CIRSIUM GENUS IN "ALEXANDRU BELDIE" HERBARIUM FROM "MARIN DRĂCEA" NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT FOR FORESTRY

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ABSTRACT

Cirsium Genus is well represented in "Alexandru Beldie" Herbarium by 60 species and numerous subspecies. The herbarium, hosted by „Marin Drăcea" National Institute for Research and Development in Forestry, also contains additional information for each sample, such as: the plants' harvesting places, harvesting dates and the name of specialists who have collected the sample. The present paper synthesizes, organizes and presents all the samples of Cirsium genus from this herbarium, taking into account different characteristics stored on plates. The obtained results were then rendered in graphic representations of harvesting periods, in a harvesting map and in a list of specialists who have collected the plants. The introduction contains a short description of the herbarium with the most representative genres, followed by a description of the method used for obtaining the systematization of the Cirsium genre. This was obtained by recording, for each sample, the number and drawer, the collection name, the specialist who collected the plant as well as the harvesting date and place. A conservation degree was also given from 1 to 4, where 1 means a very good conservation degree, and 4 is a very weak conservation degree. The most proliferous period for the herbarium's development with Cirsium genus species was recorded between 1881-1900. A Cirsium pauciflorum Spr. plant is the oldest plant of this genus present in the herbarium and dates back to 1835, being collected from Călimani Mountains. Cirsium samples have been collected from all Europe with a focus on our country. The conclusions of the paper present interesting aspects regarding Cirsium genus samples from "Alexandru Beldie" Herbarium.

INTRODUCTION

„Marin Drăcea" National Institute for Research and Development in Forestry keeps in very good conditions one of the most impressive plant collections from our country – "Alexandru Beldie" Herbarium. Created in 1929, the herbarium is inscribed in Index herbarium with the international BUCF code. This herbarium is remarkable both through its richness of plants, as well as through the large areas from where the plants were gathered. As such, the collection has approximately 40.000 vouchers with plants harvested from Romania or from abroad (Vechiu et al., 2018; Dincă et al., 2018).

A special importance is also given by the numerous personalities from previous decades who have contributed to the herbarium's enrichment. Furthermore, the herbarium takes its name from Alexandru Beldie, one of the most remarkable botanists from our countries who has dedicated almost his entire career to studying the flora from Bucegi Mountains (Beldie 1967, Beldie 1972).

Together with the *Cirsium* genus which is the subject of this paper, "Alexandru Beldie" Herbarium hosts in its collections thousands of samples from different genera. The most well represented genres from this herbarium are: *Trifolium* genus with 80 species (Cântar et al., 2018), *Polygonum* genus with 41 species (Vechiu et al., 2018), *Bronus* genus with 36 species (Tudor et al., 2019), *Asperula* genus with 25 species (Plesca et al., 2020), *Centaurea* genus with 19 species (Dincă et al., 2019), *Amaranthus* genus with 17 species (Dincă et al., 2018), *Lycopodium* genus with 7 species (Vechiu et al., 2018), and *Vaccinium* genus with 6 species (Scărlătescu et al., 2017).

The plants were collected from abroad and especially from our country, from different areas such as Bazoș Dendrology Park (Chisăliță *et al*., 2017), or the former Vlașca County (Ciontu et al., 2019).

MATERIAL AND METHOD

The material used for the present paper is represented by the 194 herbarium vouchers that contain samples from the 60 *Cirsium* species and subspecies.

The method used consisted in systemizing the *Cirsium* samples from the 194 vouchers on the following criteria: the plant's location within the herbarium (the botanic collection to which it belongs, voucher drawer number, herbarium drawer number), the sample's characteristics (specie's name and plant's conservation degree, numbered on a scale of 1 to 4; 1 – very good conservation degree; 4 – a poor conservation degree), and the plant's harvesting (harvesting date and place, the name of the specialist that has determined and/or collected it).

Table number 1 renders an excerpt from *Cirsium* inventory, resulted from the systematization method.

Table 1

***Cirsium* Genus inventory from Al. Beldie Herbarium, INCDS Bucharest (excerpt)**

Drawer number	Voucher number	Herbarium/ Botanic Collection/ Institution	Specie's name	Harvesting date	Harvesting place	Collected/ Determined by:	Conservation degree (1..4)
189	89	Museum Botanicum Universitatis, Cluj / Flora Romaniae exsiccata	Cirsium erisithales (Jacq.) Scop.	1929.07.31.	distr. Hunedoara, Șerel 800m	E. I. Nyarady	1
189	57	Cluj University's Herbarium	Cirsium palustre (L.) Scop.	1929.08.23.	Distr. Odorhei, sat Corund	E.I.Nyarady	1
189	41	Herbarium Werner Rothmaler	Cirsium oleraceum x tuberosum	1930.06.17.	Erfurt	B.Rothmaler	1
189	79	Bucharest Polytechnic's School Herbarium, Botanic Laboratory	Cirsium erisithales (Jacq.) Scop.	1931.07.08.	jud. Hunedoara	C.C. Georgescu, Cretzoiu	1
189	65	Bucharest Polytechnic's School Herbarium	Cirsium panonicum (L.f.) Gaud.	1931.07.21.	Muntii Ceahlau	P.Cretzoiu	1
189	13	Bucharest Polytechnic's School Herbarium, Botanic Laboratory	Cirsium acaule All.	1931.08.12.	Banat, Cornereva	C.C. Georgescu/ P. Cretzoiu	1
189	69	ICEF	Cirsium pauciflorum Sprengel	1933.08.01	Valea Lotrului	A.Haralamb, J. Neuwirth	1
189	64	ICEF, the Institute of Forestry Research and Experimentation	Cirsium decussatum Janka	1934.06.09.	Piscul Câineui	At. Haralamb, J. Neuwirth	1

RESULTS AND DISCUSSIONS

Cirsium is a genus from the Asteraceae family, Asterales order. Some species (*Cirsium arvense*) are widespread, while the majority are native in Eurasia, North Africa and North America (even though some species were introduced outside their natural areal). Some *Cirsium* species (*Cirsium monspessulanum*, *Cirsium pyrenaicum* and *Cirsium vulgare)*, were used traditionally as food in rural areas from South Europe. *Cirsium oleraceum* is cultivated as food source in Japan and India (www.wikipedia.org).

The *Cirsium* systematization after the species name has allowed the identification of 60 species within "Alexandru Beldie" Herbarium (Fig. 1).

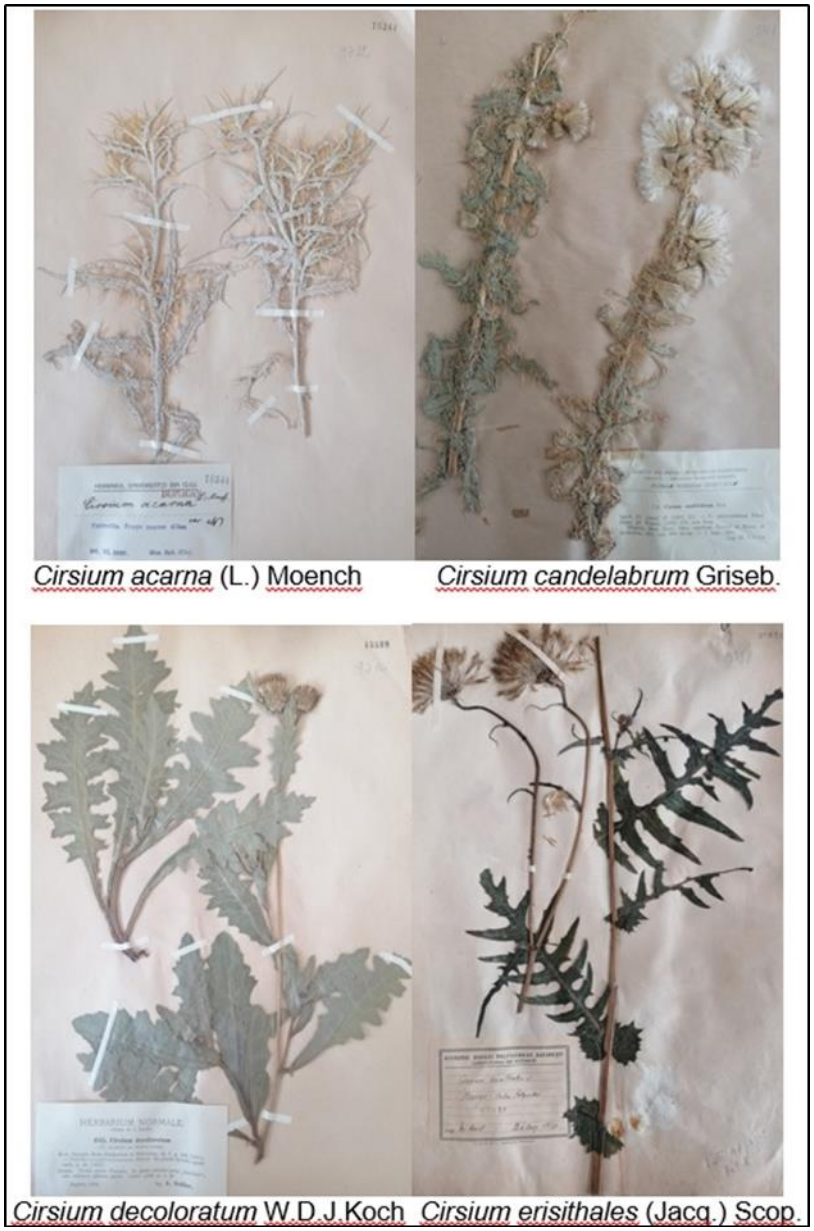

Figure 1. Vouchers from "Alexandru Beldie" herbarium with Cirsium species

This has further led to identifying of the most well represented species from this herbarium. As such, the following species were identified: 27 *Cirsium arvense* (L.) Scop., 18 *Cirsium oleraceum* (L.) Scop., 17

Cirsium erisithales (Jacq.) Scop., 13 *Cirsium pauciflorum* (W.K.) Spr., 11 *Cirsium rivulare* (Jacq.) All. and 10 *Cirsium palustre* (L.) Scop.. All the other species present in the herbarium have less than 10 samples.

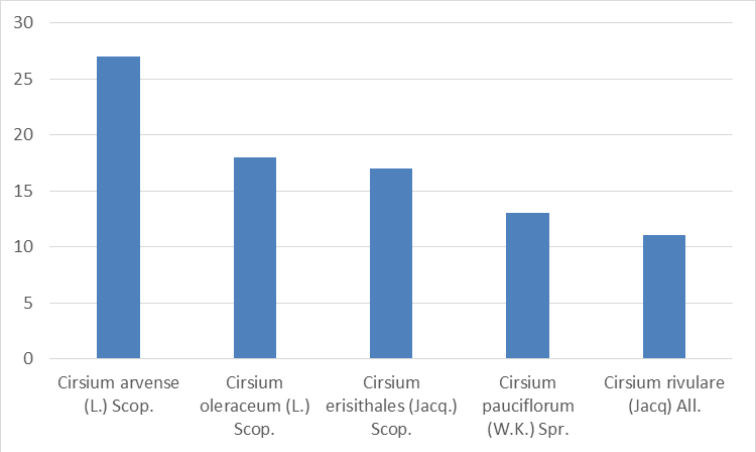

Figure 2. Representative Cirsium species from "Alexandru Beldie" Herbarium

As it can be seen in Figure number 2, the most well represented species within the herbarium is *Cirsium arvense*. Cirsium arvense, a perennial species of flowering plant from Asteraceae family is native throughout Europe, western Asia and northern Africa from where it was widely introduced elsewhere. Creeping thistle is the standard name for this plant in its native area, while in other places it is commonly known as Canadian thistle or field thistle. Cirsium arvensis is a beneficial plant for pollinators, being rich in nectar (www.wikipedia.org).

The second most well represented species within the herbarium is *Cirsium oleraceum* (L.) Scop. *Cirsium oleraceum*, commonly known as Siberian thistle or cabbage thistle, is native to eastern central Europe and Asia. It grows in wet lowland soils and is an herbaceous perennial plant that can grow up to 1.5 m (www.wikipedia.org).

In regard with the time period in which the herbarium's *Cirsium* collection were developed, the obtained systematization has allowed the identification of a time interval (1835-1994) in which the plants were harvested. The herbarium's development time period is graphically rendered in Figure number 3 by reporting the number of harvested plants on period of 20 years.

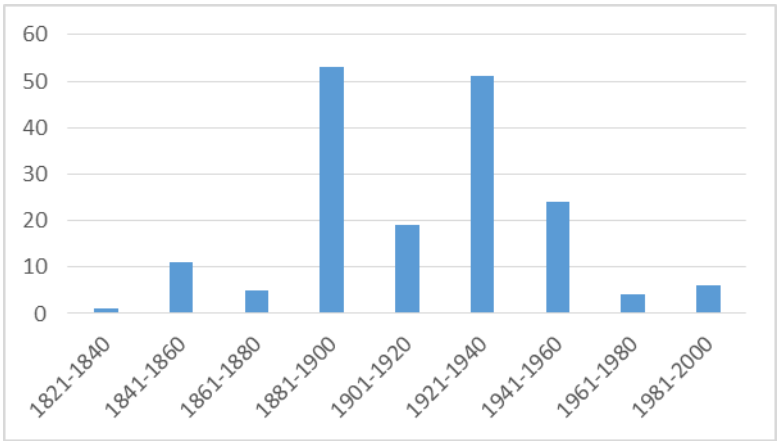

Figure 3. Harvesting period of Cirsium samples from „Alexandru Beldie" Herbarium

As it can be seen, the *Cirsium* samples were gathered on a period of almost 160 years (1835-1994), most of them being harvested in the last decades of the XIXth century (1881-1900) or in the period between the two world wars.

The oldest plant identified in the herbarium and which has an exceptional scientifical and historical value is 185 years old, being harvested in the summer of 1835 from Călimani Mountains, Tihului Valley by C. C.Georgescu.

The analysis of the plants' origin places was realized based on the same systematization method, taking advantage of the harvesting places mentioned on each voucher. Based on this data, a map was created for visually representing the places from our countries from where the plants were collected (Fig. 4).

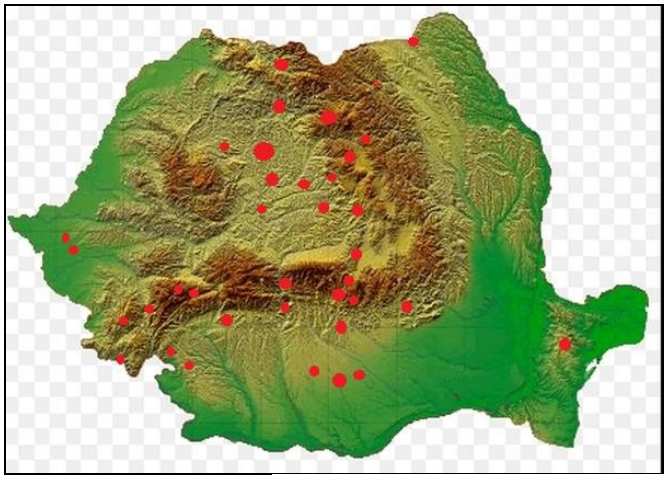

Figure 4. Harvesting locations of Cirsium species from „Alexandru Beldie" herbarium

As it can be seen in Figure number 4, the harvesting places belong to all Romanian provinces and especially from the main mountain and hill regions (the country's center, the Carpathians). A strong connection exists between the harvesting places and the activity of the specialists who have worked in enriching the herbarium.

The intensive analysis of voucher annotations allows the creation of a list of specialists who have contributed to the development of this collection. As such, the Romanian and foreign specialists who have left their mark in creating the present *Cirsium* collection were: Haralamb, Cretzoiu, Păun, Buia, Todor, Borza, Beldie, Borza, Onică, Georgescu, Badea, Ciucă, Cîrțu, Morariu, Prodan, Todor, Ciuca, Haret, Iacobescu, Pteancu, Todor, Pascovschi, Iacob, Berker, Goller, Richter, Coman, Pellat, Neuwirth , Nyarady, Gurtler, Makomski, Hillestorm, Fleischer, Rothmaler, Bordere, Bruyers, Rossetti, Ozanon, Stormer, Derby, Schatz, Durrnberger, Khek, Reverchon, Hausser, Eysn, Gerard, Beaudoni, Groves, Bornmuller, Juratzka, Ortmann, Schultz, Abbe Faure, Leithner, Gandoger, Malinky, Kerke, Guzzino, Reiner, Romer, Rothmaler, Chaboisseau, Bunes, Volke, Woeff, Wolff.

CONCLUSIONS

Cirsium Genus is well represented within "Alexandru Beldie" Herbarium from INCSD "Marin Drăcea". The vouchers that contain species that belong to this genus amount to 194 and total 60 species. Amongst them, the most numerous samples belong to *arvense* (L.) Scop. (27 samples).

The oldest plant has 185 years and holds a remarkable scientific and

historical value. Furthermore, from the 194 plants present in the herbarium, over 70 date back to the XIX century.

The plants that form the *Cirsium* collections were harvested from all around Romania and especially from the main mountain and hill units of our country. The harvesting places are focused on the country's center and the Carpathian Mountains.

The majority of plants were collected in the last decades of the XIX century and during the period between the two world wars.

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