

AGROSTIS SPECIES PRESENT IN THE “ALEXANDRU BELDIE” HERBARIUM FROM “MARIN DRĂCEA” NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN FORESTRY

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ABSTRACT

Well represented within Al. Beldie Herbarium from „Marin Drăcea” National Institute for Research and Development in Forestry, the Agrostis Genus stands out through the important number of plates that contain plants representative for this Genus, as well as through the information contained within it. This information relates to the plants’ gathering places, covering almost our entire country, and to the renowned specialists that have contributed to the collection’s development, gathering or identifying plants belonging to the Agrostis Genus.

The present paper summarises and presents the Agrostis species present in the Herbarium based on their gathering place and year, as well as after the specialists that has collected them. Furthermore, the most important Agrostis species are described based on the abundance from the Herbarium’s maps, their rarity or endangerment in the natural environment.

The paper starts with a description of the Herbarium, continuing with

presenting the studied material (93 plates that contain 21 Agrostis species). The materials and methods used for elaborating the present paper are then presented together with a systematization of plants and the description of the most important ones.

From the Agrostis Genus, the Herbarium accommodates a sample of a species that appears in the Red Book of vascular plants from Romania (Agrostis alpina Scop.). Furthermore, the Herbarium can also take pride of old plants with an historical value, collected almost 150 years ago (Agrostis maritima DC, 1874, Coulon, France).

In addition, the present paper presents a graphic of gathering periods for the plants belonging to this Genus, followed by a map of their gathering places from Romania.

The conclusions present some important aspects regarding the Agrostis species and samples present in the above-mentioned Herbarium.

INTRODUCTION

“Alexandru Beldie” Herbarium from Marin Drăcea National Institute for Research-Development in Forestry (INCDS) from Bucharest, holds a significant value both from a scientific as well as historical value (Vasile *et al.*, 2017). This fact is proven by the 30 drawers with 20 drawers each, that reunite approximately 40 000 plates with plants conserved in their original maps.

The „Alexandru Beldie” Herbarium is registered in INDEX HERBARIUM, being formed of different private donated collections as well as exemplars from foreign collections obtained through exchanges.

The Herbarium was developed due to the work of collecting and establishing plants by renowned personalities from the systematics domain. As such, the

Herbarium takes its name from Alexandru Beldie, one of the most remarkable Romanian botanists who has dedicated his work to studying the flora from Bucegi mountains (Beldie 1967, Beldie 1972).

In regard with the *Agrostis* species described in this paper, the Herbarium reunites numerous other species and genera, such as: 32 *Arabis* species (Dincă L. *et al.*, 2017a), 19 *Androsace* species (Dincă M. *et al.*, 2017a), 9 *Melica* species and 11 *Eragrostis* species (Cântar C. *et al.*, 2017), 33 *Orobanche* species (Scărlătescu V. *et al.*, 2017), 112

Hieracium species (Dincă L. *et al.*, 2017b), 19 *Scorzonera* species (Dincă L. *et al.*, 2017c), 19 *Centaurea* species (Dincă M. *et al.*, 2017), 15 *Ornithogalum* species (Enescu R. *et al.*, 2017), and 15 *Veronica* species (Dincă L. *et al.*, 2017d). Besides the numerous species collected from mountain areas, the Herbarium also contains species collected from different areas of our country, or from abroad, such as those collected from Bazoș Dendrologic Park by Pașcovschi (Chisălițaeț *al.*, 2017).

MATERIALS AND METHODS

The studied material was represented by the 93 plates that contain species belonging to the *Agrostis* Genus, present in Al. Beldie Herbarium from INCDS „Marin Drăcea”.

Work methods specific to the research activity were applied on the presented material, as is described below.

Bibliographic research and documentation, used for characterising from an ecological and morphologic point of view the main *Agrostis* species.

Analysis and synthesis, used a work method for systematizing and digitizing the Herbarium’s plates as well

as for creating maps. The analysis and synthesis of data has led to the paper’s results and conclusions.

Systematizing the plates that contain *Agrostis* exemplars has revealed the presence of 21 species belonging to this Genus. These species were then grouped on the gathering place and year and the specialist that has collected them. An excerpt of this systematization is rendered in Table number 1.

Furthermore, the main species of the *Agrostis* Genus present in the Herbarium were described, based on the thorough bibliographic research stage.

***Agrostis* Inventory from Al. Beldie Herbarium, INCDS Bucharest (excerpt)**

Table 1

Plate number	Herbarium/ Botanic collection/ Institution	Species name	Gathering date	Gathering place	Collected/ Determined by:	Conservation degree (1..4)
26	Museum Botanicum Universitatis, Cluj / Flora Romaniae exsiccata	<i>Agrostis alba</i> L.	1923.07.18	Dobrogea, distr. Tulcea alt 3 m	E.L. Nyárády	1
27	ICEF, Forestry Research and Experimentation Institute	<i>Agrostis alba</i> L.	1944.07.24	distr. Muscel, Mihăești	I. Morariu, M. Ciucă	1
28	ICEF, Forestry Research and Experimentation Institute	<i>Agrostis alba</i> L.	1944.08.02	Siria, Arad County	S. Pașcovschi	1
29	ICEF, Forestry Research and Experimentation Institute	<i>Agrostis alba</i> L.	1938.07.03	Casa Verde Forest, Timișoara	S. Pașcovschi	1
30	ICEF, Forestry Research and Experimentation Institute	<i>Agrostis alba</i> L.	1937.06.20	Casa Verde Forest, Timișoara	S. Pașcovschi / Al. Beldie	1

31	ICEF, Forestry Research and Experimentation Institute	<i>Agrostis alba</i> L.	1938.07.23	Sabed Experimental Stand, Mureș County	S. Pașcovschi / Al. Beldie	1
32	ICEF, Forestry Research and Experimentation Institute	<i>Agrostis alba</i> L.	1938.07.22	Sabed Experimental Stand, Mureș County	S. Pașcovschi / Al. Beldie	1
33	ICEF, Forestry Research and Experimentation Institute	<i>Agrostis alba</i> L.	1939.07.06	Sabed Experimental Stand, Mureș County	S. Pașcovschi	1
36	Bucharest Polytechnics Herbarium, Forestry Faculty/ Botanic Laboratory	<i>Agrostis alba</i> L.	1943.08.01	Bucegi	Al. Beldie	1
37	ICEF, Forestry Research and Experimentation Institute	<i>Agrostis alba</i> L.	1936.07.15	Matei Basarab, Prahova	Haralamb	1
38	ICEF, Forestry Research and Experimentation Institute	<i>Agrostis alba</i> L.	1934.01.01	Novaci, Gorj	Haralamb/ J. Neuwirth	1
39	ICEF, Forestry Research and Experimentation Institute	<i>Agrostis alba</i> L.	1935.08.06.	Broasca, Buzău	Haralamb / Al. Beldie	1
42	ICEF, Forestry Research and Experimentation Institute	<i>Agrostis alba</i> L.	1935.08.06	Broasca, Buzău	Haralamb / Al. Beldie	1

RESULTS AND DISCUSSIONS

***Agrostis* Genus** belongs to the *Poales* Order, *Poaceae* Family, *Poeae* Tribe.

The most common *Agrostis* species present in the Herbarium are the following: *Agrostis tenuis* Sibth. (26 plates), *Agrostis alba* L. (25 plates), *Agrostis vulgaris* (12 plates), *Agrostis rupestre* (10 plates).

The most encountered species from the Herbarium's maps, *Agrostis tenuis* Sibth. (Fig. 1), forms a dense sward of quite fine leaves; during flowering, a reddish-purple

inflorescence forms an haze over the mat of leaves; the flowering panicle is finely branched with numerous small spikelet. This species is very varied, having many cultivars recognized; it easily adapts to environmental stresses, by adapting genetically, and through plasticity. Like many other members of the *Agrostis* genus, it is a valuable agronomic species when used for fodder and can also be used for golf courses or home lawns (<http://www.ibaf.cnr.it>).



Fig. 1 *Agrostis tenuis* Siebth. habitus (Photo: Javier Martin - <https://commons.wikimedia.org>)

A special importance, from a scientific point of view, is held by an *Agrostis alpina* Scop. Sample that is mentioned in Romania's Red Book of vascular plants (rare, endangered or endemic species). The plant was gathered in 1928 from Mehedinți County by E.L. Nyárády. Within the Herbarium, the plant can be found in Plate number 3 from the *Museum Botanicum Universitatis*

Collection, Cluj / Flora Romaniae exsiccata.

Agrostis alpina Scop. (fig. 2) is a glabrate perennial plant, with a small, fibrous and erect stem, short and lanceolate leaves. The panicle can reach 3-5 cm, being oval-elongated, purple or sometimes gold. The plant grows in rocky areas from high mountains from Central Europe, Alps or the Pyrenees and it usually blooms between July and August (<https://www.tela-botanica.org>).



Fig. 2 *Agrostis alpina* Scop. (Photo: O. Nawrot - <https://inpn.mnhn.fr>)

Other *Agrostis* species present in the Herbarium are: *A. canina* L., *A. capillaris* L., *A. clavata* Trin., *A. gigantea*, *A. hallii* Vasey, *A. humilis* Vasey, *A. maritima* DC, *A. nebulosa*, *A. pallida* DC, *A. pyrenaea*, *A. rubra* Whlbg., *A. schleicheri*, *A. varians*, *A. verticillata* Vill., *A. stolonifera* L.

The plant's gathering year. The *Agrostis* plants present in Al. Beldie Herbarium were gathered between 1874 and 1989. The oldest plant from the Herbarium is an *Agrostis maritima* DC sample, collected from Coulon, France in 1874.

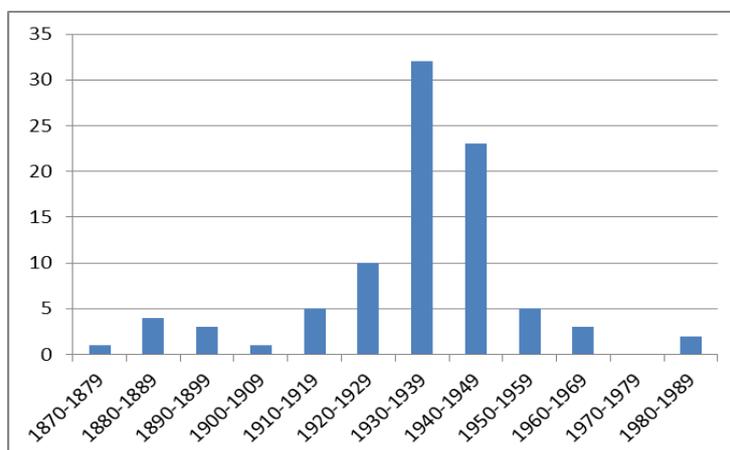


Figure 3. Gathering periods of *Agrostis* plants from INCDS Herbarium

The gathering places of *Agrostis* species present in Al. Beldie Herbarium is represented by locations from Romania (Fig. 4), such as: Săbed Experimental Stand (Mureș), Bucegi Mountains, Buzău, Căciulata (Vâlcea), Mihaești (Argeș), Tulcea, Ilfov, Hemeiuș (Bacău), Cluj, Gorj, Pădurea Verde Timișoara,

Dâmbovița, Șiria (Arad), Brașov, Mehedinți, Bihor, Hunedoara, Dolj, Gorj, Mureș, Harghita and Maramureș.

Some of the *Agrostis* samples were also gathered from different locations from Europe, such as France, Spain, Italy or Bulgaria.

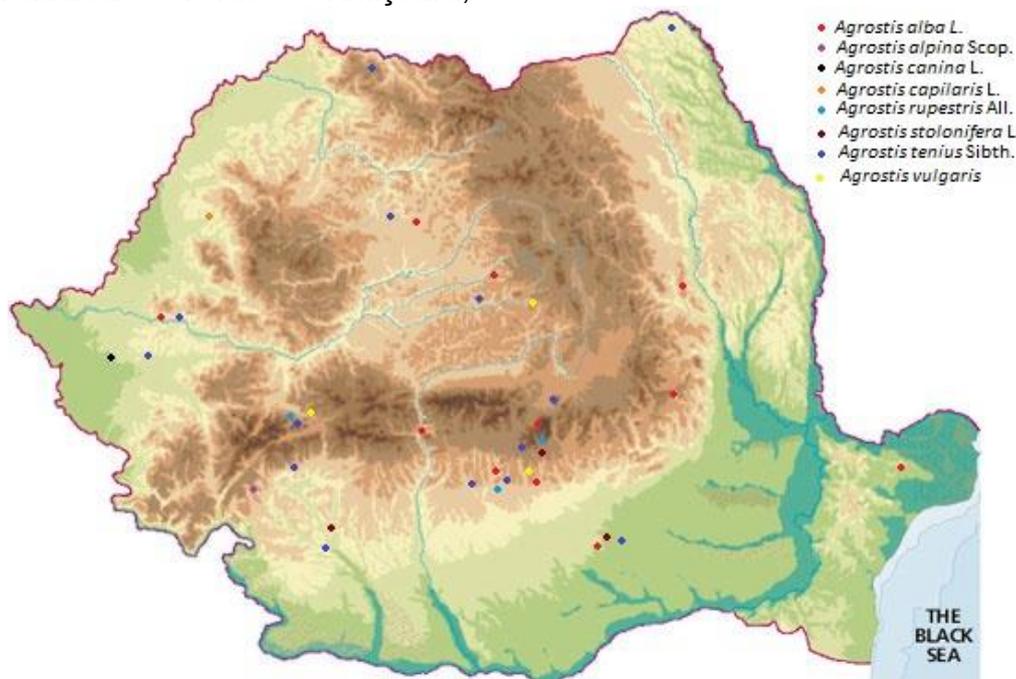


Figure 4. Gathering place of *Agrostis* species from Romania

The persons who have gathered the samples are Romanian specialists (Al. Beldie, C. Georgescu, At. Haralamb, M. Haret, I. Morariu, M. Ciucă, E. I. Nyarady, S. Pascovschi, I. Prodan, E. Petrini, C. Maloș, M. Olaru, Gh. Bujorean, Al. Borza,

A. Coman, T. Bunea., I. Iacob, M. Păun, C. Pavel, I. Zaharia, M. Petcuț, P. Cretzoiu, V. Ciocîrlan, I. Todor) or foreign ones (Abbé J. Sauze, C. Baenitz, C. Blom, E. Reverchon, J. Neuwirth, I. Borumüller, P. Billiet, Sagorski).

CONCLUSIONS

Agrostis is a well-represented Genus within Al. Beldie Herbarium from INCDS Bucharest, through a number of 21 species displayed in 93 plates. Within the *Agrostis* maps, the most well represented species are *Agrostis tenuis* Sibth and *Agrostis alba* L. which can be found in 26 and 25 plates.

Within the Herbarium, the *Agrostis* Genus is also represented by a rare species registered in Romania's Red Book of vascular plants (that contains rare, endangered or endemic species),

namely *Agrostis alpina* Scop. Gathered in 1928 from Mehedinți County.

The *Agrostis* samples present in the Herbarium hold also an important historical value, as the oldest plant dates back to 1874 (an *Agrostis maritima* DC sample gathered from Coulon, West France).

As can be seen in Figure number 4, the *Agrostis* species from the Herbarium were gathered from almost all the country's areas, both from mountain areas (Bucegi, Retezat) hills (Mureș, Cluj Arad etc.) as well as plains (Tulcea, Ilfov,

Timiș). Besides the locations from Romania, *Agrostis* samples were also gathered from different European countries, such as France, Spain, Italy or Bulgaria.

In regard with the gathering periods, as can be seen in Figure number 3, the *Agrostis* collection was created by gathering plants on a period of almost 120 years, starting with one *Agrostis maritima* DC collected in 1974 in France

and ending with *Agrostis rubra* gathered in 1989. The period of maximum development spans between 1930 and 1950, during which time the collection was enriched with 55 exemplars. Even though this period coincided with the harsh period of the Second World War, our fore runners did not renounce building this inheritance, known as Alexandru Beldie Herbarium.

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