

PLANTS FROM JEPI MOUNTAINS, BUCEGI, PRESENT IN "ALEXANDRU BELDIE" HERBARIUM

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Abstract

The present article describes the plants collected from Jepsi Mountains area (Bucegi) and present in one of the most important Romanian herbarium - “Alexandru Beldie” Herbarium from “Marin Drăcea” National Institute for Research and Development in Forestry. The article presents the studied material, the number of vouchers with species harvested from this area as well as some characteristics of this great plant collection. The most important species collected from Jepsi Mountains are also mentioned, with an analysis of their characteristics: the collection’s creation period and the plant’s harvesting periods. The plants collected from this area belong to 54 different genera. Most of them belong to *Hieracium* and *Gentiana* and were collected during the last century, starting with 1900 and ending in 1999. The found genera were systematized, with an emphasis on the most representative ones. Furthermore, the specialists that had an important contribution for the representation of Jepsi Mountains within the herbarium are also mentioned and honored.

Keywords: “Alexandru Beldie” Herbarium, Jepsi Mountains, plant vouchers.

1. INTRODUCTION

Bucegi Mountains belong to the Southern Carpathians and are located in their East part. Prahova Valley separates them from the Curvature Carpathians (figure 1). The highest peak is represented by Omu Peak, with an altitude of 2505 m. The highest area of the Bucegi Mountains is a large complex of structural plateaus located at an altitude between 1800 and 2500 m, and a local relief index of no more than 400-500 m, usually 100-200 m (Mihai et al., 2009).

“Alexandru Beldie” Herbarium was created in 1929 and is inscribed in Index Herbariorum, having the international BUCF code. With approximately 40.000 vouchers (Vechiu et al., 2018a; Dincă et al., 2018), the herbarium is owned by „Marin Drăcea” National Institute for Research and Development in Forestry from Bucharest.

The herbarium contains numerous vouchers initially harvested by Al. Beldie himself and then enriched by exchanges with other national or international herbariums. As such, the herbarium is nowadays one of the most important from our country. Among the genera of plants present in this herbarium we mention: 36 *Bromus* species (Tudor et al., 2019), 21 *Agrostis* species (Cântar et al., 2019), 33 *Orobanch*e species (Scărlătescu et al., 2017a), 42 *Alnus* species (Dincă et al., 2019), 6 *Vaccinium* species (Scărlătescu et al., 2017b), 80 *Trifolium* species (Cântar et al., 2018), 19 *Centaurea* species (Dincă et al., 2017) and 7 *Lycopodium* species (Vechiu et al., 2018b).

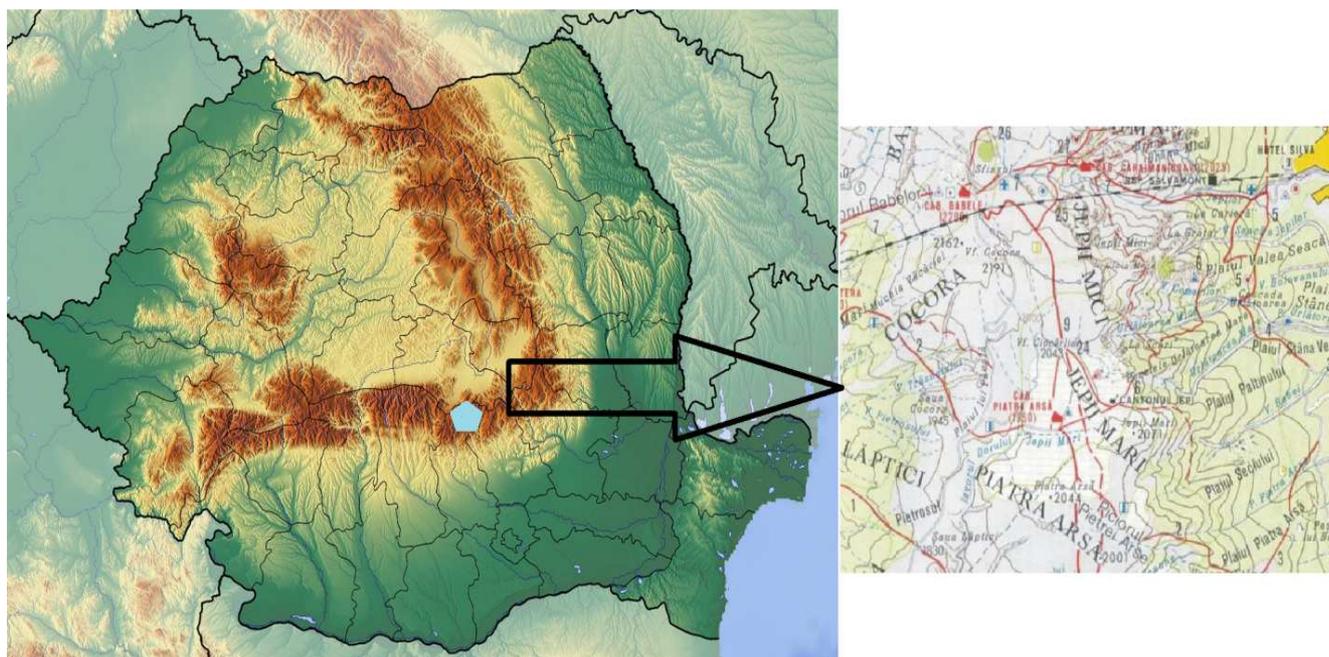


Figure 1. The map of harvesting places for the plants from Jepi Mountains area (Bucegi)

2. MATERIALS AND METHODS

The material that was used for the present article is composed of 146 vouchers belonging to different genera from the studied area. The database was created with the information inscribed on the identification labels of each voucher. As such, the following data was taken from the labels: drawer number, voucher number, plant's scientific name, collection name, harvesting date, harvesting place, the name of the person who has collected or identified the plant. Due to the fact that the creation of the database has involved the analysis of each voucher, another characteristic was also added, namely the conservation degree of each specimen. In this way, a grade from 1 to 4 was given to each specimen as follows: 1 for an entire plant, correctly attached to the voucher and well conserved; 2 for the plant detached from the voucher with existent but detached parts; 3 for plant detached from the voucher with missing parts and 4 for plant detached and fragmented, with over 50% of its parts missing. The next step was to verify if their scientific name is accepted at an international level followed by their update based on The Plant List (www.iucnredlist.org; www.theplantlist.org; www.ipni.org; www2.bgbm.org/EuroPlusMed/query.asp).

3. RESULTS AND DISCUSSIONS

After the vouchers were analysed and systematized, 146 vouchers were identified as containing plants collected from Bucegi Mountains, namely from Jepi Mountains. The vouchers belong to more than 54 genera, with the most representative plants from this area belonging to: *Hieracium* (18 samples from 11 species), *Gentiana* (16 samples belonging to 6 species), *Trifolium* (8 samples from 3 species), *Bupleurum* (7 samples from 3 species).

An excerpt concerning the vouchers that contain plants collected from Bucegi Mountains, area of Jepi Mountains is rendered in table no.1.

Table 1. Plants harvested from Jepsi Mountains area (Bucegi Mountains) and present in "Alexandru Beldie" Herbarium from "Marin Drăcea" National Institute for Research and Development in Forestry - excerpt

Drawer number	Voucher number	Herbarium/ Botanic Collection / Institution (from the voucher's label)	Species (from the voucher's label)	Harvesting Date (from the voucher's label)	Harvesting Place (from the voucher's label)	Collected/ Determined by	Conservation Degree (1...4)
60	79	Al. Beldie Herbarium Bucharest	<i>Bromus barcensis</i> Smk. var. <i>romanicus</i>	1937.09.01.	Bucegi, Jepsi Valley	Al. Beldie	1
60	86	Bucharest Polytechnics School Herbarium, Botanic Laboratory	<i>Bromus barcensis</i> Smk. var. <i>romanicus</i>	1940.09.01.	Bucegi, Jepsi Valley	Al. Beldie	1
155	46	The Institute of Forestry Research and Experimentations	<i>Galium erectum</i> Huds.	1993.08.03.	Bucegi, Jepsi Valley	Al. Beldie	1
156	14	Al. Beldie Herbarium Bucharest	<i>Galium schultesii</i> Vest.	1935.05.01.	Bucegi, Jepsi Valley 1150 m	Al. Beldie	1
87	6	Al. Beldie Herbarium Bucharest	<i>Gentiana phlogifolia</i> Schott et Kotschy	1935.08.01.	Bucegi, Jepsi Mici Mountains	Al. Beldie	3
122	76	Bucharest Polytechnics School Herbarium, Silviculture Faculty	<i>Dianthus tenuifolius</i> Schur.	1948.09.02.	Bucegi, Seaca Valley of Jepsi Mountains	Al. Beldie	1
44	70	Bucharest Polytechnics School Herbarium, Botanic Laboratory	<i>Artemisia petrosa</i> Baum. ssp. <i>carpatica</i>	1939.09.03.	Bucegi, Jepsi Valley	P. Cretzoiu	2
47	21	Bucharest Polytechnics School Herbarium	<i>Trifolium repens</i> L. var. <i>ochranthum</i>	1940.09.01	Bucegi, Jepsi Valley	P. Cretzoiu, Al. Beldie	1
62	49	Bucharest Polytechnics School Herbarium, Botanic Laboratory	<i>Bupleurum falcatum</i> L.	1946.08.01	Bucegi, Jepsi Mountains	Al. Beldie	2
37	1	The Institute of Forestry Research and Experimentations	<i>Hieracium nigrescens</i>	1935.03.09	Bucegi, Jepsi Mici Mountains	Al. Beldie	1

In the area of Jepsi Mountains there were also identified following species in "Alexandru Beldie" Herbarium: *Achillea millefolium* subsp. *stricta* (Schleich. ex Heimerl) Hyl., *Aconitum anthora* L., *Aconitum toxicum* Rchb., *Elymus caninus* (L.) L., *Agrostis rupestris* All., *Alchemilla glaucescens* Wallr., *Alchemilla heteropoda* Buser, *Alchemilla obtusa* Buser, *Alchemilla fissa* Günther & Schummel., *Allium oleraceum* L., *Androsace lactea* L., *Anemone narcissiflora* L., *Angelica archangelica* L., *Cota tinctoria* subsp. *fussii* (Griseb. & Schenk) Oberpr. & Greuter, *Anthyllis alpestris* (Schult.) Kit., *Angelica archangelica* L., *Arenaria biflora* L., *Artemisia umbelliformis* subsp. *eriantha* (Ten.) Vallès-Xirau & Oliva Brañas, *Astrantia major* L., *Helictotrichon pubescens* (Huds.) Schult. & Schult.f., *Helictotrichon planiculme* (Schrader) Pilg., *Brachypodium pinnatum* (L.) P.Beauv., *Bromus riparius* Rehmman, *Bupleurum falcatum* subsp. *cernuum* (Ten.) Arcang., *Bupleurum falcatum* L., *Bupleurum longifolium* L., *Conioselinum vaginatum* (Spreng.) Thell., *Dianthus carthusianorum* subsp. *tenuifolius* (Schur) Hegi, *Kobresia myosuroides* (Vill.) Fiori, *Equisetum hyemale* L., *Equisetum pratense* Ehrh., *Festuca amethystina* L., *Festuca altissima* All., *Galium austriacum* Jacq., *Galium album* Mill., *Galium mollugo* L., *Galium intermedium* Schult., *Galium verum* L., *Gentiana asclepiadea* L., *Gentiana acaulis* L., *Gentiana cruciata* L., *Gentianella*

lutescens (Velen.) Holub, *Gentianella austriaca* (A.Kern. & Jos.Kern.) Holub, *Gentiana punctata* L., *Gentiana verna* L., *Hedysarum hedysaroides* (L.) Schinz & Thell., *Hieracium bifidum* Ser. ex Froel., *Hieracium fritzei* F.W.Schultz, *Hieracium murorum* C.B.Clarke, *Hieracium murorum* subsp. *medianum* (Griseb.) Zahn, *Hieracium nigrescens* Willd., *Hieracium pietroszense* Degen & Zahn, *Hieracium praecurrens* Vuk., *Hieracium prenanthoides* subsp. *lanceolatum* (Vill.) Zahn, *Pilosella stoloniflora* (Waldst. & Kit.) F.W.Schultz & Sch.Bip., *Hieracium villosum* Jacq., *Hieracium villosum* subsp. *ovalifolium* Nägeli & Peter, *Hypochoeris argentina* Cabrera, *Minuartia recurva* (All.) Schinz & Thell., *Ornithogalum gussonei* Ten., *Orobanche alba* Stephan ex Willd., *Orobanche caryophyllacea* Sm., *Phyteuma spicatum* L., *Pinus mugo* Turra, *Plantago montana* Huds., *Persicaria bistorta* (L.) Samp., *Primula elatior* (L.) Hill, *Primula veris* L., *Ranunculus montanus* Willd., *Ranunculus oreophilus* M.Bieb., *Ranunculus serpens* subsp. *nemorosus* (DC.) G.López, *Rubus saxatilis* L., *Podospermum roseum* (Waldst. & Kit.) Gemeinholzer & Greuter, *Tephrosia integrifolia* subsp. *capitata* (Wahlenb.) B.Nord., *Senecio integerrimus* var. *major* (A.Gray) Cronquist, *Senecio supernitens*, *Sesleria coeruleans* Friv., *Sesleria coeruleans* Friv., *Silene nutans* L., *Solidago virga-aurea* L., *Sorbus aucuparia* L., *Telekia speciosa* (Schreb.) Baumg., *Thesium alpinum* L., *Thymus pulegioides* subsp. *montanus* (Benth.) Ronniger, *Trifolium alpestre* L., *Trifolium pratense* L., *Trifolium repens* L., *Trifolium repens* var. *ochranthum* K.Maly, *Trifolium repens* var. *orphanideum* (Boiss.) Boiss., *Vaccinium uliginosum* L..

Hieracium belongs to the *Asteraceae* family and is a perennial herb. They are complex plants with an intricate pattern of morphological variation and reproductive systems (Zeljko et al., 2008). According to the International Plant Names Index, there are more than 12.000 names for this species including subspecies and synonymous. The majority of *Hieracium* species can be found in the Alps and Central Europe, but they also occur in North America and Asia. It grows in forests and forest margins, pastures, screes, rocks and disturbed ground. In the area of Jepsi Mountains botanists found following *Hieracium* species: *Hieracium bifidum* Ser. ex Froel., *Hieracium fritzei* F.W.Schultz, *Hieracium murorum* C.B.Clarke, *Hieracium murorum* subsp. *medianum* (Griseb.) Zahn, *Hieracium nigrescens* Willd., *Hieracium pietroszense* Degen & Zahn, *Hieracium praecurrens* Vuk., *Hieracium prenanthoides* subsp. *lanceolatum* (Vill.) Zahn, *Pilosella stoloniflora* (Waldst. & Kit.) F.W.Schultz & Sch.Bip., *Hieracium villosum* Jacq., *Hieracium villosum* subsp. *ovalifolium* Nägeli & Peter.

Gentiana genus is part of the *Gentianales* order, *Gentianaceae* family. This genus includes approximately 400 species which are found mainly in the alpine areas of the temperate regions of Asia, Europe and America. It prefers neutral and acidic soils rich in humus and well-drained. "Alexandru Beldie" Herbarium contains more than 60.000 plates from which 206 belong to the *Gentiana* genus (Enescu et al., 2018). The *Gentiana* species found in Jepsi mountains are the following: *Gentiana asclepiadea* L., *Gentiana acaulis* L., *Gentiana cruciata* L., *Gentianella lutescens* (Velen.) Holub, *Gentianella austriaca* (A.Kern. & Jos.Kern.) Holub, *Gentiana punctata* L., and *Gentiana verna* L.. The most numerous *Gentiana* species found in "Alexandru Beldie" Herbarium harvested all over Romania are the following: *Gentiana asclepiadea* L. (21 plates), *Gentianopsis ciliata* L. (10 plates), *Gentiana acaulis* L. (11 plates), *Gentianella lutescens* (Velen.) Holub (25 plates), *Gentiana verna* L. (23 plates) and *Gentiana utriculosa* L. (20 plates) (Enescu et al., 2018).

Trifolium genus is very large and includes annual and perennial species. Numerous *Trifolium* species were originally native to the middle and south of Europe, North Africa and the area ranging from Asia Minor to China. *Trifolium* species are found in a wide variety of moist habitats

throughout those areas (Sabudak and Guler, 2009). Botanists have found three species belonging to this genus in Jepi Valley from Bucegi Mountains: *Trifolium alpestre* L., *Trifolium pratense* L. and *Trifolium repens* L.

The plants collected from Jepi Mountains (Bucegi) that are present in “Alexandru Beldie” Herbarium are in a good conservation state.

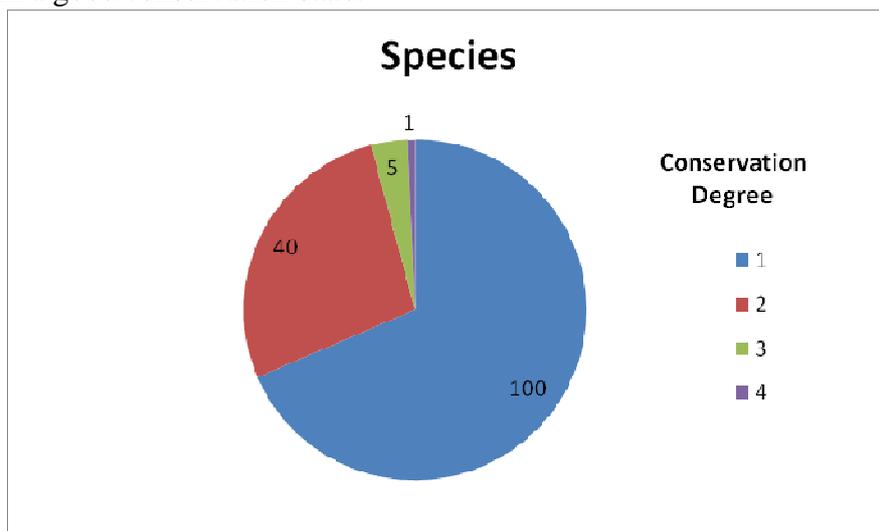


Figure 2. Conservation degree of species collected from Jepi Mountains

As such, from the total of 146, the majority of vouchers, namely 100, are in a very good conservation state. 40 vouchers are in a good conservation state, while 5 vouchers are in a weak conservation state and only one is in a very poor state (figure 2). The majority of vouchers are kept in their original maps (figures 3, 4).



Figure 3. Vouchers with plants from Jepi Mountains (Bucegi) present in “Alexandru Beldie” Herbarium, “Marin Drăcea” National Institute for Research and Development in Forestry (*Gentiana asclepiadea* L. – left, *Hieracium carneum* Greene - right)



Figure 4. Vouchers with plants from Jepsi Mountains (Bucegi) present in “Alexandru Beldie” Herbarium, “Marin Drăcea” National Institute for Research and Development in Forestry (*Telekia speciosa* – left, *Trifolium repens* - right)

The plants gathered from Jepsi Mountains (Bucegi) and present in “Alexandru Beldie” Herbarium were systematized based on their harvesting year. This has allowed for an observation of the periods in which the plants were gathered and when this area of Bucegi Mountains were an important area for the herbarium’s development. These periods can also be analysed in figure 5.

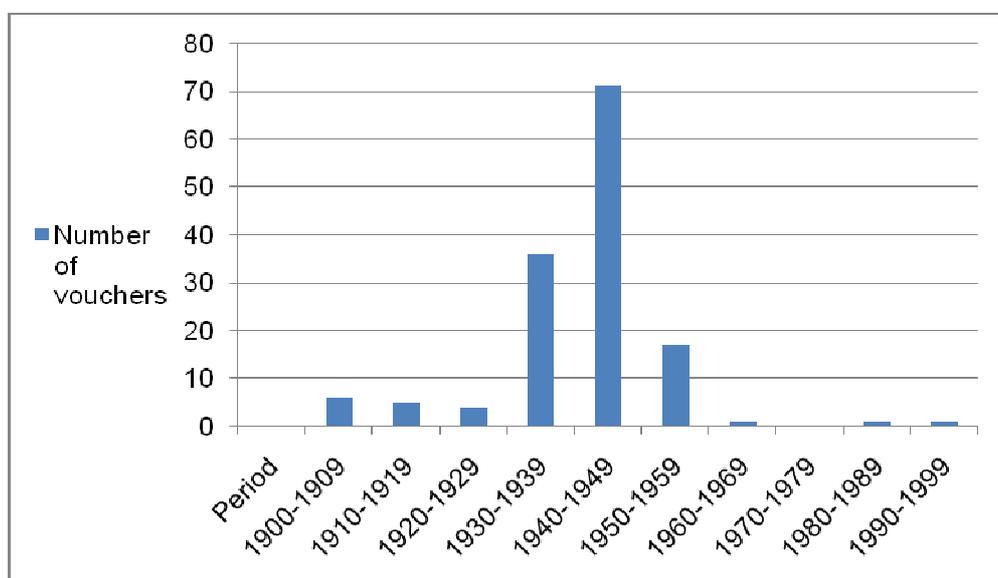


Figure 5. Harvesting periods for plants from Bucegi Mountains that can be found in “Alexandru Beldie” Herbarium

As such, from a total of 146 plants, the majority (71) were collected during 1940-1949 (figure 5). The majority of plants harvested from this area amount to 114 and were gathered by Alexandru Beldie himself who was very attached to this area. As such, Alexandru Beldie has known in detail the flora and vegetation from Bucegi Mountains and is considered the father of Bucegi Natural

Reservation, being also its first custodian (Vasile et al., 2016). In addition, “Alexandru Beldie” Herbarium also contains vouchers with plants collected by other botanists from this region such as C.C. Georgescu (whose name is present on 2 vouchers), M. Haret (14 vouchers), M. Brandza (2 vouchers), P. Cretzoiu (6 vouchers), R. Zitti, T. Bunea and I. Todor (each with one voucher).

4. CONCLUSIONS

Jepi Mountains area (Bucegi) represents a territory with a rich biodiversity and has represented in the past as well as in the present, an important source for the development and enrichment of “Alexandru Beldie” Herbarium from “Marin Drăcea” National Institute for Research and Development in Forestry.

The plants collected from this area belong to 54 different genera. Most of them belong to *Hieracium* and *Gentiana* and were collected during the last century, starting with 1900 and ending in 1999.

Numerous plant species from Jepi Mountains (Bucegi) can be found in “Alexandru Beldie” Herbarium.

Even though more than 100 vouchers were collected by the famous botanist Alexandru Beldie, approximately 9 specialists have covered the forests, meadows and pastures from Jepi Mountains (Bucegi) in order to collect plants that have extended the collections from this herbarium.

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