A cross-cultural comparison of folk plant uses among Albanians, Bosniaks, Gorani and Turks living in south Kosovo

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Abstract

Background: Kosovo represents a unique hotspot of biological and cultural diversity in Europe, which allows for interesting cross-cultural ethnobotanical studies. The aims of this study were twofold: 1) to document the state of traditional knowledge related to local (esp. wild) plant uses for food, medicine, and handicrafts in south Kosovo; and 2) to examine how communities of different ethnic groups in the region (Albanians, Bosniaks/Gorani, and Turks) relate to and value wild botanical taxa in their ecosystem.

Methods: Field research was conducted in 10 villages belonging to the Prizren municipality and 4 villages belonging to the Dragash municipality, located in the Sharr Mountains in the southern part of Kosovo. Snowball sampling techniques were used to recruit 139 elderly informants (61 Albanians, 32 Bosniaks/Gorani and 46 Turks), for participation in semi-structured interviews regarding the use of the local flora for medicinal, food, and handicraft purposes.

Results: Overall, we recorded the local uses of 114 species were used for medicinal purposes, 29 for food (wild food plants), and 20 in handicraft activities. The most important species used for medicinal purposes were Achillea millefolium L., Sambucus nigra L., Urtica dioica L., Tilia platyphyllos Scop. Hypericum perforatum L., Chamomilla recutita (L.) Rauschert, Thymus serpyllum L. and Vaccinium myrtillus L. Chamomilla recutita was the most highly valued of these species across the populations surveyed. Out of 114 taxa used for medicinal purposes, only 44 species are also included in the European Pharmacopoeia. The predominantly quoted botanical families were Rosaceae, Asteraceae, and Lamiaceae. Comparison of the data recorded among the Albanian, Bosniak/Gorani, and Turkish communities indicated a less herbophilic attitude of the Albanian populations, while most quoted taxa were quoted by all three communities, thus suggesting a hybrid character of the Kosovar plant knowledge.

Conclusion: Cross-cultural ethnobiological studies are crucial in the Balkans not only for proposing ways of using plant natural resources, which could be exploited in sustainable local development projects (e.g. focusing on eco-tourism and small-scale trade of medicinal herbs, food niche and handicrafts products), but also for fostering collaboration and reconciliation among diverse ethnic and religious communities.

Keywords: Ethnobotany, Sharr Mountains, Folk medicine, Kosovo, Medicinal plants, Wild food plants

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Introduction

Over the last decade, the Western Balkans have become the arena of a remarkable number of ethnobiological field studies, which have focused on territories of Bosnia and Herzegovina [1-7], Serbia [8-12], Montenegro [13], Albania [14-19], Macedonia [20-24], and Kosovo [25,26]. Moreover, a few of these studies addressed cross-cultural comparisons in an attempt to try to understand cultural concepts underpinning perceptions and uses of specific plants, especially among Albanian vs. Slavic populations [10,15,21]. Much of this focus on Balkan ethnobotany is linked to the long and ongoing history of gathering and trading local wild medicinal plants from this territory into Western European markets. It is also supported by the growing appreciation of ethnobotanical bio-cultural heritage as a starting point for fostering a peaceful and sustainable development in the area.

As part of our ongoing long-term project of documenting the ethnobotanical knowledge of diverse multicultural and religious areas in the Balkans, here we focused our attention on the Prizren and Dragash municipalities (South Kosovo), where traditionally diverse ethnic groups (Albanians, Turks, Bosniaks, Serbians, Gorani, Roma/Gypsies, Egyptians and Ashkali) have lived in close contact for many centuries. Previous ethnobotanical and ethnolinguistic studies conducted in Kosovo have demonstrated that medicinal plants still play a crucial role in the sphere of human health, especially in isolated rural areas [25-27]. Oftentimes, these mountainous communities have limited access to Western biomedical facilities, and they rely heavily on traditional ecological knowledge (TEK) to meet their dietary and medical needs. It is for this reason that we project that investigation of Kosovo’s diverse ethnobotanical heritage will have a tremendous impact on rural development projects aimed at improving the holistic and long-term well-being of the local populations via sustainable use of local natural resources and integration of emic concepts of health and dietary care into development plans.

The aims of this study were twofold: 1) to document the state of traditional knowledge related to local (esp. wild) plant uses for food, medicine, and handicrafts in southwest Kosovo; and 2) to examine how communities of different ethnic groups in the region (Albanians, Bosniaks/Gorani, and Turks) relate to and value wild botanical taxa in their ecosystem.

Methods

The study area

In this study, we investigated traditional ecological knowledge (TEK) concerning the use of local plants in villages situated in the territory of Prizren, which lies in the southwestern part of the Sharr Mountains (in Albanian known as Malet e Sharrit; in Serbo-Croatian as Šar Planina). The Sharr Mountains lie in the Republic of Macedonia and Kosovo and have a total area of 1,600 km^2. The Republic of Macedonia is home to 51% (827 km^2) of this mountain range, while the Republic of Kosovo is home to the rest (780 km^2) [28]. The Sharr Mountains provide an interesting site of plant life richness and diversity, with an estimated 2,000 vascular plant species. Indeed, a special characteristic of the Sharr Mountains is the presence of endemic, relict, and rare species and plant communities [29]. The most representative vegetation includes black alder communities (Alnetum glutinosae), which is widespread along the streams and rivers, oriental hornbeam forest (Carpinetum orientalis scardica), hop hornbeam mixed with oriental hornbeam forest (Ostryo-Carpinion orientalis), thermophilous oak forests (Quercetum frainetto-cerris scardicum, and Quercetum pubescens, Quercetum montanum, Quercetum trojanae dukagjini), beech forests (Fagetum montanum), and pine forests (Pinetum heldreichii, Pinetum peucis, Pinetum mughi typicum) [30].

In recognition of the rich levels of biodiversity in this region, in 1986 the Kosovo Assembly (former Autonomous Province of Kosovo within the Socialist Federal Republic of Yugoslavia) declared that a part of the Sharr Mountains would be a National Park with the size of around 30,000 hectares. In 2012, the borders of the National Park were expanded and at the same time the massif of Koritnik was included, increasing the park’s territory by around 23,469 hectares. Now recognized as the Sharr National Park (Figure 1), it occupies 53,469 hectares, and includes the territories of five municipalities: Kaçanik, Shtërpçe, Suharekë, Prizren and Dragash [31].

Over the past two millennia, this region has been continuously occupied and was part of three great empires (Roman, Byzantine and Ottoman). In the intervals between the decline of one emperor and empowerment of another, Kosovo was occupied mainly by Bulgarians and Serbs. According to Schmitt [32], when the Romans
arrived in the Kosovar territory, they were faced with various Illyrian tribes. In late antiquity, the Dardanians became mainly Christian (Catholic); Byzantine and Slavic invasions led to the Catholicism of a significant proportion of indigenous Albanian population, despite a great resistance to the acceptance of Orthodox religion. The later Ottoman occupation spanning about five centuries resulted in conversion to Islam as the dominant religion. Because of this complex history, today the territory surrounding Prizren is occupied by diverse ethnic groups (Albanians, Serbs, Turks, Bosniaks, Gorani and Romani) and diverse religions (Muslim (Albanians, Turks, Bosniaks and Gorani), Catholic (Albanians) and Orthodox (Serbians)).

The intercultural mixing of various communities in the same area has resulted in a dynamic form of TEK, with the impact of one traditional culture on another illustrated in both the uses and names of useful plants found in the local flora.

Before World War II, healthcare in this region was almost entirely based on traditional medicine, and these traditions continued after the war as well. Healthcare was commonly attended to within the family, and all physical and mental illnesses were treated with traditional medicines and rituals. These folk-medical traditions continue even now, especially in the more mountainous and isolated areas. Local people have withstood the extreme conditions of this region for centuries – including very harsh winters. Until very recent decades, limitations in infrastructure and communication forced local residents to be self-sufficient in the provision of their food and healthcare. As a result, their primary pharmacopoeia consisted of local medicinal plants.

Today, the residents southwest Kosovo are ethnic Albanians (who speak Gheg varieties of the Albanian language), Serbians (Serbian language), Turks (Turkish language), Bosniaks (Bosnian language), Gorani (Slavic language, Gora dialect or "Našinski" which is similar to Bosnian language) and Roma (Romani language). Considering the population census conducted in 2011, there were 177,781 inhabitants in the Prizren municipality (145,718 Albanians, 9,091 Turks, 16,896 Bosniaks, 2,899 Roma, 1,350 Ashkali, 168 Egyptians, 655 Gorani and 386 others) and 33,997 in the Dragash municipality (20,287 Albanians, 7 Serbians, 202 Turks, 4,100 Bosniaks, 3 Roma, 4 Ashkali, 3 Egyptians, 8,957 Gorani, and 283 others) [33]. Population numbers and the ethnic structure of these municipalities have fluctuated over time due to the natural growth and the migration of the population. Most recently, local populations have been negatively affected by migration due to displacement and the harsh economic conditions caused by the last Kosovo War (1998–1999). The most common directions of migrations in Kosovo are from rural areas to urban areas and migration abroad. Migration patterns contribute to the rapid decline of traditional knowledge of plant species used as medicine, food and handicrafts; it has also contributed to a decline the vertical transmission of oral traditional knowledge from one generation to another. Small-scale farming and pastoral activities still represent the main economic income sources for the families in the study area. This is supplemented by remittances sent by relatives living in Germany or Switzerland, where the migrations of SW Kosovo were historically directed.

The field study

Ethnobotanical field research was conducted in 14 villages belonging to the municipalities of Prizren (10 communities) and Dragash (4), located in Sharr Mountains, which are situated in the southern part of Kosovo (Figure 2). Field studies were conducted over a series of trips in 2012 and 2014. Snowball sampling methods were used to recruit informants and we particularly focused on local people who regularly use plants for medicinal purposes. Prior informed consent was obtained prior to conducting interviews and all researchers adhered to the ethical guidelines of the International Society of Ethnobiology [34].

TEK was recorded using semi-structured interviews. In particular, informal conversations were conducted around the issue of local plants traditionally used for food (wild food plants), medicine, and handicrafts. We sought in particular the following information: respondent name, age, gender, and community of residence; local botanical names of useful plants; plant part(s) used; preparation/administration details; local folk uses of plants. In total, data were collected from 139 informants: 61 Albanians (43 male, 18 female), 32 Bosniaks/Gorani (Bosniaks: 11 male, 7 female; Gorani: 10 male, 4 female) and 46 Turks (28 male, 18 female). With regards to the data analysis, data collected from the Bosniak and Gorani informants were merged as both are culturally similar and share the same religion and language. Gorani communities have been claimed by Bosniaks, Serbs, and Bulgarians and recently by Macedonians, but in Kosovo they are recognized as a distinct minority group.

The respondents were older than 50 years (with a few exceptions), mainly engaged in agricultural activities and typically inherited their ethnobotanical knowledge from their direct ancestors (parents, grandparents) via oral traditions. During the interviews, fresh plants were collected to create voucher specimens for the herbarium and whenever possible, informants were followed into the field to show us the quoted species. Most plant species were collected while flowering. Taxonomic identification was undertaken using relevant standard botanical literature of the area [35–38]. Plant nomenclature largely follows the Flora Europaea [39], while plant family assignments follow the current Angiosperm Phylogeny...
Group III guidelines [40]. Voucher specimens of the wild taxa were deposited at the Department of Biology (Herbarium code Pz/2013), University of Prishtina.

Data analysis

Overlap analysis for cited taxa

Taxa with use-citations based on general category of use (medicinal, food or handicraft) were compared across three groups (Albanian, Turks and Bosniaks/Gorani). Data are represented in the form of a Venn Diagram (Figure 3) to illustrate overlaps in use of taxa.

Use-value for individual species

The use-value citation \((\text{UV}_c)\) index was calculated for each species for each ethnic group [41]. Here, we modified this method to calculate UV values in three different categories of use: medicinal, food, and handicraft. This index is useful for examination of relative importance of each species for a general category of use based on the number of use-citations. Briefly, it was calculated as follows:

\[
\text{UV}_c = \frac{\sum N_{uc}}{N}
\]

Where \(N_{uc}\) is the number of use citation reports concerning a given species in a use category (e.g. medicinal, food, handicraft), divided by the total number of informants (\(N\)) in a specific group (e.g. Albanian, Turkish, or Bosniak & Gorani). In a recent paper by Quave and Pieroni [42], UV values were plotted on a two-dimensional matrix framework to assess relative values for individual species between two ethnic groups. Here, we expand upon this concept and apply it to a three-dimensional matrix for comparison of plant use-values for individual species between three ethnic groups that share access to the same environmental and botanical resources.

Three-dimensional (3-D) use-value matrix design and analysis

We propose a new approach for the comparative analysis of how use-values differ in three ethnic groups, and across different general categories of use. The UV\(_c\) data for each category of use (medicinal, food, handicraft)
were normalized to allow for comparison on a scale of 0–1. This was achieved by identifying the maximum UVc value for each category of use (UVmax). The UVc for each species (and ethnic group) was then divided by the UVmax to create the adjusted UV value (UVadj) and plotted onto a 3-D scatterplot using MATLAB® software. Eight 3-D overlay quadrants were created to assist in classifying the UVadj clusters (Figure 4A). They were defined as follows in relationship to the three ethnic groups being compared (Group 1: Bosniak/Gorani; Group 2: Turkish; Group 3: Albanian):

- Quadrant I: Taxa with UVadj ≤ 0.05 for all three groups, indicating consensus in low use-value across groups.
- Quadrant II: Group 1 UVadj > 0.05; Group 2 UVadj ≤ 0.05; Group 3 UVadj ≤ 0.05, indicating consensus on lower use-value among Group 2 and 3, but higher use-value for Group 1.
- Quadrant III: Group 1 UVadj ≤ 0.05; Group 2 UVadj > 0.05; Group 3 UVadj ≤ 0.05, indicating consensus on lower use-value among Group 1 and 3, but higher use-value for Group 2.
- Quadrant IV: Group 1 UVadj > 0.05; Group 2 UVadj > 0.05; Group 3 UVadj ≤ 0.05, indicating consensus on higher use-value among Group 1 and 2, but lower use-value for Group 3.
- Quadrant V: Group 1 UVadj ≤ 0.05; Group 2 UVadj ≤ 0.05; Group 3 UVadj > 0.05, indicating consensus on lower use-value among Group 1 and 2, but higher use-value for Group 3.
- Quadrant VI: Group 1 UVadj > 0.05; Group 2 UVadj ≤ 0.05; Group 3 UVadj > 0.05, indicating consensus on higher use-value among Group 1 and 3, but lower use-value for Group 2.
- Quadrant VII: Group 1 UVadj ≤ 0.05; Group 2 UVadj > 0.05; Group 3 UVadj > 0.05, indicating consensus on higher use-value among Group 2 and 3, but lower use-value for Group 1.
- Quadrant VIII: Taxa with UVadj > 0.05 for all three groups, indicating consensus in high use-value across groups.

Quadrant assignments are also reported in Tables 1, 2, and 3.

Results and discussion
In total, TEK on the local uses of 124 taxa (belonging to 51 families) was recorded; of these, 114 species were used for medicinal purposes, 29 wild species for food, and 20 for handicrafts. Some of the cited species were used for multiple purposes. The total number of use citation (Nuc) for each species is reported by ethnic group and category of use: medicinal (Table 1), food (Table 2), and handicraft (Table 3) applications.

Medicinal plants
TEK on the recorded local uses of 114 medicinal plant taxa, representing 49 taxonomic families, are reported in Table 1. Of these species, Achillea millefolium L., Sambucus nigra L., Urtica dioica L., Tilia platyphyllos Scop., Hypericum perforatum L., Matricaria chamomilla
L., *Thymus serpyllum* L., and *Vaccinium myrtillus* L. were cited by more than 30% of the informants. Of the 114 cited for medicinal purposes, 44 are also included in the official Pharmacopoeia of Europe (European Pharmacopoeia. 6 ed.). The predominantly quoted botanical families were Rosaceae (13%), Asteraceae (11%), and Lamiaceae (10%). These same three “top” families were found to also be predominant among the wild medicinal taxa used in the folk medicine of the Albanian Alps (Kosovo), Alps in Montenegro, Albania, and in the Gollak region of Kosovo [13,17-19,25,26].

The total number species quoted by each ethnic group were roughly equivalent: 67, 66, and 71 for the Albanians, Turks and Bosniaks, respectively. Figure 3A illustrates the overlap in citation of medicinal plant among the three populations, with 10 species used only by Albanians, 18 by Turks and 21 only by Bosniaks/Gorani. Furthermore, common uses were shared between certain groups: 15 only between Albanians and Turks, 8 only between Bosniaks/Gorani and Turks and 17 only between Albanian and Bosniaks/Gorani. A total of 25 species were cited for medicinal use by all three study populations.

The most frequently cited medicinal uses referred to gastrointestinal (17.8%), respiratory (15.1%) ailments, heart disease (13.6%), illnesses affecting the urogenital system (12.4%) and the skin (10.5%). These categories were the most frequently quoted in the ethnobotanical studies conducted in Gollak (Kosovo) [26], while the gastrointestinal and respiratory troubles were also the most frequently quoted in the ethnobotanical studies conducted in the Albanian Alps (Kosovar, Montenegrin and Albanian sides) [13,17-19,25].

Our 3-D analysis of the data revealed that of the cited species, *Chamomila recutita* had the highest use-value across groups, and was assigned to Quadrant VI, demonstrating high value among Albanians and Bosniaks/Gorani, with moderately high (UV$_{adj}$ = 0.46) use-value among the Turkish population studied as well. While most taxa fell into Quadrant I, representing low to moderate level use-values among all three populations, two
| Botanical taxon, family and voucher | Status | Folk name(s)† | Part(s) used | Administration | Treated disease(s) or folk medical uses(s) | Alb N_ab | Bo/Go N_ad | Tur N_cq | UV_{Alb} | UV_{Bo/Go} | UV_{Tur} | Q^3 |
|-------------------------------------|--------|---------------|--------------|----------------|------------------------------------------|----------|-----------|----------|----------|-----------|----------|-----|
| *Abies alba* Mill. (Pinaceae) 14/Pz/2013 | W       | Bredhi\textsuperscript{ALB} | Wood         | Resin, mixed with fat | Anti-fungal | 2 | 0 | 0 | 0.033 | 0 | 0 | 1 |
| *Agrimonia eupatoria* L. (Rosaceae) 08/Pz/2013 | W       | Petrovac\textsuperscript{BOG}, Kezelli japrak\textsuperscript{TUR} | Aerial parts | Infusion | Anti-allergic, Earache, Anti-inflammatory, Anti-diarrheal | 0 | 3 | 1 | 0 | 0.219 | 0.065 | 1 |
| *Agropyron repens* (L.) Beauv. (Poaceae) 07/Pz/2013 | W       | Bari i magant\textsuperscript{ALB}, Priovina\textsuperscript{ALB}, Priovina\textsuperscript{BOG} | Aerial parts | Infusion | Anti-hemorrhoidal, Respiratory system disorders, Urinary tract disorders | 2 | 0 | 0 | 0.049 | 0.125 | 0.065 | 1 |
| *Alchemilla vulgaris* L. (Rosaceae) 05/Pz/2013 | E       | Alhemla\textsuperscript{ALB} | Aerial parts | Infusion | Improve fertility in women | 2 | 0 | 0 | 0.033 | 0 | 0 | 1 |
| *Achillea millefolium* L. (Asteraceae) 03/Pz/2013 | W       | Barepezmati\textsuperscript{ALB}, Hajdutka trava\textsuperscript{BOG}, Hajdut oti\textsuperscript{TUR} | Aerial parts | Infusion | Anti-cholesterolemic, Anti-coagulant, Appetizing, Anti-microbial, Anti-emetic, Carminative and spasmolytic, Anti-diabetic, Antacid, Menstrual pains, Influenza, Stomachache | 0 | 4 | 0 | 0.557 | 2.656 | 0.652 | 1 |
| *Allium cepa* L. (Amaryllidaceae) 11/Pz/2013 | C       | Kepa\textsuperscript{ALB}, Cerveni luk\textsuperscript{BOG}, Kepi\textsuperscript{TUR} | Bulbs         | Eaten raw, Topically in wound | Anti-cholesterolemic, Anti-bacterial | 3 | 7 | 1 | 0.656 | 1.125 | 0.5 | 1 |
| *Allium porrum* L. (Amaryllidaceae) 09/Pz/2013 | C       | Purri\textsuperscript{ALB}, Prazilluk\textsuperscript{BOG} | Leaves        | Eaten | Thyroid disorders | 2 | 4 | 0 | 0.033 | 0.125 | 0 | 1 |
| *Allium sativum* L. (Amaryllidaceae) 10/Pz/2013 | C       | Hudra\textsuperscript{ALB}, Beli lluk\textsuperscript{BOG}, Sarimsak\textsuperscript{TUR} | Bulbs         | Eaten | Anti-hypertensive, Anti-fungal, Anti-ageing, Urinary tract infections, Anti-hypertensive, Bronchitis, Anti-tussive, Skeletal system enhancement, Immunostimulant | 16 | 24 | 11 | 1.361 | 3.188 | 1.63 | 1 |

† Folktalk and drug use practices are captured primarily in the study area, with some variation noted in other regions. The data collection was conducted using a semi-structured interview format, ensuring the accuracy of the folkloric and medical knowledge transmitted. The administration methods include oral, topical, and mixed with honey. The treated diseases or folk medical uses are recorded for each plant, providing a comprehensive understanding of their medicinal value in the area.
| Medicinal Plant | Local Names | Part Used | Preparation | Use(s) | Cautions | Comment |
|-----------------|-------------|-----------|-------------|--------|----------|---------|
| *Althaea officinalis* L. (Malvaceae) | Mullaga<sub>ALB</sub> | Flowers | Infusion | Anti-anemic, Respiratory system disorders, Skin regeneration | 0 2 1 | 8 17 13 | 0 1 4 | 0.197 0.563 0.196 1 |
| | Beli slez<sub>TUR</sub> | | | Anti-tussive/expectorant | 12 18 9 | 0.049 0 0 | | |
| | Gul hatem<sub>TUR</sub> | | | | | | | |
| *Aloe vera* (L.) Burm.f. (Xanthorrhoeaceae) | Aloo<sub>ALB</sub> | Leaves | Eaten fresh with honey | Anti-tumor | 3 0 0 | 0.033 0 0 | | |
| | Beli slez<sub>TUR</sub> | | | | | | | |
| *Amanita caesarea* (Scop.) Pers. (Amanitaceae) | Kerpurdha<sub>ALB</sub> | Fruiting body | Topically applied | Skin infections | 2 0 0 | 0.344 1 0 | | |
| | Rrush arushe<sub>BOG</sub> | | | | | | | |
| *Apium graveolens* L. (Apiaceae) | Kerêviz<sub>TUR</sub> | Aerial parts | Infusion | To treat sterility | 0 0 2 | 0 0 0.109 | | |
| | | | | Anti-diabetic, Appetizing | 0 0 3 | | | |
| | | | | Improve hormonal balance in women | 0 2 0 | | | |
| | | | | Skin infections | 12 16 0 | | | |
| | | | | Urinary tract infections and pains | 9 16 0 | | | |
| *Arctostaphyllos uva-ursi* L. (Ericaceae) | Çaj uvin<sub>ALB</sub> | Leaves | Infusion | Anti-anemic, Anti-malarial | 2 3 0 | 0.377 1.25 0 | | |
| | Medvegje ushi<sub>BOG</sub> | | | Anti-diabetic | 0 0 3 | | | |
| | | | | Appetizing | 4 5 0 | | | |
| | | | | Urinary tract infections | 12 16 0 | | | |
| *Artemisia absinthium* L. (Asteraceae) | Fshiga<sub>ALB</sub> | Leaves | Infusion | Anti-asthmatic, Anti-diabetic | 2 3 0 | 0.033 0.087 | | |
| | Pelini<sub>ALB</sub> | | | | | | | |
| | Divli pelin<sub>BOG</sub> | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| *Avena sativa* L. (Poaceae) | Thekna<sub>ALB</sub> | Aerial parts | Infusion | Skeletal system enhancement | 2 0 4 | 0.033 0.087 | | |
| | Jullaf<sub>TUR</sub> | | | | | | | |
| *Betula alba* L. (Betulaceae) | Meshtекna<sub>ALB</sub> | Roots | Infusion | Diuretic, Edema, Urinary disorders | 0 1 0 | 0.164 0.563 0.217 | | |
| | Plesh<sub>TUR</sub> | | | | | | | |
| | Brezë<sub>BOG</sub> | | | | | | | |
| | Hush agaggi<sub>TUR</sub> | | | | | | | |
| *Brassica rapa* L. (Brassicaceae) | Rrep<sub>ALB</sub> | Taproot | Infusion | Alopecia | 8 11 6 | | | |
| | Shalgar<sub>TUR</sub> | | | | | | | |
| *Calendula officinalis* L. (Asteraceae) | Lule dukat<sub>ALB</sub> | Aerial parts | Extracted with different oils | Anticoagulant | 2 5 0 | 0.033 0.156 | | |
| | Neven<sub>BOG</sub> | | | | | | | |
| *Capsella bursa-pastoris* (L.) Medik. | Mé do s’mé don<sub>ALB</sub> | Aerial parts | Infusion | | | | | |
| | Tarqushak<sub>BOG</sub> | | | | | | | |

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### Table 1 Medicinal plant used in the study area (Continued)

| Family  | Number | Region | Plant Name | Part Used | Infusion | Effect(s)                                      | VIF |
|---------|--------|--------|------------|-----------|----------|------------------------------------------------|-----|
| (Brassicaceae) 28/ Pz/2013 | Hoqunequ BOG | W/C | Castanea sativa Mill. (Fagaceae) 19/Pz/2013 | Flowers | Infusion | Anti-anemic, Bronchitis, Anti-tussive | 0.131 | 0 | 0 | 1 |
|         |        |        |            | Cortex   |          | Anti-tussive                                  | 0   | 0 | 0 |   |
|         |        |        |            |          |          | Anti-tussive                                  | 1   | 0 | 0 |   |
| (Brassicaceae) 28/ Pz/2013 | Hoqunequ BOG | W | Centaurium erythraea Rafn (Gentianaceae) 29/Pz/2013 | Aerial parts | Infusion | Anticoagulant, Anti-pyretic, Anti-malarial | 0.426 | 1.063 | 0.391 |   |
|         |        |        |            |          |          | Anti-anemic, Anti-anemic, Anti-anemic, Anti-anemic | 13  | 18 | 9  |   |
|         |        |        |            |          |          | Anti-anemic, Anti-anemic, Anti-anemic, Anti-anemic | 9   | 12 | 6  |   |
|         |        |        |            |          |          | Anti-anemic, Anti-anemic, Anti-anemic, Anti-anemic | 2   | 1  | 0  |   |
|         |        |        |            |          |          | Anti-anemic, Anti-anemic, Anti-anemic, Anti-anemic | 0   | 0  | 0  |   |
|         |        |        |            |          |          | Anti-anemic, Anti-anemic, Anti-anemic, Anti-anemic | 0   | 0  | 0  |   |
|         |        |        |            |          |          | Anti-anemic, Anti-anemic, Anti-anemic, Anti-anemic | 2   | 0  | 2  |   |
| (Asteraceae) 20/ Pz/2013 | Kicica BOG | W | Centaurea cyanus L. (Asteraceae) 20/ Pz/2013 | Flower | Infusion | Respiratory disorders | 0.049 | 0.031 | 0  |   |
|         |        |        |            |          |          | Anti-tussive, Anti-tussive, Anti-tussive, Anti-tussive | 14  | 26 | 22 |   |
|         |        |        |            |          |          | Anti-tussive, Anti-tussive, Anti-tussive, Anti-tussive | 31  | 35 | 12 |   |
|         |        |        |            |          |          | Anti-tussive, Anti-tussive, Anti-tussive, Anti-tussive | 11  | 9  | 9  |   |
|         |        |        |            |          |          | Anti-tussive, Anti-tussive, Anti-tussive, Anti-tussive | 9   | 3  | 4  |   |
|         |        |        |            |          |          | Anti-tussive, Anti-tussive, Anti-tussive, Anti-tussive | 1   | 0  | 7  |   |
|         |        |        |            |          |          | Anti-tussive, Anti-tussive, Anti-tussive, Anti-tussive | 2   | 0  | 0  |   |
|         |        |        |            |          |          | Anti-tussive, Anti-tussive, Anti-tussive, Anti-tussive | 20  | 23 | 6  |   |
|         |        |        |            |          |          | Anti-tussive, Anti-tussive, Anti-tussive, Anti-tussive | 3   | 4  | 0  |   |
| (Papaveraceae) 30/ Pz/2013 | Kena çiqegi TUR | W | Chelidonium majus L. (Papaveraceae) 30/ Pz/2013 | Latex | Topically used | Skin infections, warts | 0.18 | 0  | 0.152 | I |
|         |        |        |            |          |          | Anti-tussive, Anti-tussive, Anti-tussive, Anti-tussive | 11  | 0  | 7  |   |
| (Asteraceae) 21/ Pz/2013 | Mavi çiček TUR | W | Cichorium intybus L. (Asteraceae) 21/ Pz/2013 | Aerial parts | Infusion | Hepatic disorders | 0.033 | 0  | 0.087 | I |
|         |        |        |            |          |          | Anti-tussive, Bronchitis | 0   | 6  | 3  |   |
|         |        |        |            |          |          | Anti-tussive, Bronchitis | 31  | 35 | 12 |   |
|         |        |        |            |          |          | Anti-tussive, Bronchitis | 11  | 9  | 9  |   |
|         |        |        |            |          |          | Anti-tussive, Bronchitis | 9   | 3  | 4  |   |
|         |        |        |            |          |          | Anti-tussive, Bronchitis | 1   | 0  | 7  |   |
|         |        |        |            |          |          | Anti-tussive, Bronchitis | 2   | 0  | 0  |   |
|         |        |        |            |          |          | Anti-tussive, Bronchitis | 20  | 23 | 6  |   |
|         |        |        |            |          |          | Anti-tussive, Bronchitis | 3   | 4  | 0  |   |
| (Rutaceae) 31/ Pz/2013 | Limun TUR | C | Citrus limon (L.) Osbeck (Rutaceae) 31/ Pz/2013 | Fruits | Infusion | Lemon juice mixed with sugar | 0.188 | 0.065 | I |
|         |        |        |            |          |          | Anti-tussive, Bronchitis | 0   | 6  | 3  |   |
|         |        |        |            |          |          | Anti-tussive, Bronchitis | 31  | 35 | 12 |   |
|         |        |        |            |          |          | Anti-tussive, Bronchitis | 11  | 9  | 9  |   |
|         |        |        |            |          |          | Anti-tussive, Bronchitis | 9   | 3  | 4  |   |
|         |        |        |            |          |          | Anti-tussive, Bronchitis | 1   | 0  | 7  |   |
|         |        |        |            |          |          | Anti-tussive, Bronchitis | 2   | 0  | 0  |   |
|         |        |        |            |          |          | Anti-tussive, Bronchitis | 20  | 23 | 6  |   |
|         |        |        |            |          |          | Anti-tussive, Bronchitis | 3   | 4  | 0  |   |
| (Cornaceae) 23/ Pz/2013 | Drenilje BOG | W | Cornus mas L. (Cornaceae) 23/ Pz/2013 | Fruits | Infusion | Anti-anemic, Anti-anemic, Anti-anemic, Anti-anemic | 0.148 | 0.656 | 0.304 | I |
|         |        |        |            |          |          | Anti-anemic, Anti-anemic, Anti-anemic, Anti-anemic | 5   | 3  | 6  |   |
|         |        |        |            |          |          | Anti-anemic, Anti-anemic, Anti-anemic, Anti-anemic | 0   | 4  | 2  |   |
|         |        |        |            |          |          | Anti-anemic, Anti-anemic, Anti-anemic, Anti-anemic | 1   | 1  | 1  |   |
### Table 1 Medicinal plant used in the study area (Continued)

| Plant Name | Author | Plant Part | Method | Use | Anti-emetic in early stage of pregnancy (for morning sickness), 2 | 5 | 2 |
|------------|--------|------------|--------|-----|---------------------------------------------------------------|---|---|
| Corylus avellana L. (Betulaceae) 24/Pz/2013 | W Lejth<sup>ALB</sup> | Leaves | Infusion | Anti-tussive, 0 | 2 | 1 |
| | | | | Antacid, 0 | 3 | 0 |
| | W Ruğ<sup>TUR</sup> | | | Hepatic disorders, 0 | 1 | 0 |
| Cotinus coggygria Scop. (Anacardiaceae) 64/Pz/2013 | W Boyacı sumak<sup>TUR</sup> | | | Stomach disorders, 0 | 0 | 2 |
| | | | | Kidney disorders, 0 | 0 | 1 |
| | | | | Anti-diarrheal, 0 | 0 | 4 |
| Crataegus monogyna Jacq. (Rosaceae) 18/Pz/2013 05/Pz/11 | W Murriz<sup>ALB</sup> | Fruits | Infusion | Improve liver function, 0 | 3 | 0 |
| | W Gllog<sup>BOG</sup> | | | Improve blood circulation, 27 | 21 | 18 |
| | W Adi aliç<sup>TUR</sup> | | | Anti-hypertensive, 22 | 20 | 12 |
| | | Leaves and flowers | Infusion | Anti-diabetic, 12 | 20 | 12 |
| Cucumis sativus L. (Cucurbitaceae) 26/Pz/2013 | C Kastravec<sup>ALB</sup> | Fruits and seeds | Eaten fresh | Anti-cholesterol, 13 | 4 | 9 |
| | C Kastravac<sup>BOG</sup> | | | Kidney disorders, 4 | 3 | 0 |
| | | | | Improve blood circulation, 3 | 7 | 0 |
| | | | | Improve skin vitality, 1 | 1 | 0 |
| | | | | Eye disorders, 0 | 1 | 0 |
| | | | | Infection of digestive system, 4 | 0 | 0 |
| Cucumis melo L. (Cucurbitaceae) 25/Pz/2013 | C Pjepni<sup>ALB</sup> | Fruits | Eaten fresh | Anti-parasitic, 0 | 2 | 0 |
| | | | | 0.063 | 0 | 1 |
| Cydonia oblonga Mill. (Rosaceae) | C Ftu<sup>ALB</sup> | Leaves | Infusion | Anti-diarrheal, 7 | 4 | 0 |
| | W Dunia<sup>BOG</sup> | | | 0.115 | 0.125 | 0 |
| Dryopteris filix-mas (L.) Schott (Dryopteridaceae) | W Papra<sup>BOG</sup> | Leaves | Infusion | Anti-parasitic, 0 | 2 | 0 |
| | | | | 0.063 | 0 | 1 |
| Equisetum arvense L. (Equisetaceae) 07/Pz/11 | W Konksi rep<sup>BOG</sup> | Aerial parts | Infusion | Hepatic disorders, 0 | 2 | 0 |
| | | | | Kidney infections and pain, 0 | 7 | 0 |
| Euphorbia amygdaloides L. (Euphorbiaceae) | W Mali mleq<sup>BOG</sup> | Latex | Topically used | Warts, 0 | 3 | 0 |
| | | | | 0.094 | 0 | 1 |
| Foeniculum vulgare Mill. (Apiaceae) 32/Pz/2013 | W Köpé<sup>ALB</sup> | Fruits | Infusion | Eye disorders, 0 | 2 | 0 |
| | W Rezene<sup>BOG</sup> | | | 0.197 | 0.375 | 0.130 |
| | W Anason<sup>TUR</sup> | | | Galactogogue, 0 | 1 | 1 |
| Fragaria vesca L. (Rosaceae) | W Dredhza<sup>ALB</sup> | Fruits | Infusion | Digestive disorders, 2 | 0 | 3 |
| | W Diva jagoda<sup>BOG</sup> | | | Spasmolytic, 12 | 9 | 5 |
| | W Shatere<sup>TUR</sup> | Aerial parts | Infusion | Diuretic, 0 | 2 | 3 |
| | | | | 0.188 | 0.087 | 1 |
| Fumaria officinalis L. (Papaveraceae) 33/Pz/2013 | W Shatere<sup>TUR</sup> | Aerial parts | Infusion | Relaxant, 0 | 2 | 1 |

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| Plant Name | Species | Part | Infusion | Use | Dose |
|------------|---------|------|----------|-----|------|
| Galium verum L. | (Rubiaceae) 35/ Pz/2013 | Aerial parts | Infusion | Anti-hypertensive | 0 3 0 |
| Gentiana lutea L. | (Gentianaceae) 34/ Pz/2013 | Roots | Infusion | Kidney disorders, Skin regeneration | 0 0 2 0 0 0.130 |
| Geranium sanguineum L. | (Geraniaceae) | Aerial parts | Infusion | Digestive disorders, Flavor additive for alcoholic beverage | 5 12 0 0.180 0.375 0 1 |
| Helianthus annuus L. | (Asteraceae) | Seeds | Extracted with animal fat | Respiratory disorders, laryngitis | 0 3 0 0 0.094 0 1 |
| Hordeum vulgare Jess. | (Poaceae) | Aerial parts | Infusion | Kidney disorders, Skin regeneration | 0 0 2 0 0 0.130 |
| Humulus lupulus L. | (Cannabaceae) | Aerial parts | Infusion | Anti-anemic, Wound healing, Anticoagulant, Neurorelaxant, Antacid | 0 4 0 0.475 1.844 0 1 |
| Inula sp. (Asteraceae) | | Roots | Infusion | Anti-tussive, Bile simulation, Diuretic | 0 0 2 0 0 0.130 |
| Juglans regia L. | (Juglandaceae) | Fruits | Eaten | Anti-parasitic, Thyroid disorders | 0 0 3 |
| Juniperus communis L. | (Cupressaceae) | Wood | Extracted with oil, topically used in skin | Anti-fungal, Skin depigmentation | 0 0 1 0.065 |
| Lactuca sativa L. | (Asteraceae) | Aerial parts | Infusion | Anti-rheumatic | 5 3 0 |
| Leonurus cardiaca L. | (Lamiaceae) | Aerial parts | Infusion | Cardiotonic | 0 0 3 0 0 0.065 |

*Note: Dose values are in grams per person.*
| Medicinal Plant Used in the Study Area | Species/Genus | Genera | Application | Potency | Source | Uses |
|--------------------------------------|---------------|--------|-------------|---------|--------|-------|
| Lycoperdon sp. (Agaricaceae) 60/Pz/2013 | W | Puškai ALB, Mantaria BOG | Powder | Topically applied | Improve blood circulation, Memory enhancement | 0 0 2 |
| | | | | | Wound healing, Hemostatic | 4 1 0 0.066 0.031 0 1 |
| | | | | | | 8 4 0 |
| Lycopodium clavatum L. (Lycopodiaceae) | W | Bari qibrit ALB, BOG | Aerial parts | Topically applied to skin | Anti-microbial | 2 0 0 0.033 0 0 1 |
| Malva sylvestris L. (Malvaceae) 44/Pz/2013 | W | Mullaga ALB, BOG, Mali slez BOG, Ebe gumec TLIR | Aerial parts | Extracted with fat (melhem) | Wound healing, Anti-acne | 3 5 2 0.262 0.250 0.283 1 |
| Melantia | | | | | Anti-tussive, Bronchitis, Antimicrobial | 2 1 3 4 0 4 1 |
| Mespilus germanica L. (Rosaceae) 47/Pz/2013 | C | Mushmolla ALB | Aerial parts | Infusion | Anti-diarrheal, Anti-diabetic, Ear disorders | 4 0 0 0.115 0 0 1 |
| Melissa officinalis L. (Lamiaceae) 42/Pz/2013 | W | Bari i bletæ ALB, BOG, Matoqina BOG, Molshvatrava BOG | Aerial parts | Infusion | Neurorelaxant, Headache, Anti-hypertensive, Appetizing | 3 8 5 0.475 0.406 0.413 1 |
| Mentha longifolia (L.) Huds. (Lamiaceae) 45/Pz/2013 | C | Çaj nana ALB, Nana BOG | Aerial parts | Infusion | Stomach disorders, Carminative, Influenza, Respiratory disorders | 0 3 0 0.311 0.75 0 1 |
| | | | | | Respiratory system infections, | 3 4 0 2 6 0 8 9 0 |
| Mentha pulegium L. (Lamiaceae) 46/Pz/2013 | W | Divla menta BOG | Aerial parts | Infusion | Neurorelaxant, Improve blood circulation, Respiratory system infections, Anti-tussive, Expectorant | 0 3 0 0.625 0 1 |
| | | | | | | 0 7 0 0 9 0 2 1 0 |
| Momordica charantia L. (Cucurbitaceae) 50/Pz/2013 | C | Kudret nare TLIR, Sari kadak TLIR | Fruits | Mixed with oil – internal use | Wound healing, Anti-diabetic, Anti-cancer | 0 0 7 0 0 0.435 1 |
| | | | | | Vulnerary for burn wounds | 0 0 0 0 0 4 0 8 0 |
| Plant Name                        | Culture Code | Geographical Location | Part Used          | Method of Preparation | Disease/Condition                  | Activity        |
|----------------------------------|--------------|-----------------------|--------------------|-----------------------|------------------------------------|-----------------|
| Morus alba L. (Moraceae) 49/Pz/2013 | C            | Mani i bardhe ALB     | Leaves Infusion    | Anti-diabetic          | 0 0 4 0 0 0.087 I                  |
| Morus nigra L. (Moraceae) 48/Pz/2013 | C            | Mani i z ALB          | Fruits Eaten fresh | Infections of upper part of respiratory system | 3 0 5 0.148 0 0.196 I |
| Ocimum basilicum L. (Lamiaceae) 51/Pz/2013 | C            | Bosiljak BOG         | Aerial parts Infusion | Anti-pyretic, Diuretic | 6 0 4 0 0 0.219 0 0.196 I |
| Olea europaea L. (Oleaceae) 15/Pz/11 | C            | Ullin ALB            | Fruits Eaten fresh | Tuberculosis, Spasmolytic | 0 1 0 0.131 0.219 0.283 I |
| Origanum vulgare L. (Lamiaceae) 52/Pz/2013 | W            | Čaj mali ALB         | Aerial parts Infusion | Anti-tussive, Influenza, Respiratory system infections | 6 4 2 0.279 0.750 0.304 I |
| Pinus nigra J.F. Arnold. (Pinaceae) | W/C          | Pisha ALB, Kara qam TUR | Resin Extracted with oil | Skin infections | 3 0 6 0.049 0 0.130 I |
| Plantago major L. (Plantaginaceae) 54/Pz/2013 | W            | Dejz ALB             | Leaves Infusion    | Wound healing          | 0 6 0 0.313 0 0.1 |
| Polygonum aviculare L. (Polygonaceae) | W            | Barthek ALB          | Aerial parts Infusion | Urinary system disorders, Anti-coagulant | 2 0 4 0.082 0 0.109 I |

Table 1 Medicinal plant used in the study area (Continued)
| Plant Name                     | Country/Region | Type | Parts Used | Uses                                      | Health Problems                          |
|-------------------------------|----------------|------|------------|-------------------------------------------|------------------------------------------|
| Populus alba L.               |                 | W    | Aerial     | Topically uses                            | Wound healing                           |
|                               |                |      |            |                                           | Urinary tract disorders                  |
|                               |                |      | Infusion   |                                           | Headache,                               |
|                               |                |      |            |                                           | Anti-tussive,                            |
|                               |                |      |            |                                           | Respiratory system disorders,            |
| Primula veris L.              | W              |      | Flowers    | Infusion                                  | Improve blood circulation               |
| (Primulaceae) 56/Pz/2013       |                |      |            |                                           | Anti-tussive,                            |
|                               |                |      |            |                                           | Expectorant,                            |
|                               |                |      |            |                                           | Bronchitis                               |
|                               |                |      | Infusion   |                                           | Digestive tract disorders               |
| Prunus avium L.               | C              |      | Fruits     | Decoction                                 | Scabies                                  |
| (Rosaceae)                     |                |      |            |                                           | Hepatic disorders,                       |
|                               |                |      |            |                                           | Anti-hemorrhoidal,                       |
|                               |                |      |            |                                           | Anti-parasitic,                          |
|                               |                |      |            |                                           | Constipation                             |
| Prunus domestica L.            | C              |      | Resin      | Topically used                            | Wound healing                            |
| (Rosaceae) 55/Pz/2013          |                |      |            |                                           | Urinary tract disorders                  |
|                               |                |      | Infusion   |                                           | Headache,                               |
|                               |                |      |            |                                           | Anti-tussive,                            |
|                               |                |      |            |                                           | Respiratory system disorders,            |
|                               |                |      | Infusion   |                                           | Improve blood circulation               |
|                               |                |      |            |                                           | Anti-tussive,                            |
|                               |                |      |            |                                           | Expectorant,                            |
|                               |                |      |            |                                           | Bronchitis                               |
|                               |                |      | Infusion   |                                           | Digestive tract disorders               |
| Prunus spinosa L.             | W              |      | Flowers    | Infusion                                  | Constipation                             |
| (Rosaceae)                     |                |      |            |                                           | Anti-diabetic,                           |
|                               |                |      |            |                                           | Hepatic disorders,                       |
|                               |                |      |            |                                           | Anti-malarial                            |
|                               |                |      |            |                                           | Anti-allergic                            |
|                               |                |      | Infusion   |                                           | Heart disorders                          |
| Pyrus communis L.             | W              |      | Fruits     | Infusion                                  | Digestive system infections,            |
| (Rosaceae) 58/Pz/2013          |                |      |            |                                           | Bronchitis,                              |
|                               |                |      |            |                                           | Anti-anemiac,                           |
|                               |                |      |            |                                           | Anti-rheumatic,                          |
|                               |                |      | Infusion   |                                           | Anti-malarial                            |
|                               |                |      |            |                                           | Anti-allergic                            |
|                               |                |      | Infusion   |                                           | Heart disorders                          |
Table 1 Medicinal plant used in the study area (Continued)

| Plant                      | Tribe | Flowers/Cortex/Roots/Fruits | Parts  | Infusion | Uses                                                                 | Number of Use | P value | I value |
|----------------------------|-------|-----------------------------|--------|----------|----------------------------------------------------------------------|----------------|---------|---------|
| Robinia pseudoacacia L.    | W     | Flowers                     |        | Infusion | Skin infections                                                        | 3              | 0.049   | 0.043   |
|                           |       |                             |        |          |                                                                        |                |         |         |
| (Fabaceae) 68/Pz/2013      |       |                             |        |          |                                                                        |                |         |         |
|                           |       |                             |        |          |                                                                        |                |         |         |
| Rosa canina L.             | W     | Fruits                      |        | Infusion | Improve immunity, Hepatic disorders, Anti-anaemic, Influenza, Digestive tract disorders. | 3              | 0.328   | 0.594   |
| (Rosaceae) 67/Pz/2013      |       |                             |        |          |                                                                        |                |         |         |
|                           |       |                             |        |          |                                                                        |                |         |         |
| Rubia tinctorum L.         | W     | Aerial parts                |        | Infusion | Kidney disorders, Skeletal disorders, “Saroxva” (cutaneous tuberculosis) | 0              | 0.281   |         |
| (Rubiaceae)                |       |                             |        |          |                                                                        |                |         |         |
|                           |       |                             |        |          |                                                                        |                |         |         |
| Rubus fruticosus L.        | W     | Aerial parts                |        | Infusion | Anti-anemic, Improve blood circulation, Anti-hypertensive, Wound healing, Anti-diabetic, Antimycotic | 0              | 1.031   |         |
| (Rosaceae) 65/Pz/2013      |       |                             |        |          |                                                                        |                |         |         |
|                           |       |                             |        |          |                                                                        |                |         |         |
| Rubus idaeus L.            | W     | Leaves                      |        | Infusion | Improve blood circulation, Anti-hypertensive, Anti-diarrheal, Anti-tussive, Anti-parasitic, Anti-pyretic, Oral cavity infections | 0              | 1.188   |         |
| (Rosaceae) 66/Pz/2013      |       |                             |        |          |                                                                        |                |         |         |
|                           |       |                             |        |          |                                                                        |                |         |         |
| Salix alba L.              | W     | Flowers                     |        | Extracted with olive oil | To treated skin wounds caused by insects and snakes | 0              | 0.313   |         |
| (Salicaceae) 70/Pz/2013    |       |                             |        |           |                                                                        |                |         |         |
|                           |       |                             |        |           |                                                                        |                |         |         |

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Table 1 Medicinal plant used in the study area (Continued)

| Plant Name                      | Country | Medicinal Part | Method of Use              | Uses                                                                 | Frequency | Percentage | p-Value | I2 |
|---------------------------------|---------|----------------|---------------------------|----------------------------------------------------------------------|-----------|------------|---------|----|
| **Salvia officinalis L.**       | C       | Aerial parts   | Infusion, then added honey| Analgesic, Tonsillitis, other infections of respiratory system, Anti-diabetic, Antiperspirant | 0 2 0     | 0.344      | 0.344  | 0  I|
| **Sambucus nigra L. (Adoxaceae)** | W       | Flowers        | Infusion                  | Bronchitis, Anti-tussive, Expectorant, Antiperspirant, Anti-halitosis, Influenza, Anti-asthmatic, Stomach disorders, Urinary tract disorders | 14 7 15   | 0.787      | 1.250  | 0.891  I|
| **Satureja montana L. (Lamiaceae)** | W       | Aerial parts   | Infusion                  | Spasmolytic, Anti-diabetic, Anti-parasitic, Respiratory tract infections, Anti-tussive, Expectorant | 0 5 0     | 0.563      | 0.563  | 0  I|
| **Scrophularia nodosa L.**      | W       | Aerial parts   | Topically applied         | "Saraxha" (cutaneous tuberculosis), Tuberculosis                    | 0 3 2     | 0.094      | 0.043  | 0  I|
| **Sempervivum tectorum L. (Crassulaceae)** | W       | Roots          | Extracted with fat         | Wound healing                                                       | 6 3 0     | 0.279      | 0.531  | 0  I|
| **Symphytum officinale L. (Boraginaceae)** | W       | Roots          | Extracted with fat         | Wound healing                                                       | 0 4 2     | 0.188      | 0.109  | 0  I|
| **Tanacetum vulgare L. (Asteraceae)** | W       | Seeds          | Infusion                  | Anti-parasitic (intestinal parasites), Anti-rheumatic                | 0 0 3     | 0 0 3      | 0.304  | 0  I|

*Notes:*
- C = Ciudad, W = Wildlife, TUR = TUR, ALB = ALB, Pz = Pz
- 0 = No, 1 = Yes
- I2: Percentage of variation among studies due to heterogeneity rather than chance.
| Medicinal plant used in the study area (Continued) | Scientific Name | Part Used | Part Used | Method | Use(s) | Yield | Dilution | p-value |
|--------------------------------------------------|----------------|-----------|-----------|--------|--------|-------|----------|---------|
| *Taraxacum officinale* F.H. Wigg. (Asteraceae) | 84/ Pz/2013 | Flowers | Aerial parts | Infusion | Anti-hemorrhoidal, Eczema | 0.295 | 0.304 | 1 |
| *Teucrium chamaedrys* L. (Lamiaceae) | 79/ Pz/2013 | Aerial parts | Infusion | Appetizing, Stomachache, Anti- diarrheal, Anti- hemorrhoidal | 0 2 0 | 0 0.250 | 0 I |
| *Teucrium polium* L. (Lamiaceae) | 78/ Pz/2013 | Aerial parts | Infusion | Anti-hemorrhoidal, Digestive tract disorders, Urinary tract disorders, Anti-anemic, Appetizing, Stomachache, Anti- diarrheal, Anti- hemorrhoidal | 0 4 0 | 0 0 | 0 |
| *Thymus serpyllum* L. (Lamiaceae) | 76/ Pz/2013 | Aerial parts | Infusion | Anti-hemorrhoidal, Digestive tract disorders, Stomachache, Anti- hemorrhoidal | 0 1 0 | 0 1 0 | 0 |
| *Thymus vulgaris* L. (Lamiaceae) | 77/ Pz/2013 | Aerial parts | Infusion | Anti-tussive, Anti-cholesterolemic | 0 3 0 | 0 0.281 | 0 I |
| *Typha latifolia* L. (Typhaceae) | 82/ Pz/2013 | Fruits | Infusion | Respiratory system inflammations | 0 0 3 | 0 0 | 0.065 | 1 |
| *Tilia platyphyllos* Scop. (Malvaceae) | 80/ Pz/2013 | Flowers | Infusion | Respiratory system inflammations, Anti-anemic, Stomach infections, Headache, Anti-tussive | 8 13 8 | 0.689 | 1.469 | 0.804 | 1 |
| *Tilia platyphyllos* Scop. (Malvaceae) | 80/ Pz/2013 | Flowers | Infusion | Respiratory system inflammations, Anti-anemic, Stomach infections, Headache, Anti-tussive, Expectorant | 8 13 8 | 0.689 | 1.469 | 0.804 | 1 |
| Plant Name                  | Country | Part Used          | Preparation Method | Uses                                                                 | Code | Effects | Significances |
|----------------------------|---------|--------------------|--------------------|----------------------------------------------------------------------|------|---------|---------------|
| *Trifolium arvense* L.     | W/C     | Leaves and Flowers | Aerial part        | Respiratory system inflammations                                      | 17   | 19      | 11            |
| *Triticum vulgare* L.      | W       | Flour              | Mixed with hot water | Skin inflammation and ulcers                                          | 0    | 0       | 4             |
| *Tussilago farfara* L.     | W       | Aerial parts       | Infusion           | Expectorant, Anti-tussive                                            | 0    | 7       | 0             |
| *Urtica dioica* L.         | W       | Aerial parts       | Infusion           | Anti-hemorrhoidal, Anti-anemic, Influenza, Anti-cancer, Eczemas, Bronchitis, Headache, Anti-rheumatic, Anti-bacterial, Alopecia, Anti-dandruff, Digestive disorders, Urinary disorders | 3    | 1       | 5             |
| *Vaccinium myrtillus* L.   | W       | Fruits             | Juice of fresh fruits | Digestive tract infections, Anti-anemic, Eye inflammations, Hepatitis, Digestive disorders, Urinary disorders | 6    | 9       | 5             |
| *Vaccinium vitis-idaea* L. | W       | Leaves             | Infusion           | Urinary inflammations, Anti-anemic                                   | 0    | 14      | 0             |
|                            |         | Fruits             | Infusion           | Urinary tract infections                                              | 0    | 21      | 0             |
|                            |         | Fruits and leaves  | Infusion           | Lithontriptic, Anti-anemic                                           | 0    | 11      | 0             |
additional species stood out from the majority and fell into Quadrant II: *Allium sativum* and *Urtica dioica*. Both of these taxa demonstrated high use-value scores among Bosniaks/Gorani, with moderate use-values among Albanians and Turks.

Upon cross-cultural comparative analysis of our findings with those reported in the medico-ethnobotanical literature available on the Southern Balkans [1-4,6,8-10,12,13,15,17,19-21,25-27], we identified the following novel uses of several plants, which could merit further phytochemical and bioactivity analyses:

- the topical application of the fruiting body of *Amanita caesarea* in the treatment of skin infections;
- the drinking of an infusion of the aerial parts of *Apium graveolens* to treat sterility;
- the drinking of an infusion of the aerial parts of *Avena sativa* (Figure 5) for its skeletal system enhancement effect;
- the consumption of *Brassica rapa* taproot to treat eye disorders and stimulate the immune system;
- the drinking of an infusion of aerial parts of *Geranium sanguineum* to treat respiratory disorders;

Note: The list continues with specific uses for various plants, such as the topical application of *Veratrum album* for skin infections and the drinking of *Verbascum sp.* infusions for bronchitis.

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Table 1: Medicinal plant used in the study area (Continued)

| Plant Name (Family) | Use(s) | Albanian Use-Value | Bosniak/Gorani Use-Value | Turkish Use-Value |
|---------------------|--------|--------------------|--------------------------|------------------|
| Fruits and leaves   |        |                    |                          |                  |
| *Veratrum album* L. (Melanthiaceae) W | Shtara<sup>ALB</sup> | Aerial parts | Infusion | Anti-hypertensive. | 3 5 0 0.049 0.156 0 1 |
|                     | Cemenika<sup>BOG</sup> |                      |                          |                  |
|                     | Divizma<sup>BOG</sup> |                      |                          |                  |
|                     | Diviza<sup>TUR</sup> |                      |                          |                  |
|                     | Sig kuşuru<sup>TUR</sup> |                      |                          |                  |
| *Verbascum sp.* (Scrophulariaceae) 89/Pz/2013 W | Divizma<sup>BOG</sup> | Aerial parts | Infusion and Mixed with fat "mehlem" | Anti-tussive, | 0 2 1 0 0.250 0.087 1 |
|                     |                      |                      |                          | Bronchitis,     | 0 5 2 |
|                     |                      |                      |                          | Digestive tract disorders | 0 1 1 |
| *Veronica officinalis* L. (Plantaginaceae) 88/Pz/2013 W | Paskalya otu<sup>TUR</sup> | Leaves | Infusion | Anticoagulant, | 0 0 3 0 0.196 1 |
|                     | Yavshar otu<sup>TUR</sup> |                      |                          | Respiratory system inflammations, | 00 0 2 |
|                     |                      |                      |                          | Wound healing    | 0 4 |
|                     |                      |                      |                          | Increase immunity, | 4 1 0 0.311 0.438 0.435 1 |
| *Vitis vinifera* L. (Vitaceae) 90/Pz/2013 C | Rrush<sup>ALB</sup> | Leaves | Infusion | Anti-anemic, | 3 4 2 |
|                     | Grozhgje<sup>BOG</sup> |                      |                          | Hepatic disorders, | 1 2 3 |
|                     | Siyah üzüm<sup>TUR</sup> |                      |                          | Urinary system inflammations, | 6 2 1 |
|                     |                      | Fruits | Eaten fresh | Anti-anemic, | 1 1 10 |
|                     |                      | Juice of fruits (semi fermented) | Internal used | Anti-cholesterolemic | 2 3 1 |
| *Zea mays* L. (Poaceae) 92/Pz/2013 C | Mısr<sup>ALB</sup> | Female flower | Infusion | Urinary tract inflammations, | 2 0 3 0.115 0 0.152 1 |
|                     | Kollomoq<sup>ALB</sup> |                      |                          | Edema,          | 1 0 1 |
|                     | Kollomoq<sup>TUR</sup> |                      |                          | Stomach disorders, | 2 0 0 |
|                     |                      | Ripe seeds | Infusion | Anti-parasitic | 1 0 0 |

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<sup>ALB</sup> Folk names recorded among Albanians; <sup>BOG</sup> Folk name(s) recorded among Bosniaks/Gorani; <sup>TUR</sup> Folk name(s) recorded among Turks
<sup>UV<sub>Alb</sub></sup>: Use-value for one species by the Albanian group;
<sup>UV<sub>Bo/Go</sub></sup>: Use-value for one species by the Bosniaks and Gorani;
<sup>UV<sub>Tur</sub></sup>: Use-value for one species by the Turkish group. This index measures the relative importance of each species based on its reported use by informants from each cultural group under study.

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<sup>Quadrant assignments are based on adjusted use-values (UV<sub>adj</sub>), which were calculated by dividing the use-value (UV) of each group by the maximum use-value (UV<sub>max</sub>) for medicinal citations (UV<sub>adj</sub> not shown).</sup>
### Table 2 Wild plant or mushroom species used as local food in the study area

| Botanical taxon, family and voucher specimen code | Folk name(s) | Part(s) used | Preparation | Folk uses(s) | Alb N<sub>b</sub> | Bo/Go N<sub>b</sub> | Tur N<sub>b</sub> | UV<sub>Alb</sub> | UV<sub>Bo/Go</sub> | UV<sub>Tur</sub> | Q<sup>2</sup> |
|-------------------------------------------------|--------------|--------------|-------------|--------------|----------------|-----------------|----------------|----------------|----------------|----------------|---------|
| *Amanita caesarea* (Scop.) Pers. (Amanitaceae)  | Kërpurdha<sup>ALB</sup> | Aerial parts | Fresh or conserved | Food used in small quantities, Food additive | 3 | 0 | 0 | 0.08 | 0 | 0 | 1 |
| *Castanea sativa* Mill. (Fagaceae) 19/Pz/2013 | Gështaja<sup>ALB</sup> | Fruits | Fresh, beaked | Food | 2 | 0 | 0 | 2 |
| *Cichorium intybus* L. (Asteraceae) 21/Pz/2013 | Cikorja<sup>SKQ</sup>, Mavi çiçek<sup>TUR</sup>, Satali bitki<sup>TUR</sup> | Aerial parts | Dried and ground | Coffee substitute, prepared as Turkish coffee | 2 | 0 | 3 | 0.033 | 0 | 0.065 | 1 |
| *Cornus mas* L. (Cornaceae) 23/Pz/2013 | Thana<sup>ALB</sup>, Dimina<sup>TUR</sup> | Fruits | Eaten fresh | Food | 5 | 6 | 0 | 0.082 | 0.563 | 0 | 1 |
| | | | Mixed and boiled with sugar for short period | Beverage | 0 | 6 | 0 |
| | | | Mixed and boiled with sugar for longer period | Jam | 0 | 6 | 0 |
| *Corylus avellana* L. (Betulaceae) 24/Pz/2013 | Lejth<sup>ALB</sup> | Fruits | Fresh or dried | Food, Sweetener | 9 | 15 | 5 | 0.148 | 0.469 | 0.109 | 1 |
| *Foeniculum vulgare* Mill. (Apiaceae) 32/Pz/2013 | Koper<sup>ALB</sup>, Rezene<sup>BOG</sup> | Leaves, seeds | Dried | Food additive for flavoring | 0 | 0 | 2 | 0 | 0 | 0.043 | 1 |
| *Fragaria vesca* L. (Rosaceae) | Dreza<sup>ALB</sup> | Fruits | Eaten fresh | Food | 15 | 19 | 7 | 0.295 | 1.406 | 0.196 | II |
| | | | Mixed and boiled with sugar for short period | Beverage | 0 | 15 | 0 | 2 |
| | | | Mixed and boiled with sugar for longer period | Jam | 3 | 11 | 2 |
| *Helianthus tuberosus* L. (Asteraceae) | Orashka<sup>ALB</sup> | Tuber | Eaten fresh | Food | 3 | 0 | 0 | 0.033 | 0.25 | 0 | 1 |
| *Malus sylvestris* Mill. (Rosaceae) | | Fruits | Boiled with sugar | Jams | 0 | 3 | 0 | 0.033 | 0.25 | 0 | 1 |
| | | | Sliced and dried (ahaf), boiled in water prior to eating | Wintertime food | 2 | 5 | 0 |
| *Matricaria chamomilla* L. (Asteraceae) 43/Pz/2013 | Lule qeni<sup>ALB</sup>, Kamomil<sup>ALB</sup>, Papatja<sup>TUR</sup>, Sarı çiçek<sup>TUR</sup>, Kamilica<sup>BOG</sup>, Babune<sup>BOG</sup> | Aerial parts | Dried | Tea | 0 | 5 | 3 | 0 | 0.156 | 0.065 | 1 |
| *Mentha longifolia* (L.) Huds. (Lamiaceae) 45/Pz/2013 | Çaj nana<sup>ALB</sup>, Nana<sup>BOG</sup> | Aerial parts | Infusion | Tea | 0 | 0 | 3 | 0 | 0 | 0.065 | 1 |
| *Morus alba* L. (Moraceae) 49/Pz/2013 | Mani i bardhe<sup>ALB</sup> | Fruits | Fresh | Food | 6 | 5 | 0 | 0.098 | 0.156 | 0 | 1 |
| *Morus nigra* L. (Moraceae) 48/Pz/2013 | Mani i z<sup>ALB</sup>, Dut<sup>TUR</sup> | Fruits | Eaten fresh | Food | 8 | 9 | 4 | 0.131 | 0.406 | 0.109 | 1 |
| | | | Beverage | 0 | 2 | 1 |
| Species and Genus                              | Species Name | Country | Part Used | Preparation Method | Product     | Fisher's exact test p-value (2x2 contingency table) |
|-----------------------------------------------|--------------|---------|-----------|--------------------|-------------|-----------------------------------------------------|
| *Orchis morio* L. (Orchidaceae)               |              |         |           | Mixed and boiled   | Food        |                                                     |
|                                               |              |         |           | with sugar          |             |                                                     |
|                                               |              |         |           | for short period    |             |                                                     |
|                                               |              |         |           | Jam                |             |                                                     |
|                                               |              |         |           |                    |             |                                                     |
| *Origanum vulgare* L. (Lamiaceae)             |              |         |           | Mixed and boiled   | Food        |                                                     |
|                                               |              |         |           | with sugar          |             |                                                     |
|                                               |              |         |           | for longer period   |             |                                                     |
|                                               |              |         |           | Hot beverage        |             |                                                     |
|                                               |              |         |           | mixed with milk     |             |                                                     |
|                                               |              |         |           | “salep”             |             |                                                     |
|                                               |              |         |           |                    |             |                                                     |
| *Prunus spinosa* L. (Rosaceae)                |              |         |           | Mixed and boiled   | Food        |                                                     |
|                                               |              |         |           | with sugar          |             |                                                     |
|                                               |              |         |           | for short period    |             |                                                     |
|                                               |              |         |           | Beverage            |             |                                                     |
|                                               |              |         |           |                    |             |                                                     |
| *Rosa canina* L. (Rosaceae)                   |              |         |           | Mixed and boiled   | Food        |                                                     |
|                                               |              |         |           | with sugar          |             |                                                     |
|                                               |              |         |           | for short period    |             |                                                     |
|                                               |              |         |           | Beverage            |             |                                                     |
|                                               |              |         |           |                    |             |                                                     |
| *Rosa damascena* Mill. (Rosaceae)             |              |         |           | Mixed and boiled   | Food        |                                                     |
|                                               |              |         |           | with sugar          |             |                                                     |
|                                               |              |         |           | for short period    |             |                                                     |
|                                               |              |         |           | Beverage            |             |                                                     |
|                                               |              |         |           |                    |             |                                                     |
| *Rubus fruticosus* L. (Rosaceae)              |              |         |           | Mixed and boiled   | Food        |                                                     |
|                                               |              |         |           | with sugar          |             |                                                     |
|                                               |              |         |           | for short period    |             |                                                     |
|                                               |              |         |           | Beverage            |             |                                                     |
|                                               |              |         |           |                    |             |                                                     |
| *Rubus idaeus* L. (Rosaceae)                  |              |         |           | Mixed and boiled   | Food        |                                                     |
|                                               |              |         |           | with sugar          |             |                                                     |
|                                               |              |         |           | for short period    |             |                                                     |
|                                               |              |         |           | Beverage            |             |                                                     |
|                                               |              |         |           |                    |             |                                                     |
| *Sambucus nigra* L. (Adoxaceae)               |              |         |           | Mixed and boiled   | Food        |                                                     |
|                                               |              |         |           | with sugar          |             |                                                     |
|                                               |              |         |           | for short period    |             |                                                     |
|                                               |              |         |           | Beverage            |             |                                                     |
|                                               |              |         |           |                    |             |                                                     |
| *Thymus serpyllum* L. (Lamiaceae)             |              |         |           | Mixed and boiled   | Food        |                                                     |
|                                               |              |         |           | with sugar          |             |                                                     |
|                                               |              |         |           | for short period    |             |                                                     |
|                                               |              |         |           | Beverage            |             |                                                     |
|                                               |              |         |           |                    |             |                                                     |
| *Thymus vulgaris* L. (Lamiaceae)              |              |         |           | Mixed and boiled   | Food        |                                                     |
|                                               |              |         |           | with sugar          |             |                                                     |
|                                               |              |         |           | for short period    |             |                                                     |
|                                               |              |         |           | Beverage            |             |                                                     |
|                                               |              |         |           |                    |             |                                                     |
| *Tilia platyphyllos* Scop. (Malvaceae)        |              |         |           | Mixed and boiled   | Food        |                                                     |
|                                               |              |         |           | with sugar          |             |                                                     |
|                                               |              |         |           | for short period    |             |                                                     |
|                                               |              |         |           | Beverage            |             |                                                     |
|                                               |              |         |           |                    |             |                                                     |
| *Urtica dioica* L. (Urticaceae)               |              |         |           | Mixed and boiled   | Food        |                                                     |
|                                               |              |         |           | with sugar          |             |                                                     |
|                                               |              |         |           | for short period    |             |                                                     |
|                                               |              |         |           | Beverage            |             |                                                     |
|                                               |              |         |           |                    |             |                                                     |
| *Vaccinium myrtillus* L. (Ericaceae)          |              |         |           | Mixed and boiled   | Food        |                                                     |
|                                               |              |         |           | with sugar          |             |                                                     |
|                                               |              |         |           | for short period    |             |                                                     |
|                                               |              |         |           | Beverage            |             |                                                     |
|                                               |              |         |           |                    |             |                                                     |
the topical application of *Hordeum sativum* flour, mixed with oil, for wound healing;
- the drinking of an infusion of the aerial parts of *Juncus effusus* (Figure 6) to treat urinary tract disorders;
- the drinking of an infusion of the aerial parts of *Leonurus cardiaca* as cardiotonic, to improve blood circulation and memory enhancement; and
- the drinking of an infusion of aerial parts of *Trifolium arvense* as an anti-rheumatic.

**Food plants**

The food uses of 29 wild species, representing 16 families, were recorded (Table 2). Of these, 3 were quoted only by Albanians, 2 only by Turks and 2 only by Bosniaks/Gorani. Figure 3B illustrates the high level of overlap of cited plant species for food uses, with 12 species being cited by all three populations. Regarding common overlaps in species uses, 1 was shared in common only between Albanians and Turks, 4 only between Bosniaks/Gorani and Turks and 5 only between Albanian and Bosniaks/Gorani. Regarding the preparation of traditional foods, some of these, such as *salep* (beverage from *Orchis* spp. tubers) and *shurup* (syrup from *Rosa damascena* flowers), were prepared quite frequently in the past, but nowadays have nearly disappeared. The most frequently cited food uses of local plants referred to foods that are eaten fresh or processed (33.3%), beverages (22.2%), teas (17.8%), jams (17.8%) and food additives (8.9%). Our 3-D analysis of adjusted use values revealed that all taxa with the exception of one are placed in Quadrant I, indicating a common low to moderate level of use-value shared among populations. Wild strawberries (*Fragaria vesca*), on the other hand, fell in Quadrant II, and is highly valued by Bosniaks/Gorani for its use as a food, beverage ingredient and jam ingredient. Its use as a beverage by the Bosniak/Gorani, prepared by boiling with sugar, was not cited by either Albanians or Turks in this study.

**Handicraft plants**

The handicraft uses of 20 species, representing 18 families, were recorded (Table 3). Of these, 5 were quoted only by Albanians, 3 by Turks and 2 by Bosniaks/Gorani. Figure 3C illustrates a moderate level of overlap of the handicraft uses of plant species, with only 4 being cited by all 3 populations. Regarding common overlaps in species uses, 3 were shared in common only between Albanians and Turks, 1 only between Bosniaks/Gorani and Turks and 2 only between Albanian and Bosniaks/Gorani. The most frequently cited form of handicraft uses of local flora included dyes (38.1%), musical instruments (28.6%), carpentry (19.0%) and liquid containers (14.3%).

As might be expected with lower levels of overlap between taxa cited for use for this purpose, we also observed greater distinction in the spread of taxa in our 3-D comparative analysis of adjusted use-values. Of note, *Corylus avellana*, which is a key resource for basket weaving in this region, fell into Quadrant VI, indicating its high use-value among Albanians and Bosniaks/Gorani. It had no cited use among Turks. *Lagenaria sicerraria*, whose fruits are used as a container for carrying water, had a top use-value among Bosniaks/Gorani, with moderate scores among Albanians and Turks (Quadrant II). *Pinus nigra*, used for home and furniture construction, likewise has a high use-value score among

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**Table 2 Wild plant or mushroom species used as local food in the study area (Continued)**

| Species                                      | Mixed and boiled with sugar for short period | Leaves | Fresh ore conserved | Samma ingredient: leaves are rolled around a filling usually based on minced meat and rice. | Folk Names. | UV<sub>max</sub> | UV<sub>sys</sub> | UV<sub>bac</sub> | UV<sub>ide</sub> |
|----------------------------------------------|---------------------------------------------|--------|---------------------|-----------------------------------------------------------------------------------------------|-------------|-----------------|-----------------|---------------|---------------|
| *Vitis vinifera* L. (Vitaceae) 90/Pz/2013    |                                             |        |                     |                                                                                               |             | 0.217 I         | 0.217 I         | 0.217 I       | 0.217 I       |
| *Rushı*<sup>SHQ</sup> Grozhgje<sup>CGG</sup> |                                             |        |                     |                                                                                               |             |                 |                 |               |               |
| *Zea mays* L. (Poaceae) 92/Pz/2013           |                                             |        |                     |                                                                                               |             |                 |                 |               |               |
| *Mıstri*<sup>ALB</sup> Kollomoq<sup>ALB</sup> |                                             |        |                     |                                                                                               |             | 0.188 1         | 0.174 1         | 0.174 1       | 0.174 1       |
| *Kollomoq* TUR                              |                                             |        |                     |                                                                                               |             |                 |                 |               |               |

*Folk Names.* <sup>ALB</sup> folk name(s) recorded among Albanians; <sup>SHQ</sup> folk name(s) recorded among Bosniaks/Gorani; <sup>CGG</sup> folk name(s) recorded among Turks.

<sup>Alb</sup> <sup>Nac</sup>: Number of use citations provided by Albanian informants; <sup>Bo/Go</sup> <sup>Nac</sup>: Number of use citations provided by Bosnian and Gorani informants; <sup>Tur</sup> <sup>Nac</sup>: Number of use citations provided by Turkish informants.

<sup>UV</sup><sub>max</sub>: Use-value for one species by the Albanian group; <sup>UV</sup><sub>bac</sub>: Use-value for one species by the Bosniaks and Gorani; <sup>UV</sup><sub>ide</sub>: Use-value for one species by the Turkish group. This index measures the relative importance of each species based on its reported use by informants from each cultural group under study.

<sup>Q</sup>: Quadrant assignments are based on adjusted use-values (<sup>UV</sup><sub>sys</sub>), which were calculated by dividing the use-value (<sup>UV</sup><sub>sys</sub>) of each group by the maximum use-value (<sup>UV</sup><sub>max</sub>) for food citations (<sup>UV</sup><sub>max</sub> not shown).
| Botanical taxon, family and voucher specimen code | Status | Folk name(s) * | Part(s) used | Use Category | Specific Use(s) | Alb N_{dep} | Bo/ Go N_{dep} | Tur N_{dep} | UV_{Alb} | UV_{Bo/ Go} | UV_{Tur} | Q* |
|-----------------------------------------------|--------|----------------|-------------|--------------|----------------|-------------|---------------|-------------|-----------|-------------|-------------|-----|
| Abies alba Mill. (Pinaceae) 14/Pz/2013 | W | Bredeh{*ALB} | Wood | Carpentry | Used for home construction and different home furniture | 5 | 4 | 2 | 0.082 | 0.125 | 0.043 | I |
| Acer campestre L. (Sapindaceae) | W | Panja{*ALB} | Wood | Carpentry | Used for constructing musical instruments (“çifteli”, violin etc.) | 2 | 0 | 0 | 0.033 | 0 | 0 | I |
| Alnus glutinosa L. (Betulaceae) | W | Veni{*ALB} | Twigs | Dye | Brown color used for textile coloring | 2 | 1 | 1 | 0.033 | 0.031 | 0.022 | I |
| Beta vulgaris L. (Amaranthaceae) | C | Reepa{*ALB} | Taproot | Dye | Red color, used for textile coloring | 2 | 0 | 0 | 0.033 | 0 | 0 | I |
| Centaurea cyanus L. (Asteraceae) | W | Kokoçeli{*ALB} | Flowers | Dye | Blue color, used for textile coloring | 0 | 5 | 0 | 0.156 | 0 | 0 | I |
| Corylus avellana L. (Betulaceae) 24/Pz/2013 | W | Lejth{*ALB} | Stems | Handicraft | Used to construct baskets, usually large ones for carrying animal food | 10 | 5 | 0 | 0.164 | 0.156 | 0 | VI |
| Cotinus coggyria Scop. (Anacardiaceae) 64/Pz/2013 | W | Dru boje{*RJTUR} | Fruits | Dye | Yellow color, used for leather, wool and other textile coloring | 2 | 0 | 3 | 0.033 | 0 | 0.065 | I |
| Juglans regia L. (Juglandaceae) 40/Pz/2013 | C | Ara{*ALB} | Wood | Carpentry | Used for furniture preservation, this is characterized by a high aesthetic value. | 3 | 2 | 2 | 0.082 | 0.063 | 0.043 | I |
| Juniperus communis L. (Cupressaceae) 39/Pz/2013 | W | Geçilija{*ALB} | Wood | Musical instrument | Used for construction of “lahuta”, a single-stringed musical instrument used in traditionally music. | 2 | 0 | 0 | 0.033 | 0 | 0 | I |
| Lagenaria siceraria (Molina) Standl. (Cucurbitaceae) | C | Pocerka{*ALB} | Dried fruits | Liquid container | Fruits opened and used as a water container | 6 | 8 | 4 | 0.098 | 0.25 | 0.087 | II |
| Morus alba L. (Moraceae) 49/Pz/2013 | C | Mani i bardha{*ALB} | Wood | Liquid container | Used to construct casks for storing alcohol, which gives it a characteristic light yellow color | 4 | 0 | 1 | 0.066 | 0 | 0.022 | I |
| Morus nigra L. (Moraceae) 48/Pz/2013 | C | Mani i zëli{*TUR} | Wood | Liquid container | Used to construct casks for storing alcohol, which gives it a characteristic light yellow color | 4 | 0 | 1 | 0.066 | 0 | 0.022 | I |
| Pinus nigra J.F. Arnold. (Pinaceae) | W/C | Pisha{*ALB} | Wood | Carpentry | Used for home construction and construction of different furniture. | 0 | 6 | 1 | 0.188 | 0.022 | 0 | II |
| Polygonum aviculare L. (Polygonaceae) | W | Madimak{*TUR} | Aerial parts | Dye | Blue color, used for wool coloring | 0 | 0 | 3 | 0 | 0 | 0.065 | I |
| Pyrus communis L. (Rosaceae) 58/Pz/2013 | W | Dardha{*ALB} | Wood | Musical instrument | Used for construction of “Zurla”, an oboe-like woodwind instrument. | 2 | 0 | 0 | 0.033 | 0 | 0 | I |
| Rhamnus frangula (Rhamnaceae) | E | Dru pinja barutit{*ALB} | Wood | Weaponry | Used as a gunpowder ingredient | 0 | 0 | 1 | 0 | 0 | 0.022 | I |
| Rubia tinctorum L. (Rubiaceae) | W | Boj kuqe{*BOG} | Roots and fruits | Dye | Red color, used for textile coloring | 0 | 4 | 0 | 0.125 | 0 | 0 | I |
| W | Rakita{*ALB} | Twigs | Handicraft | | | 5 | 2 | 0 | 0.082 | 0.063 | 0 | I |
Bosniaks/Gorani, but a very low use-value among Turks, and no citations for Albanians.

Cross-cultural comparison

Both the distinct and overlapping patterns of TEK reported by the 3 ethnic groups are illustrated in Figure 3. Although the number of informants was slightly uneven among the three populations, a general tendency can be observed nevertheless, also because “saturation” plateaus in which no new plant uses quoted by new interviewees were commonly reached after approximately 15–20 interviews. While we could not observe any remarkable differences among the wild plants used in the food and handicraft domains by the three populations, a difference is notable in the medicinal domain. When it comes to medicinal TEK, Albanians appear less herbophilic than both Slavs and Turks. This finding confirms what has already been pointed out by other field studies conducted in other Western Balkans areas and involving both Slavs and Ghegh Albanians [10,15]. This phenomenon may be best explained by the fact that the traditional economy of Ghegh Albanians was for many centuries based upon a pure pastoralist/transhumant economy, whereas they have rarely traded herbs. For the Slavs, however, the gathering of herbs from the wild has persisted as their well-known main occupation within a mixed system of small-scale agriculture and pastoralism. This is especially the case among Islamicized Slavs living in the mountainous areas of SE Europe.

Conclusion

For the first time in European ethnobotany, this study presents data comparing the medicinal, food, and handicraft plant use practices of three different ethnic populations living in the same area. We have introduced a new analytical method (3-D adjusted use-value plots) for comparison of taxa across different populations living in the same environment, with access to the same taxa and other environmental resources. While we have documented the presence of some small distinct sets of TEK in these populations, this is overwhelmingly coupled by a substantial overlap in the use of local taxa, suggesting...
a hybrid character to the Kosovar TEK in this region, especially with regards to TEK in the food and handicraft domains. Such cross-cultural studies could be important for proposing culturally-sensitive ways of using plant natural resources in future sustainable economic development initiatives. Indeed, the success of any future development efforts involving natural resources must take into account local perceptions and attitudes concerning plants, which can vary greatly in some cases, among different ethnic groups living in the same territory. Examples of such initiatives could include a focus on eco-tourism and the small-scale trade of foods, aromatic plants, medicinal herbs, and handicraft products. Findings from studies such as this one should be implemented in projects aimed at fostering collaboration and reconciliation among the diverse ethnic and religious communities living in Kosovo.

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

Authors’ contributions
BM and AH conceived and designed the study, XK, BP, AH performed the interviews, and CQ, AP and AH analyzed the data. AH and BM wrote the paper; AP and CQ provided revisions. All authors read and approved the final manuscript.

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