One century later: the folk botanical knowledge of the last remaining Albanians of the upper Reka Valley, Mount Korab, Western Macedonia

Pieroni et al.
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Abstract

Background: Ethnobotanical surveys of the Western Balkans are important for the cross-cultural study of local plant knowledge and also for obtaining baseline data, which is crucial for fostering future rural development and eco-tourism initiatives in the region. The current ethnobotanical field study was conducted among the last remaining Albanians inhabiting the upper Reka Valley at the base of Mount Korab in the Mavrovo National Park of the Republic of Macedonia.

The aims of the study were threefold: 1) to document local knowledge pertaining to plants; 2) to compare these findings with those of an ethnographic account written one century ago and focused on the same territory; and 3) to compare these findings with those of similar field studies previously conducted in other areas of the Balkans.

Methods: Field research was conducted with all inhabitants of the last four inhabited villages of the upper Reka Valley (n=17). Semi-structured and open interviews were conducted regarding the perception and use of the local flora and cultivated plants.

Results and conclusion: The uses of ninety-two plant and fungal taxa were recorded; among the most uncommon uses, the contemporary use of young cooked potato (Solanum tuberosum) leaves and Rumex patientia as a filling for savory pies was documented. Comparison of the data with an ethnographic study conducted one century ago in the same area shows a remarkable resilience of original local plant knowledge, with the only exception of rye, which has today disappeared from the local foodscape. Medicinal plant use reports show important similarities with the ethnobotanical data collected in other Albanian areas, which are largely influenced by South-Slavic cultures.

Keywords: Ethnobotany, Mavrovo, Traditional Knowledge, Balkans

Background

Ethnobiological studies conducted in the Western Balkans in recent years have reported a rich biocultural diversity and a remarkable vitality of traditional knowledge (TK) concerning the local flora in this region [1-12]. Such studies have been postulated to represent crucial lynch-pins for the development of community-based management strategies for local natural resources, sustainable eco-tourism and high-quality niche food and herbal products [13].

On the other hand, the ethno-historical perspective in the European ethnobotanical literature may represent an important tool for exploring trajectories of changes in plant use, as a few recent works have shown [14-18]. However, the integration of original ethnographic data with historical reports can only take place in those areas in Europe where detailed reports on local uses of plants are available. The comparison of current ethnographic data on plant uses with that reported in ancient treatises on medicinal plants can be more complex and even problematic, as information regarding local plant perceptions cannot generally be traced back. Comparative analysis between the plant knowledge of historical medical
schools and that of subaltern rural classes may, however, be useful for understanding eventual hybridisations of these diverse plant knowledge systems [19-21].

The upper Reka Valley in Western Macedonia represents one of the very few Albanian-speaking areas in South Eastern Europe where a very detailed ethnographic account – including important notes concerning local food and medicinal plant uses - was written in the first decade of the 20th Century. Bajazid Elmaz Doda (approx. 1888–1933) was the personal assistant and long-term partner of one of the most famous scholars in the field of Albanian studies: the Hungarian aristocrat and palaeontologist Baron Franz Nopcsa von Felső-Szilvás (1877–1933). Doda finalised a manuscript in 1914, probably written in collaboration with his mentor/partner, which was focused on the daily mountain life of his village, Shtirovica, located in the upper Reka Valley (approx. 1400 m.a.s.l.). This manuscript remained unpublished until the Albanologist Robert Elsie found it in the Austrian National Library and edited it in 2007 [22]. Doda apparently wrote this account to challenge the argument of the Serbian-Austrian historian and astronomer Spiridon Gopčević (1855–1928), who described the Albanians of the upper Reka Valley as “albanicised Slavs” [23].

Doda’s village of Shtirovica was completely destroyed in 1916 by the Bulgarian army [22]. However, a few surrounding tiny Albanian villages still survive to this day, despite the fact that the local population has been dramatically eroded by recent migration waves, both to the main centres in Macedonia and also abroad.

The aim of this study was to record the traditional plant knowledge of the last remaining Albanians living in these villages of the upper Reka Valley and to compare this with the ethnobotanical notes found in Doda’s work in order to better understand trajectories of change in plant uses. Moreover, a further objective of the study was to compare this field data with that of other recent ethnobotanical surveys conducted in surrounding areas and countries in order to trace commonalities and similarities, and to address overlaps and divergences in Albanian and South-Slavic traditional plant knowledge and practice.

**Methods**

**Field study**

In-depth open and semi-structured interviews, as well as participant observation were conducted in August 2012 with members (n=17) of all remaining families of the last inhabited villages of the upper Reka Valley (Figure 1): Nistrovë, Bibaj, Nicpur, and Tanushaj, within the Mavrovo National Park. The same villages were inhabited a few decades ago by hundreds of locals, who mostly migrated to the nearby towns of Gostivar and Skopje, as well as abroad for work or (as in Tanushaj) as a consequence of a (minor) Macedonian portion of the last Yugoslavian Wars.

Locals are now exclusively Muslims, but Albanians of Christian Orthodox faith also lived in the villages until a...
few decades ago. For example, in Nistrovë, one side of the village (with a mosque) is inhabited by Muslims, while the other side was inhabited by Orthodox believers. The entire population of Orthodox Christians migrated to towns a few decades ago, but they return to their village homes sometimes during the summer. Most of the houses in this part of the village are however abandoned even though the Church has been recently restored. According to our (Albanian Muslim) informants, these migrated Orthodox Christian Albanians assimilated within the Macedonian culture and now prefer to be labelled as “Macedonians”, even if they are still able to fluently speak Albanian. Contact between these two subsets of the village communities, which were very intense and continuous in the past, no longer exists today.

All Albanian inhabitants of the upper Reka are – to different degrees depending on the age – bilingual in Macedonian. Participants were questioned about traditional uses of medicinal plants and wild food plants (in use until a few decades ago or still in use today). Specifically, data concerning the local name(s) of each quoted taxon, the plant part(s) used, in-depth details about its/their manipulation/preparation and medicinal or food use(s) were collected. Interviews were conducted in Albanian with the help of two simultaneous translators.

Prior informed consent was always obtained verbally before conducting interviews and researchers adhered to the new ethical guidelines of the American Anthropological Association [24]. During interviews, informants were always asked to show the quoted plants. Voucher specimens of the most uncommon wild taxa, as well as digital pictures of the most quoted preparations were taken and are deposited at the University of Tetovo and at the University of Gastronomic Sciences, respectively. A short video documentation of the field study is available online [25].

Taxonomic identification was conducted by the first author and plant nomenclature follows Flora Europaea [26], the Angiosperm Phylogeny Group III system [27] and The Plant List database [28]. The collected data was compared with Bajazid Elmez Doda’s ethnographic study, which was conducted one century ago in the village of Shtirovica (Figure 1), within the same study area of our survey [22], and with the most relevant recent Balkan ethnobotanical field studies [1,8-10,13,29-33] and the other available South-Slavic linguistic and folkloric-botanical sources [22,34-44].

Results and discussion

The current ethnobotanical knowledge of the upper Reka Valley

Table 1 reports the plant uses recorded in the upper Reka Valley. Ninety-two taxa were reported to be known and in use by the last remaining inhabitants, who were all interviewed. The resilience of the local traditional knowledge concerning plants is especially remarkable when compared with the recordings of the local plant knowledge documented one century ago (see last column of the table [22]). A few of the plant uses (with the exception of rye) recorded one century ago are still actively practiced today in the upper Reka Valley.

This seems to contradict what Bajazid Elmez Doda postulated in his ethnographic report about the possible disappearance of the Albanians and their cultural heritage in the upper Reka [22], where an important folk medical heritage, although dramatically eroded, is still occurring. Among the most uncommon plant uses, the most noteworthy is the continuation of the use of the young leaves of cultivated potatoes and of wild Rumex patientia as filling for home-made savory pies. To the best of our knowledge, the recording of a food use of aerial parts of potatoes is new in contemporary Europe and may be explained by the extreme poverty and scarcity of resources in this mountainous area, even in the context of the Western Balkans. A confirmation of this phenomenon is perhaps best illustrated by the migration trends from the upper Reka to Romania and Istanbul (mainly of young men), beginning in the 19th Century [22]. In another study conducted on the Albanian side of Mount Korab (unpublished data), elderly locals confirmed that the upper Reka villages on the (current day) Macedonian side of the mountain were well known to them even in the folk history for being extremely disadvantaged in terms of socio-economic conditions.

The linguistic features of the current ethnobotanical knowledge of the upper Reka Valley

In Table 1, the folk plant names that were recorded in the upper Reka Valley and which are also used by South Slavs are denoted by an asterisk. Approximately one-third of the recorded pythonyms are also used by the South Slavs, with some notable examples of Slavic etymology concerning culturally-important and very commonly used wild plants, such as Urtica dioica, Hypericum perforatum, and Primula veris, as well as most cultivated crops and some forest trees too.

Wild gentian vs. the white hellebore: a surprising cognitive “inversion”

In the study area, the linguistic labels of gentian (Gentiana lutea) and white hellebore (Veratrum album) are the same. Gentian is, in fact, locally named as wild (meaning here “looking-like”) white hellebore (shtarë). This contradicts what would be expected regarding the plant cognitive prototype, which generally is represented by the most culturally salient or mostly used folk species [45], which in the Balkans is surely gentian. Instead, here gentian has been largely gathered solely for trade in the
| Scientific taxon and family | Local folk name(s) | Ecological status or provenience | Part(s) used | Local use(s) | Folk name(s) and use(s) as recorded one century ago in the same area [22] |
|-----------------------------|--------------------|----------------------------------|--------------|--------------|---------------------------------------------------------------------|
| Abies alba Mill. and Picea abies (L.) H. Karst. (Pinaceae) | Bren | W | Resin (smol*) | MEDICINAL: topically applied to wounds, sometimes together with tobacco (as haemostatic) or on warts | Breh MEDICINAL: resin (smol*) as an ingredient of a home-made poultice (mehlem) - made also by adding wax, fat, and powdered pine wood – for treating wounds |
| | Klenje* | Klen* | Wood | HANDICRAFTS: diverse objects, among them, snow shoes | |
| Acacia pseudoplatanus L. (Faboideae) | Klenje* | Klen* | Bark | VETERINARY: decoction, in external washes for treating wounds in animals | |
| Acer pseudoplatanus L. (Faboideae) | Lule e bardhe* | Lule miu | Dried flowering aerial parts | MEDICINAL: tea, considered healthy for stomach-ache and liver problems; traded in the past | Pani |
| | Lule e bardhe' | Lule miu | Bark | VETERINARY: decoction, in external washes for treating wounds in animals | |
| Acer pseudoplatanus L. (Faboideae) | Lule e bardhe' | Lule miu | Dried flowering aerial parts | MEDICINAL: tea, considered healthy for stomach-ache and liver problems; traded in the past | Pani |
| | Lule e bardhe' | Lule miu | Bark | VETERINARY: decoction, in external washes for treating wounds in animals | |
| Allium cepa L. (Amaryllidaceae) | Qepa | C | Bulbs | FOOD: many culinary uses, including home-made savory pies called ndri, filled with buttermilk (dhallët) and diverse vegetables; MEDICINAL: compresses made with crushed onions and salt for treating bruises RITUAL: burned on the fire | Qep FOOD: filling for savory pies MEDICINAL: externally applied with salt on wounds |
| | Prash* | | Juice | MEDICINAL: instilled in the ear for treating ear-ache | Prasa |
| Allium porrum L. (Amaryllidaceae) | Prash* | | Fresh aerial parts | FOOD: filling for home-made savory pies (ndri) | |
| Allium sativum L. (Amaryllidaceae) | Hudra | C | Bulbs | FOOD: seasoning RITUAL: burned on the fire; the resulting strong odour was considered a repellent for werewolves; tied to cow horns as a protective amulet against evil-eye | Hudr |
| | Verri | W | Bark. | DYEING: the bark was boiled in the past; the resulting red decoction was used for dyeing in black | Verri |
| Alnus glutinosa (L.) Gaerth. (Betulaceae) | Llabot e egër | | Leaves | FODDER | |
| Amaranthus spp. (Chenopodiaceae) | Kakuda | W | Leaves | FODDER | |
| Artemisia absinthium L. (Asteraceae) | Laboda* | Labat* | Leaves | FOOD: most preferred filling for pies (ndri) | |
| | Laboda* | Labat* | Leaves | FOOD: most preferred filling for pies (ndri) | |
| Betula pendula Roth (Betulaceae) | Mustekna | W | Bark | MEDICINAL: burned; the vapours are exposed to the skin for treating skin inflammations HANDICRAFTS: brooms | Mushtekn |
Table 1 Folk names and uses of plants and fungi quoted in the current study, compared with those recorded one century ago in the same area (Continued)

| Plant Name                | Folk Name     | Use/Part          | Food                           | Medicinal                                      | Ritual                                      |
|---------------------------|---------------|-------------------|--------------------------------|-----------------------------------------------|---------------------------------------------|
| Boletus spp. (Boletaceae) | Këpurdha (Varganj*) | W Fresh fruiting body | FOOD: stored dried and sold to middle men; traditionally it was not consumed, nowadays is sometimes used in omelettes with eggs and cheese, or as a filling for savory pies |                                |                                             |
| Brassica oleracea L. (Brassicaceae) | Lakna | C Leaves | FOOD: in diverse preparations | Lakna FOOD: filling for savory pies; lactofermented, in sarma (sauerkraut leaves filled with rice and meat) or minced in salads |                                             |
| Calamintha officinalis Mill. (Lamiaceae) | W Fresh leaves | MEDICINAL: externally applied to treat toothache |                                             |                                             |                                             |
| Cantharellus cibarius Fr. (Cantharellaceae) | Këpurdha (Liščanka*) | W Fruiting body | FOOD: consumed fried with eggs and clarified butter |                                             |                                             |
| Capsicum annuum L. (Solanaceae) | Spec (sweet varieties) | C Dried fruits | FOOD: as a vegetable, fried; mixed with ricotta (gjizë) and consumed after a few weeks; ground, as one of the ingredients of the home-made seasoning mixture called piprik e shtupun, prepared by mixing ground red peppers, chilli, pumpkin seeds, corn flour, mint, and salt (traditionally consumed on boiled potatoes or warm bread) | Spec FOOD: ingredient of the spice mix piprik e shtupun (see above) |                                             |
| Carlinia acanthifolia All. (Asteraceae) | Thera Kaçani* | W Fresh flower receptacles | FOOD: consumed raw as snacks |                                             |                                             |
| Carpinus betulus L. (Betulaceae) | Dru kaprivë | W Wood | HANDICRAFTS: diverse agricultural tools, including sickles |                                             |                                             |
| Carpinus orientalis Mill. (Betulaceae) | Gaber* | W Bark | VETERINARY: decoction, in external washed on cuts |                                             |                                             |
| Cetraria islandica (L.) Ach. (Parmeliaceae) | Mishk | W Thallus | MEDICINAL: gathered and traded in the past |                                             |                                             |
| Chenopodium bonus-henricus L. (Amaranthaceae) | Çuen* | W Roots | FOOD: used in the past for making home-made halva* (Ottoman sweet prepared by gently stirring the decoction obtained by boiling these roots in water, with wheat and/or corn flour for one hour, and generally adding walnuts or raisins at the end, and letting it cool/solidify); the roots were also traded in the past | Çuen FOOD: home-made production of the sweet halva, made by cooking together roots, sugar syrup and powdered nuts - roots of çuen were erroneously identified by Doda as those of Saponaria spp. Upper Reka men were famous halva-sellers |                                             |
Table 1 Folk names and uses of plants and fungi quoted in the current study, compared with those recorded one century ago in the same area (Continued)

| Species                                      | Folk name | Part(s) | Use(s)                                                                 |
|----------------------------------------------|-----------|---------|------------------------------------------------------------------------|
| *Citrullus lanatus* (Thunb.) Mansf. (Cucurbitaceae) | Bostan Lubenice* | B | Fruit pulp FOOD/MEDICINAL: consumed raw, considered a means for cleansing the intestines |
| *Clematis vitalba* L. (Ranunculaceae)        | Kurpna Pofi* | W | Branches HANDICRAFTS: traditionally weaved in baskets used for bee-keeping |
| *Cornus mas* L. (Cornaceae)                  | Thona     | W | Fresh fruits FOOD: consumed raw; FOOD/MEDICINAL: syrups and distillate (raki thonë) considered healthy, esp. for treating fever |
| *Corylus avellana* L. (Betulaceae)           | Leithi    | W | Kernels FOOD: consumed raw as snacks.Leithi |
| *Crataegus monogyna* Jacq. var. *sericea* Dzekov (Rosaceae) | Murrisi | W | Dried flowers MEDICINAL: tea, as an anti-hypertensive Murrës geni RITUAL: child affected by measles was placed under a hawthorn plant and water was thrown on him/her |
| *Cornus sativus* L. (Cucurbitaceae)          | Kastraveca* | C | Fruits FOOD: consumed as snack and in syrups and jams |
| *Cucurbita maxima* Duchesne (Cucurbitaceae)   | Kungulla  | C | Fruits FOOD: filling for pies Kungull FOOD: filling for pies (ndri) |
| *Euphorbia* sp. (Euphorbiaceae)              | Lule gjarpi | W | Aerial parts OTHERS: crushed and used for fishing trout (pastërma) in the river (as a fish poison) Lishanj |
| *Fagus sylvatica* L. (Fagaceae)              | Ahu       | W | Fresh young leaves and kernels FOOD: consumed as a snack in the past Ah |
| *Fraxinus excelsior* L. (Oleaceae)           | Frashëri  | W | Wood FOOD: filling for pies HANDICRAFTS: for building flutes (kava) |
| *Fomes fomentarius* (L.) J. J. Kickx (Polyporaceae) | Eshka     | W | Dried fruiting body OTHERS: burned; the resulting smoke is used to keep away bees while gathering honey |
| *Prunus cerasus* L. (Rosaceae)               | Drethja   | W | Fruits FOOD: consumed raw Drethja |
| *Pieroni* et al. Journal of Ethnobiology and Ethnomedicine 2013, 9(2) http://www.ethnobiomed.com/content/9/1/22 | Pieroni | W | Roots MEDICINAL: largely gathered and traded in the past; use unknown Shatër e egër |
| Plant Species | Common Name(s) | Part Used | Uses |
|---------------|----------------|-----------|------|
| *Helleborus* spp. (Ranunculaceae) | Kukurek* | Roots | MEDICINAL: inserted in the horse’s breast for treating muscular blocks (horses not able to be ridden anymore) **Kukurek VETERINARY:** inserted into the nose to treat nasal congestion in horses |
| *Helichrysum plicatum* DC. (Asteraceae) | Lule për molca | Dried flowering tops | OTHERS: placed in the closets as a moth repellent |
| *Hordeum vulgare* L. (Poaceae) | Elb | Fruits | FOOD: consumed in the past in gruels with corn; FODDER for sheep |
| *Hyosciamus niger* L. (Solanaceae) | W | Dried flowers | MEDICINAL: burned and the smoke exposed to the mouth to treat toothache (in the past) |
| *Hypericum perforatum* L. (Hypericaceae) | Katrion* | Dried flowering tops | MEDICINAL: tea, for treating kidney stones, colds, stomach-ache, rheumatism (used every day for at least a few months) or simply drunk as a “healthy” beverage; topically applied for treating wounds |
| **Fresh flowering tops** | | | MEDICINAL: Macerate in oil (obtained by exposing it in the sun for several weeks) or prepare as a tea externally applied for treating skin burns, cuts, or other skin inflammations |
| *Juglans regia* L. (Juglandaceae) | Arra | Kernels | FOOD: used for cakes; a specific pie (*ndri*) was prepared with walnuts and lamb meat, and consumed on feast days |
| **Unripe fruits** | | | FOOD/MEDICINAL: dipped in honey (and eventually lemon juice), the resulting preserve is considered healthy against tuberculosis and bronchitis |
| *Juniperus communis* L. (Cupressaceae) | Dëllinia | Galbules | FOOD: seasoning; MEDICINAL: tea, for treating cough, rheumatism and “good for the blood”; largely gathered and sold, especially in the past |
| **Dried bark** | | | OTHERS: smoked as a tobacco substitute |
| *Lactuca sativa* L. (Asteraceae) | Marolla* | Fresh leaves | FOOD: salads |
| *Lycopersicon esculentum* Mill. (Solanaceae) | Patlichan* | Fresh fruits | FOOD |
| *Malus domestica* Borkh. (Rosaceae) | Molla | Fruits | FOOD/MEDICINAL: traditionally consumed raw, or roasted, or in pies or jams; the fruits of the most acidic landraces were used for producing home-made vinegar (adding water and letting ferment for 40 days) - this vinegar is considered healthy for treating hypertension |
| **Fruits—Raki** | | | MEDICINAL: drunk as a stimulant (anti-lethargic) |
| Species                                      | Common Name | Type | Use 1 | Use 2 |
|----------------------------------------------|-------------|------|-------|-------|
| *Matricaria recutita* L. (Asteraceae)         | Kamomila    | W    | Dried flowering aerial parts | MEDICINAL: tea for treating toothache, stomach-ache and belly pains (esp. in babies) |
| *Medicago sativa* L. (Fabaceae)              | Jumhe       | C    | Aerial parts | FODDER |
| *Melissa officinalis* L. (Lamiaceae)          | Milc        | W    | Fresh flowers | HONEY PLANT: considered the best honey plant |
| *Mentha longifolia* (L.) Huds. (Lamiaceae)    | Nagjas i eçër | W   | Dried flowering tops | MEDICINAL: tea, as a stimulant (considered poisonous if drunk in large amounts) |
| *Mentha spicata* L. (Lamiaceae)               | Nane        | W and C | Dried leaves | FOOD: ground, used as an ingredient of the seasoning mix piprik e shtupun (see *Capsicum annuum*) |
| *Nicotiana tabacum* L. (Solanaceae)           | Duhan*      | B    | Dried crashed leaves | VETERINARY: externally applied on wounds or skin problems in sheep |
|                                               | Tutun*      |      |       | MEDICINAL: external applications for treating wounds (mixed with honey) |
| *Orchis* spp. (Orchidaceae)                   | Salep*      | W    | Dried tubers | MEDICINAL: ground, and then mixed with milk and dried again; the resulting powder is used in teas, as a “healthy” beverage (rarely macerated in plum distillate and drunk as a medicine); in the past largely gathered and sold |
|                                               |             |      |       | Broçka Salep FOOD: powdered orchid tubers were stirred with warm water and sugar; many young men from the upper Reka left their homes to work as salep, bosa and halva sellers in Skopje, Istanbul, Romania, and Bulgaria |
| *Oreganum vulgare* L. (Lamiaceae)             | Çaj*         | W    | Dried flowering aerial parts | MEDICINAL: tea for treating sore throat, cough, heart problems, intestinal discomforts, or as a recreational beverage |
|                                               | Çaj i malit* |      |       | |
|                                               | Çaj i livadhi* |      |       | |
| *Petasites hybridus* (L.) Gaertn. (Asteraceae) | Kakuda Lapua | W    | Leaves | FODDER |
| *Phaseolus vulgaris* L. (Fabaceae)            | Grosha*     | C    | Dried seeds | FOOD: soups |
|                                               |             | (brown and white landraces) | Grosh FOOD: boiled, generally cooked together fresh or dried meat, adding bone marrow (galgo) |
| *Pisum sativum* L. (Fabaceae)                 | Grashaka*   | C    | Seeds | FOOD: cooked with meat or potatoes |
|                                               |             |      |       | Nahut |
| *Plantago major* L. (Plantaginaceae)          | Lule deli   | W    | Leaves | MEDICINAL: tea, for treating kidney stones; externally applied for treating cuts |
|                                               |             |      |       | Bajsh deli MEDICINAL: external applications of leaves and roots for treating furuncles |
| *Primula veris* L. (Primulaceae)              | Gornicfet*  | W    | Flowers | MEDICINAL: sold and traded in the past – use unknown |
| *Prunus avium* L. (Rosaceae)                  | Shunshia     | SD   | Fresh fruits | FOOD: consumed raw, syrups |
|                                               |             |      |       | Qershi |
| *Prunus cerasus* L. (Rosaceae)                | Vrishija*   | SD   | Fruits | FOOD: consumed raw, or dried, or in syrups |
|                                               |             |      |       | Vishnija |
|                                               | Resin (smoil*) |      |       | MEDICINAL: externally applied on skin inflammations |
| *Prunus cerasus* L. var. marasca* (Host.) Viv. (Rosaceae) | Shunshia e eçër | SD | Fruits | FOOD: consumed raw or dried, or in syrups |
| Plant Species | Folk Name | Common Name | Description | Uses |
|---------------|-----------|-------------|-------------|------|
| Prunus domestica L. (Rosaceae) | Kumbulla | Gjagalka | SD (many diverse landraces, with yellow, red, and black fruits) | FOOD: consumed raw or dried; cooked with sugar and dried, and consumed as candies; hoshaf* – thickened fruit juice preserve; it is diluted with water (and eventually sugar) and drunk |
| | | | Fruits | MEDICINAL: instilled in the ear for treating earaches; drunk as a “healthy” beverage for the heart (rare) or to counteract tiredness; externally applied as a disinfectant for wounds |
| | Kumla | | | MEDICINAL: distillate externally applied on bullet wounds |
| Pyrus communis L. (Rosaceae) | Dardha | | W | FOOD: consumed raw |
| | | | | Dardha |
| Rhamnus alpina L. (Rhamnaceae) | Bagrem* | | W | FOOD: consumed as snacks |
| Robinia pseudoacacia L. (Fabaceae) | Bagrem* | | W | FOOD: consumed as snacks |
| Rosa canina L. (s.l.) (Rosaceae) | Kaça | Shipinka* | W | FOOD: jams |
| Rubus idaeus L. (Rosaceae) | Medra | Mjedra | Malina* | FOOD/MEDICINAL: consumed raw; syrup (sok*) and hoshaf* (dense thickened juice, diluted with water and drunk) are considered healthy |
| | | | | MEDICINAL: tea, for treating cold, fever, cough |
| Rubus schleicheri Weihe ex Tratt. and other Rubus spp. (Rosaceae) | Manaferra | | W | FOOD: consumed raw; jams |
| Salix alba L. and other Salix spp. (Salicaceae) | Shelçe | | | HANDICRAFTS: weaved in diverse kinds of baskets (kosh*) |
| Salix verticillata L. (Lamiaceae) | Gammash | | W | FOOD: filling for pie (peta) |
| | | | | MEDICINAL: steam baths for treating rheumatisms |
| Sambucus ebulus L. (Adoxaceae) | Basdalina* | Shhtog | Shtog i egër | FOOD: filling for pie (peta) |
| Sambucus nigra L. (Adoxaceae) | Shtog | | W | MEDICINAL: topically applied against snake bites |

* = Local name
Table 1 Folk names and uses of plants and fungi quoted in the current study, compared with those recorded one century ago in the same area (Continued)

| Plant/Species | Folk Name | Gender | Uses                                                                 | Table 2 |
|---------------|-----------|--------|----------------------------------------------------------------------|---------|
| Satureja montana L. (Lamiaceae) | Lis | W | Fresh fruits FOOD: syrups and jams FOOD: Handicrafts: for building spindles* | Thekna FOOD: kurkurama - gruel made by rye, corn, wheat and beans |
| Secale cereale L. (Poaceae) | Thekna | C | Fruits FOOD: syrups and jams FOOD: roasted, as a coffee substitute* | Thekn FOOD: kurkurama - gruel made by rye, corn, wheat and beans |
| Thekn | | | | |
| Dried fruits (grounded) → Flour | | | FOOD: in the past used for baking sourdough bread (bukë çerepi) - prepared adding dhallët (buttermilk) and fermenting 2–3 days - and also for pies | FOOD: buk thekninta – sourdough bread; buk e persiet – sourdough bread made by mixing rye, wheat, and corn flours |
| Dried aerial parts (straw) | HANDICRAFTS: filling for horse saddles, pillows and mattresses | – |
| Sideritis spp. (Lamiaceae) | Çaj malit | B (brought from the town pazar / market, presumably gathered from mountainous areas nearby) | Dried flowering aerial parts | MEDICINAL: tea for treating cold |
| Solanum tuberosum L. (Solanaceae) | Repa* | C | Tubers FOOD: traditionally consumed boiled with pipik e shrupun (see Capsicum annuum); fried, or roasted | Kampire |
| Syringa vulgaris L. (Oleaceae) | Ergovan* | C | Flowers ORNAMENTAL | Ergovan |
| Tanacetum vulgare L. (Asteraceae) | Vratik* | W | Dried flowering tops | MEDICINAL: tea, as a digestive; in the past, the decoctions were externally used for washing children affected by rubella or persons affected by hepatitis* – for this last use sometimes the decoction was also drunk VETERINARY: considered poisonous for calves OTHERS: placed in closets as a moth repellent |
| Taraxacum officinale Weber (Asteraceae) | Bastë e egër | W | Fresh leaves | FOOD: eaten in spring salads |
| Plant Name                              | Folk Names and Uses |
|----------------------------------------|---------------------|
| *Thymus serpyllum* L. (Lamiaceae)       | Lis Majčina dushnica* |
|                                        | Aerial parts MEDICINAL: tea, for treating cold and cough |
|                                        | Fresh flowers HONEY PLANT |
| *Tilia cordata* Mill. (Malvaceae)       | Lipo*               |
|                                        | Dried inflorescences MEDICINAL: tea, for treating colds Blini |
|                                        | Fresh flowers HONEY PLANT |
|                                        | Resin (smol*) MEDICINAL: externally applied to skin inflammations |
| *Trifolium* spp. (Fabaceae)             | Detelina*           |
|                                        | Fresh flowers HONEY PLANT; Trfonj |
|                                        | FOOD: for cows, it is considered a galactagogue (promoting milk production) |
| *Trigonella foenum-graecum* L. (Fabaceae)| Gruni piprikes      |
|                                        | Dried aerial parts FOOD: as an ingredient of the seasoning mix piprik e sh tupun (see *Capsicum annuum*) |
| *Triticum aestivum* L. (Poaceae)        | Grur                |
|                                        | Fruits FOOD Gruni FOOD: kukurama - gruel made by rye, corn, wheat and beans |
|                                        | Fruits (ground)→Flour FOOD: bread and pies |
|                                        | FOOD: buk e ngeshun – leavened bread; buk grunit – sourdough bread; buk e perset – bread obtained mixing corn, rye, and wheat flours peçiv - kind of crusty bread, with a buttered inner part fli - a kind of crusty bread, made by several alternate layers of dough and butter, each layer is baked in sequence; koleç - bread made by diverse little bread units; ndurđhi - like fli, but with thicker layers, which are broken and finally dipped with melted butter bosa – a lacto-fermented beverage made with wheat flour, mixed with millet flour (or maize flour), which was boiled in water approx. 12 hrs.; the resulting mass was then knitted by hands and, after the adding of yeast, kept overnight, until it was dissolved in water; in the upper Reka, young men used to migrate to town as bosa producers and vendors in the Ottoman Empire |
| *Vaccinium myrtillus* L. (Ericaceae)    | Shunshia tê egra Bazuk Borovnica* |
|                                        | Fresh fruits FOOD/MEDICINAL: consumed raw, and sometimes believed to be “healthy for the blood”; syrups and jams; the fresh fruits are nowadays gathered in the summertime in large amounts and sold to middle men from Gostivar Qyrshiat t egra |
|                                        | Dried leaves MEDICINAL: tea, used for heart problems |
| *Veratrum album* L. (Melanthiaceae)    | Shtarë              |
|                                        | Roots VETERINARY: decoctions, in external washes for treating lice in animals; root inserted in the horse’s breast for treating muscular blocks (horses can’t be ridden anymore) Shtar VETERINARY: decoction of the roots was used for treating scabies in sheep |
| Plant/Species | Folk Names | Uses |
|--------------|------------|------|
| *Verbascum thapsus* L. (Scrophulariaceae) | **Stems** | VETERINARY: considered poisonous if animals consume in large amounts (foaming at the mouth) |
| | **Fresh leaves** | VETERINARY: consuming large amounts of the leaves of the same plant was considered poisonous in sheep (foaming at the mouth), even very rarely lethal |
| **Dried leaves** | OTHERS: smoked as tobacco substitute |
| **Bubujak** | **Brusla** | **Fresh leaves** |
| **Kôpriva*** | **Urîca dioica** L. (Urticaceae) | **Stems** |
| | **Medicinal**: externally as a haemostatic |
| | **Others**: used for covering butter, peppers with ricotta cheese, or lacto-fermented vegetables |
| **Kôpriva** | **Roots** |
| **Çenk Kolomoç Barsak** | **C (white and yellow landraces)** | **Fruits** |
| **Mçenk Kalamoç** | **Food/Medicinal**: consumed boiled (also in the past mixed with sorrel and potato leaves) or in soups, or as filling for savory pies – consumption of nettle is considered healthy as a “blood depurative” |
| **Kôpriva** | **Medicinal**: decoctions are considered able to treat cancer and especially to relieve liver problems (decoction of the leaves and roots together) |
| **Zea mays** L. (Poaceae) | **Çenk Kolomoç Barsak** | **Food**: kukurama - gruel made by rye, corn, wheat and beans |
| | **Kalamoç** | **Food**: buk kolomoçit – bread (traditionally leavened with buttermilk [dhallët]); ingredient of the seasoning mix bagdrar - polenta obtained boiling the flour for at least one hour on the fire, generally served with buttermilk (dhallët), or clarified butter (tylnë) or yogurt (kos) - esp. ewe yogurt (kos delje); alternatively, polenta is served with beans or potato soup; pies (peta), filled with various vegetables |
| | **Mçenk Kolomoç** | **Food**: buk mçenkut – bread; buk pervlue – sourdough bread; pershenik - leavened bread; pershesh - pershenik dipped in buttermilk (dhallët) or yogurt (kos); mçenka (like kukurama, but prepared with corn only); bagdrar or kaçamak me tylnë - polenta served with clarified butter |
| | **Barsak** | **Fodder** |
| | **Pershesh** | **Ritual**: corn flour was brought to the Islamic spiritual guide (hoxha), who “wrote” something with this; this was considered essential for treating the evil eye of a member of the family |
| | **Pershenik** | **Food**: buk kolomoçit; ingredient of the seasoning mix bagdrar - polenta obtained boiling the flour for at least one hour on the fire, generally served with buttermilk (dhallët), or clarified butter (tylnë) or yogurt (kos) - esp. ewe yogurt (kos delje); alternatively, polenta is served with beans or potato soup; pies (peta), filled with various vegetables |
| | **Bagdrar** | **Ritual**: corn flour was brought to the Islamic spiritual guide (hoxha), who “wrote” something with this; this was considered essential for treating the evil eye of a member of the family |
| | **Mçenka** | **Food**: kukurama - gruel made by rye, corn, wheat and beans |
| | **Bagdrar or kaçamak me tylnë** | **Food**: buk kolomoçit – bread (traditionally leavened with buttermilk [dhallët]); ingredient of the seasoning mix bagdrar - polenta obtained boiling the flour for at least one hour on the fire, generally served with buttermilk (dhallët), or clarified butter (tylnë) or yogurt (kos) - esp. ewe yogurt (kos delje); alternatively, polenta is served with beans or potato soup; pies (peta), filled with various vegetables |
| | **Pershesh** | **Ritual**: corn flour was brought to the Islamic spiritual guide (hoxha), who “wrote” something with this; this was considered essential for treating the evil eye of a member of the family |
| | **Pershenik** | **Food**: buk kolomoçit; ingredient of the seasoning mix bagdrar - polenta obtained boiling the flour for at least one hour on the fire, generally served with buttermilk (dhallët), or clarified butter (tylnë) or yogurt (kos) - esp. ewe yogurt (kos delje); alternatively, polenta is served with beans or potato soup; pies (peta), filled with various vegetables |
| | **Bagdrar or kaçamak me tylnë** | **Food**: buk kolomoçit – bread (traditionally leavened with buttermilk [dhallët]); ingredient of the seasoning mix bagdrar - polenta obtained boiling the flour for at least one hour on the fire, generally served with buttermilk (dhallët), or clarified butter (tylnë) or yogurt (kos) - esp. ewe yogurt (kos delje); alternatively, polenta is served with beans or potato soup; pies (peta), filled with various vegetables |
| Various tree species | W | Wood (burned) → Charcoal | MEDICINAL: used in the past in the ritual healing of the evil-eye: three pieces of hot coals were put in cold water; with the resulting water child face was washed (generally it has to be done by the first-born for his/her brothers/sisters; the first-born has to be treated by a neighbour) and the same water had to be drunk by the child or animal; depending on how the coal was dipped into water, this was also used for the diagnosis of the evil-eye – sometimes the water was given to the child in three spoons, which were then thrown behind the back; depending on how the spoons fell on the ground, the occurrence of the evil-eye was confirmed |
|--------------------|---|--------------------------|-------------------------------------------------|
| Not identified      |   | Ferra magjara            | Leavese FODDER: for washing clothes               |
| Not identified      |   | Kulosgjarpi              | Fresh flowers VETERINARY: applied externally against snake bites in horses |
| Not identified      |   | Morava*                  | Leaves FOOD: filling for savory pies              |

* Recorded local phytonyms, names of plant parts or plant preparations, which have been recorded also among South Slavs (even if the etymology may not be always Slavic; according to [22,34-44]): B: bought; C: cultivated; SD: semi-domesticated (not cultivated), but in some way “managed”; W: wild.
past and partially today, however a local use of gentian is unknown. Vice-versa, the use of hellebore in local ethnoveterinary practices may be very ancient; it was used mainly as external/topical agent for treating lice in diverse animals and especially for healing horses (roots were inserted into the musculature of the horse breast). This perhaps suggests that the gathering of *Veratrum album* in the Albanian mountains preceded the gathering of gentian, which could have been introduced by “external” factors: other cultures, such as the contiguous Slav ones, where the folk uses of gentian are widespread [1,4-7], or by the demands of urban markets.

**Cross-cultural comparison**

Figure 2 shows that a relevant portion of the medicinal plant taxa recorded and used in the upper Reka Valley are also part of the folk medical heritage of surrounding Balkan regions, where other field ethnobotanical surveys have been recently conducted (Figure 3).

![Figure 2 Percentage of the wild medicinal plant taxa recorded and locally used in the upper Reka, which have also been recorded as used in field ethnobotanical studies conducted in other areas of Western Balkans (Figure 3).](image)

**Figure 3 Location of the Western Balkan areas, where the ethnobotanical studies used for the comparative analysis have been recently conducted.**

- KEL=Kelmend, Northern Albania
- GOL=Gollak, Kosovo
- PES=Pešter plateau, SW Serbia
- REK=upper Reka Valley (present study)
- KSA=Albanian Alps, Kosovo
- SHA=Sharr Mountains, Western Macedonia
- THE=Theth, Northern Albania
| Product (local name) | Local use |
|---------------------|-----------|
| Animal rennet (stomach of very young animals) *(sirisht)* | Used for producing cheese, but also as a starter for making yogurt, anti-diarrheal |
| Ants | Used in the past as a rennet substitute |
| Bear’s fat | Used externally for treating rheumatism |
| Beer | One glass of beer, drunk, is considered healthy for the kidney |
| Black piece of cloth | Tied onto cow’s neck or horns, as a protective amulet against evil eye |
| Bullet | Attached to clothes and worn as a protective amulet against evil eye |
| Buttermilk *(dhallët)* | Drunk as a post-partum reconstituent or for treating intestinal troubles and hypertension; used as starter for producing home-made yogurt |
| Chicken | Cooked for a long time, until obtaining a gelatinous material, which is further cooked together with onions, corn flour and vinegar to create home-made soap |
| Clarified butter *(tlynë)* | Drunk for treating hypotension |
| Clothes dressed on the wrong side | Protective amulet against evil eye |
| Coffee powder | Spoonful is ingested for treating hypotension; decoction (“Turkish coffee”) for hypotension; externally applied to cuts |
| Copper sulphate | Used externally for healing lameness in sheep |
| Cow’s milk | Drunk in cases of constipation |
| Cut | Cutting the ewe’s ear and letting blood coming out was considered an effective method for treating several sheep diseases |
| Dried sheep and cow’s faeces | Burned, the resulting smoke keeps the bees away while taking honey |
| Goat’s milk | Applied (warm) into the ear against earache |
| Gunpowder *(barut)* | Its odour is exposed to the nose of sleepwalkers, in order to bring them back to consciousness; odour was also considered a repellent for werewolves |
| Hare’s meat | If consumed, believed to inhibit fertility |
| Honey *(mjalt)* | Consumed for improving blood circulation or as a post-partum reconstituent; ingested for treating sore throats |
| Knife | A knife placed under the pillow is considered preventive for sleepwalking |
| Leech | Applied externally for “sucking the bad blood” |
| Lemon | Drunk to treat hypertension; sometimes used in the past as rennet for making cheese |
| Match’s head | Topically applied for treating toothaches |
| Mother’s milk | Instilled in the ear for treating inflammations/earache |
| Mud | Applied onto bee stings for pain relief |
| Oil | Ingested to treat constipation |
| Pork fat | Externally used on burns |
| Propolis | Tea or macerate in raki used for treating cough/respiratory problems and intestinal discomforts (all of which are considered “new” uses) |
| Ricotta cheese *(gjizë)* | Consumed, is considered “good for the blood” |
| Royal gelly | Consumed for improving mental faculties (“new” use) |
| Salt | Brought to the Islamic spiritual guide *(hoxha)*, who “wrote something” with this; this was considered essential for treating the evil eye of a member of the family; mixed with water, and the resulting solution instilled in the ear or eye for treating inflammations; mixed with hot water in external baths for treating chilblains; applied topically for treating toothache |
| Soap | A small piece inserted in the anus, as a purgative |
| Snow | Applied on the feet for relieving arthritic pains |
| Starch | Ingested for treating diarrhoea |
| Stone | Pressed on skin zone affected by the bee bite, in order to relieve the pain |
| Sugar | Externally applied to cuts; mixed with water *(sherbet)* for treating stomach-ache; burned and ingested considered a medicine for sore throats |
| Tobacco | Haemostatic |
This is especially true in those areas where the Albanian population was historically in extensive contact with the South-Slavic cultures, such as the Gollak area in eastern Kosovo [9], the Pešter plateau in south-western Serbia [1] and the Sharr Mountain (Šar Planina in Macedonian) in western Macedonia [29] (Figure 3). This may confirm the findings of both our linguistic analysis on the folk plant names carried out in Table 1 and also Franz Nopcsa’s ethnolinguistic analysis of the terms referring to the material culture in upper Reka [22], which showed very important loans from the Romanian and especially Slavic languages. It can thus be postulated that the upper Reka Albanians had been heavily influenced by the Slavic culture - and not vice-versa, as Spiridon Gopčević stated [23].

Study participants confirmed that over recent decades their most important markets and “exchange” centres have been the multi-ethnic (Macedonian, Albanian, and Turk) towns of Gostivar in Western Macedonia and Prizren, in Southern Kosovo. Moreover, it must also be noted that over the span of the last century, the Albanians of the upper Reka lived outside of the borders of the Albanian state (founded in 1912), and for the major part of this period within the former Socialist Republic of Macedonia within Yugoslavia, where the dominant culture and languages have been Macedonian and Serbo-Croatian. In other words, the remarkable “interference” of the Slavic cultures found within the domain of Albanian traditional plant knowledge of the upper Reka represents a unique phenomenon, which nowadays is not easy to trace back in detail. This could be due to the difficulty faced in establishing to which degree the Slavic culture influenced the traditional knowledge among Albanians in the upper Reka, considering the role that ancient “hybridisations” may have played, as both Gopčević and Nopcsa, although in a different way, have underlined in their respective works.

Moreover, as well analysed by Fredrick Barth more than four decades ago [46], cultural contacts and boundaries among ethnic groups may be very complex and subject to dynamic change, since they respond to very unique societal and historical circumstances. It could be interesting to follow the future development of local perceptions of nature among the last remaining Albanians of the upper Reka and the strategies that they will adopt through processes of further negotiation of their identities within the rest of the population in Western Macedonia and the whole country.

**Other domestic remedies**

Table 2 reports other domestic and medicinal remedies recorded in the area, which are not based on indigenous plants; a large portion of these remedies survives only in the memories of the interviewees.

**Conclusions**

The very few last remaining Albanians living on the Macedonian side of Mount Korab of the upper Reka still retain a remarkable level of local knowledge concerning botanicals; this knowledge is however eroded, especially in quantitative terms, due the very tiny population, who have decided to remain in the region despite the influence of economic hardships. The hybrid “Albanian-Slav” cultural features of the local inhabitants, which have been largely discussed and disputed in Balkanological studies, could be confirmed in our ethnobotanical surveys, since both local plant names and especially a significant portion of the recorded plant uses share common features with other Slavic and culturally mixed areas of the Western Balkans. The multi-faceted knowledge recorded here could represent a crucial added value for the local managers of the Mavrovo National Park and also for further fostering new forms of eco-tourism, which must be sensitive not only to local biodiversity, but also to the multi-cultural dimension of a historically complex area like the upper Reka.

**Competing interests**

The authors declare that they have no competing interests.

**Authors’ contributions**

AP designed the research and conducted the historical and field studies; BR assisted in the field study; AN, VK, and HA contributed to the ethnolinguistic and cross-cultural comparative analysis of the data; AN, HA, SM, and KC contributed to the preparation of the manuscript.

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**Table 2 Food, medicinal, and other domestic uses of non-indigenous plants, and animal, mineral, and industrial products quoted in the study area (Continued)**

| Product                  | Use                                                                 |
|-------------------------|----------------------------------------------------------------------|
| Vinegar from honey       | Used as rennet; Externally applied on the chest for treating bronchitis; applied on the belly of babies when crying or colicky |
| Yogurt (kos)             | Post-partum reconstituent                                           |
| Water                    | Drunk against high blood pressure; Fumigations of hot water (eventually heated by previously heated stone) for treating cold |
| Whey (hirno)             | Drunk as a diuretic, or against hypertension, or "to decrease fats in the blood" |
| Wool                    | Raw sheep wool externally applied for treating bruises              |

# remembered, but nowadays disappeared use(s).
analysed the botanical taxonomic part of the data; AP and CLQ drafted the overall scientific discussion. All authors read and approved the final manuscript.

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