CHARACTERIZATION OF CORNUS PLANT PRESENT IN ”AL. BELDIE” HERBARIUM

Emilia VECHIU[1], Lucian DINCĂ[1]
[1] ***“Marin Drăcea” National Institute for Research and Development in Forestry, Braşov, Romania***
email: vechiu.emilia@yahoo.com

Abstract: *”Al. Beldie” Herbarium from ”Marin Drăcea” National Institute for Research and Development in Forestry contains a rich collection of plants. Approximately 40.000 vouchers belong to this herbarium and are stored in 600 drawers. Herbariuns are important because they provide information about plants and their area of propagation during long periods that help to carry out studies in taxonomy, biodiversity, ecology, anatomy, morphology etc. As such, various investigations were carried out with the help of data from this herbarium concerning different families and types of plants. The purpose of this article is to morphologically and ecologicallycharacterize certain Cornus species that can be found in this herbarium. Cornus Genus contains approximately 55-58 species cares that are widespread in the northern hemisphere, with few in Africa and southern America. The species found in the herbarium are the following: Cornus alba L., Cornus amomum Mill., Cornus alternifolia L., Cornus asperifolia Michx., Cornus baileyi J.M. Coult. & W.H. Evans, Cornus canadensis L., Cornus candidissima Marshall., Cornus florida L., Cornus mas L., Cornus macrophylla Wall., Cornus obliqua Raf., Cornus paniculata L'Hér., Cornus pumila Koehne, Cornus sanguinea L., Cornus stolonifera Michx. Cornus stricta Lam. and Cornus suecica L . Each plants contains data referring to the name of the species, the harvesting place, the harvesting year, the person who has collected them as well as their conservation degree. Most of the plants were harvested from Romania and were collected by botanists such as: S. Pascovschi, Al. Beldie, At. Haralamb, C.C. Georgescu, J. Neuwirth, M. Badea, P. Cretzoiu, I. Morariu, Dr. H. Hapeman, Dr. Heuser, V. Leandru etc. The plants were harvested between 1834-1989, amounting to 129 plants that are in a good conservation state, 46 between 1940-1949, while the oldest plant was harvested in 1834 by P. Cretzoiu. The Cornul mas L. fruits are edible, rich in vitamin C and can be consumed fresh or in the form of various products derived from them, such as syrups, compotes, juices, wines, etc.*

Keywords*: Cornus, plants, herbarium, species*

INTRODUCTION

A herbarium is a collection of dried plants that are kept in special rooms for conservation. Their purpose is important because they provide information about plants and their area of propagation during long periods that help to carry out studies in taxonomy, biodiversity, ecology, anatomy, morphology etc. Numerous investigations were carried out with the help of the data provided by the herbarium, concerning different families and types of plants (ŞTEFÎRŢĂ, 2008). “Alexandru Beldie” Herbarium was founded in 1929 and is presently hosted by "Marin Drăcea" National Institute for Research and Development in Forestry from Bucharest. The herbarium is inscribed in *INDEX HERBARIORUM*, having the international BUCF and containing about 60,000 plates that are stored in 600 drawers (DINCĂ and CÂNTAR 2017; ENESCU and CRISAN, 2017; VECHIU *et al*., 2018a).

The collection contains numerosus plates with the following species: 19 *Centaurea* species (DINCĂ *et al*., 2017a), 80 *Trifolium* species (CÂNTAR *et al*., 2018), 69 *Potentilla* species (CRIŞAN *et al*,, 2017), 19 *Androsace* species (DINCĂ m. *et al*., 2017), 15 *Veronica* species (DINCĂ *et al*., 2017b), 15 *Ornitogalum* species (ENESCU and DINCĂ, 2017), 21 *Agrostis* species (CÂNTAR *et al*., 2019), 112 *Hieracium* species (DINCĂ *et al*., 2017c) and 41 *Polygonum* species (VECHIU *et al*., 2018b).

The purpose of this article is to morphologically and ecologically characterize certain *Cornus* species that are found in this herbarium.

MATERIAL AND METHODS

The articles is based on a database consisting of 129 plates from which 17 *Cornus* species were identified. Each plates contains data referring to the name of the species, the harvesting place, the harvesting year, the person who has collected them as well as their conservation degree (table 1).

In order to ecologically and morphologically describe the species of this genus, a study was carried out based on the information found in the specialized literature.

Table 1

Cornus inventory (excerpt from the data base)

Drawer no	Plate no	Herbarium/ Botanic collection/ Institution	Species name	Harvesting date	Harvesting place	Collected/ Determined by:	Conservation Degree (1..4)
	8	Bucharest's Polytechnic School Herbarium / Botanic Laboratory	*Cornus mas* L.	1834.04.01.	Durostor district, Pusnicul forest	P. Cretzoiu	1
	21	ICEF, Forestry Research and Experimentation Institute	*Cornus candidissima* Marshall	1939.05.29.	Bazoş Park, Timiş County Torontal	S. Paşcovschi	1
	14	INDIAN FOREST RANGER COLLEGE, DEHRA DUN. Botanical Collections	*Cornus macrophylla*	1942.05.13.	Ranikhet	D.D. Sadhata ?	14
	82	Flora Romaniae Exsiccata A Museo Botanico Universitatis Clusiensis (in Timisoara)	*Cornus sanguinea* L.	1937.05.29.	Năsăud District, Vinului Valley, Rodnei Mountain 800-900 m	S. Forstner	1
	71	Agriculture and Silviculture Ministry, Forestry Research Institute	*Cornus pumila* Koehne	1959.01.01.	Snagov		1
	36	ICEF, Forestry Research and Experimentation Institute	*Cornus amomum* Mill.	1942.06.20.	Timişoara County Nursery	S. Paşcovschi	1
	18	ICEF, Forestry Research and Experimentation Institute	*Cornus florida* L.	1939.08.14.	Bazoş Park, Timiş County Torontal	T. Iacob, S. Paşcovschi	1

RESULTS AND DISCUSSIONS

Cornus Genus consists of approximately 55-58 tree and shrub species that are mainly used in ornamental purposes due to their diverse flower colors. The genus is widespread in the northern hemisphere, with a few species in Africa and southern America (FAN and XIANG, 2001; XIANG *et al*., 2006). The species are rich in phenolic compounds so that their biologic activities recommend them for usage in the medicinal and pharmaceutical industries (STANKOVIĆ and TOPUZOVIĆ, 2012; YOUSFBEYK *et al*., 2014).

The 17 *Cornus* species that were found in the herbarium are the following: *C. alba* L., *C. amomum* Mill., *C. alternifolia* L., *C. asperifolia* Michx., *C. baileyi* J.M. Coult. & W.H.

Evans, *C. canadensis* L., *C. candidissima* Marshall., *C. florida* L., *C. mas* L., *C. macrophylla* Wall., *C. obliqua* Raf., *C. paniculata* L'Hér., *C. pumila* Koehne, *C. sanguinea* L., *C. stolonifera* Michx. *C. stricta* Lam. and *C. suecica* L .

As can be seen in Figure number one, the majority of plates belong to *Cornus sanguinea* L. (48 plates) and *Cornus mas* L. (41 plates), these being also the most representatives plants from our country.

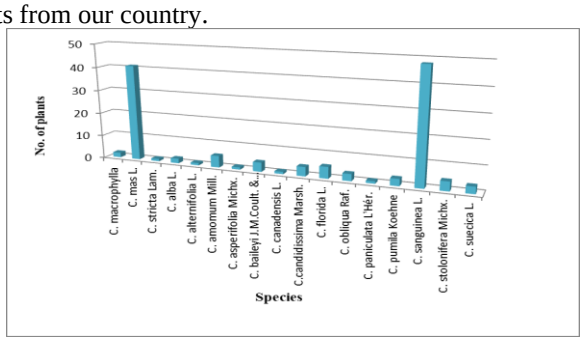

Figure 1. *Cornus* species present in the herbarium

Cornus mas L.(figure 2 left), also known as Cornelian Cherry, is an average-height shrub that can reach 5-12 m and can be found in South Europe and South-West Asia. The specie's name originates from Latin where "Cornu" means corn and "mas" comes from "maschile", meaning hard wood ((DINDA *et al*., 2016). The fruits are purple elongated drupes, with a sour taste and highly edible. Rich in vitamin C, the fruits can be consumed fresh or in the form of various derived products such as syrups, compotes, juices, wines, etc. (KLIMENKO, 2004; TURAL, and KOCA, 2008; PAWLOWSKA *et al*., 2010).

Cornus sanguinea L. is a tall shrub that can reach 4 m in heights and blooming from May up to June. The fruits are drupe, pulpy, 7-10 mm in diameter, red in the beginning then black-blue that ripen during September and October (KRÜSI and DEBUSSCHE, 1988; GUITIÁN *et al*., 1996). The species is widespread in Europe and the Caucasian area, especially in broad-leaved forests and is cultivated in ornamental purposes due to its persistent leaves (KOLLMANN and GRUBB, 2001).

Cornus amomum Mill., also known as silky dogwood, is an average shrub that can reach 6-12 m in height. The flowers are yellow and bloom at the end of spring, while the fruits are drupes that are white at the beginning and then blue, ripening at the end of summer (www.missouribotanicalgarden.org).

Cornus alternifolia L. is a species widespread in the East of the USA, having dark blue fruits (VAREED *et al*., 2006).

Cornus florida L. (flowering dogwood) is one of the most known shrubs from East North America, being used in ornamental purposes (REED, 2004). The flowers are small, with green bractea and are grouped in a dense inflorescence of approximately 20 flowers. The shrub blooms from the end of March up to May (MCLEMORE, 1990).

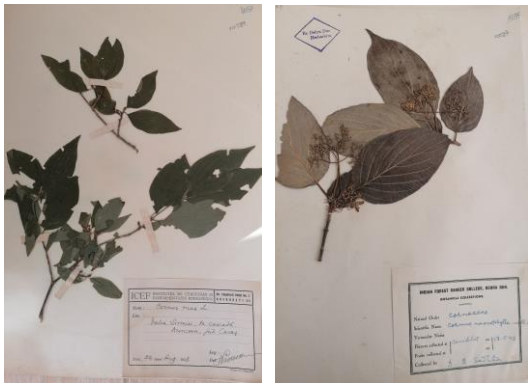

Figure. 2. Samples of preserved biological material

Cornus macrophylla Wall. (figure 2, right) is a shrub that can reach to 20 m in height, widespread in Asia. The leaves are ovate, can reach 7-15 cm in length, while the fruits are 6 mm in diameter and bloom from July up to August (NOSHIRO and BAAS, 2000). The fruits are used in medicine for treating different affections: allergies, infections, cancer, diabetes, malaria etc. (SHAH *et al*., 2015).

The majority of plants (129) were harvested between 1834-1989, and are in a good state of conservation. 46 plants were harvested between 1940-1949, while the oldest plant was gathered in 1834 by P. Cretzoiu (Figure 3).

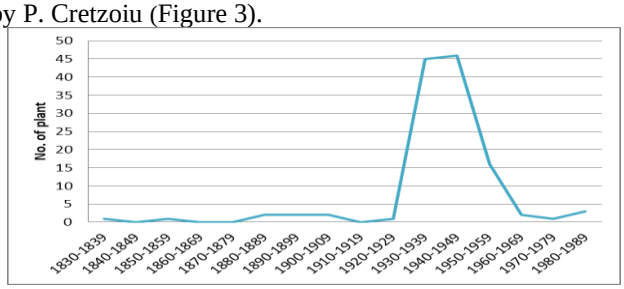

Figure 3. Harvesting periods of *Cornus* plants from INCDS Herbarium

The persons that have gathered the plants are renowned Romanian specialists (S. Pascovschi, Al. Beldie, At. Haralamb, C.C. Georgescu, J. Neuwirth, M. Badea, P. Cretzoiu, I. Morariu, V. Leandru, Al. Buia, M. Olaru, I. Lupe, I. Apahidean, M. Petcuţ, T. Iacob) or foreign ones (Wolff, Dr. H. Hapeman, Dr. Heuser).

The Cornus species present in “”Al. Beldie” Herbarium were mainly gathered from different Romanian areas: Arad, Bucureşti, Alba, Dâmboviţa, Prahova, Bistriţa-Năsăud, Vâlcea, Gorj, Maramureş, Timişoara, Buzău, Hunedoara, Mureş, Cluj, Constanţa, Suceava (Figure 4).

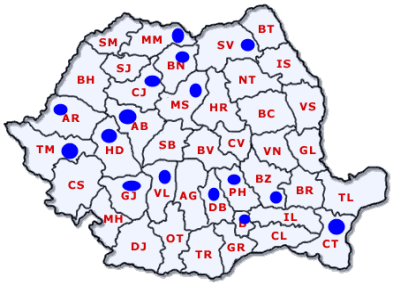

Figure 4. Harvesting places of *Cornus* plants (source: https://portalsm.ro)

CONCLUSIONS

The herbarium is important as its provides relevant information about plants and their area of propagation during long periods that help to carry out studies in taxonomy, biodiversity, ecology, anatomy, morphology etc.

Amongst the 58 *Cornus* species widespread in the North hemisphere, "Al. Beldie" Herbarium contains 17 species that are kept in a good conservation state. Characteristics concerning their apparition, distribution and habitat can be appreciated based on the data collected from their vouchers, harvesting year and place. This data can be used for comparing their geographic distribution over time.

The plants were harvested between 1834-1989, with 46 plants harvested between 1940-1949. The majority of species are used in ornamental purposes, while certain species (*Cornus mas* L. and *Cornus macrophylla* Wall.) are used in nutrition or medicine for treating certain diseases.

BIBLIOGRAPHY

CÂNTAR I.C., DINCĂ L., 2018 - *Trifolium* genus species present in "Alexandru Beldie" Herbarium from "Marin Drăcea" National Institute for Reseach and Development in Forestry, Annals of West University of Timisora, ser. Biology, 21(2): 123-132.

CÂNTAR, I.C., DINCĂ, L., 2019 - *Agrostis* species present in the "Alexandru Beldie" Herbarium from "Marin Dracea" National Institute for Research and Development in Forestry. Annals of the University of Craiova - Agriculture, Montanology, Cadastre Series, Vol. 48 (2): 44-49.

CRIȘAN, V., DINCĂ L., ONEȚ, C., ONEȚ, A., 2017 - Collection species from *Potentilla* genus. Natural Resources and Sustainable Development, 21 (70): 27-34.

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. Currents Trends in Natural Sciences, 6 (12): 16-24.

DINCĂ, L., CÂNTAR, 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 Series, 47 (1): 118-126.

DINCĂ, L., VASILE, D., DINCĂ, M., 2017a - 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 (1): 127-135.

DINCĂ, L., ENESCU, R., ONEȚ, A., 2017b - Plant species from "Al. Beldie" Herbarium - *Veronica* genus - short description. Natural Resources and Sustainable Development, 9: 43-50.

DINCĂ, L., VASILE D., VOICULESCU I. 2017c - The characteristics of plants from *Hieracium* genre present in Alexandru Beldie Herbarium from INCDS Bucharest, Lucrări ştiinţifice USAMV Iaşi, seria Horticultură, 60 (1): 39-48.

DINDA, B., KYRIAKOPOULOS, A. M., DINDA, S., ZOUMPOURLIS, V., THOMAIDIS, N. S., VELEGRAKI, A., ... DINDA, M., 2016 - *Cornus mas* L.(cornelian cherry), an important European and Asian traditional food and medicine: Ethnomedicine, phytochemistry and pharmacology for its commercial utilization in drug industry. Journal of Ethnopharmacology, 193: 670-690.

ENESCU, R., CRISAN, V.E, 2017 - Plants preserved in" Alexandru Beldie" herbarium: genus *Sorbus*. Revista de Silvicultură şi Cinegetică, *22*(41): 72-76.

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.

FAN, C., XIANG, Q. Y. 2001 - Phylogenetic relationships within *Cornus (Cornaceae*) based on 26S rDNA sequences. American Journal of Botany, 88 (6): 1131-1138.

GUITIÁN, J., GUITIÁN, P., NAVARRO, L. 1996 - Fruit set, fruit reduction, and fruiting strategy in *Cornus sanguinea* (Cornaceae). American Journal of Botany, 83 (6): 744-748.

KLIMENKO, S. 2004 - The cornelian cherry (Cornus mas L.): collection, preservation, and utilization of genetic resources. J. Fruit Ornam. Plant Res, 12: 93-98.

KOLLMANN, J., GRUBB, P. J. 2001 - Biological Flora of Central Europe: *Cornus sanguinea* L. Flora, 196 (3): 161-179.

KRÜSI, B. O., DEBUSSCHE, M. 1988 - The fate of flowers and fruits of *Cornus sanguinea* L. in three contrasting Mediterranean habitats. Oecologia, 74 (4): 592-599.

MCLEMORE, B. F. 1990 - *Cornus florida* L. flowering dogwood. Silvics of North America, 2(654): 278.

MISSOURI BOTANICAL GARDEN (www.missouribotanicalgarden.org, Accessed 3 November 2019)

NOSHIRO, S., BAAS, P., 2000 - Latitudinal trends in wood anatomy within species and genera: Case study in *Cornus* s.l. (Cornaceae). Am. J. Bot., 87: 1495-1506.

PAWLOWSKA, A. M., CAMANGI, F., BRACA, A. 2010 - Quali-quantitative analysis of flavonoids of *Cornus mas* L.(Cornaceae) fruits. Food Chemistry, 119 (3): 1257-1261.

REED, S. M. 2004 - Self-incompatibility in *Cornus florida*. HortScience, 39 (2): 335-338.

SHAH, S., SHAH, S. M. M., AHMAD, Z., YASEEN, M., SHAH, R., SADIQ, A., ... KHAN, B. 2015 - Phytochemicals, in vitro antioxidant, total phenolic contents and phytotoxic activity of *Cornus macrophylla* Wall bark collected from the North-West of Pakistan. Pak J Pharm Sci, 28 (1): 23-8.

STANKOVIĆ, M. S., TOPUZOVIĆ, M. D. 2012 - In vitro antioxidant activity of extracts from leaves and fruits of common dogwood (*Cornus sanguinea* L.). Acta Botanica Gallica, 159 (1): 79-83.

ŞTEFÎRŢĂ, ANA, 2008 - COLECŢIILE HERBARULUI GRĂDINII BOTANICE (INSTITUT), Rev. Bot. 1 (1): 197-200. Chişinău

TURAL, S., KOCA, I. 2008 - Physico-chemical and antioxidant properties of cornelian cherry fruits (*Cornus mas* L.) grown in Turkey. Scientia Horticulturae, 116 (4): 362-366.

VAREED, S. K., REDDY, M. K., SCHUTZKI, R. E., NAIR, M. G. 2006 -Anthocyanins in *Cornus alternifolia*, *Cornus controversa*, *Cornus kousa* and *Cornus florida* fruits with health benefits. Life Sciences, 78 (7): 777-784.

VECHIU, EMILIA, DINCĂ, L., CÂNTAR, I.C., 2018a - Describing the *Lycopodium* Genus based on the plants present in Al. Beldie Herbarium. Research Journal of Agricultural Science, 50 (4): 385-390.

VECHIU, EMILIA, DINCĂ, L., BRATU, I., 2018b- The characteristics of *Polygonum* plants present in the Alexandru Beldie Herbarium. Research Journal of Agricultural Science, 50 (4): 378-384.

XIANG, Q. Y. J., THOMAS, D. T., ZHANG, W., MANCHESTER, S. R., MURRELL, Z., 2006 - Species level phylogeny of the genus *Cornus* (Cornaceae) based on molecular and morphological evidence—implications for taxonomy and Tertiary intercontinental migration. Taxon, 55 (1): 9-30.

YOUSFBEYK, F., ESMAIILI, T., PASHNA, Z., HOZORI, Z., GHOHARI, A. R., OSTAD, S. N., & AMIN, G., 2014 - Antioxidant activity, total phenol and total anthocyanin contents of *Cornus sanguinea* L subsp *australis*.(CA Mey.) Jáv. 74-69 :)49(1 ,فصلنامه علمی پژوهشی گیاهان دارویی.