PLANTS FROM BUZAU COUNTY PRESENT IN "ALEXANDRU BELDIE" AND W.U. HERBARIUMS

V. CRIȘAN[1], L. DINCĂ[1], S. DECĂ[2]

[1] "Marin Drăcea" National Institute for Research and Development in Forestry, Brașov, Romania, Closca street, no.13.
[2]Romanian Academy of Advanced Studies, 125 Calea Victoriei street, sector 1, Bucharest 010071, Romania

Corresponding author: vlad_crsn@yahoo.com

Abstract. *The present article describes the plants collected from Buzau County and present in "Alexandru Beldie" Herbarium from "Marin Drăcea" National Institute for Research and Development in Forestry and W.U. Herbarium from the University of Vienna. Buzău County connects the Carpathian ark with Danube's Plain as it occupies an area located at the border of the three historical Romanian provinces - Muntenia, Moldova and Transylvania. The county occupies the largest part of Buzău river's hydrographic basin, accommodating harmoniously all relief forms: mountains in the north part, field in the south and the sub-carpathian hill area between them. The article presents the studied material, the number of vouchers with species harvested from this area as well as some characteristics of the plant collections. The most important species collected from Buzau County are also mentioned, followed by an analysis of their characteristics: the collection's creation period and the plant's harvesting periods. The found genera were systematized, with an emphasis on the most representative ones. Buzau County represents a territory with a rich biodiversity and has represented both in the past as well as in the present, an important source for the development and enrichment of herbariums from all over the world. The plants collected from this area belong to 56 different genera. Most of them belong to Quercus and Cytisus genera and were collected during the first half of the past century, with a peak registered between 1932 and 1942. Four species are present in W.U. Herbarium and not present in "Alexandru Beldie" Herbarium: Galium, Inula, Seratula and Asplenium. Even though more than 70 vouchers were collected by the famous botanist S. Paşcovschi, approximately 18 romanian and foreign specialists have covered the forests, meadows and pastures from Buzau County in order to collect plants that have extended the collections from both W.U. and "Alexandru Beldie" herbariums.*

Keywords: *Buzau County, plants, WU Herbarium, "Alexandru Beldie" Herbarium.*

INTRODUCTION

Buzău County is located in the Southeast part of Romania, in the Southeast of the Southern Carpathians and on Buzău River. With a surface of 6.102,6 square kilometres, the county represents 2,6 % of the country's territory (fig.1). Buzău County connects the Carpathian ark with Danube's Plain as it occupies an area located at the border of the three historical Romanian provinces - Muntenia, Moldova and Transylvania. The county occupies the largest part of Buzău river's hydrographic basin, accommodating harmoniously all relief forms: mountains in the north part, field in the south and the sub-carpathian hill area between them. The mountain area is formed of Buzăului Mountains and Vrancei Mountains which belong to the Curvature Carpathians. The hill area, also known as Buzău Sub-Carpathians (Buzăului Hills), is formed of a succession of hill summits and depressions. The plain area covers the county's South and Southeast parts, belonging to the large Romanian Plain

morphologic unit. The climate is temperate continental with variations from North to South due to altitude, the relief's general orientation and the local configuration (insse.ro).

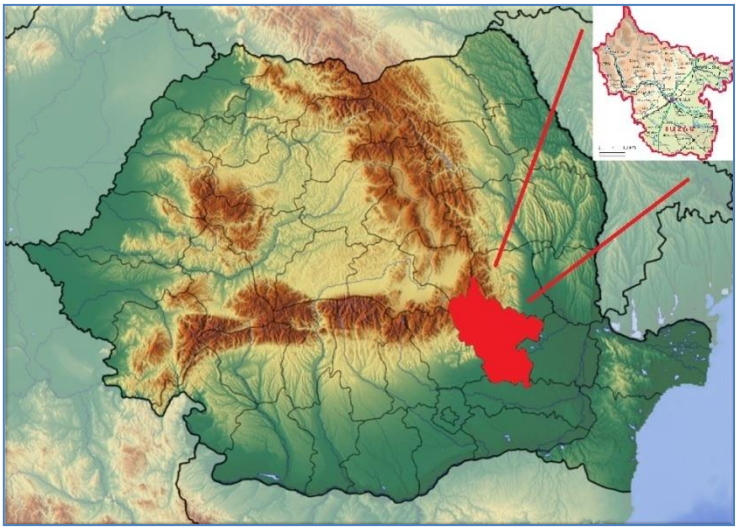


Fig.1. The map of Buzau County

Due to its relief harmony, Buzau County has an exceptional flora that attracts numerous Romanian and foreign botanists who have collected over time plants from the entire county's surface. The result of their work can be found in renowned herbariums such as "Alexandru Beldie" Herbarium or Herbarium W.U. from the Institute of Botany, University of Vienna.

"Alexandru Beldie" Herbarium was created in 1929 and is inscribed in Index Herbariorum, having the international BUCF code. With more than 40.000 vouchers, the herbarium is owned by „Marin Drăcea" National Institute for Research and Development in Forestry from Bucharest and contains numerous plants that belong to different genera such as: 17 *Amaranthus* species (Dincă et al., 2018), 11 *Elymus* species (Pleșca et al., 2019), 7 *Lycopodium* species (Vechiu et al., 2018), 80 *Trifolium* species (Cântar and Dincă, 2018), 19 *Centaurea* species (Dincă et al., 2017), 33 *Orobanche* species (Scărlătescu et al., 2017), 21 *Agrostis* species (Cântar and Dincă, 2019), 36 *Bromus* species (Tudor and Dincă, 2019), 42 *Alnus* species (Dincă and Peticilă, 2019) and the 58 *Cornus* species (Vechiu and Dincă, 2019).

Herbarium W.U. belongs to the Institute of Botany, University of Vienna. The collection of dried plant specimens dates back to the year 1879 when the then Director of the Botanical Museum, Anton Kerner von Marilaun, had begun to acquire herbarium material for the installation of an institute's new herbarium (WU). The new herbarium grew rapidly and in 1889, it contained already 80.000 specimens. Today the herbarium of the Institute of Botany is estimated to contain about 1,400.000 specimens covering all worldwide plant groups (www.herbarium.univie.ac.at).

MATERIAL AND METHODS

The material from "Alexandru Beldie" Herbarium that was used for the present article is composed of 276 vouchers belonging to different genera from the studied area. The database was created from 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 (Table 1). 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 a plant detached from the voucher with missing parts and 4 for a plant detached and fragmented, with over 50% of its parts missing. The next step was to verify the acceptance of their scientific names at an international level followed by their update based on *The Plant List (www.theplantlist.org)*.

The material from WU Herbarium was composed of 8 vouchers belonging to different genera from the studied area and it was downloaded from herbarium database (https://herbarium.univie.ac.at/database).

RESULTS AND DISCUSSION

The material from WU Herbarium that was used for the present article is composed of 8 vouchers belonging to 6 genera from the studied area of Buzau County (table 1).

Table 1

Plants harvested from Buzau County and present in WU Herbarium from the University of Vienna

Taxon	Collector	Date	Location
Agrostis stolonifera L.	Ciocîrlan,V. Flora Romaniae exsiccata 3491	1970-08-04	Buzau
Equisetum hyemale L.	Walter,S. s.n.	1973-08	Buzau
Galium volhynicum Pobed.	Ciocîrlan,V. Flora Romaniae exsiccata 922b	1964-08-10	Buzau
Inula salicina L.	Anastasiu,P	2003-06-14	Buzau
Serratula caput-najae Zahar.	Zahariadi,C. Flora Romaniae exsiccata s.n.	1944-06-21	Buzau
Serratula caput-najae Zahar.	Zahariadi,C. Flora Romaniae exsiccata s.n.	1944-07-13	Buzau
Serratula caput-najae Zahar. forma semivestita Zahar.	Zahariadi,C. Flora Romaniae exsiccata 2982	1944-06-21	Buzau
Asplenium cuneifolium Viv.	Richter,A. s.n. [1906-08-23]	1906-08-23	Buzau

The plants gathered from Buzau County and present in W.U. Herbarium were harvested between 1906 and 2003 by romanian and foreign botanists.

After the vouchers from "Alexandru Beldie" Herbarium were analysed and systematized, 276 vouchers were identified as containing plants collected from Buzau County. The vouchers belong to 52 genera, with the most representative plants from this area belonging to: *Quercus* (66 samples from 6 species), *Cytisus* (49 samples belonging to 4 species), *Sorbus* (13 samples from 3 species), *Alnus* (11 samples from 3 species), and *Plantago* (11 samples from 5 species).

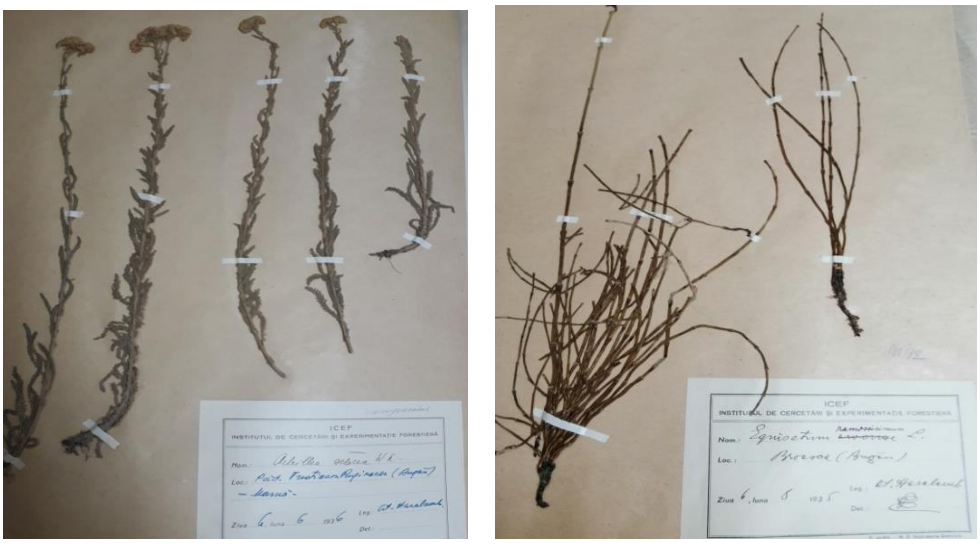
An excerpt regarding the vouchers that contain plants collected from Buzau County is rendered in Table number 2.

Table 2

Plants harvested from Buzau County 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**	**Harvesting Date**	**Harvesting Place**	**Collected/ Determined by**	**Conservation Degree (1…4)**
10	16	The Institute of Forestry Research and Experimentations	Achillea setacea Waldst. & Kit.	1936.06.06	Buzau County	At. Haralamb	1
10	17	The Institute of Forestry Research and Experimentations	Achillea setacea Waldst. & Kit.	1940.09.01.	Buzau County	At. Haralamb, Al. Beldie	1
10	65	Bucharest Polytechnics School Herbarium, Botanic Laboratory	Salix fragilis L.	1923.09.10	Forest District Tisau, Buzau County	S. Paşcovschi	2
98	89	Bucharest Polytechnics School Herbarium, Botanic Laboratory	Vaccinium myrtillus L.	1932.10.23	Forest District Tisau, Buzau County	S. Paşcovschi	1
36	50	The Institute of Forestry Research and Experimentations	Anthoxanthum odoratum L.	1936.06.10	Broasca, Buzau County	At. Haralamb, Al. Beldie	1
25	4	The Institute of Forestry Research and Experimentations	Alnus glutinosa L. Gaertn..	1937.10.02.	"Frasinul" Forest, Buzau County	C.C. Georgescu, M. Ciucă	1
53	15	Bucharest Polytechnics School Herbarium, Botanic Laboratory	Euphorbia amygdaloides L.	1948.05.10	Buzau County	C.C. Georgescu, P. Cretzoiu, I. Morariu	2
124	105	Bucharest Polytechnics School Herbarium, Silviculture Faculty	Hieracium transsilvanicum Heuff.	1949.10.17	Penteleu Mountain, Buzau County	S. Paşcovschi	1

Achillea setacea (6 samples) and *Equisetum ramossisimum* (4 samples) can also be found amongst the vouchers present in "Alexandru Beldie" Herbarium (fig. 2). *Achillea setacea* presented in figure 2 was harvested from Trestioara forest, Ruginoasa area, Buzau County while *Equisetum ramossisimum* was harvested from Broasca area, Buzau County.



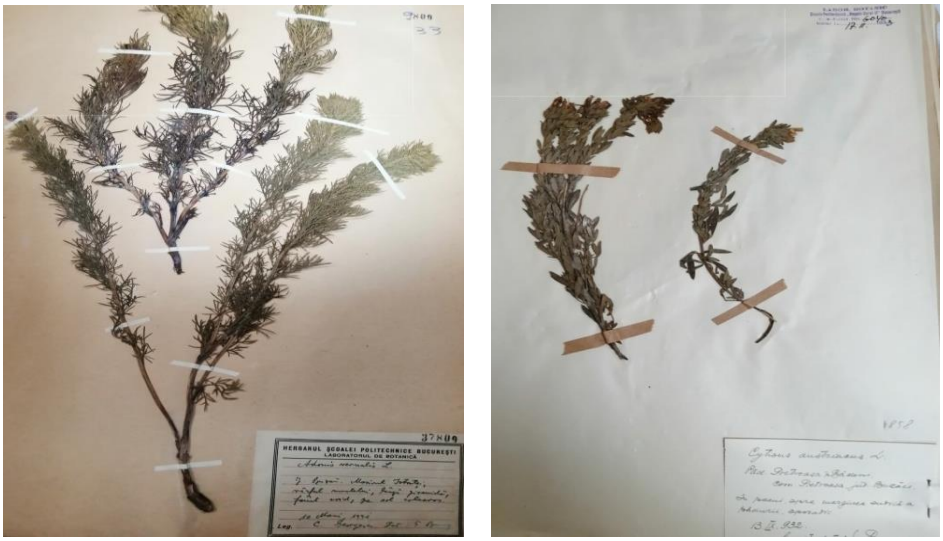
Achillea setacea *Equisetum ramossisimum*

Fig. 2. Vouchers with plants from Buzau County present in "Alexandru Beldie" Herbarium, "Marin Drăcea" National Institute for Research and Development in Forestry (*Achillea setacea* – left, *Equisetum ramossisimum* - right)

Quercus L. Genus originates from the North hemisphere's temperate and tall subtropical regions. The genus mainly contains Ist size trees that can reach 50 m in height, with rich foliage. The dark-brown bark presents rhyitidom with different drawings and depths. The species prefer rich, profound and compact soils although they can also vegetate well on sandy soils. They are resistant to frosts, with the exception of sempervirescent species that are more sensible while drought resistance depends on the species (https://icashd.ro/quercus) The oak wood is hard, durable and valued for several purposes including for construction, furniture, veneer, fencing and firewood. Furthermore, it has a high tannin content, which makes it resistant to insect and fungal attacks and is particular useful for wine and spirit barrels (http://www.euforgen.org/species/quercus-robur).

The *Cytisus* genus contains approximately 60 species distributed from northern Africa to Europe, western Russia, the Black Sea and Turkey (fig. 3). The highest species diversity is observed around the Mediterranean Sea (Cristofolini and Troìa, 2006). The Plant List includes 478 scientific plant names of species ranks for the *Cytisus* genus. Amongst them, 73 are accepted species names (www.theplantlist.org). *Cytisus scoparius* form large, sprawling plants, up to 6 m across. They can live up to 25-30 years but this is extremely rare as most mature plants die between the ages of 6 and 15 (Rees and Paynter, 1997; Downey and Smith, 2000). The most widespread use of *Cytisus* is in the horticultural industry. The species is attractive because of its large, coloured flowers and dark-green foliage (Peterson and Prasad, 1998). Commercial production of *Cytisus scoparius* occurred in southwest France, when it was deliberately planted within Pinus pinaster plantations over large areas and harvested for textile fibres (Simon, 1950). *Cytisus scoparius* is also used in forestry as a nurse plant to protect saplings from frosts and to prevent soil erosion, particularly following controlled

burns (Nimmo, 1963; Nemoto et al., 1993; Peterson and Prasad, 1998). In Europe, the plant has restored soil fertility after the last hay crop while the generated wood was used to fuel bakery ovens (Rousseau and Loiseau, 1982). In the nineteenth and early twentieth century's, the seeds were roasted and used as a hot drink in Canada (Peterson and Prasad, 1998). A drug obtained from the twigs is used medicinally for heart and respiratory conditions and the bark has been used for rope and tanning (Polunin and Smythies, 1973). Figure number 3 presents a voucher with *Cytisus austriacus* harvested from Pietroasa Forest, Buzau County and a voucher with *Adonis vernalis* harvested form Istritei Mountains, Buzau County.



Adonis vernalis *Cytisus austriacus*

Fig. 3. Vouchers with plants from Buzau County present in "Alexandru Beldie" Herbarium, "Marin Drăcea" National Institute for Research and Development in Forestry (*Adonis vernalis* – left, *Cytisus austriacus* – right)

The plants gathered from Buzau County and present in "Alexandru Beldie" Herbarium were systematized based on their harvesting year beginning with 1889 until 1954. The peak was registered between 1932 and 1942. This was the most important period in which Buzau County was an important area for the herbarium's development.

The plants from Buzău County were collected by renowned botanists such as At. Haralamb, C.C. Georgescu, Al. Beldie, M. Ciuca or S. Paşcovschi. In addition, the county's flora has also attracted foreign botanists such as Walter S. or Richter A.. By far, S. Paşcovschi is the botanists that have collected the most plants from this area, contributing with over 70 vouchers for "Alexandru Beldie" Herbarium.

CONCLUSIONS

Buzau County represents a territory with a rich biodiversity and has represented both in the past as well as in the present, an important source for the development and enrichment of herbariums from all over the world.

The plants collected from this area belong to 56 different genera. Most of them belong to *Quercus* and *Cytisus* genera and were collected during the first half of the past century, with a peak registered between 1932 and 1942. Species belonging to four genera are present in W.U. Herbarium and not present in "Alexandru Beldie" Herbarium: *Galium, Inula, Seratula and Asplenium*.

Even though more than 70 vouchers were collected by the famous botanist S. Paşcovschi, about 18 romanian and foreign specialists have covered the forests and meadows from Buzau County in order to collect plants that have extended the collections from both W.U. and "Alexandru Beldie" herbariums.

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