Annals of West University of Timişoara, ser. Biology, 2018, vol. 21 (2), pp.123-132

TRIFOLIUM GENUS SPECIES PRESENT IN *"ALEXANDRU BELDIE"* HERBARIUM FROM "MARIN DRĂCEA" NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT IN FORESTRY

Ilie-Cosmin CÂNTAR*, Lucian DINCĂ
National Institute for Research and Development in Forestry „Marin Drăcea"
**Corresponding author e-mail: cantar.cosmin@yahoo.com*
Received 14 July 2018; accepted 10 December 2018

ABSTRACT
Trifolium is an important genus within Al. Bedie Herbarium from "Marin Drăcea" National Institute for Research and Development in Forestry, both through the number of plates contained, as well as the data gathered in these plates regarding the variety of years and harvesting locations or the specialists that have gathered them. The present paper describes the main Trifolium species present in the above mentioned Herbarium, systematizing at the same time the contained plates based on their harvesting year and location, as well as the specialist involved in their gathering. After a short introductory description of the Herbarium, the present paper continues with detailing the studied material, represented by 505 Trifolium plates, together with describing the work methods used for systematizing and describing the plants from the studied plates. The Herbarium contains an important number of rare or endemic plants, threatened with extinction that appear nowadays in the Red Book of Romanian vascular plants. A number of three Trifolium species belonging to the Red Book have been identified in the Herbarium, namely Trifolium subteraneum (two plates), Trifolium ornithopodioides (L) (3 plates) and Trifolium michelianum Savi (one plate). Other distinctive attractions of this genre present within the Herbarium are one Trifolium pratense L., harvested in 1836 and one Trifolium arvense gathered in 1801. These are the oldest Trifolium exemplars present in the Herbarium. Together with the description of Trifolium species present in the Herbarium, the paper also contains the map of their gathering, as well as a graphic representation of harvesting periods and a highlight of the oldest exemplars. The final part reunites conclusions regarding the Trifolium species and exemplars present in the Herbarium, emphasizing some remarkable aspects regarding them.
KEY WORDS: *herbarium, plants, flowers, leaves, botanists.*

INTRODUCTION

With an exceptional scientific and historical value, the *„Alexandru Beldie"* Herbarium owned by *Marin Drăcea* National Institute for Research and Development in Forestry (INCDS) from Bucharest reunites approximately 40 000 plant plates kept in their original maps and arranged in 30 modules with 20 drawers each (Vasile *et al.,* 2017).

Registered in the INDEX HERBARIUM, the *„Alexandru Beldie"* Herbarium is composed of different privately donated collections and foreign collection pieces that were obtained through exchanges.

The botanists that have collected and determined the herbarium exemplars are well renowned personalities specialized in the domain of systematic botanic. The herbarium itself takes its name from Alexandru Beldie, a remarkable Romanian botanist interested in Bucegi Mountains flora (Beldie 1967, Beldie 1972).

Besides the *Trifolium* species presented in this paper, the Herbarium also contains other species such as 32 *Arabis* genre species (Dincă *et al.,* 2017a), 9 *Melica* species, 11 *Eragrostis* species (Cântar C. *et al.,* 2017), 19 *Androsace* species (Dincă *et al.,* 2017a), 33 *Orobanche* species (Scărlătescu *et al.,* 2017), 19 *Centaurea* species (Dincă *et al.,* 2017b), 112 *Hieracium* species (Dincă *et al.,* 2017b), 15 *Ornithogalum* species (Enescu R. *et al.,* 2017), 19 *Scorzonera* species (Dincă *et al.,* 2017c), or the 15 *Veronica* species (Dincă *et al.,* 2017d). Besides the numerous mountain species, the Herbarium also contains species collected from different parts of the country, such as the ones gathered by S. Paşcovschi in Bazoş Dendrology Park, near Timişoara (Chisăliță *et al*., 2017) or from different countries.

MATERIALS AND METHODS

The research material is composed of the 505 *Trifolium* genre species present in the maps of Al. Beldie Herbarium from INCDS „Marin Drăcea".

The work methods used are the ones characteristic to the research activity. As such, research and bibliographic documentation have played a very important role, especially from a morphologic and ecologic point of view. Together with these methods, analysis and synthesis were used as main work methods for digitizing and systematizing the data from the herbarium's plates. Furthermore, creating the map, preparing the work, results and its conclusions have implied the analysis and synthesis of the initially systematized data.

The study of these plates has revealed the fact that the Herbarium contains 80 *Trifolium* species. These were categorized based on their harvest year, place and the person that has gathered them. An excerpt is rendered in Table number 1. After a thorough bibliographic analysis, the main *Trifolium* species present in the Herbarium were described one at a time.

TABLE 1. *Trifolium* genre inventory from Al. Beldie Herbarium NCDS Bucureşti (excerpt)

Drawer no.	Plate no.	Herbarium/ Botanic Collection/ Institution	Specie's name	Harvest date	Harvest place	Collected/ Determined by:	Conservation degree (1..4)
79	17	ICEF, Forestry Experimental Research Institute	*Trifolium alpestre L.*	1944.06.24	Mihăeşti	Haralamb	2
79	62	Flora Romaniae exsiccata/ Museum botanicum universitatis, Cluj	*Trifolium arvense L.*	1938.07.14	Basarabia, distr. Lăpuşna	A. Arvat	2
49	2	Dris Frid Tremols Herbarium	*Trifolium glomeratum L.*	1881.05.01	Cadoque	Barcinone	1
49	1	Hortus botanicus instituti agronomici T. Vadimirescu Craiova	*Trifolium gracilis Thuill.*	1960.07.13	Oltenia, Novaci	Al. Buia, C. Malos, M. Paun	1
49	7	JH Hervier St. Etienne	*Trifolium Hervieri Freyn*	1893.06.01	Sierra de Camarena	Reverchon	1

49	17	Al. Beldie Herbarium	*Trifolium hybridum L.*	1947.08.04	Bucegi, Valea Rasnoavei	Al. Beldie	1
49	32	Museum Botanicum Universitatis Cluj	*Trifolium incarnatum L.*	1933.09.22	Cluj	E.I.Nyarady	1
49	37	Flora Bulgarica Exiccata	*Trifolium lagopus L.*	1931.05.24	Bakadzik, Jambol	N. Stojanoff	1
49	43	F. Poggi et C. Rossetti, Plantae italicae	*Trifolium ligusticum Balb.*	1890.06.01	Seranezza (Etruria)	C. Rossetti	1
49	56	ICEF	*Trifolium medium L.*	1944.07.21	Valea Bradului, Muscel	At. Haralamb, M. Ciuca	1
49	78	ICEF	*Trifolium montanum L.*	1936.06.14	Gurghiu, Mures	S. Pascovschi	1
49	107	Bucharest Polytechnic School's Herbarium	*Trifolium ochroleucum Huds.*	1938.06.13	Durostor, Turtucaia, Pad. Bobla	J.Neuwirth	1
80	10	Bucharest Polytechnic School's Herbarium / Botanic Laboratory	*Trifolium pannonicum L.*	1938.06.13	Durostor: Turtucaia, păd. Bobla	J. Neuwirk	2
80	102	Bucharest Polytechnic School's Herbarium / Botanic Laboratory	*Trifolium pratense L.*	1836.06.01	Distr. Buzău: Dofteana	C.C. Georgescu	2
47	16	Bucharest Polytechnic School	*Trifolium repens L.*	1903.08.10	jud. Valcea, la Brezoi	N.Al. Iacobescu	1
47	104	N. Balcescu Agronomy Institute-Bucuresti	*Trifolium strepens Cr.*	1958.07.05	Raion Toplita, Lunca Bradului	C. Chirila	1

RESULTS AND DISCUSSIONS

Clover (***Trifolium***) is a genre of approximatively 300 plant species belonging to the *Fabaceae* legumes family. The largest diversity appears in the temperate areas from the North Hemisphere. However, some species are present in South America and Africa, including the high altitudes from the tropics. They are small herbaceous plants, annual or biennale and short-lived. The leaves are trifoliate (rarely 5- or 7- foliated), and give the plant's name, derived from the Latin term *tres* (three) and *folium* (leaf). Occasionally, clovers have four folioles instead of three. These clovers with four leaves, as well as other rare instances are considered as lucky. The clover can also have five, six or even more leaves, but these are even rarer cases. According to Guinness, the worldwide record is represented by 18 leaves. Clover contains a small quantity of morphine which, if consumed by cattle, can reach the milk. During the 1970's and 1980's, drug tests became very exact and capable of determining the slightest hints of morphine. As such, the substance can be detected by anti-drug tests (https://ro.wikipedia.org).

An important part of these species that are present in the Herbarium are described below. The most widespread *Trifolium* species from the Herbarium are: *T. pratense* (36 plates), *T. alpestre* (34 plates), *T. hybridum* (23 plates), *T. arvense* (19 plates), *T. repens* (19 plates), *T. montanum* (19 plates), *T. pannonicum* (18 plates), *T. medium* (17 plates) and *T. ochroleucum* (14 plates).

Trifolium pretense L., or the red clover, is a herbaceous flowering plant species from the *Fabaceae* bean family, native to Europe, Western Asia and northwest Africa, but planted and naturalized in many other regions. It is a herbaceous,

short-lived perennial plant, variable in size, that can grow up to 20–80 cm tall. It has a profound taproot which makes it tolerant to drought and gives it a good soil structuring effect. It is widely grown as a fodder crop, being valued for its nitrogen fixation, which increases soil fertility. For these reasons, it is used as a green manure crop (https://en.wikipedia.org).

Trifolium alpestre L., or the alpine clover, is a perennial herbaceous plant belonging to the *Fabaceae* family. It has an upward and woody stem at the bottom with a single terminal head, from which a globular purple corolla is shrouded in two leaves, between May and August. The oblong-lanceolate leaves are tied in groups of three, giving the name of the genus. The plant grows in the mountain areas of Europe, between 800 and 2000 m altitude (https://it.wikipedia.org).

Trifolium hybridum L., or the alsike clover, is native to much of southern Europe and southwestern Asia, especially in mountainous regions. It is widely cultivated and used as a forage crop. For this purpose, the subspecies *T. hybridum* is used and has become naturalized further north in Europe and in other parts of the world. Its natural habitat is represented by fields, meadows, roadsides, banks and waste grounds. When added to seed mixtures, it seldom persists once the sward has closed up. Despite its scientific name, alsike clover is not of hybrid origin. The plant gets its common name from the town of Alsike in Sweden, from which Linnaeus first described it (https://en.wikipedia.org).

Trifolium arvense L. is native to most of Europe, excluding the Arctic zone, and western Asia, growing in plain or mid-mountain habitats up to 1,600 meters altitude. It grows in dry sandy soils, both acidic and alkaline, typically found at the edge of fields, in wastelands, on the side of roads, on sand dunes, and opportunistically in vineyards and orchards that are not irrigated (https://en.wikipedia.org).

Trifolium repens L., or the white clover, (also known as Dutch clover, Ladino clover, or Ladino) is native to Europe and central Asia, and is one of the most widely cultivated types of clover. It has been widely introduced worldwide as a forage crop, and is now also common in most grassy areas (lawns and gardens) of North America and New Zealand. The species includes varieties often classified as small, intermediate and large, according to height, which reflects petiole length. The term "white clover" is applied to the species in general, "Dutch clover" is often applied to intermediate varieties (but sometimes to smaller varieties), whereas "ladino clover" is applied to large varieties (https://en.wikipedia.org).

Trifolium montanum L., or mountain clover, seems to have adapted to life in dry, sun baked areas, with its strong rootstock and deep-reaching taproot. Its aerial parts have a biennial cycle: in the first year it develops a leaf rosette and only produces flowering shoots in the following year. It is easiest to spot around midsummer, when its white inflorescence reaches higher than the meadow vegetation that usually surrounds it. It is pollinated by bumble bees and honey bees. Compared to many other clover species, the nectar is relatively easy to access – and it probably attracts a correspondingly wider range of pollinators to ensure its seed production (http://www.luontoportti.com).

T. pannonicum Jacq. is a clump-forming, herbaceous perennial plant with oblong to lance-shaped, dark green leaves and upright stems bearing dense, ovoid racemes of cream to pale yellow flowers in summer. This species is native to central and southern Europe (https://www.shootgardening.co.uk).

Trifolium medium L., or the zigzag clover, it is similar in appearance to red clover, *Trifolium pratense*, but the leaflets are narrower and have no white markings while the narrow stipules are not bristle-pointed. The species is native to Europe, ranging from Britain to the Caucasus (https://en.wikipedia.org).

T. ochroleucum Huds., is a taller growing herbaceous clover with heads of scented pale-yellow flowers that appear during early summer and that enjoys full sun and partly shaded areas. Its height can reach 50 cm, while its spread 40cm (http://www.bethchatto.co.uk).

In regard with the **rare plants present in the Herbarium,** during the inventory phase, the presence of some taxons from Romania's flora that nowadays appear in the Red Book of Romania's vascular plants (rare, endemic, endangered species etc.) was identified. As such, taxons that are mentioned in the Red Book were encountered and inventoried, and evaluated after the last IUCN category as critically (high) endangered species (CR) when the taxon is confronted with an extremely high risk of extinction in the immediate future.

From this category we mention the following species that can be found in the Alexandru Beldie Herbarium: *Trifolium subteraneum*, (drawer number 47, plates 113 and 114), *Trifolium ornithopodioides (L)* (drawer 49, plates 113, 114, and 115), *Trifolium michelianum Savi* (drawer 49, plate 65).

Trifolium subteraneum L. is presented in the Red Book with the status of critically (high) periclitated endangered species (CR) and was located in South Romania, namely Banat, Oltenia, and Dobrogea (AR, DJ, MH, and TM Counties). The areal areas are confirmed by the Herbarium plates, namely Timis-Torontal District, and Ciacova city, where they were gathered and determined by Al. Buia from Cluj University (1942) (fig.1) and Arad County and Ciala forest, where they were gathered and determined by I. Prodan from Cluj Agricultural Academy (fig.2). From a scientific point of view, the plat is rare and with a distinctive biology. Nowadays, the plant is included in the Gighera Halophile Meadow Reservation.

FIG.1. Museum Botanicum Universitatis Cluj (in Timisoara), *Trifolium subteraneum L.*, harvest date: 1942. 05. 30., harvest are: Timis -Torontal district, Ciacova, harvested and determined by: Al. Buia

Trifolium subteraneum, or the subterranean clover or trefoil (often shortened to sub clover), is a species of clover native to northwestern Europe, present from East Ireland to Belgium. The plant's name comes from its underground seed development (geocarpy), a characteristic not possessed by other clovers. It can thrive in poor-quality soil where other clovers cannot survive and is grown commercially for animal fodder. Three distinct subspecies are used in agriculture, each with its own ideal climate and soil type, allowing for wide distribution of the plant over varied environments (https://en.wikipedia.org).

FIG.2. Agricultural Academy Cluj, Systematic Botanic and Seed Control Laboratory, *Trifolium subteraneum L.* species, harvesting area: Arad, Ceala forest, gathered and determined by I. Prodan

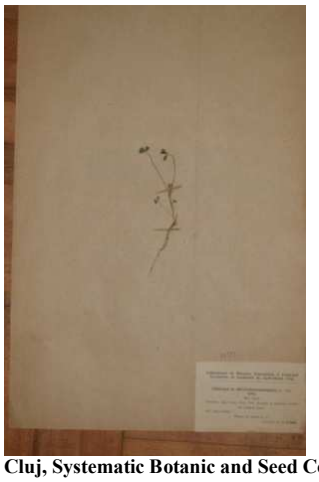

FIG.3. Agricultural Academy Cluj, Systematic Botanic and Seed Control Laboratory, *Trifolium ornithopodioides (L.) Sm.* species, harvesting area: Arad, Ciala Forest, gathered and determined by I. Prodan

Trifolium michelianum Savi., or Balansa clover, is extremely productive and tolerant at cold temperatures and annual winters. Prostrate, hollow stemmed plants form dense, highly productive stands of very palatable forage. The plant is suited to various soil types, except infertile sands and has a wide pH range, with a moderate tolerance to saline soils. Mature plants are tolerant of periods of saturated soils. The plant is mainly used as cover crop, pasture, hay or silage in a monoculture or mixed with other species. The plant is persistent under continuous, intensive grazing and readily reseeds itself when allowed to set seed (http://www.lhseeds.com).

Besides these rare species and the most widespread ones presented above, the Herbarium also hosts a number of approximately 70 clover species. Some of these species are presented in the following paragraphs.

Trifolium hirtum is a species of clover known under the common name of rose clover, native to Europe, Western Asia, and North Africa. However, the species is present elsewhere as an introduced species and it is cultivated as a cover crop and animal fodder. It is a hairy annual herb growing erect in form. The leaves have oval leaflets up to 2.5 centimeters long and bristle-tipped stipules. The inflorescence is a head of flowers about 1.5 centimeters wide. Each flower has a calyx of sepals with long, needlelike lobes that may harden into bristles with age. The calyces are coated in long hairs. The flower has a pink corolla, 1 or 1.5 centimeters long (https://en.wikipedia.org).

Trifolium strictum is an annual plant that germinates in September and October and overwinters as a rosette. Flowers are produced in late May and early June in most years and in late June or early July in drought conditions when the plants quickly die. It does not appear every year at some of its sites, indicating the presence of a viable seed-bank. After a mild winter and spring, particularly following intense summer droughts when competitive perennial species are suppressed, populations of *T. strictum* do well, but there are reduced numbers of flowering plants following a cold wet winter and spring. This species occurs widely in western and southern Europe, ranging northwards to Britain and Jersey, and from Spain and Portugal eastwards to Bulgaria and Greece. It can also be found in Turkey (http://www.brc.ac.uk/plantatlas).

Trifolium incarnatum, known as crimson clover or Italian clover, is a species of clover native to most of Europe. The specie's name of *incarnatum* means "blood red". This upright annual herb grows up to 20–50 cm in height and is unbranched or branched only at the base. The leaves are trifoliate with a long petiole, each leaflet being hairy, 8–16 mm across, with a truncated or bilobed apex. The flowers are produced throughout the spring and summer, rich red or crimson, congested on an elongated spike inflorescence 3–5 cm tall and 1.5 cm broad; the individual flowers are up to 10–13 mm long and have five petals. The banner of each flower does not sit upright, but folds forward (https://en.wikipedia.org).

Trifolium lupinaster L. is a perennial plant growing up to 0.5 m. It blooms from July to October, while the seeds ripen from July to October. The flowers are hermaphrodite (have both male and female organs) and are pollinated by insects. Furthermore, the plant is known for fixing Nitrogen, being suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefering well-drained soil and also growing in nutritionally poor soil. The suitable pH is acid, neutral and basic (alkaline) soils. It cannot grow in the shade and it prefers moist soil (https://www.pfaf.org).

Trifolium glomeratum is a species of clover known by the common names of clustered clover and bush clover. It is native to Eurasia and North Africa and it is known

elsewhere as an introduced species. Furthermore, the plant easily takes hold in disturbed areas, becoming a common weed. It is an annual herb growing decumbent to upright in form with mostly hairless herbage. The leaves are made up of oval leaflets, up to 1.2 centimeters in length. The inflorescences occur in leaf axils, each similar with a head-like cluster of many flowers. Each flower has a calyx of sepals with triangular points that bend outward, and a pink corolla (https://en.wikipedia.org).

The plant's harvesting years. The plants were mainly gathered between 1801 and 1991. The oldest plants from this genus are *Trifolium arvense,* harvested in 1801 in Retezat Mountains and *Trifolium pratense*, harvested in 1836 in Dofteana (Buzau). Most plants were gathered between 1930-1939 and 1940-1949 (Figure 4).

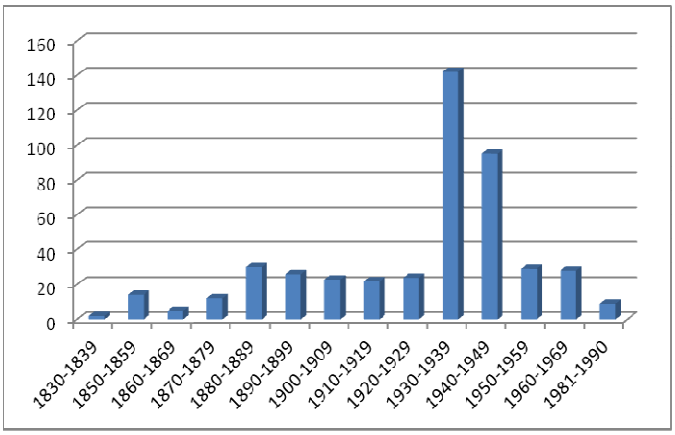

FIG. 4. Gathering periods of *Trifolium* plants from INCDS Herbarium

The species gathering location is represented mainly by areas from Romania such as: Ceala forest from Arad, Sabed arboretum frum Mureș, Băile Herculane, Borșa, Borsec, Bucegi, Bâscei Valley from Buzău, Căciulata, Ceahlău, Cluj, Comana, Gurghiu, Iași, Brănești, Mihăești, Retezat, Segarcea, Strehaia, Timișoara, Piatra Craiului, Pitești, Sinaia. However, there are also numerous locations from Europe from where clover exemplars were gathered (fig. 5), namely Yambol Bulgaria, Budapest, Corsica, Napoli, Freiburg, Pyrenees, Thasos, Morocco, San Sebastian, Torino, Vsetin Czech Republic.

The persons that have gathered the plants are represented by Romanian specialists (Al. Beldie, Al. Buia, G. Bujorean, C. Chirilă, I. Colibaș, A. Coman, P. Cretzoiu, C.C. Georgescu, At. Haralamb, M. Haret, N. Al. Iacobescu, I. Morariu, Nascov, E. I. Nyarady, S. Pascovschi, I. Prodan, St. Purcelean, I.D. Tătăranu, I. Todor, G. Turcu) or foreign ones (Adamovic, Bordere, J. Bornmuller, H. Bourdot, Henry Groves, A. Faure, E. Reverchon, Karl Richter, F. Schulz, Stephen Sommier).

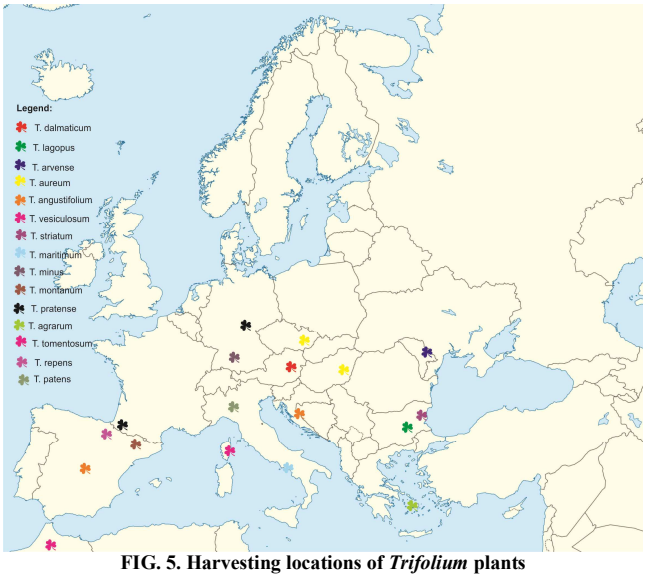

FIG. 5. Harvesting locations of *Trifolium* plants

CONCLUSIONS

An important genus for INCDS Bucharest Al. Beldie Herbarium, *Trifolium* is emphasized by a number of 80 species present in 505 plates. The most widespread species of this genus present in the above-mentioned herbarium is *Trifolium pratense*, which can be found in more than 36 plates.

The rare species representative for *Trifolium* and present in the Herbarium are *Trifolium subteraneum*, *Trifolium ornithopodioides* (L), and *Trifolium michelianum* Savi. These taxa also appear in the Red Book of Romania's vascular plants (rare, endangered or endemic species).

In regard with the historical value of the exemplars present in the Herbarium, the oldest identified taxon dates back to 1801*(Trifolium arvense)* harvested in Retezat Mountain and *1836 (Trifolium pratense)* gathered from Dofteana area (Buzau).

As it can be seen in Figure number 5, besides the harvesting locations from our country, the Herbarium plates also contain plants from Central and South Europe, from countries such as Bulgaria, Hungary, Czech Republic, Slovakia, Austria, Germany, Bosnia Herzegovina, Italy, France, Spain, Greece and even from North Africa (Morocco).

In regard with the plants' harvesting periods, as it can be observed in Figure number 4, the *Trifolium* collection was realized by gathering plants over a period of almost 200 years, starting with 1801 (*Trifololium arvense*, Retezat Massif) and up to the 1990's. The most fruitful period in developing the *Trifolium's* presence in the Herbarium was registered in the period 1930-1950, with 230 exemplars.

The fact that this maximum development period of *Trifolium* collections and not only overlays with the Second World War indicates the professionalism, commitment and

ambition of our predecessors in leaving us a valuable collection of plants, unique in our country, the Alexandru Beldie Herbarium.

REFERENCES

- Cântar, I. C., Dincă M. 2017. Two genus of plants from *Poaceae* family (*Melica* and *Eragrostis*) existing in "Alexandru Beldie" herbarium of I.N.C.D.S. Bucharest. *JOURNAL of Horticulture* Forestry and *Biotechnology* 21(3): 68-76.
- Chisăliță I., Vasile D., Dincă L. 2017. Unele specii de plante culese din parcul Bazoș, județul Timiș, existente în colecția Herbarului Alexandru Beldie de la INCDS Bucureşti, *Revista de Silvicultură și Cinegetică* 40: 71-76.
- Crișan V, Dincă L, Oneț C, Oneț A. 2017. Collection species from *Potentilla* genus. *Natural Resources and Sustainable Development*: 27-34.
- Dincă L., Cântar I.C., Dincă M. 2017. The characteristics of plant species from *Arabis* type present in Al. Beldie Herbariun from INCDS Bucharest. *Annals of West University of Timişoara, ser. Biology* 20 (2): 115-122.
- Dincă L., Vasile D., Voiculescu I. 2017. The characteristics of plants from *Hieracium* genre present in Alexandru Beldie Herbarium from I.N.C.D.S. Bucharest". *Lucrări ştiinţifice USAMV Iaşi, seria Horticultură* 60 (1): 39-48.
- Dinca L., Cantar I.C. 2017. A short description of *Scorzonera* plant species present in Alexandru Beldie Herbarium from I.N.C.D.S. Bucharest", *Annals of University of Craiova - Agriculture, Montanology, cadastre, 47*: 118-126.
- Dincă L., Enescu R., Oneț A., Laslo V., Oneț C. 2017. Plant species from Al. Beldie herbarium - *Veronica* genre - short description. *Natural Resources and Sustainable Development,* 43-50.
- Dincă M., Dincă L., Vasile D. 2017. A short description of *Androsace* genre plants present in Alexandru Beldie Herbarium from I.N.C.D.S. Bucharest. *Current Trends in Natural Sciences* 6 (12): 16-24.
- Dincă L., Vasile D., Dincă M. 2017. Short characterisation of plant species from *Centaurea* genus present in Al.Beldie Herbarium from Marin Dracea National Institute for Reseach and Development in Forestry Bucharest, *Annals of University of Craiova - Agriculture, Montanology, cadastre Series* 47: 127-135.
- Enescu R., Dincă L. 2017. Description of plant species of *Ornithoghalum* genus present in *Al. Beldie* Herbarium from "Marin Drăcea" Bucharest N.I.R.D.F. *JOURNAL of Horticulture, Forestry and Biotechnology* 21(3): 89-95.
- Scărlătescu V., Vasile D., Dincă L. 2017. Plant species from "Al. Beldie" Herbarium - *Orobanche* Genre - short description. *ProEnvironment Promediu* 10(31): 191-198.
- Vasile D., Dincă L., Indreica A., Voiculescu I. 2016. Herbarul Alexandru Beldie - o colecție de plante şi o importantă bază de date pentru specialişti. *Revista de Silvicultură şi Cinegetică 39: 114-119.*
- https://en.wikipedia.org
- http://www.brc.ac.uk/plantatlas
- https://www.pfaf.org
- https://ro.wikipedia.org
- https://it.wikipedia.org
- http://www.luontoportti.com
- https://www.shootgardening.co.uk
- http://www.bethchatto.co.uk
- http://www.lhseeds.com