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The medicinal plants of Chepan Mountain (Western Bulgaria)**Dimcho Zahariev***University of Shumen Bishop Konstantin Preslavski,**Faculty of Natural Sciences,
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Abstract: *Bulgaria is one of the European countries with the greatest biodiversity, including biodiversity of medicinal plants. The object of this study is Chepan Mountain. It is located in Western Bulgaria and it is part of Balkan Mountain. On the territory of the Chepan Mountain (only 80 km²) we found 344 species of medicinal plants from 237 genera and 83 families. The floristic analysis indicates, that the most of the families and the genera are represented by a small number of inferior taxa. The hemicryptophytes dominate among the life forms with 49.71%. The biological types are represented mainly by perennial herbaceous plants (60.47%). There are 7 types of floristic elements divided in 27 groups. The largest percentage of species are of the European type (58.43%). Among the medicinal plants, there are two Balkan endemic species and 18 relic species. We described 23 species with protection statute. The anthropophytes among the medicinal plants are 220 species (63.95%).*

Keywords: *Chepan Mountain, medicinal plants, analysis*

Introduction

Chepan Mountain is part of the Western part of Balkan Mountain, the longest mountain chain in Bulgaria, which divides the country into two parts: North and South Bulgaria. Chepan Mountain bordered to the north by the valley of the Nishava River, to the east bordered to Mala Mountain, to the south are Dragoman marsh and Ponor Mountain and on the west the road Dragoman–Godech separates it from the neighboring hills. The mountain is oriented in an east–west. Its length is about 20 km, and its width varies from 2.5 to 5.5 km. Its area is about 80 km². The highest peak is Petrov crast height 1205.6 m above sea level, located in the western part of the mountain, about 3 km northeast of the town of Dragoman.

At the foot of the mountain there are 14 villages connected by roads, describing the belt around it. The only cities in the neighborhood are Dragoman, located in the southwestern foothills and Godech, located in remote north. The mountain is about 6 km from the border checkpoint Kalotina–Dimitrovgrad. Next to the mountain, there are international road E80 and the railway line connecting

Bulgaria with Serbia.

In phytogeographic terms Chepan Mountain is located in the Balkan floristic province of the European deciduous forest area. It is located in two floristic regions: the western parts are in Znepolski floristic region and east parts are in Stara planina (Western) floristic region. During the Crusades, between the cities of Nis and Sofia there was a huge array, that included Chepan Mountain and was going through narrow mountain roads [1]. Today, in the mountain dominates the treeless landscape. Its entire length Chepan Mountain is a typical karst terrain with typical phenomena: karst surfaces, potholes and cliffs. Southern and southwestern slopes of the mountain are rugged, with rocky valleys and rock ledges with steep slope, making them difficult to pass. At the bottom of the northern slopes reserved arrays of deciduous forests. On the southern slopes are common mosaic cultures of pine.

In 1889, during his third trip to Bulgaria Velenovski, accompanied by his collaborator Hermengild Shkorpil collected and described plants near to town of Dragoman. In the following years Shkorpil continues to send materials to Velenovski from this region. The results are reflected in the first Bulgarian flora and supplement to it [2].

The herbaceous vegetation of Chepan Mountain is explored by Velchev as part of a study of grass cover near to the area Dragoman–Belidie Khan [3]. The study of the flora of the mountain is made by Tashev and Angelova [4, 5, 6]. They found the presence of 465 species and subspecies of vascular plants belonging to 252 genera and 63 families and publish data on the medicinal plants in the mountain [7]. The current information on species with conservation status gives Angelova [8]. Later it was expanded and extended together with Tashev [6]. We conducted a detailed study of the flora as a result of which found the presence of 784 species of wild vascular plants belonging to 378 genera and 84 families.

In 2007, with a decision of the Council of Ministers of Bulgaria №122 of March 2, 2007 Chepan mountain is included in Dragoman Protected area (BG0000322). The protected area is designated under the Habitats Directive (Directive 92/43/EEC of the Council of the European Community for the conservation of natural habitats and of wild fauna and flora) and overlaps a protected area under the Birds Directive (Directive 79/409/EEC on the conservation of wild birds, replaced by Directive 2009/147/EO). It covers an extensive karst region in the southwestern foothills of Balkan Mountain with a total area of 21 357.18 ha. Chepan Mountain occupies 12.45% of the territory of the protected area [9]. The aims of the protected area are the following:

1. Keeping the area of the natural habitats and the habitats of species and their populations under protection within the protected area.

2. Preserving the natural state of the natural habitats and the habitats of the species subject to conservation in the protected area, including the natural habitat for these species composition, characteristic species and environmental conditions.

3. Recovery if necessary of the areas and the natural condition of the priority habitats and the habitats of the species as well as the populations of the species subject to protection within the protected area.

The subjects to protection in the protected area are 17 natural habitats and 3 plant species. Thereof in Chepan Mountain there are 12 habitats and one plant species *Himantoglossum caprinum* (Bieb.) C. Koch.

The aim of our study was to perform a new inventory of the medicinal plants of Chepan Mountain. The reason for this is that in the study of flora of the mountain we found significantly greater wealth of species. The results of our study of the flora of the mountain not yet been published.

Materials and Methods

This survey was conducted on the route method in the period 2010–2011. The medicinal plants are under the Annex to the Medicinal Plants Act [10], supplemented with data from the literature on the medicinal plants in Bulgaria. In determining the species are used: Handbook for Vascular Plants in Bulgaria [11], Flora of PR Bulgaria, Volumes 1 to 9 [12, 13] and Flora of the Republic of Bulgaria, Volume 10 [14]. The names of the taxa are under Conspectus of the Bulgarian vascular flora [15].

The life forms are represented in the system of Raunkiaer [16]. For their determination are used Flora of PR Bulgaria, Volumes 1 to 9 [12, 13] and Flora of the Republic of Bulgaria, Volumes 10 and 11 [14, 17]. Biological types are defined by Handbook for Plants in Bulgaria [18]. The floristic elements and the endemics are under Conspectus of the Bulgarian vascular flora [15]. Relics are presented under Gruev & Kuzmanov [19], Peev & al. [20] Peev [21], Boža & al. [22].

The conservation statute is recognized using the following documents: Annex II to Council Directive 92/43/EEC of the European Community to protect natural habitats and of wild fauna and flora [23], Appendix I to *Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)* [24], Appendix II to *Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)* [25], Red Data Book of the Republic of Bulgaria, Vol. 1. Plants and Fungi [26], IUCN Red List for Bulgaria [27], Annex III and Annex IV to Biological Diversity Act [28]. Described species are included in Order for special arrangements for the conservation and use of the medicinal plants [29].

The anthropophytes are presented by Stefanov & Kitanov [30].

Results and Discussion

As a result of our investigations of Chepan Mountain 344 species, belonging to 237 genera and 83 families were identified. This represents 43.88% of the species, 62.53% of families and 93.26% of the families of vascular plants identified by us in the mountain.

Medicinal Plants of Chepan Mountain are 40.76% of the species, 53.38% of the genera and 70.34% of the families of the medicinal plants in Bulgaria. Systematic list of identified species is presented in Appendix 1.

The most of the families and genera are presented with smaller number of lower taxa, from 1 to 4. The majority of families, 76 (87.36%) were presented with 1–4 genera. Only 11 (12.64%) of the families included 5 or more genera (Table 1).

Table 1. Families with most genera and species

Families	Genera	Species
Asteraceae	28	40
Lamiaceae	22	40
Fabaceae	12	24
Rosaceae	13	22
Scrophulariaceae	9	20
Apiaceae	15	16

Ranunculaceae	10	15
Caryophyllaceae	9	12
Brassicaceae	8	9
Orchidaceae	–	7
Boraginaceae	6	7
Geraniaceae	–	6
Polygonaceae	–	6
Poaceae	5	5
Rubiaceae	–	5

Most genera are found in the families: Asteraceae (28), Lamiaceae (22), Apiaceae (15), Rosaceae (13), Fabaceae (12). Most families, 72 (82.76%) have 1–4 species. Only 15 (17.24%) of the families are represented by 5 or more species (Table 1). Most species belong to the following families: Asteraceae (40), Lamiaceae (40), Fabaceae (24), Rosaceae (22), Scrophulariaceae (20). Only 5 genera (2.11%), included 5 or more species: *Veronica* L. (7), *Artemisia* L. (5), *Geranium* L. (5), *Thymus* L. (5) and *Trifolium* L. (5).

In the analysis of the life forms (Table 2) was found dominant participation of the hemicryptophytes, 171 species (49.71%), followed by the phanerophytes, 48 species (13.95%) and the therophytes, 47 species (13.66%).

Table 2. Distribution of the species by life form

Group	Subgroup	Number of species	Percentage
Phanerophytes (Ph)		48	13.95
	Megaphanerophytes	3	0.87
	Mesophanerophytes	25	7.27
	Microphanerophytes	14	4.07
	Nanophanerophytes	6	1.74
Chamaephytes		24	6.98

(Ch)			
Hemicryptophytes (H)		171	49.71
Therophytes-Hemicryptophytes (Th-H)		22	6.40
Cryptophytes (Cr)		31	9.01
	Geophytes	25	7.27
	Helophytes	5	1.45
	Hydrophytes	1	0.29
Therophytes (Th)		48	13.95

Among the biological types (Table 3) dominated perennial herbaceous plants: 208 species (60.47%). The annual herbaceous plants are significantly less: 48 species (13.95%). The remaining groups are represented by a small number of species.

Table 3. Distribution of the species by biological type

Biological type	Symbol	Number of species	Percentage
Annual herbaceous plant	a	48	13.95
Annual or biannual herbaceous plant	a-b	17	4.94
Annual or perennial herbaceous plant	a-p	5	1.45
Biannual herbaceous plant	b	11	3.20
Biannual or perennial herbaceous plant	b-p	9	2.62
Perennial herbaceous plant	p	208	60.47
Perennial herbaceous plant or shrub	p-sh	1	0.29
Shrub	sh	14	4.07
Shrub or tree	sh-t	8	2.33
Tree	t	23	6.69

Regarding the phytogeographical structure (Table 4) the highest percentage of the species is of European type (58.43%), followed by species of Mediterranean (16.28%) and Boreal type (11.92%).

Table 4. Phytogeographical structure

Type of floristic elements	Number of species	Percentage
Boreal	41	11.92
European	201	58.43
Pontic	15	4.36
Mediterranean	56	16.28
Cosmopolitan	20	5.81
Adventive	6	1.74
Endemic and sub-endemic	4	1.16
Other	1	0.29

Among the medicinal plants have two Balkan endemics (0.58%) and 18 relicts (5.23%). Balkan endemics are: *Acanthus balcanicus* Heywood & I. Richardson and *Achillea clypeolata* Sm. Of the relict species 17 are Tertiary relicts: *Acer campestre* L., *Acer pseudoplatanus* L., *Betula pendula* Roth, *Carpinus betulus* L., *Clematis vitalba* L., *Corylus avellana* L., *Cotinus coggygria* Scop., *Fraxinus ornus* L., *Hedera helix* L., *Juniperus communis* L., *Populus nigra* L., *Populus tremula* L., *Quercus dalechampii* Ten., *Salix alba* L., *Salix fragilis* L., *Syringa vulgaris* L. and *Ulmus minor* Mill. One species is a Quaternary relict: *Gymnadenia conopsea* (L.) R. Br.

The species with conservation status are 23 (6.69%). One of them *Himantoglossum caprinum* (M. Bieb.) Spreng. is included in Annex II of Directive 92/43/EEC: Plant and animal species of Community interest whose conservation requires the designation of special areas of conservation and in Appendix I of the Bern Convention.

In Appendix II of CITES Convention are included 9 species: *Adonis vernalis* L., *Galanthus elwesii* Hook. f., *Gymnadenia conopsea* (L.) R. Br., *Himantoglossum caprinum* (M. Bieb.) Spreng., *Ophrys cornuta* Steven, *Orchis morio* L., *Orchis purpurea* Huds., *Orchis simia* Lam. and *Orchis tridentata* Scop.

In IUCN Red List for Bulgaria are included 7 species. In category Endangered is included *Galanthus elwesii* Hook. f. In category Vulnerable are two species: *Himantoglossum caprinum* (M. Bieb.) Spreng. and *Ophrys cornuta* Steven. In category Near threatened are two species: *Anemone sylvestris* L. and *Artemisia pontica* L. In category Least concern are two species: *Acanthus balcanicus* Heywood & I. Richardson and *Laserpitium siler* L.

In Red Book of Bulgaria are included two species: *Galanthus elwesii* Hook. f. in the category Endangered and *Himantoglossum caprinum* (M. Bieb.) Spreng. in the category Vulnerable.

In Biodiversity Act in Annex III: Protected species are included four species: *Anemone sylvestris* L., *Galanthus elwesii* Hook. f., *Himantoglossum caprinum* (M. Bieb.) Spreng. and *Ophrys cornuta* Steven. In Annex IV: Under the conservation and regulated use of the nature are included 14 species: *Asparagus officinalis* L., *Asphodelus albus* Mill., *Bupleurum rotundifolium* L., *Dryopteris filix-mas* (L.) Schott, *Echinops sphaerocephalus* L., *Lilium martagon* L., *Orchis morio* L., *Orchis purpurea* Huds., *Orchis simia* Lam., *Orchis tridentata* Scop., *Paeonia peregrina* Mill., *Polygonatum odoratum* (Mill.) Druce, *Primula veris* L., *Scilla bifolia* L.

Among the listed 23 species of medicinal plants with conservation status with the highest conservation value are as follows: *Himantoglossum caprinum* (M. Bieb.) Spreng. (included in 6 documents), *Galanthus elwesii* Hook. f. (included in 4 documents) and *Ophrys cornuta* Steven (included in 3 documents).

In Order №RD-83 of 03.02.2014 on special arrangements for conservation and use of the medicinal plants in 2014 are included 17 species. Prohibited from gathering herbs from their natural habitats are 9 species: *Adonis vernalis* L., *Asarum europaeum* L., *Asplenium trichomanes* L., *Hyssopus officinalis* L. ssp. *aristatus*, *Orchis morio* L., *Orchis purpurea* Huds., *Orchis simia* L., *Orchis tridentata* Scop. and *Valeriana officinalis* L. Under restricted collection of herbs from their natural habitats are 8 species: *Artemisia alba* L., *Berberis vulgaris* L., *Betonica officinalis* L., *Carlina acanthifolia* All., *Galium odoratum* (L.) Scop., *Paeonia peregrina* Mill., *Primula veris* L. and *Sedum acre* L.

The anthropophytes among the medicinal plants are 220 species (63.95%). Many of them are distributed as ruderal plants: *Agrimonia eupatoria* L., *Capsella bursa-pastoris* Moench., *Cardaria draba* (L.) Desv., *Conium maculatum* L., *Conyza canadensis* (L.) Cronquist, *Galium aparine* L., *Heracleum sibiricum* L., *Lactuca serriola* L., *Plantago major* L., *Sambucus ebulus* L., *Solanum dulcamara* L., *Stellaria media* (L.) Vill., *Urtica dioica* L., *Xanthium strumarium* L. and more.

Conclusions

The inventory of the medicinal plants on the territory of Chepan Mountain is only the first step in a long series of studies required: mapping of the distribution, inquiry status, threats and prospects of the population, resource characteristics of the deposits of industrial stocks. Not registered effects that lead to overexploitation and destruction of the habitats of the medicinal plants. The obtained data can be used as a basis for comparison with the data of the medicinal plants in other floristic regions, and in the study of the flora of different geographical sites in Znepolski floristic region and Stara planina (Western) floristic region.

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