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Medicinal plants in the Tri ushi Mountain Ridge (Western Bulgaria)

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Abstract: *Tri ushi is a mountain Ridge located in the Western Stara Planina Mountains (Western Bulgaria). A study of medicinal plants of this part of the Stara Planina Mts is being done for the first time. During the research conducted in 2024 on the territory of the Tri ushi Mountain Ridge, we identified 209 species of medicinal plants, which belong to 161 genera and 51 families. This represents 24.73% of the species, 36.26% of the genera and 43.22% of the families of medicinal plants in Bulgaria. Among the life forms, the most widespread are hemicryptophytes (46.89%). Among the biological types, perennial herbaceous plants prevail (56.46%). The described medicinal plants belong to 30 floral elements. Two species of Balkan endemics and 19 relict species were identified, of which 18 species are Tertiary relicts and one species is a Quaternary relict. The species with conservation status are 14 in number (6.70%). Anthropophytes are 149 species (71.29%). On the territory of the Tri ushi Mountain Ridge, we identified 5 invasive alien plant species (2.39% of medicinal plants), one of which is among the most dangerous invasive alien species threatening biodiversity in Europe. Poisonous plants and species causing side effects upon physical contact with them or their components were identified. The results obtained were compared with the data on medicinal plants on the Chepan Mountain. Both territories are located within the boundaries of BG0000322 Dragoman - a protected area of the Natura 2000 European ecological network.*

Keywords: analysis, endemics, protected species, relicts, anthropophytes, poisonous plant

Introduction

The Tri ushi Mountain Ridge is part of a larger system of elevations in the Western Stara Planina Mountains (Western Bulgaria). It is located 38 km northwest of the city of Sofia, which is the capital of Bulgaria and it is close to the border with the neighboring country of Serbia. It is composed of the heights Tri Ushi, Meka Tsrev and Leshta. The highest point is Chavchi Kamak peak (897.6 m above sea level), which is located on the

Tri Ushi Height, located in the western part of the Ridge, about 2 km southeast of the town of Dragoman. The Ridge of the peak is sharp and jagged, and its slopes are steep, heavily karstified and deforested [1]. The territory of the Ridge is located in 2 quadrants of the UTM network of Bulgaria: FN55 and FN56 (Fig. 1). The figure also presents the geographical position of the Chepan Mountain, located to the north, which will be used for comparison.

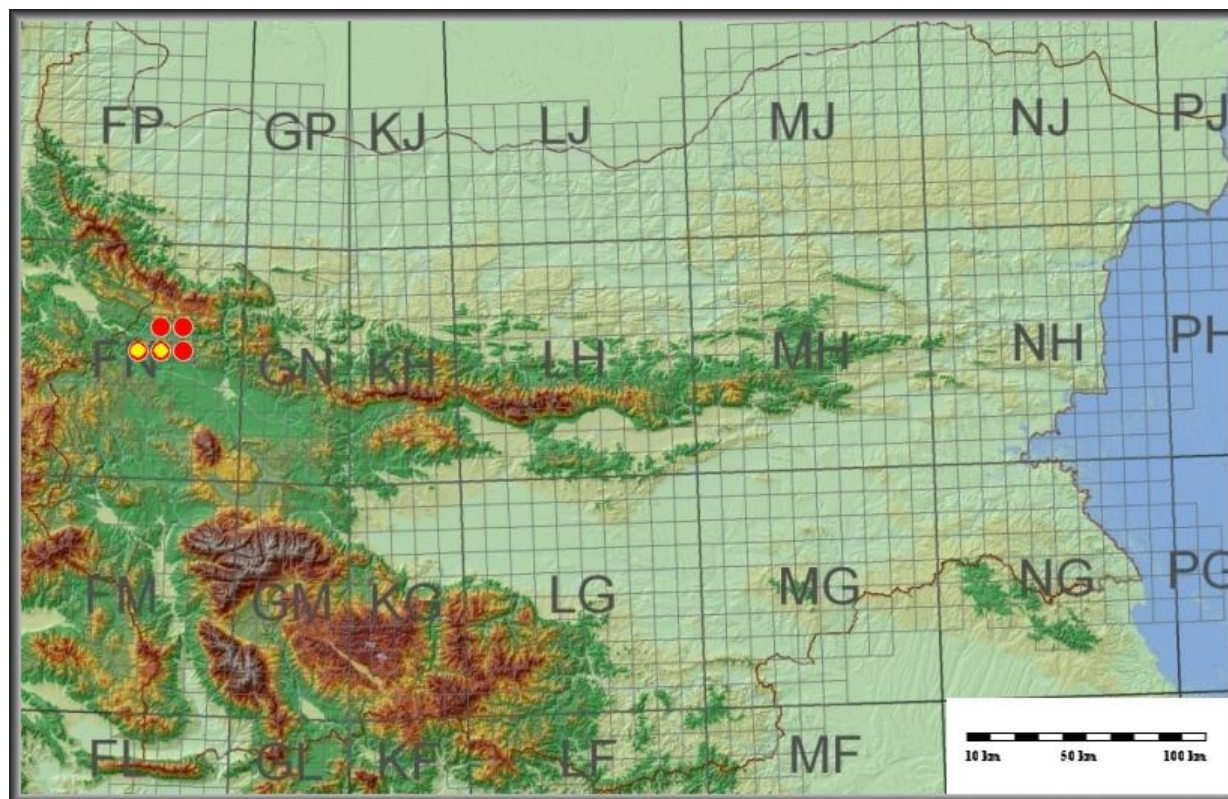


Fig. 1. Geographical location of the Tri ushi Mountain Ridge (yellow marking) and the Chepan Mt (red marking)

The bedrock in almost the entire area of the mountain Ridge is made up of aphanitic, nodular and massive organogenic limestones. In the northwestern and southwestern parts, the geological base consists of stones, pebbles, sand, and in the southwestern there are conglomerates of breccia, sandstones, siltstones, shales, sands, clays and coal. The soils are diverse, as in the eastern and southwestern parts of the studied area there are leached chernozem-tar soils, which are clayey; in the northern half there are leached cinnamon forest soils, which are heavily sandy-clayey; in the central and southeastern parts of the Ridge there are rendzins (humus-carbonate), which are sandy-clayey, and in the southeastern part the soils are meadow-chernozem-like (marshy), which are heavily sandy-clayey to slightly clayey.

There is almost no surface water within the study area. Winter is cold and relatively poor in precipitation. The amount of precipitation is lowest in winter: from 115 to 130 mm. The snow cover lasts for a total of 50-80 days in winter. Spring in the region comes late - only towards the end of March or the beginning of April does the average temperature remain consistently above 5°C. Precipitation in spring significantly exceeds winter and is between 150 and 185 mm. Summer is relatively cool - the average temperature in July is 17-20°C, and maximum temperatures do not exceed 32-34°C. The summer precipitation is the highest - on average between 180 and 220 mm, and in autumn it decreases and is between 140 and 170 mm. The winds are almost constant, with their main direction being east-west [2, 3].

In floristic terms, the studied area belongs to the Znepolski floristic region [4]. The vegetation is poor and includes two forest communities, two grassland communities and one type of agricultural areas in place of forests [5].

The medicinal plants in the of Tri ushi Mountain Ridge have not been studied so far. Based on the data obtained from the inventory, we prepared an analysis and compared the results with the data on the medicinal plants in the Chepan Mt located north of the study site. Both territories are located within the boundaries of BG0000322 Dragoman - a protected area of the Natura 2000 European ecological network.

Materials and Methods

The study of medicinal plants in the Tri ushi Mountain Ridge was conducted using the route method in 2024. The medicinal plants were determined according to the application of the Medicinal Plants Act of the Republic of Bulgaria [6] and the list of medicinal plants in Bulgaria according to Zahariev [7].

In determining the species, the following were used: Handbook for Plants in Bulgaria [8], Flora of the People's Republic of Bulgaria, Volumes from 1 to 9 [9-16], and Flora of the Republic of Bulgaria, Volumes 10 and 11 [17-18]. In compiling the alphabetical index of Bulgarian and Latin names, the Determinant of local and foreign higher plants in Bulgaria was used [19]. Families are represented according to Angiosperm Phylogeny Group IV [20].

Life forms are represented according to the Raunkiaer system [21]. The biological types are according to Delipavlov et al. [8]. The floral elements and endemics are according to Asyov et al. [22]. The relict species are according to Zahariev [23].

The conservation status is presented using the following documents: Council Directive 92/43/EEC of the European Community on the conservation of natural habitats and of wild flora and fauna [24], Convention on the conservation of wild European flora and fauna and of natural habitats (Bern Convention) [25], Convention on International Trade in Endangered Species of Wild Fauna and Flora [26], Red List of Bulgarian Higher Plants [27], Red Book of the Republic of Bulgaria, Volume 1. Plants and Fungi [28], Biological Diversity Act of the

Republic of Bulgaria [29]. The species included in Order No. RD-99/09.02.2024 on the special regime for the protection and use of medicinal plants in 2024 are described [30]. Endemics were identified according to Asyov et al. [22].

Poisonous plants are according to Bernhard-Smith [31], Hiller and Bickerich [32], and Wagstaff [33]. Plants causing side effects upon contact with them are, according to Rycroft et al. [34] and Tampion [35]. Anthropophytes were defined according to Stefanov & Kitanov [36], and invasive alien plant species were identified according to Petrova et al. [37].

The floristic analysis was compared with the data on the medicinal plants of the Chepan Mt [38].

Results and Discussion

As a result of the fieldwork conducted on the Tri ushi Mountain Ridge, we identified 209 species of medicinal plants, which belong to 161 genera and 51 families. A list of the identified species of medicinal plants is presented in the Appendix. This represents 24.73% of the species, 36.26% of the genera and 43.22% of the families of medicinal plants in Bulgaria. The number of medicinal plants is smaller compared to the Chepan Mt, where 344 species have been described [38].

The majority of the families to which medicinal plants belong – 44 in number (86.27%) are represented by 1-4 genera. Only 7 of the families (13.73%) are represented by 5 or more genera. The families with the most genera are: Ateraceae (21 genera), Lamiaceae (17 genera), Rosaceae (13 genera), Fabaceae (10 genera), Apiaceae (8 genera), and Ranunculaceae (7 genera). Most families – 41 in number (80.39%) have from 1 to 4 species. Only 10 (19.61%) of the families are represented by 5 or more species. The following families with the most species are: Asteraceae (28 species), Lamiaceae (28 species), Rosaceae (22 species), and Fabaceae (15 species). Compared to the Chepan Mt, the percentage of medicinal plant families with the most genera and species is higher, but the difference is not large: by 1.09% in the families with the most genera and 2.37% in the families with the most species.

Almost all families are represented with 1-4 species. Most of the genera - 150 in number (93.17%) have one or two species. Only one of the genera (0.62%) is represented by 5 species. This is the genus *Prunus* L. from the Rosaceae family. The percentage of the genera of medicinal plants with the most species is lower than the Chepan Mt, where it is 2.11% [38].

The medicinal plants on the territory of the Tri ushi Mountain Ridge are represented by all groups of life forms (Fig. 2). The hemicryptophytes are the most numerous with 98 species (46.89%). Second in number are the phanerophytes with 34 species (16.27%). Therophytes and chamephytes are also represented by a relatively large number of species: 29 species (13.88%) and 18 species (8.61%) respectively. The least represented are

therophytes-hemicryptophytes and cryptophytes with 15 species (7.18%) each of them. The results are comparable to the results of the study of the Chepan Mt [38].

On the territory of the Tri ushi Mountain Ridge have been established medicinal plants of all biological types (Fig. 3).

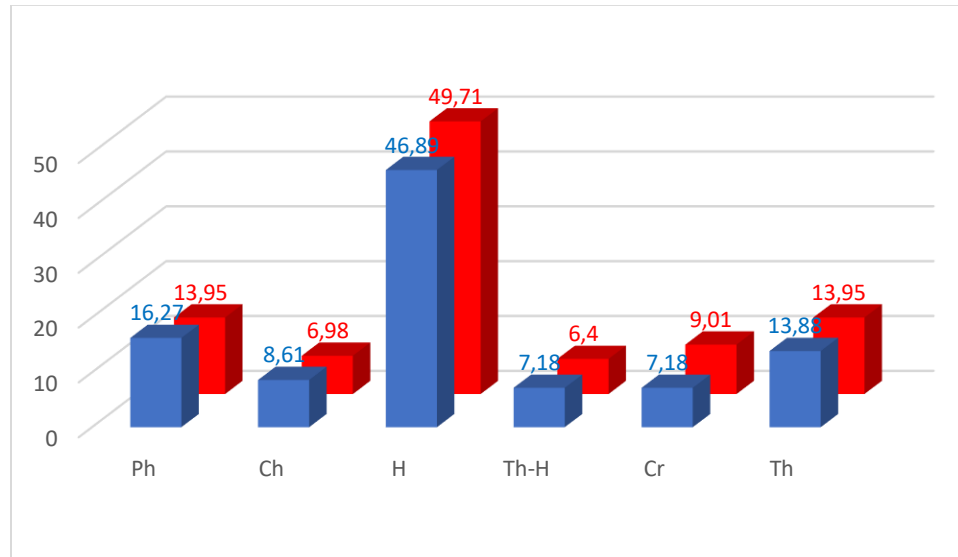


Fig. 2. Comparison of medicinal plants on the Tri ushi Mountain Ridge (blue) with the Chepan Mt (red) in terms of life forms (in percentages)

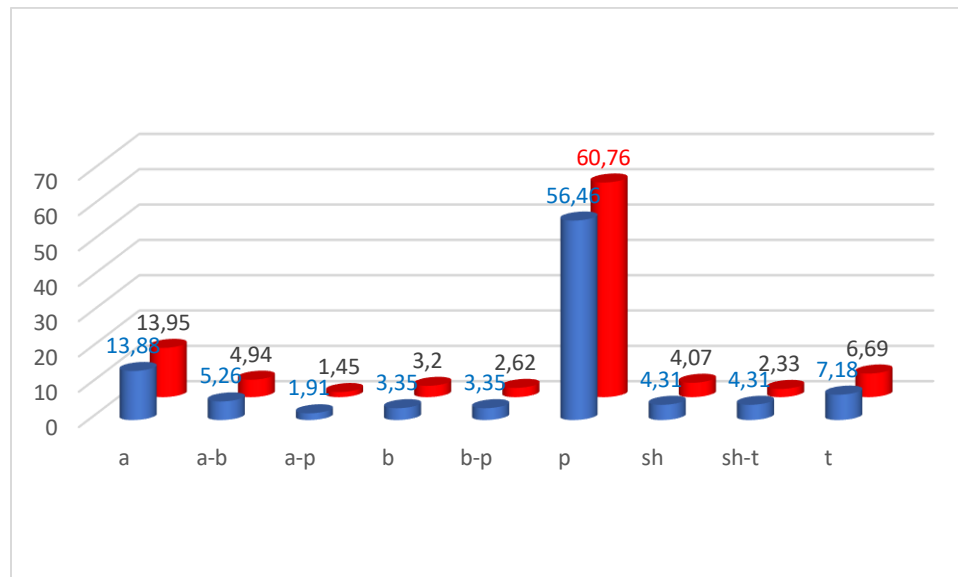


Fig. 3. Comparison of medicinal plants on the Tri ushi Mountain Ridge (blue) with the Chepan Mt (red) in terms of biological types (in percentages)

The results obtained show the prevalence of perennial herbaceous plants with 118 species (56.46%). Second in the number of species are annual herbaceous plants with 29 species (13.88%), followed by trees with 15 species (7.18%) and annual or two-year grassy plants with 11 species (5.26%). Shrubs and other transitional forms between the main biological types have a smaller number of species. The prevailing presence of perennial herbaceous plants can be explained by their participation in all communities and habitats that meet the Tri ushi Mountain Ridge. The distribution of biological types among the medicinal plants of the Chepan Mt shows very close results [38].

The physiographic features of the Tri ushi Mountain Ridge offers favorable conditions for the existence of various types of plants with medicinal properties and provide an opportunity for the development of species from different parts of the world. As a result of the research we conducted, we identified 30 different floral elements.

The majority of medicinal plants belong to the Euro-Asian floral element (Eur-As) – 36 species (17.22%). In second place are the species from the Euro-Mediterranean (Eur-Med) and sub-Mediterranean (subMed) floral elements with 34 species (16.27%). Tracking adventitious plants (1.91%) is important because this includes species that are foreign to the flora of Bulgaria, but were brought by humans and subsequently spread in natural habitats. Another similar group is the cosmopolitans (7.18%). These are species with a distribution in all or almost all continents. In the Chepan Mt [38], due to the geographical proximity of the two sites, the most widespread floral elements are the same as those of the Tri ushi Mountain Ridge, and their percentage participation is relatively close (Fig. 4).

Among the medicinal plants on the territory of the Tri ushi Mountain Ridge, we identified two Balkan endemics (0.96% of the medicinal plant species): *Acanthus balcanicus* Heywood & I. Richardson and *Achillea clypeolata* Sm. The same species have also been described on the territory of the Chepan Mt [38].

Relict species are 19 in number (9.09%). Of these, the most numerous are Tertiary relicts (18 species) and one species is a Quaternary relict. Tertiary relicts among medicinal plants are: *Acer campestre* L., *Betula pendula* Roth, *Carpinus betulus* L., *Clematis vitalba* L., *Corylus avellana* L., *Cotinus coggygria* Scop., *Dictamnus albus* L., *Fraxinus ornus* L., *Hedera helix* L., *Lycopus europaeus* L., *Populus tremula* L., *Prunus fruticosa* Pall., *Rumex acetosa* L., *Salix alba* L., *S. caprea* L., *S. fragilis* L., *Syringa vulgaris* L., *Ulmus minor* Mill. The Quaternary relict is *Adonis vernalis* L. and belongs to the group of interglacial relicts. The percentage of relict species among the medicinal plants of the Tri ushi Mountain Ridge is higher than that of the Chepan Mt [38], where both the number of relict species (17 Tertiary and one Quaternary relic) and their percentage ratio to the total number of medicinal plants (5.23%) are lower (Fig. 5).

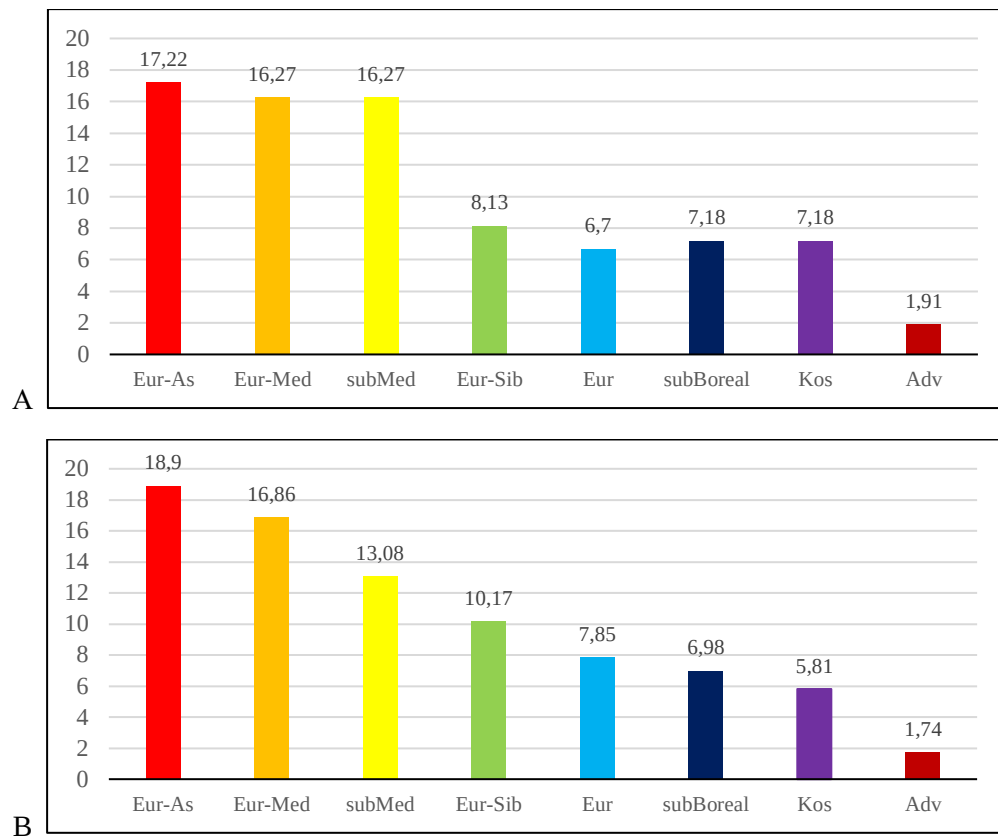


Fig. 4. Comparison of medicinal plants in terms of phytogeographic structure (in percentages):

A. Tri ushi Mountain Ridge, B. Chepan Mt

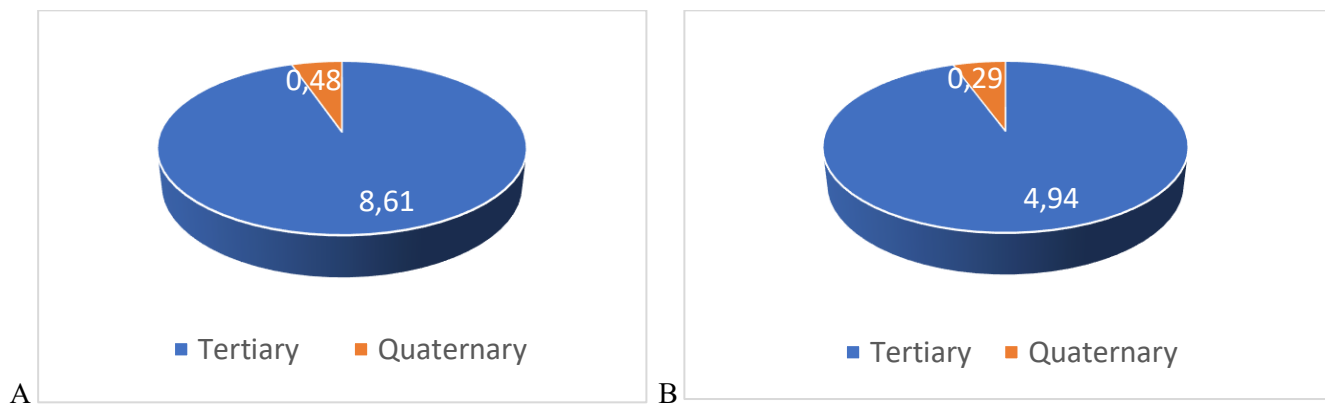


Fig. 5. Comparison of medicinal plants on the Tri ushi Mountain Ridge (blue) with the Chepan Mt (red) in terms of relict species (in percentages)

The number of species with conservation status is 14 species (6.70%). One of them, *Himantoglossum calcaratum* (Beck) Schltr. (syn. *Himantoglossum caprinum* (M. Bieb.) Spreng.), is included in Annex II (Plant and animal species of Community importance whose conservation requires the designation of special protection areas) of Directive 92/43/EEC [24] and in Annex I (Protected species of wild flora) of the Bern Convention [25].

Appendix II (Species not necessarily threatened with extinction, but trade in which should be controlled) of the CITES [26] include 5 species: *Adonis vernalis* L., *Anacamptis pyramidalis* (L.) Rich., *Himantoglossum calcaratum* (Beck) Schltr., *Orchis purpurea* Huds., *O. simia* Lam.

The Red List of Bulgarian vascular plants [27] include 4 species. Two species are included in the "vulnerable" category: *Anacamptis pyramidalis* (L.) Rich. and *Himantoglossum calcaratum* (Beck) Schltr. In the "near threatened" category is *Artemisia pontica* L. In the "slightly affected" category is *Acanthus balcanicus* Heywood & I. Richardson.

The Red Book of the Republic of Bulgaria [28] include one species in the "vulnerable" category: *Himantoglossum calcaratum* (Beck) Schltr.

The Biological Diversity Act [29] include 11 species. Of these, 2 species are included in Annex III (Protected Species): *Anacamptis pyramidalis* (L.) Rich. and *Himantoglossum calcaratum* (Beck) Schltr. In Appendix IV (Under the regime of conservation and regulated use of nature), 9 species are included: *Asparagus officinalis* L., *Bupleurum rotundifolium* L., *Echinops sphaerocephalus* L., *Orchis purpurea* Huds., *O. simia* Lam., *Polygonatum odoratum* (Mill.) Druce, *Primula veris* L., *Salix caprea* L., *Scilla bifolia* L.

The percentage of species with conservation status among medicinal plants on the Tri ushi Mountain Ridge (6.70%) is the same as that on the Chepan Mt (6.69%), but in absolute terms it is higher on the Chepan Mt (23 species) [38].

When collecting medicinal herbs, the species included in Order No. RD-83 of 03.02.2014 on the special regime for the protection and use of medicinal plants in 2024 should be taken into account [30]. This annual order, which is issued by the Minister of Environment and Water, lists 2 groups of medicinal plants. The first group includes medicinal plants that are prohibited from collecting herbs from their natural habitats. Of the medicinal plants found on the territory of the Tri ushi Mountain Ridge, the following 6 species belong to this group: *Adonis vernalis* L., *Althaea officinalis* L., *Hyssopus officinalis* L., *Orchis purpurea* Huds., *O. simia* L., and *Origanum vulgare* L. Another 5 species are under a restrictive regime for collecting herbs from their natural habitats: *Artemisia alba* L., *Carlina acanthifolia* All., *Primula veris* L., *Sedum acre* L., and *Stachys officinalis* (L.) Trevis. (*Betonica officinalis* L.). The quotas for collecting herbs from these plants and the areas in which they can be collected are specified in an annex to the order.

Among medicinal plants, there are species that are poisonous to varying degrees. A small number of plants (10 species) are highly poisonous: *Adonis vernalis* L., *Anagallis arvensis* L., *Conium maculatum* L., *Datura stramonium* L., *Dictamnus albus* L., *Digitalis lanata* Ehrh., *Erysimum diffusum* Ehrh., *Euphorbia cyparissias* L., *Hedera helix* L., *Helleborus odoratus* Waldst. & Kit.

The following species belong to plants that are poisonous (31 species): *Adonis aestivalis* L., *Artemisia vulgaris* L., *Astragalus glycyphyllos* L., *Chenopodium album* L., *Clematis vitalba* L., *Consolida regalis* S. F. Gray, *Convolvulus arvensis* L., *Cotinus coggygria* Scop., *Digitalis ferruginea* L., *Euonymus europaeus* L., *Inula britannica* L., *Jacobaea vulgaris* Gaertn., *Lactuca serriola* L., *Ligustrum vulgare* L., *Melilotus officinalis* (L.) Pall., *Orchis purpurea* Huds., *O. simia* Lam., *Papaver rhoeas* L., *Polygonatum odoratum* (Mill.) Druce, *Rhinanthus minor* L., *Robinia pseudoacacia* L., *Scilla bifolia* L., *Securigera varia* (L.) Lassen, *Tanacetum vulgare* L., *Teucrium capitatum* L., *T. chamaedrys* L., *Thalictrum aquilegiifolium* L., *T. minus* L., *Tragopogon pratensis* L., *Vincetoxicum hirundinaria* Medicus, *Xanthium strumarium* L.

Another part of medicinal plants (34 species) are poisonous only at higher doses: *Achillea millefolium* L., *Agrimonia eupatoria* L., *Althaea officinalis* L., *Artemisia absinthium* L., *Asparagus officinalis* L., *Ballota nigra* L., *Buglossoides purpureocaerulea* (L.) I. M. Johnst., *Cirsium arvense* (L.) Scop., *Crataegus monogyna* Jacq., *Cyanus segetum* Hill, *Euphrasia pectinata* Ten., *Geranium sanguineum* L., *Herniaria hirsuta* L., *Hypericum perforatum* L., *Linaria vulgaris* Mill., *Lotus corniculatus* L., *Melilotus albus* Medik., *Ononis spinosa* L., *Origanum vulgare* L., *Pilosella officinarum* Vaill., *Populus tremula* L., *Primula veris* L., *Ranunculus acris* L., *Rhamnus cathartica* L., *Rumex acetosa* L., *Sambucus ebulus* L., *Sedum acre* L., *Stachys annua* L., *S. germanica* L., *S. officinalis* (L.) Trevis., *S. recta* L., *Verbascum phlomoides* L., *Vicia sativa* L., *Viola tricolor* L.

The plants causing side effects upon physical contact with them or their components (11 species) are the following: *Cirsium arvense* (L.) Scop., *Clematis vitalba* L., *Conium maculatum* L., *Cornus mas* L., *Echium vulgare* L., *Eryngium campestre* L., *Hypericum perforatum* L., *Lactuca serriola* L., *Tanacetum vulgare* L., *Xanthium strumarium* L. In contact with the plant, *Dictamnus albus* L. can cause particularly severe damage to the human skin

Of the 209 species of medicinal plants identified by us on the territory of the Tri ushi Mountain Ridge, 149 species (71.29%) are anthropophytes. Therefore, the majority of medicinal plants in the studied area are related to human activity to varying degrees. Of these, the most numerous species are perennial herbaceous plants – 79 species (53.02% of anthropophytes). Next are annual herbaceous plants with 28 species (18.79% of anthropophytes), annual to biennial herbaceous plants with 10 species (6.71% of anthropophytes) and biennial herbaceous plants with 7 species (4.70% of anthropophytes). The remaining biological types have a smaller number of species.

The percentage of anthropophytes among medicinal plants on the Tri ushi Mountain Ridge (71.29%) is higher than that on the Chepan Mt (63.95%), which we use for comparison [38]. The reason for this can be found in the presence of a large number of roads on the territory of the Tri ushi Mountain Ridge, as well as a quarry for the extraction of inert materials and a military training ground, which are associated with the movement of vehicles carrying fruits and seeds of anthropophytes.

On the territory of the Tri ushi Mountain Ridge, we identified 5 invasive alien plant species (2.39% of medicinal plants): *Amaranthus retroflexus* L., *Datura stramonium* L., *Elaeagnus angustifolia* L., *Erigeron canadensis* L., and *Robinia pseudoacacia* L. One of these species, *Robinia pseudoacacia* L., is included in the DAISIE (Delivering Alien Invasive Species Inventories for Europe) list of the most dangerous invasive alien species threatening biodiversity in Europe [39]. When comparing the invasive alien species on the Tri ushi Mountain Ridge with the Chepan Mt (8 species, which are 2.33% of the medicinal plants according to Zahariev, 2015), it is seen that despite the more intense anthropogenic pressure on the Tri ushi Mountain Ridge, the number of invasive alien species among the medicinal plants is smaller, and their percentage share is approximately the same.

Conclusion

The results obtained from the study of medicinal plants on the Tri ushi Mountain Ridge are comparable to the results of similar studies on the neighboring the Chepan Mt. The results of the present study can be used as a basis for comparison in studies of medicinal plants in other parts of the country. Species with nature conservation status, endemic and relict species should be subject to special treatment for the protection of both their populations and their habitats.

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Appendix

Alphabetical list of medicinal plant species, established in the Tri ushi Mountain Ridge (Western Bulgaria)

<i>Acanthus hungaricus</i> (Borbás) Baen	<i>Betula pendula</i> Roth
<i>Acer campestre</i> L.	<i>Briza media</i> L.
<i>Achillea clypeolata</i> Sm.	<i>Buglossoides purpureocaerulea</i> (L.) I. M. Johnst.
<i>Achillea millefolium</i> L.	<i>Bupleurum rotundifolium</i> L.
<i>Adonis aestivalis</i> L.	<i>Carduus acanthoides</i> L.
<i>Adonis vernalis</i> L.	<i>Carlina acanthifolia</i> All.
<i>Agrimonia eupatoria</i> L.	<i>Carlina vulgaris</i> L.
<i>Ajuga chamaepitys</i> (L.) Schreb.	<i>Carpinus betulus</i> L.
<i>Ajuga laxmannii</i> (L.) Benth.	<i>Carthamus lanatus</i> L.
<i>Alcea pallida</i> (Willd.) Waldst. & Kit.	<i>Centaurea solstitialis</i> L.
<i>Alliaria petiolata</i> (M. Bieb.) Cavara & Grande	<i>Centaureum erythraea</i> Rafn.
<i>Althaea officinalis</i> L.	<i>Cerinthe minor</i> L.
<i>Amaranthus retroflexus</i> L.	<i>Chaerophyllum bulbosum</i> L.
<i>Anacamptis pyramidalis</i> (L.) L. C. Rich.	<i>Chenopodium album</i> L.
<i>Anagallis arvensis</i> L.	<i>Cichorium intybus</i> L.
<i>Anthoxanthum odoratum</i> L.	<i>Cirsium arvense</i> (L.) Scop.
<i>Anthyllis vulneraria</i> L.	<i>Cirsium vulgare</i> (Savi) Ten.
<i>Arctium lappa</i> L.	<i>Clematis vitalba</i> L.
<i>Artemisia absinthium</i> L.	<i>Clinopodium acinos</i> (L.) Kuntze
<i>Artemisia alba</i> Turra	<i>Clinopodium vulgare</i> L.
<i>Artemisia pontica</i> L.	<i>Conium maculatum</i> L.
<i>Artemisia vulgaris</i> L.	<i>Consolida regalis</i> S. F. Gray
<i>Asparagus officinalis</i> L.	<i>Convolvulus arvensis</i> L.
<i>Astragalus glycyphylloides</i> DC.	<i>Cornus mas</i> L.
<i>Astragalus glycyphyllos</i> L.	<i>Corylus avellana</i> L.
<i>Ballota nigra</i> L.	<i>Cotinus coggygria</i> Scop.

- Crataegus monogyna* Jacq.
Crataegus pentagyna Willd. & Kit. ex Willd.
Cruciata laevipes Opiz.
Cyanus segetum Hill
Cynodon dactylon (L.) Pers.
Datura stramonium L.
Daucus carota L.
Dictamnus albus L.
Digitalis ferruginea L.
Digitalis lanata Ehrh.
Dipsacus laciniatus L.
Echinops sphaerocephalus L.
Echium vulgare L.
Elaeagnus angustifolia L.
Elymus repens (L.) Gould.
Erigeron canadensis L.
Erodium cicutarium (L.) L'Her.
Eryngium campestre L.
Erysimum diffusum Ehrh.
Euonymus europaeus L.
Euphorbia cyparissias L.
Euphrasia pectinata Ten.
Fallopia dumetorum (L.) Holub
Ferulago sylvatica (Besser) Rchb.
Filago arvensis L.
Filipendula ulmaria (L.) Maxim.
Filipendula vulgaris Moench
Fragaria vesca L.
Fraxinus ornus L.
Galium aparine L.
Galium verum L.
Geranium sanguineum L.
Geum urbanum L.
Hedera helix L.
Helleborus odoratus Waldst. & Kit.
Herniaria hirsuta L.
Himantoglossum calcaratum (Beck) Schltr.
Hylotelephium maximum (L.) Holub
Hypericum perforatum L.
Hyssopus officinalis L.
Inula britannica L.
Inula germanica L.
Jacobaea vulgaris Gaertn.
Juncus inflexus L.
Knautia arvensis (L.) Coult.
Lactuca serriola L.
Lathyrus tuberosus L.
Lavatera thuringiaca L.
Lepidium campestre (L.) R. Br.
Lepidium draba L.
Ligustrum vulgare L.
Linaria vulgaris Mill.
Lipandra polysperma (L.) S. Fuentes, Uotila & Borsch
Lotus corniculatus L.
Lycopus europaeus L.
Malus sylvestris Mill.
Malva sylvestris L.
Marrubium peregrinum L.
Melilotus albus Medik.
Melilotus officinalis (L.) Pall.
Mentha spicata L.
Minuartia setacea (Thuill.) Hayek
Mummenhoffia alliacea (L.) Esmailbegi & Al-Shehbaz
Nepeta cataria L.
Nigella arvensis L.
Ononis spinosa L.
Orchis purpurea Huds.
Orchis simia Lam.
Origanum vulgare L.
Papaver rhoeas L.
Persicaria amphibia (L.) Delarbre
Persicaria lapathifolia (L.) Delarbre
Phlomis tuberosa (L.) Moench
Pilosella officinarum Vaill.
Plantago lanceolata L.
Plantago major L.
Plantago media L.
Polygonatum odoratum (Mill.) Druce
Populus tremula L.
Potentilla argentea L.
Potentilla cinerea Chaix. ex Vill.
Potentilla micrantha Ramond
Potentilla reptans L.
Primula veris L.

Prunella vulgaris L.
Prunus avium L.
Prunus cerasifera Ehrh.
Prunus fruticosa Pall.
Prunus mahaleb L.
Prunus spinosa L.
Pyrus pyraister Burgsd.
Quercus robur L.
Ranunculus acris L.
Reseda lutea L.
Rhamnus cathartica L.
Rhinanthus minor L.
Robinia pseudoacacia L.
Rosa canina L.
Rubus caesius L.
Rumex acetosa L.
Rumex crispus L.
Rumex palustris Sm.
Rumex patientia L.
Salix alba L.
Salix caprea L.
Salix fragilis L.
Salvia aethiopis L.
Salvia nemorosa L.
Salvia verticillata L.
Sambucus ebulus L.
Sanguisorba minor Scop.
Satureja montana L.
Scabiosa ochroleuca L.
Scilla bifolia L.
Scrophularia canina L.
Securigera varia (L.) Lassen
Sedum acre L.
Sempervivum marmoreum Griseb.
Sempervivum tectorum L.
Sideritis montana L.
Silene otites (L.) Wibel
Sorbus torminalis (L.) Crantz
Stachys annua (L.) L.
Stachys germanica L.
Stachys officinalis (L.) Trevis.
Stachys recta L.
Syringa vulgaris L.
Tanacetum vulgare L.
Teucrium capitatum L.
Teucrium chamaedrys L.
Teucrium montanum L.
Thalictrum aquilegiifolium L.
Thalictrum minus L.
Thymus odoratissimus Mill.
Thymus roegneri K. Koch
Thymus striatus Vahl
Tilia tomentosa Moench
Tordylium maximum L.
Torilis arvensis (Hudson) Link
Tragopogon pratensis L.
Trifolium alpestre L.
Trifolium pratense L.
Typha angustifolia L.
Typha latifolia L.
Ulmus minor Mill.
Urtica dioica L.
Verbascum phlomoides L.
Verbena officinalis L.
Vicia cracca L.
Vicia grandiflora Scop.
Vicia sativa L.
Vinca herbacea Waldst. & Kit.
Vincetoxicum hirundinaria Medik.
Viola odorata L.
Viola tricolor L.
Xanthium strumarium L.
Xeranthemum annuum L.