<i>S. officinale</i> (L.) Scop.	Respiratory system problems (cough, asthma and to protect from tuberculosis)	–	–	–	+	–
<i>T. vulgare</i> L.	Stimulate child birth	–	–	–	–	–
<i>T. officinale</i> F.H. Wigg.	Cardio vascular system (applied as tea to regulate hypertension during pregnancy)	–	–	–	–	–
<i>T. serpyllum</i> L.	Respiratory system problems (fever, influenza and cold)	–	–	–	–	+
<i>T. striatus</i> Vahl	Dermatological system (applied as tea to minimize the effect of edemas/to remove fluid)	–	–	–	–	–
<i>T. cordata</i> Mill.	Abdominal pain (stomach ache); Sleeping difficulties (insomnia); Respiratory system problems (cough and fever)	+	+	+	+	–
<i>Trifolium</i> spp.	Cardio vascular system (troubles related to the blood pressure)	–	–	–	–	–
<i>T. farfara</i> L.	Gastric ulcers; Cardio vascular system, hemostatic (to heal open veins)	–	–	+	–	–
<i>U. dioica</i> L.	Cardio vascular system (applied as syrup to improve schedule/picture of the blood; applied as tea to increase the blood sugar (diabetes)	+	–	+	+	+
<i>V. myrtillus</i> L.	Throat wash (gargle for viral infections of the throat); Cardio vascular system (as syrup applied to regulate schedule of the blood); Respiratory system problems (chronic bronchitis, asthma, cold, fever, influenza and to prevent from tuberculosis)	+	+	+	+	+
<i>V. uliginosum</i> L.	Abdominal pain (stomach ache); Food poisoning (diarrhea); Cardio vascular system (as syrup applied to regulate blood flow)	–	–	–	–	–
<i>V. phlomoides</i> L.	Respiratory system problems (chronic bronchitis, asthma, cold, fever, influenza and to prevent tuberculosis)	–	–	+	+	+
<i>V. officinalis</i> L.	Nervous system (mental problems) problems (against depression), sleeping difficulties, (insomnia), neurological disorder (migraine, headache), respiratory system problems (fever, cold) and to regulate temperature	–	–	+	+	–

+ yes; – no

uses in Bosnia and Herzegovina and, to a lesser extent, in other former Yugoslavian territories, while the overlap with the ethnobotanics of mountainous areas in Albania is relatively moderate.

With regards to threats to the genetic resources of the Sharr Mountains, there is some concern regarding the potential overexploitation of those taxa collected both for household use and sale on regional trade networks. The sustainable and effective management

of wild medicinal plants should be considered as a priority for local rural development agendas. On the other hand, the conservation of TK concerning local ecological resources should also be a topic of high priority as emigration trends towards urban centers by the young and mid-aged members of the population have contributed to a decline in TK transmission. Further efforts in the conservation of the human TK diversity and cultural heritage are necessary. Future

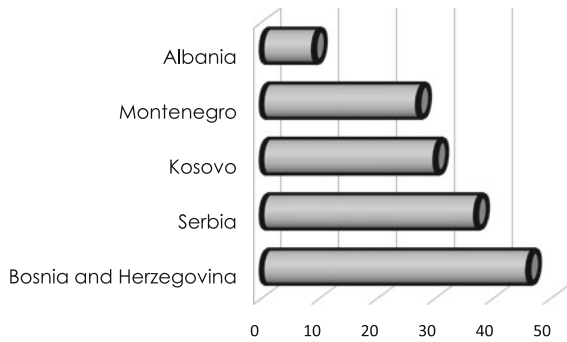


Fig. 3 Proportion (in %) of the recorded medicinal plants in the current study, which have been also recorded in ethnobotanical surveys conducted in surrounding countries

studies in Eastern Europe should aim to address the dynamics of temporal changes of folk plant knowledge, as well as the overlaps and exchange of plant knowledge among diverse ethnic communities living in the same environment, perhaps considering communities that have lived at historical, religious, and ethnic interfaces in the Balkans.

Acknowledgments Special thanks are due all study participants of the Sharr Mountains.

Annex 1

The questionnaire used in the field study.

GENERAL INFORMATION													
Name and Surname or code													
Age:	<input type="checkbox"/> 55-60					<input type="checkbox"/> Over 60 years old							
Gander:	<input type="checkbox"/> Male		<input type="checkbox"/> Female										
Level of education:	<input type="checkbox"/> Primary			<input type="checkbox"/> Secondary			<input type="checkbox"/> Higher			<input type="checkbox"/> Alternative			
Occupation:						Locality:	Lat:		Long:				
Place of origin of all the genealogy (interviewer; parents; grandparents)													
Who did you acquire the knowledge from?													
Assessment of knowledge from popular books about plants		<input type="checkbox"/> Yes			<input type="checkbox"/> No			<input type="checkbox"/> Other					
Local (folk) name of the plant													
Are there other plants with the same folk name?													
Scientific name of the plant													
Sample (voucher specimen)													
Ecological status and details (area of collection from the wild, how cultivated)													
Time of gathering		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Roots	F D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stems	F D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leaves	F D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flowers	F D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fruit	F D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Seeds	F D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aerial parts	F D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tubers	F D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bulb	F D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	F D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Perception of ecological availability													
Who are the collectors?													
Reasons to collect?													
Plant part(s) used?	<input type="checkbox"/> Aerial parts <input type="checkbox"/> Roots <input type="checkbox"/> Stems <input type="checkbox"/> Leaves <input type="checkbox"/> Flowers <input type="checkbox"/> Fruit <input type="checkbox"/> Seeds <input type="checkbox"/> Tubers <input type="checkbox"/> Bulb <input type="checkbox"/> Other												
Preparations and final products													
Storage:													
Dosage:													
Administration:													
Eventual diets associated with this treatment													
If eventually gathered or cultivated for trade, economic value													

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