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Original scientific paper

ENDEMIC AND SUBENDEMIC PLANTS OF THE NATURE PARK "ORJEN" (THE REPUBLIC OF SRPSKA, BOSNIA AND HERZEGOVINA)

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Abstract

Nature Park "Orjen", located in the far south of the Republic of Srpska, represents one of the richest floristic areas in Bosnia and Herzegovina. The aim of this research is to systematically show the presence of endemic and subendemic vascular plants in this area, and to analyze their taxonomic and ecological structure, as well as their protection status. The research recorded 159 taxa, of which 118 belong to Balkan endemic plants, and 41 to subendemic plants. The analysis of life forms shows the dominance of hemicryptophytes (52.2%) and chamaephytes (27%), which is in accordance with the general characteristics of the Balkan endemic flora of BiH. Taxonomically, the most represented families are Asteraceae, Caryophyllaceae, Fabaceae, Lamiaceae and Poaceae. The special conservation value of the park is confirmed by the fact that as many as 123 recorded taxa have the status of strictly protected or protected species according to the Regulation on Strictly Protected and Protected Wild Species of the Republic of Srpska. These results emphasize the exceptional importance of the Nature Park "Orjen" for the preservation of biological diversity and represent the basis for future activities in the field of nature protection, as well as for further floristic and ecological research.

Keywords: biodiversity, Bosnia and Herzegovina, strictly protected and protected species, protected area

INTRODUCTION

Bosnia and Herzegovina is characterized by a high degree of species diversity compared to the European average, and the richness of the living world is determined by the great diversity of climatic, geological, geomorphological, hydrological and pedological characteristics of the habitat (Ballian *et al*., 2024). According to Redžić *et al*. (2008) the presence of 4403 taxa of higher plants in the rank of species (3317) and subspecies (1086) was recorded on the territory of Bosnia and Herzegovina. During the inventory of the vascular flora of the Republic of Srpska, in recent research, 3692 species and subspecies were registered (Stupar *et al*., 2021).

What makes the flora of Bosnia and Herzegovina particularly interesting is the significant number of endemic taxa. According to Lubarda (2019), the Balkan endemic flora of BiH consists of 309 endemic plants in the rank of species and subspecies. The most important centers of floristic diversity in Bosnia and Herzegovina are high mountain regions, among which the mountain massifs of Maglić, Volujak and Zelengora stand out, then the Herzegovinian complex of Prenj, Čvrsnica, Čabulja and Velež (Bjelčić and Šilić, 1971) as well as the Orjen and Bijela gora mountains. According to Lubarda *et al*. (2014) the high mountains of Herzegovina (Prenj, Čvrsnica, Čabulja) are the richest in endemic plants, followed by the Bjelašnica, Treskavica, Ivan mountains, together with the Rakitnica river canyon, and the Maglić and Volujak mountains with the Sutjeska river canyon.

In addition to the Balkan endemics, whose distribution is limited to the territory of the Balkan Peninsula (Tomović *et al*., 2014), subendemic plants whose range exceeds the borders of the Balkans have great attention in the flora of an area. Usually, a smaller part of their area is located in Slovenia, Italy, Hungary and Romania.

The Oro-Mediterranean mountains of the Western Balkans, Orjen and Bijela gora, have been an important subject of floristic-vegetation research since the 19th century. Jozef Pantocsek stands out among the first botanists who studied the flora of this area in detail, who collected plant material in the nearness of Trebinje, Lastva and Bijela Gora, which he published in several works (Pantocsek, 1873a, 1873b, 1873c, 1874). In his research, Pantocsek recorded a large number of plant species, and in cooperation with Grisebach, he described more than ten new species for science from around Trebinje. A significant contribution to the knowledge of the flora of this region was made by Josif Pančić, one of the most prominent Serbian botanists (Pancić, 1875). Karel Vandas was also active in this area, collecting numerous plant species and publishing his findings through several papers (Vandas, 1888-1889). During the early 20th century, investigations of the flora of this region were continued by Berger L. (1914), Latzel A. (1914) and Malý K. (1917, 1919, 1920, 1923, 1928, 1933, 1940), with Malý and Zahn jointly publishing additional data (1925, 1929). The first comprehensive floristic review of this area was prepared by Hilda Ritter-Studnička (1959), who devoted special attention to the dolomites around Lastva. During the second half of the 20th century, there was a decline in the intensity of floristic research in this area. However, studies that, in addition to the flora, also included the vegetation characteristics of these mountains (Ritter-Studnička 1958, Fukarek 1969, Šilić 1979, Bräuchler and Cikovac, 2007, Niketić *et al*., 2013) are significant.

Nature Park "Orjen" is located in the far south of the Republic of Srpska and Bosnia and Herzegovina, in the area of the city of Trebinje, with a total area of 16715.83 ha. The base of the park is the Orjen mountain massif. In the eastern part of the area is the karst plain of Bijela gora, and the entire area descends westwards and northwards. The protected area is located at an altitude of 290 to 1865 meters above sea level. The exceptional floristic and vegetation diversity of the Nature Park "Orjen" is reflected in the presence of numerous endemic, relict, rare and endangered species (Official Gazette of the Republic of Srpska, 93/2020).

Although comprehensive floristic research in the area of protected areas of the Republic of Srpska, such as the National Park "Kozara" (Bucalo *et al*., 2007), the Strict

Nature Reserve "Prašuma Lom" (Milanović *et al*., 2015), the Nature Park "Cicelj" (Brujić *et al*., 2011) has been published for several nature objects, no research has been published in our area that included endemic and subendemic species of any protected areas so far. The publication "Endemic and rare plants of the "Blidinje" Nature Park" was published in the territory of the Federation of Bosnia and Herzegovina (Šilić, 2002).

The aim of this work is to list the endemic vascular plants of the Nature Park "Orjen" and to show the ecological characteristics of this flora together with the degree of their protection.

MATERIALS AND METHODS

This study is largely based on literature research of a very extensive material in the field of taxonomy, floristics and phytocoenology. Taxonomic status and nomenclature are presented according to Euro+Med PlantBase (2006) with the inevitable consideration of the results of some recent studies that deviate from Euro+Med. Recorded taxa are presented by families, and families are presented alphabetically. Species belong to a certain life form according to Raunkier's classification (Raunkier, 1934), developed according to Stevanović (Stevanović, 1992). The protection statuses are taken from the Regulation on Strictly Protected and Protected Wild Species of the Republic of Srpska (Official Gazette of the Republic of Srpska, 65/2020; Park prirode “Orjen” studija zaštite, 2020).

Nature Park "Orjen" represents an area of exceptional natural importance, whose values were key for its placement under the protection regime. Geological and geomorphological characteristics dominate the overall evaluated structure of the area, with karst relief occupying a special place.

Figure 1. Location of the Nature Park "Orjen"

The Orjen mountain massif belongs to the coastal chain of the Dinarides, and its highest peak on the territory of the Republic of Srpska is Velika Jastrebica (1865 m above sea level).

The climatic regime of the area is predominantly mountainous, but with a pronounced influence of the Mediterranean climate due to the proximity of the Adriatic Sea. Orjen represents a natural barrier to the penetration of warm and moist air masses from the sea, which results in a high amount of annual precipitation. At the highest altitudes, precipitation mostly occurs in the form of snow. The surface hydrographic network was developed only in the northern part of the park, where the Sušica river basin was formed on the dolomite bedrock (Figure 1) (Golob *et al*., 2015).

The vegetation of the Nature Park "Orjen" is distinguished by its high diversity. Fragments of eumediterranean vegetation are present at the lowest altitudes. In the hill belt, climatogenic forests of downy oak (*Quercus pubescens*) and oriental hornbeam (*Carpinus orientalis*) dominate, which at higher altitudes are replaced by beech (*Fagus sylvatica*) forests. In the subalpine zone, the vegetation of the Bosnian pine (*Pinus heldreichii*) develops, while the highest parts of the mountain are characterized by subalpine grasslands specific to this geographical area. On the dolomite substrate in the surroundings of Lastva, a very specific vegetation has developed, both on open and bare slopes, and also in forests (Golob *et al*., 2015).

The following habitat types of particular importance for the conservation of biological diversity at the European Union level have been recorded in the park area:
3240 Alpine rivers and their ligneous vegetation with *Salix elaeagnos*
4060 Alpine and Boreal heaths
4090 Endemic oro-Mediterranean heaths with gorse
5210 Arborescent matorral with *Juniperus* spp.
6110 *Rupicolous calcareous or basophilic grasslands of the *Alysso-Sedion albi*
6170 Alpine and subalpine calcareous grasslands
62A0 Eastern sub-mediteranean dry grasslands (*Scorzoneratalia villosae*)
6510 Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*)
6520 Mountain hay meadows
7220 *Petrifying springs with tufa formation (*Cratoneurion*)
8140 Eastern Mediterranean screes
8210 Calcareous rocky slopes with chasmophytic vegetation
8310 Caves not open to the public
9180 *Tilio-Acerion forests of slopes, screes and ravines
91K0 Illyrian Fagus sylvatica forests (*Aremonio-Fagion*)
91M0 Pannonian-Balkanic turkey oak- sessile oak forests
9250 *Quercus trojana* woods
9530 *(Sub-)Mediterranean pine forests with endemic black pines
95A0 High oro-Mediterranean pine forests
These habitat types are included in Annex I of the Habitats Directive (92/43/EEC), which further confirms the conservation value of this area (Golob et al., 2015).

RESULTS AND DISCUSSION

159 taxa of endemic and subendemic plants have been recorded in the area of the Nature Park "Orjen". Of that number, 118 species and subspecies belong to Balkan endemic plants, and 41 to subendemic plants (Appendix 1).

Among the most represented families, Asteraceae (38), Caryophyllaceae, Fabaceae and Lamiaceae (12) and Poaceae (10) stand out, which in terms of the number of species and genera are the richest in the flora of Bosnia and Herzegovina (Beck-Mannagetta, 1903a, 1903b, 1904, 1906a, 1906b, 1906c, 1907, 1909, 1914, 1916a, 1916b, 1918, 1920, 1922, 1923, 1927, Beck and Malý 1950, Bjelčić 1967, 1974, 1983) (Table 1). The largest number of species (17) is represented by the genus *Hieracium*, followed by the genera *Dianthus* with six species, *Euphorbia* and *Festuca* with four species each.

Table 1. Families with the largest number of endemic species and subspecies in the flora of the Nature Park "Orjen"

Family	No. of taxa
Asteraceae	38
Caryophyllaceae	12
Fabaceae	12
Lamiaceae	12
Poaceae	10
Apiaceae	7
Orobanchaceae	6
Boraginaceae	5
Campanulaceae	5
Iridaceae	5
Brassicaceae	4

The taxonomic structure of the endemic flora of the Nature Park "Orjen" is similar to the taxonomic structure of the endemic flora of Bosnia and Herzegovina (Lubarda, 2013). Based on the taxonomic analysis, it can be observed that in the area of Orjen, the most represented families are Asteraceae, Caryophyllaceae, Fabaceae, Lamiaceae and Poaceae.

The analysis of the representation of individual life forms of the endemic flora of the Nature Park "Orjen" revealed the percentage dominance of hemicryptophytes with 83 representatives or 52.2% of the total number of taxa (Figure 2). Other life forms are represented in the following descending order: chamaephytes (27% or 43 taxa), geophytes (10.1% or 16 taxa), therophytes (4.4% or 10 taxa), nanophanerophytes (3.1% or 5 taxa) and phanerophytes (1.3% or 2 taxa).

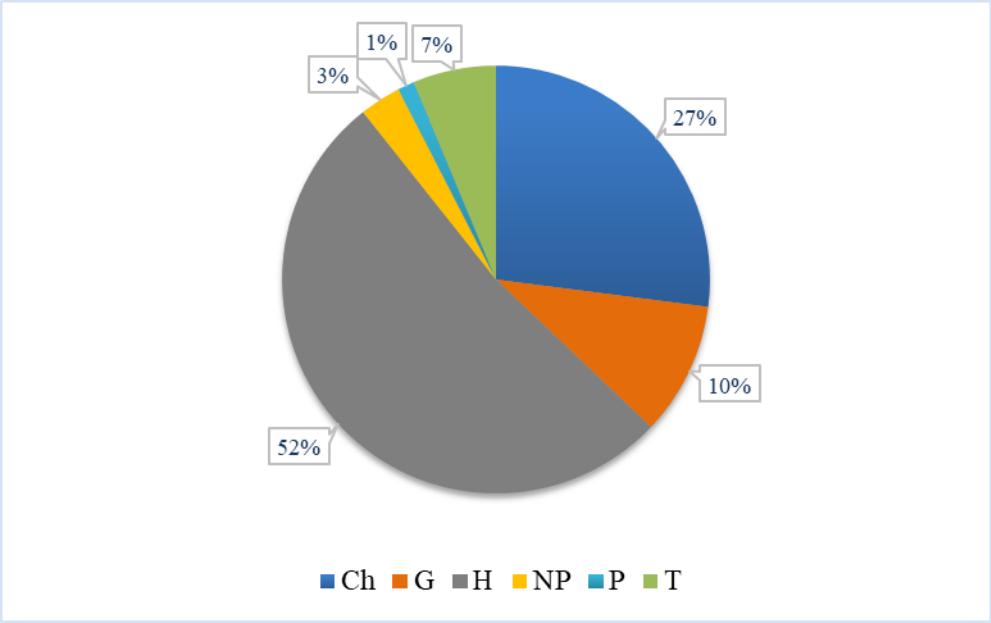

Figure 2. Representation of individual life forms in the endemic flora of the Nature Park "Orjen" (Ch – Chamaephytes, G – Geophytes, H – Hemicryptophytes, NP – Nanophanerophytes, P - Phanerophytes, T – Therophytes)

By comparing the biological spectrum of the endemic flora of Orjen with the endemic flora of Bosnia and Herzegovina, a great similarity is observed in the percentage participation of almost all life forms. However, the life forms of chamaephytes and hemicryptophytes are somewhat less represented, while the proportion of therophytes is somewhat higher. This difference can be explained by the more pronounced influence of the Mediterranean climate in the park area compared to the entire territory of Bosnia and Herzegovina (Table 2).

Table 2. Representation of individual life forms in the endemic flora of the Nature Park "Orjen" and the Balkan endemics of BiH (in %)

Life forms	Nature Park "Orjen"	B&H
Ch	27	30,2
G	10,1	6,4
H	52,2	54,7
NP	3,1	2,7
P	1,3	1,7
T	6,3	4,4

In the structure of the life form of chamaephytes, the largest number of taxa (16 or 37%) belongs to herbaceous chamaephytes with a typical bush form (Ch herb caesp) where the remains of dead leaves densely cover the lower parts of last year's shoot (Figure 3). According to the number of represented species and subspecies, semi-woody dwarf shrubs with a typical bush form (Ch suffrut caesp) belong to second place, and semi-woody dwarf

bushes (Ch suffrut) to third place with 9 representatives or 21% in relation to the total number of chamaephytes.

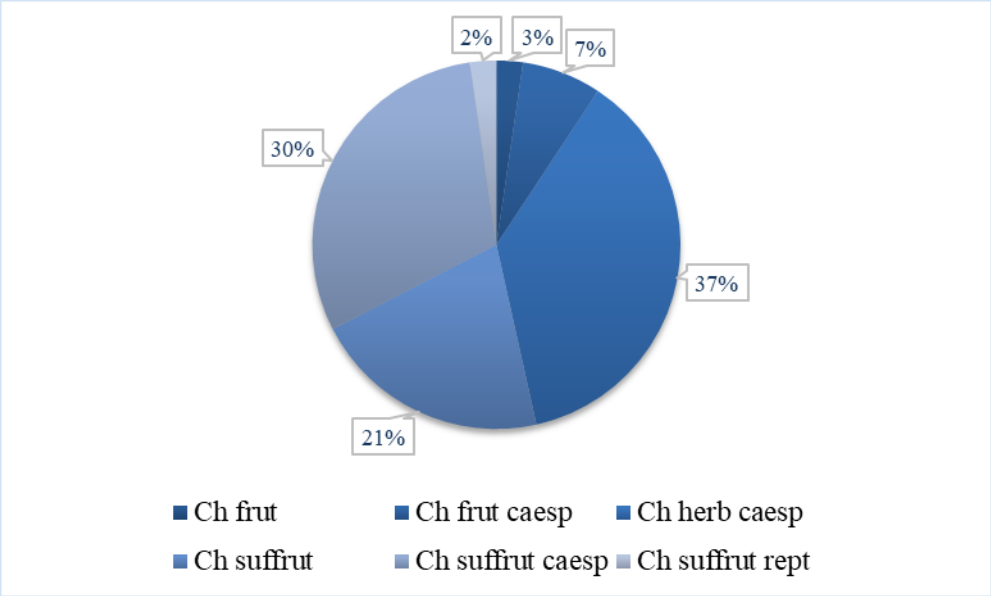

Figure 3. Representation of subgroups of endemic chamaephytes in the flora of the Nature Park "Orjen"

Analyzing the life form of geophytes, the dominance of geophytes with a bulb (G bulb) can be observed, while those with a rhizome (G rhiz) are somewhat less represented (Figure 4). Endemic geophytes have centers of diversity precisely in the area of the Bijela Gora and Orjen (Lubarda, 2013).

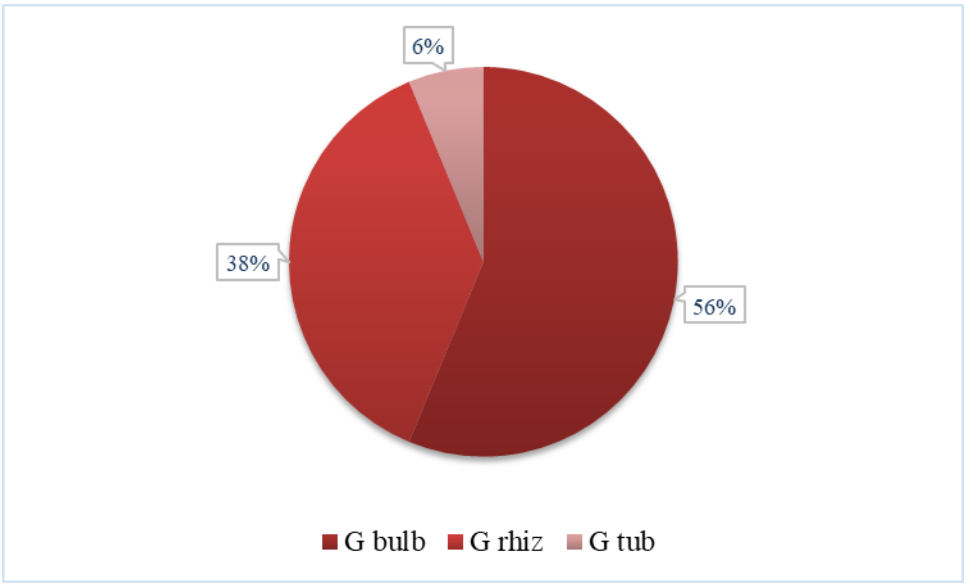

Figure 4. Representation of subgroups of endemic geophytes in the flora of the Nature Park "Orjen"

The significant participation of nanophanerophytes in the biological spectrum of the endemic flora is explained by the fact that taxa such as *Lonicera glutinosa* Vis. and *Lonicera formanekiana* subsp. *hectoderma* Blečić & E. Mayer are limited by its distribution to the area of Mount Orjen, while the species *Viburnum maculatum* Pant. which also belongs to the group of shrubs, has a distribution in the neighboring localities of Vučja Bara near Gacko and on Baba Mountain.

The spectrum of hemicryptophyte life forms shows that hemicryptophyte trees (H scap) are the most represented with 63 taxa or 76% (Figure 5). This group of hemicryptophytes includes all representatives of the genera *Hieracium*, *Centaurea*, *Knautia* and *Pedicularis*. Hemicryptophytes with a rosette (H ros) and with a grassy habitus (H caesp) have approximately equal presence in the endemic flora of Orjen.

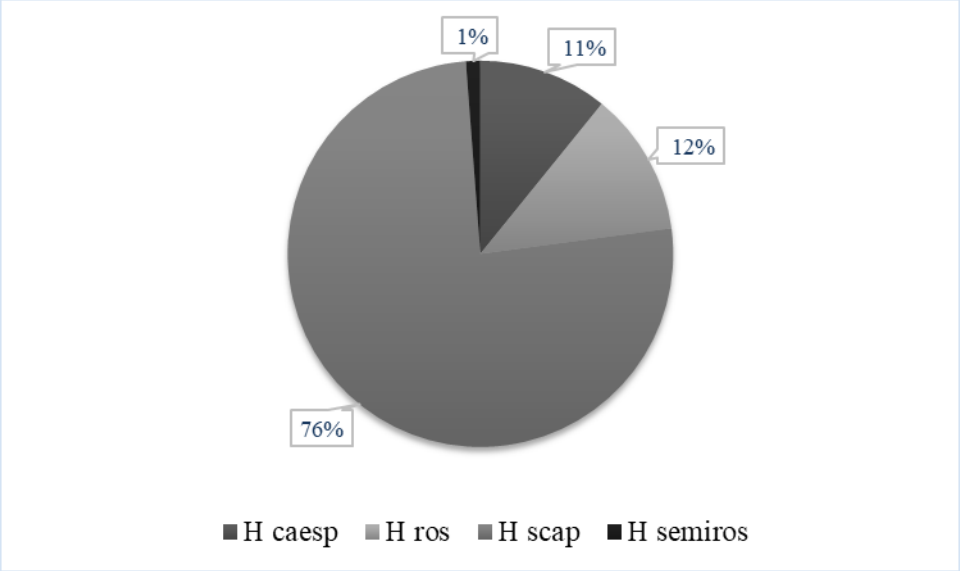

Figure 5. Representation of subgroups of endemic hemicryptophytes in the flora of the Nature Park "Orjen"

Of the total number of endemic plants in the area of the Nature Park "Orjen", as many as 123 species and subspecies belong to the category of strictly protected and protected plants according to the Regulation on Strictly Protected and Protected Wild Species of the Republic of Srpska (Official Gazette of the Republic of Srpska, 65/2020). Strictly protected species include 24 taxa in the rank of species and subspecies, and 99 taxa in the rank of species and subspecies belong to protected species.

Of the strictly protected and protected endemics in the subject area, the district and local endemics of the Orjen sector and the regional endemics, for which the Orjen area is widely recognized in the scientific community, stand out. Important taxa include: *Viburnum maculatum* Pant., *Lonicera glutinosa* Vis., *Lonicera formanekiana* subsp. *hectoderma* Blečić & E. Mayer, *Euphorbia orjeni* Beck, *Centaurea incompta* Vis., *Iris orjenii* Bräuchler & Cikovac, *Salvia brachyodon* Vandas, *Dianthus knappii* (Pant.) Borbás and *Satureja horvatii* Šilić.

CONCLUSION

Nature Park "Orjen" represents an extremely important area in terms of preserving the floristic diversity of the Republic of Srpska. The results of this research show that there are as many as 159 taxa of endemic and sub-endemic plants in the Park area, which is evidence of a high degree of endemism. The dominance of hemicryptophytes and chamaephytes in the spectrum of life forms, as well as the taxonomic structure of the flora, confirm the connection with the general characteristics of the Balkan endemic flora of B&H.

It is particularly significant that as many as 123 taxa belong to the category of strictly protected and protected species according to the current regulations of the Republic of Srpska, among which are numerous district and local endemics that are present exclusively in this area or in its immediate vicinity. These findings further emphasize the conservation value of the park and the need for the creation of a management plan, monitoring of its condition and inclusion in wider strategies for the preservation of biological diversity.

This research provides the basis for future floristic, ecological and conservation research, as well as for the planning of specific protection measures within and outside the boundaries of the Nature Park "Orjen".

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APPENDIX 1

(Bal – Balkan endemics plants, SubE – subendemic plants)

Taxa	**end**	**life form**	**first citation**
Amaryllidaceae			
Allium horvatii Lovrić	Bal	G bulb	Pančić, 1875
Apiaceae			
Astrantia major L. subsp. *elatior* (Friv.) K. Malý	Bal	H scap	Pantocsek, 1874
Athamanta ramosissima Spreng.	SubE	H scap	Studija, 2020
Athamanta turbith (L.) Brot. subsp. *haynaldii* (Borbás & R. Uechtr.) Tutin	Bal	Ch suffrut caesp	Beck, 1927
Bunium alpinum Waldst. & Kit. subsp. *alpinum*	Bal	G tub	Malý, 1919
Bupleurum karglii Vis.	Bal	T scap	Latzel, 1959
Chaerophyllum coloratum L.	Bal	T scap	Beck, 1927
Peucedanum arenarium Waldst. & Kit. subsp. *neumayeri* (Vis.) Stoj. & Stef.	Bal	H scap	Malý, 1919
Apocynaceae			
Vincetoxicum hirundinaria Medik. subsp. *adriaticum* (Beck) Markgr.	Bal	H scap	Ritter-Studnička, 1959
Vincetoxicum huteri Vis. & Asch.	Bal	H scap	Berger, 1914
Araceae			
Arum orientale M.Bieb. subsp. *longispathum* (Rchb.) Engl.	Bal	G rhiz	Beck, 1903
Asparagaceae			
Hyacinthella dalmatica Chouard	Bal	G bulb	Latzel, 1914
Scilla lakusicii Šilić	Bal	G bulb	Pantocsek, 1874
Asteraceae			
Achillea abrotanoides (Vis.) Vis.	Bal	Ch suffrut caesp	Pančić, 1875
Amphoricarpos autariatus Blečić & E. Mayer subsp. *autariatus*	Bal	Ch suffrut caesp	Bjelčić, 1983
Amphoricarpos neumayerianus (Vis.) Greuter	Bal	Ch suffrut caesp	Pančić, 1875
Centaurea glaberrima Tausch subsp. *glaberrima*	Bal	H scap	Vandas, 1889
Centaurea incompta Vis.	Bal	H scap	Pančić, 1875
Centaurea nicolae Bald.	Bal	H scap	Bjelčić, 1983
Cota segetalis (Ten.) Holub	SubE	T scap	Ritter-Studnička, 1959
Crepis pantocsekii (Vis.) Latzel	Bal	H scap	Latzel, 1959
Gnaphalium pichleri Murb.	Bal	H scap	Horvat, 1941
Hieracium bifidum Hornem. subsp. *polytricholepium* Zahn	Bal	H scap	Zhan, 1922-38
Hieracium calophyllum R. Uechtr. subsp. *calophylloides* (Rohlena & Zahn) Zahn	Bal	H scap	Bjelčić, 1983
Hieracium calophyllum R. Uechtr. subsp. *calophyllum*	Bal	H scap	Bjelčić, 1983
Hieracium calophyllum R. Uechtr. subsp. *hercegovinicum* (Freyn & Vandas) Greuter	Bal	H scap	Bjelčić, 1983

Hieracium flexicaule Freyn & Vandas subsp. *flexicaule*	Bal	H scap	Bjelčić, 1983
Hieracium gnilagredae Zahn	Bal	H scap	Bjelčić, 1983
Hieracium gymnocephalum Pant. subsp. *gymnocephalum*	Bal	H scap	Pančić, 1875
Hieracium gymnocephalum Pant. subsp. *laxipellitum* Zahn	Bal	H scap	Bjelčić, 1983
Hieracium heterogynum (Froel.) Gutermann	Bal	H scap	Abadžić i Šilić, 1982
Hieracium macrodontoides (Zahn) Zahn subsp. *macrodontoides*	Bal	H scap	Bjelčić, 1983
Hieracium pichleri A. Kern. subsp. *pichleri*	Bal	H scap	Bjelčić, 1983
Hieracium pichleri A. Kern. subsp. *pseudadamovicii* Zahn	Bal	H scap	Bjelčić, 1983
Hieracium scheppigianum Freyn subsp. *scheppigianum*	Bal	H scap	Bjelčić, 1983
Hieracium tommasinianum K. Malý	Bal	H scap	Studija, 2020
Hieracium waldsteinii Tausch subsp. *lanifolium* (Nägeli & Peter) Freyn	Bal	H scap	Pančić, 1875
Hieracium waldsteinii Tausch subsp. *plumulosum* (A. Kern.) Freyn	Bal	H scap	Bjelčić, 1983
Hieracium waldsteinii Tausch subsp. *suborieni* Zahn	Bal	H scap	Bjelčić, 1983
Hypochaeris maculata L. subsp. *pelivanovicii* (Velen.) Hayek	Bal	H ros	Studija, 2020
Klasea radiata (Waldst. & Kit.) Á.Löve & D.Löve subsp. *cetinjensis* (Rohlena) Greuter & Wagenitz	Bal	H scap	Vandas, 1889
Leucanthemum chloroticum A. Kern. & Murb.	Bal	H scap	Horvat, 1941
Picris hispidissima (Bartl.) W. D. J. Koch	SubE	H scap	Ritter-Studnička, 1959
Pilosella pavichii Heuff.	SubE	H scap	Malý i Zhan, 1929
Reichardia macrophylla (Vis. & Pančić) Pančić	Bal	H scap	Pantocsek, 1874
Scorzonera doriae Degen & Bald.	Bal	H scap	Pantocsek, 1874
Senecio scopolii Hoppe & Hornsch. subsp. *scopolii*	SubE	H ros	Pantocsek, 1874
Senecio thapsoides DC. subsp. *visianianus* (Vis.) Vandas	Bal	H scap	Pantocsek, 1874
Tanacetum cinerariifolium (Trevir.) Sch. Bip.	Bal	H scap	Pantocsek, 1874
Taraxacum janchenii Kirschner & Štěpánek	SubE	H ros	Studija, 2020
Tragopogon tommasinii Sch. Bip.	SubE	H scap	Malý, 1923
Boraginaceae			
Anchusella cretica (Mill.) Bigazzi & al.	SubE	T scap	Ritter-Studnička, 1959
Moltkia petraea (Tratt.) Griseb.	Bal	Ch frut caesp	Pantocsek, 1874
Myosotis suaveolens Willd.	Bal	H scap	Pantocsek, 1874
Onosma echioides (L.) L. subsp. *dalmatica* (Scheele) Peruzzi & N. G. Passal.	SubE	Ch suffrut	Ritter-Studnička, 1959
Onosma stellulata Waldst. & Kit.	Bal	Ch suffrut	Pantocsek, 1874
Brassicaceae			
Cardamine carnosa Waldst. & Kit.	Bal	H scap	Beck, 1916
Cardamine rupestris (O.E. Schulz) K. Malý	Bal	T scap	Beck, 1916
Erysimum linariifolium Tausch	Bal	Ch herb caesp	Pantocsek, 1874
Hesperis matronalis L. subsp. *cladotricha* (Borbás) Hayek	SubE	H scap	Studija, 2020
Campanulaceae			
Campanula austroadriatica D. Lakušić & Kovačić	Bal	Ch herb caesp	Ritter-Studnička, 1959

Campanula pichleri Vis.	Bal	Ch herb caesp	Studija, 2020
Edraianthus graminifolius (L.) A. DC. subsp. *graminifolius*	SubE	Ch suffrut caesp	Pantocsek, 1874
Edraianthus serpyllifolius (Vis.) A. DC.	Bal	Ch suffrut caesp	Bjelčić, 1983
Edraianthus tenuifolius (Waldst. & Kit.) A. DC.	Bal	Ch suffrut caesp	Ritter-Studnička, 1959
Caprifoliaceae			
Lonicera formanekiana Halácsy subsp. *hectoderma* Blečić & E. Mayer	Bal	NP caesp	Blečić i Mayer, 1974
Lonicera glutinosa Vis.	Bal	NP caesp	Visiani 1850
Caryophyllaceae			
Arenaria gracilis Waldst. & Kit.	Bal	Ch herb caesp	Pančić, 1875
Cerastium grandiflorum Waldst. & Kit.	Bal	Ch herb caesp	Pantocsek, 1874
Cerastium ligusticum Viv. subsp. t*richogynum* (Möschl) P. D. Sell & Whitehead	Bal	Ch herb caesp	Pantocsek, 1874
Dianthus ciliatus Guss. subsp. *dalmaticus* (Čelak.) Hayek	Bal	Ch suffrut caesp	Pančić, 1875
Dianthus cruentus Griseb.	Bal	H scap	Vandas, 1888
Dianthus giganteus d'Urv. subsp. *croaticus* (Borbás) Tutin	SubE	Ch herb caesp	Beck, 1909
Dianthus knappii (Pant.) Borbás	Bal	H scap	Pantocsek, 1873a
Dianthus petraeus Waldst. & Kit. subsp. *petraeus*	SubE	Ch herb caesp	Studija, 2020
Dianthus sylvestris Wulfen subsp. *nodosus* (Tausch) Hayek	Bal	Ch herb caesp	Malý, 1920
Minuartia graminifolia (Ard.) Jáv. subsp. *clandestina* (Port.) Mattf.	Bal	Ch herb caesp	Vandas, 1888
Silene reichenbachii Vis.	Bal	Ch suffrut caesp	Vandas, 1888
Silene tommasinii Vis.	Bal	Ch herb caesp	Pantocsek, 1874
Colchicaceae			
Colchicum hungaricum Janka	SubE	G bulb	Studija, 2020
Dipsacaceae			
Knautia albanica Briq.	Bal	H scap	Ritter-Studnička, 1959
Knautia travnicensis (Beck) Szabó	Bal	H scap	Studija, 2020
Knautia visianii Szabó	Bal	H scap	Studija, 2020
Euphorbiaceae			
Euphorbia barrelieri Savi subsp. *hercegovina* (Beck) Kuzmanov	Bal	Ch suffrut	Beck, 1920
Euphorbia capitulata Rchb.	Bal	Ch herb caesp	Pančić, 1875
Euphorbia orjeni Beck	Bal	Ch suffrut	Beck, 1920
Fabaceae			
Anthyllis aurea Host	Bal	Ch suffrut caesp	Vandas, 1888
Anthyllis vulneraria L. subsp. *weldeniana* (Rchb.) Cullen	SubE	H scap	Malý, 1930
Astragalus monspessulanus L. subsp. *illyricus* (Bernh.) Chater	SubE	H ros	Pantocsek, 1874
Astragalus vesicarius L. subsp. *carniolicus* (A. Kern.) Chater	SubE	H scap	Beck, 1927
Cytisus tommasinii Vis.	Bal	Ch frut	Pantocsek, 1874
Genista sericea Wulfen	SubE	Ch suffrut	Pantocsek, 1874
Genista sylvestris Scop. subsp. *dalmatica* (Bartl.) H.Lindb.	Bal	Ch suffrut caesp	Pantocsek, 1874
Onobrychis arenaria (Kit.) DC. subsp. *tommasinii* (Jord.) Asch. & Graebn.	SubE	H scap	Studija, 2020
Oxytropis dinarica (Murb.) Wettst. subsp. *dinarica*	Bal	H scap	Beck, 1927

Petteria ramentacea (Sieber) C. Presl	Bal	NP caesp	Pantocsek, 1874
Trifolium dalmaticum Vis.	Bal	T scap	Pantocsek, 1874
Trifolium pignantii Fauche & Chaub.	Bal	H scap	Pantocsek, 1874
Gentianaceae			
Gentiana verna L. subsp. *tergestin*a (Beck) Hayek	SubE	H ros	Pantocsek, 1874
Gentianella crispata (Vis.) Holub	SubE	H scap	Studija, 2020
Iridaceae			
Crocus dalmaticus Vis.	Bal	G bulb	Studija, 2020
Crocus tommasinianus Herb.	SubE	G bulb	Studija, 2020
Iris orjenii Bräuchler & Cikovac	Bal	G rhiz	Bräuchler i Cikovac, 2007
Iris pseudopallida Trinajstić	Bal	G rhiz	Pantocsek, 1874
Iris reichenbachii Heuff.	SubE	G rhiz	Pantocsek, 1874
Lamiaceae			
Clinopodium alpinum (L.) Kuntze subsp. *majoranifolium* (Mill.) Govaerts	Bal	H scap	Pantocsek, 1874
Clinopodium thymifolium (Scop.) Kuntze	SubE	Ch suffrut	Vandas, 1889
Micromeria croatica (Pers.) Schott	Bal	Ch herb caesp	Pančić, 1875
Micromeria parviflora Rchb.	Bal	Ch suffrut	Pantocsek, 1874
Salvia brachyodon Vandas	Bal	Ch suffrut	Vandas, 1889
Salvia pratensis L. subsp. *bertolonii* (Vis.) Soó	SubE	H scap	Pantocsek, 1874
Satureja horvatii Šilić subsp. *horvatii*	Bal	Ch frut caesp	Šilić. 1979
Satureja subspicata Bartl. ex Vis. subsp. *subspicata*	Bal	Ch frut caesp	Ritter-Studnička, 1959
Sideritis romana L. subsp. *purpurea* (Talbot ex Benth.) Heywood	Bal	T scap	Pantocsek, 1874
Stachys recta L. subsp. *subcrenata* (Vis.) Briq.	Bal	H scap	Pančić, 1875
Teucrium arduinii L.	Bal	Ch suffrut	Vandas, 1889
Thymus bracteosus Vis. ex Benth.	Bal	Ch suffrut rept	Vandas, 1889
Lentibulariaceae			
Pinguicula hirtiflora Ten.	SubE	H ros	Pantocsek, 1874
Liliaceae			
Fritillaria messanensis Raf. subsp. *gracilis* (Ebel) Rix	SubE	G bulb	Ritter-Studnička, 1959
Fritillaria messanensis Raf. subsp. *neglecta* (Parl.) Nyman	SubE	G bulb	Pantocsek, 1874
Lilium bosniacum (Beck) R. M. Fritsch	Bal	G bulb	Beck, 1903
Linaceae			
Linum elegans Boiss.	Bal	Ch suffrut caesp	Malý, 1920
Orobanchaceae			
Euphrasia dinarica (Beck) Murb.	SubE	T scap	Abadžić i Šilić, 1982
Melampyrum barbatum Willd. subsp. *carstiense* Ronniger	SubE	T scap	Pantocsek, 1874
Melampyrum fimbriatum Vandas	SubE	T scap	Vandas, 1889
Pedicularis brachyodonta Schloss. & Vuk. subsp. *brachyodonta*	Bal	H scap	Pantocsek, 1874
Pedicularis brachyodonta Schloss. & Vuk. subsp. *montenegrina* (Nyman) D. A. Webb	Bal	H scap	Malý, 1923
Pedicularis hoermanniana K. Malý	Bal	H scap	Bjelčić, 1967

Papaveraceae			
Pseudofumaria alba (Mill.) Lidén subsp. *leiosperma* (P. Conrath) Lidén	Bal	G rhiz	Beck, 1917
Pinaceae			
Pinus heldreichii H. Christ	SubE	P scap	Pantocsek, 1874
Plantaginaceae			
Linaria peloponnesiaca Boiss. & Heldr.	SubE	H scap	Studija, 2020
Poaceae			
Bromopsis moellendorfiana (Asch. & Graebn.) Holub	Bal	H scap	Ritter-Studnička, 1959
Danthoniastrum neumayerianum (Vis.) Tzvelev	Bal	H caesp	Pančić, 1875
Festuca bosniaca Kumm. & Sendtn. subsp. *bosniaca*	SubE	H caesp	Beck, 1903
Festuca dalmatica (Hack.) K.Richt.	SubE	H caesp	Studija, 2020
Festuca hercegovinica Markgr. - Dann.	Bal	H caesp	Markgraf-Dannenberg, 1978
Festuca panciciana (Hack.) K. Richt.	SubE	H caesp	Lakušić i sar., 1984
Koeleria australis A. Kern.	SubE	H caesp	Vandas, 1889
Leucopoa spectabilis (Bertol.) H. Scholz & Foggi subsp. *croatica* ((A.Kern.) Foggi, Parolo, Gr.Rossi, Ardenghi & Quercioli	SubE	H caesp	Vandas, 1889
Sesleria juncifolia Suffren	Bal	H caesp	Pantocsek, 1874
Sesleria robusta Schott & al.	Bal	H caesp	Vandas, 1889
Polygalaceae			
Polygala alpestris Rchb. subsp. *croatica* (Chodat) Hayek	Bal	Ch herb caesp	Studija, 2020
Ranunculaceae			
Aquilegia dinarica Beck	Bal	H scap	Beck, 1909
Aquilegia grata Malý ex Zimmeter	Bal	H scap	Malý, 1899
Helleborus hercegovinus Martinis	Bal	G rhiz	Pantocsek, 1984
Rhamnaceae			
Rhamnus orbiculata Bornm.	Bal	NP caesp	Ritter-Studnička, 1959
Rosaceae			
Alchemilla amphiargyrea Buser	Bal	H ros	Beck, 1927
Geum molle Vis. & Pančić	SubE	H ros	Studija, 2020
Potentilla speciosa Willd. subsp. *illyrica* Soják	Bal	Ch suffrut caesp	Pančić, 1875
Rubiaceae			
Asperula scutellaris Vis.	Bal	Ch herb caesp	Vandas, 1888
Galium firmum Tausch	Bal	Ch herb caesp	Ritter-Studnička, 1959
Santalaceae			
Thesium parnassi A.DC.	SubE	H scap	Pančić, 1875
Sapindaceae			
Acer hyrcanum Fisch. & C. A. Mey. subsp. *intermedium* (Pančić) Bornm.	Bal	P scap	Studija, 2020
Saxifragaceae			
Saxifraga blavii (Engl.) Beck	Bal	H ros	Beck, 1927

Scrophulariaceae			
Scrophularia bosniaca Beck	Bal	H scap	Bjelčić, 1967
Viburnaceae			
Viburnum maculatum Pant.	Bal	NP caesp	Pantocsek, 1873c
Violaceae			
Viola calcarata L. subsp. *zoysii* (Wulfen) Murb.	SubE	H scap	Beck, 1918
Viola chelmea Boiss. & Heldr. subsp. *vratnikensis* Gáyer & Degen	Bal	H semiros	Niketić i sar., 2015
Viola suavis M. Bieb. subsp. *austrodalmatica* Mereda & Hodálová	Bal	H ros	Studija, 2020

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