THE CHARACTERISTICS OF POLYGONUM PLANTS PRESENT IN THE ALEXANDRU BELDIE HERBARIUM

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Abstract. *Polygonum Genus contains over 300 species spread out in Europe, North and South America, Asia and North Africa. Most species of this Genus are used for treating different medical conditions, such as: heart failure, kidney failure, hemorrhoids, leucoreea, scrofula, acute respiratory infection and epistasis. A number of 186 plates that contain 41 Polygonum species are found in Al. Beldie Herbarium from INCDS "Marin Drăcea" Bucharest. The majority of plants belong to the following species: Polygonum lapathifolium L., Polygonum aviculare L., Polygonum bistorta L., and Polygonum convolvulus L. The species were gathered between 1842 and 1996, with a maximum period between the 1930-1939 period. The plants were collected by renowned Romanian specialists such as Al. Beldie, S. Pașcovschi, A. Coman, At. Haralamb or C.C. Georgescu from Bucegi Mountains, Retezat Mountains, Bucharest, Buzău, Cluj, Constanța and Valea Prahovei. The purpose of this present paper is to describe certain Polygonum species present in the above-mentioned Herbarium.*

Key words: *Polygonum, species, properties*

INTRODUCTION

Polygonaceae Family contains approximately 1200 species that belong to the 49 Genus that it contains. This family contains both herbaceous as well as shrub species, characterized by simple leaves with sheathing ochreate stipules. The fruit is a lenticular or trigonous achene, with a unilocular ovary and endospermic seeds [23].

Polygonum Genus contains over 300 species that are spread out in Europe, North and South America, Asia and North Africa [1]. Based on morphological studies on fruits and flowers, the Genus was divided in four sections, as follows: *Polygonum, Pseudomollia* Boiss., *Duravia* S. Watson and *Tephis* (Adans.) Meisn [27]. Certain species from this are renowned for their medicinal properties: *Polygonum equisetiforme* is used for disinfecting wounds, while *Polygonum aviculare* is used as antidiarrheal, astringent, hemostatic, vulnerary [6].

Polygonum species are characterized by varied heights (from 5 cm up to 3-4 m), leaves that vary from 1 to 30 cm, while the flowers are small, white, green or pink. The fruits are lenticular or triunghiular achenes. Certain species vegetate in swamp areas. The species from this Genus have the following chemical components: coumarins, sesquiterpenoids, tannins, anthraquinones, flavonoid, triterpenoids, stilbenoids, phenylpropanoids and lignans [21].

The purpose of this paper is to inventory and describe certain *Polygonum* species present in the Al. Beldie Herbarium from INCDS "Marin Drăcea" Bucharest.

MATERIAL AND METHODS

Marin Drăcea National Institute for Research-Development in Forestry (INCDS) from Bucharest hosts the ”Alexandru Beldie” Herbarium” that contains over 40.000 plates of forest herbaceous species. The plants from this Herbarium are organized in a number of 600 drawers and kept in their original maps [26].

As in the case of *Ornithogalum* [12], *Gentiana* [14], *Arabis* [8], *Hieracium* [10], and *Androsace* [7], a database was also created for the Polygonum Genus. This database contains the collection to which each species belongs, the gathering date and place, who has collected the plant, as well as its conservation degree.

RESULTS AND DISCUSSIONS

”Alexandru Beldie” Herbarium contains 186 plates belonging to the *Polygonum* Genus, with 41 species as follows: *Polygonum acutifolium* Schur., *Polygonum alpinum* All., *Polygonum amphibium* L., *Polygonum arenarium* Waldst. & Kit., *Polygonum aviculare* L., *Polygonum baldschuanicum* Regel., *Polygonum bistorta* L., *Polygonum calcatum* Lind., *Polygonum convolvulus* L., *Polygonum cuspidatum* Siebold & Zucc., *Polygonum dubium* Stein., *Polygonum dumetorum* L., *Polygonum elegans* Ten., *Polygonum equisetiforme* Sibth., *Polygonum flaccidum* Borb., *Polygonum foliosum* Lindb, *Polygonum graminifolium* Berker,, *Polygonum Gussonei* Tod., *Polygonum herniarioides* Spreng, *Polygonum hydropiper* L., *Polygonum kitaibelianum* Sadl., *Polygonum lapathifolium* L., *Polygonum laxiflorum* Weihe, *Polygonum littorale* Link., *Polygonum longipes* Halácsy & Charrel, *Polygonum maritimum* L. *Polygonum microspermum* Jord., *Polygonum minus* Huds., *Polygonum mite* Schrk., *Polygonum orientale* L, *Polygonum patulum* M.B., *Polygonum persicaria* L., *Polygonum polygaloides Wall., Polygonum pulchellum* Lois., *Polygonum punctatum* Ell., *Polygonum Roberti* Lois., *Polygonum romanum* Jacq., *Polygonum rurivagum* Jord., *Polygonum strictum* Led., *Polygonum virginianum* L., *Polygonum viviparum L.*.

As can be seen in Figure number 1, 16% of the plates are represented by *Polygonum aviculare* L., 10% by *Polygonum bistorta* L., 8% by *Polygonum convolvulus* L., 6% by *Polygonum hydropiper* L., 12% by *Polygonum lapathifolium* L., 6% by *Polygonum persicaria* L., 6% by *Polygonum virginianum* L., while the rest are represented by other species represented in a smaller quantity.

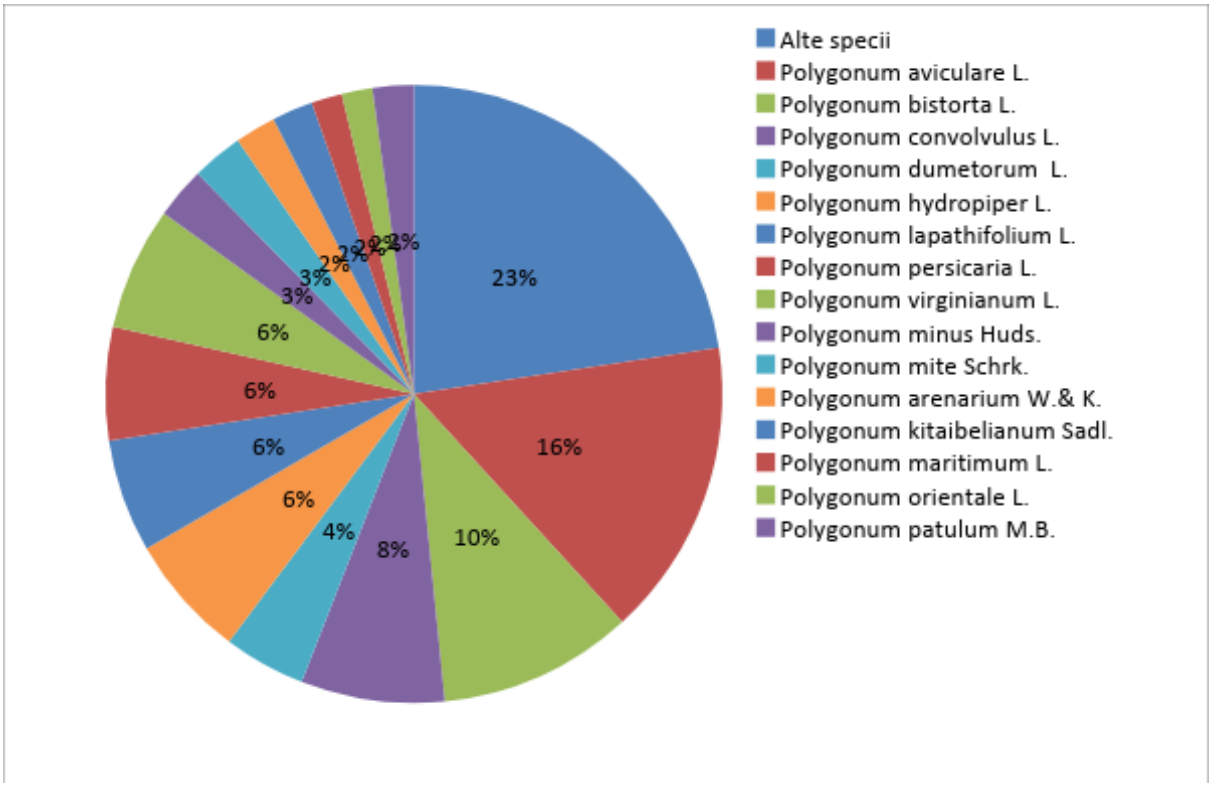

Fig. 1 *Polygonum* genus species present in the herbarium

Polygonum aviculare L. (Fig. 2), commonly known as swine grass, is an annual herbaceous plant, with small, alternate and lanceolate leaves. The root is pivotant, while the flowers are white-green, bisexual and grouped 2-4 at the leaves' base. The plant blooms from June until September and is outspread in North America and Eurasia. *Polygonum ramosissimum* and *Polygonum achoreum* S.F. Blake can be confused with *Polygonum aviculare* [5]. *Polygonum aviculare* L. also contains the following variaties: *Polygonum aviculare* L. var. *aphyllum* Hayne and *Polygonum aviculare* L. var. *ascendens* Mont.

Polygonum aviculare L. is a medicinal plant used in treating heart and renal failures as well as gingival inflammations [1].

Polygonum bistorta L. (Fig. 3), commonly known as Bistort or Snakeroot, is a perennial herbaceous plant that grows in Europe, Russia, India, China, Japan and Mongolia. The plant blooms between June and September [24]. The species can reach 20-18 cm in height, while the leaves are basal, lanceolate, light green and can reach 6 - 9 cm. The inflorescence is a spike and the plant vegetates very well on humid, fertile soils [4]. Due to its ethanolic extract, the plant has anti inflammatory properties. Also, because of its bioactive compounds, such as flavonoid, tannin and

phenolic acid, this species is used for treating hemorrhoids, leucorrhoea, scrofula, acute respiratory infection and epistasis [16].

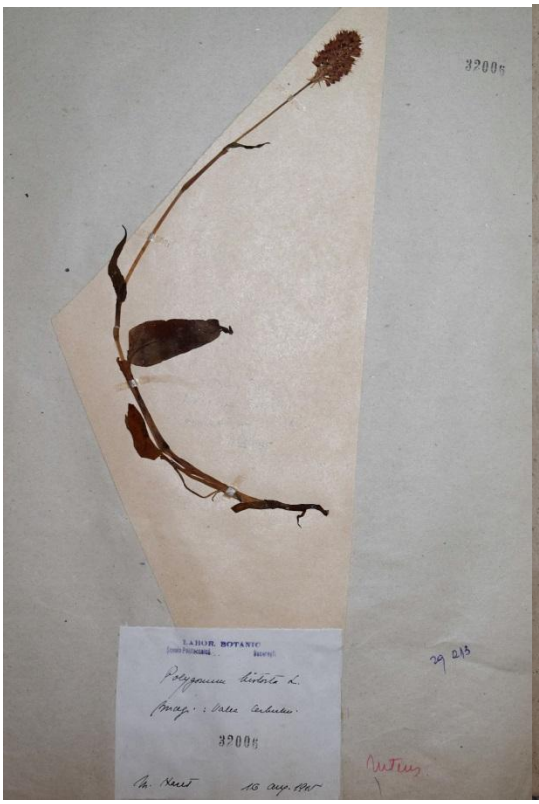

Fig. 2 *Polygonum aviculare* L.

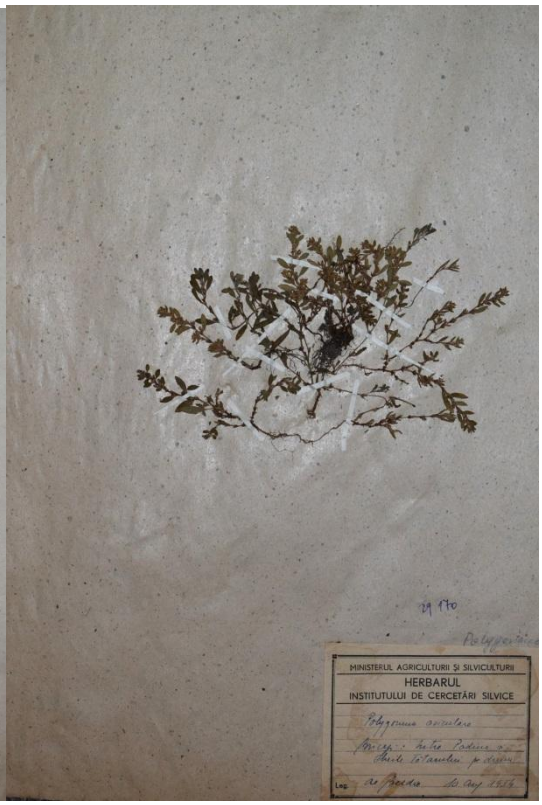

Fig. 3 *Polygonum bistorta* L

Polygonum convolvulus L. (Fig. 4) is an annual perennial plant that has deep roots, a slender green stern ramified at the basis. The stem can twist around other plants and can reach 2 m in length. The flowers are small and white-green, with the perigon composed of five sepals. The plant blooms from June until September. The leaves are petiolate, alternate, 2-6 cm in length, with an acuminate tip and a cordat-sagitated basis. The plant reproduces through seeds [15] and by self-fertilisation under greenhouse conditions [17].

Polygonum convolvulus L. is a cosmopolite species, native from Europe but that has spread throughout the planet, with the exception of Antarctica [15].

Polygonum hydropiper L. (Fig. 5) is a plant that is highly used in medicine as a flavouring; diuretic, stimulant, emmenagogue, styptic and lithontriptic. These elements are extracted from the roots, while root-juice is also used for skin affections [19]. In Japan, China and Europe the plant is also

used as a medicine for treating cancer and hemostatic disorders. The plant is spread out in the temperate area, in Europe, Japan, China and North America [20].

Polygonum lapathifolium L., also known as reed grass, porcine troscot, arnica or bitter grass. The plant has a red and erect stern, while the leaves are lanceolate or linear-lanceolate. The flowers are red, hermaphrodite and disposed in fake spikes [25]. The species grows in Europe, Norway, Russia, North and Central America and Asia [25], preferring swampy areas, floodplains and roadsides [3]. The aerial plants of the plant were used for a long time in medicine for treating dysentery and other diseases, due to their anti-inflammatory, antiviral, antifungal, antibiotic and antibacterial properties [18].

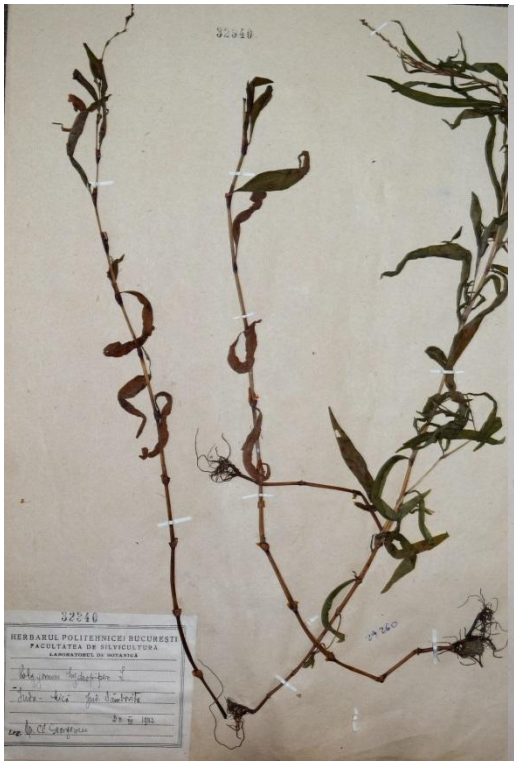

Fig. 4 *Polygonum convolvulus* L.

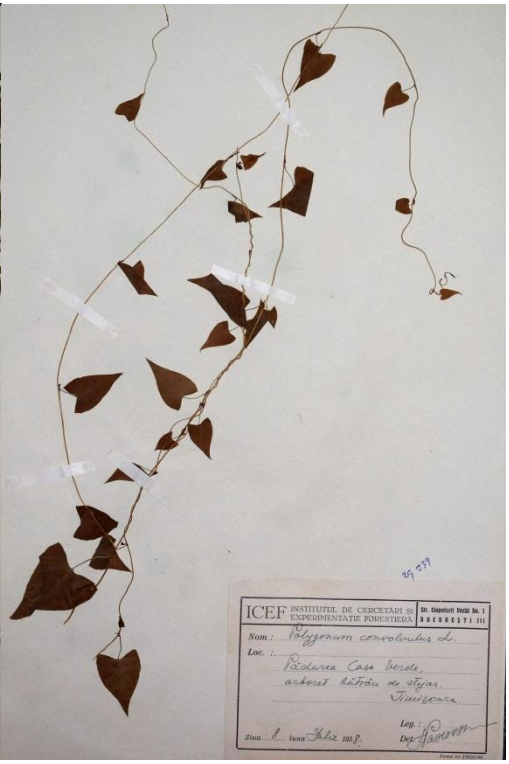

Fig. 5 *Polygonum hydropiper* L.

Polygonum alpinum All. is a perennial plant that grows in Europe, Japan, China and Mongolia. The plant is recognisable through is ovate-lanceolate up to elongate-lanceolate leaves that can reach 5-12 cm in length and are narrow at the basis. The species prefers steppe areas. In certain regions, the leaves and stem are used both in the food industry as well as with medicinal purposes [2].

Polygonum amphibium L. has both an aquatic and terrestrial growth and can reach 1 m in height. As such, the plant grows on meadows, roadsides and banks, as well as in still or slow waters [22]. The leaves are elongated and laceolate, can reach 4-14 cm in length, have accumbent hairs in their

land form, while in their aquatic form the leaves can reach 4-10 cm, have a rounded basis and a petiole of 2-8 cm. .

The plants' gathering year. The plants were gathered between 1842 and 1966. The first plant, *Polygonum aviculare* was harvested in 1842 by I. Morariu. The majority of *Polygonum* plants were gathered between 1930-1939, with 52 plants, followed by 1940-1949 with 39 plants (Fig. 6). The 1930-1939 period is also characterised as a maximum of plants in the case of *Gentiana* – over 50 plants [14], *Sorbus* – 71 plants [13], *Veronica* – 26 plants [11] and Centaurea – 28 plants [9].

The *Polygonum* plants were mainly gathered from Romania (Bucegi Mountains, Retezat Mountains, Bucharest, Buzău, Cluj, Constanța, Valea Prahovei, Caraș-Severin, Timișoara etc) as well as from Eurioe (France, Italy, Germany).

The people who have gathered them are represented by Romanian and foreign specialists. Among the Romanian botanists who have gathered these plants we mention Al. Beldie, S. Pașcovschi, A. Coman, At. Haralamb, C.C. Georgescu, I. Morariu, G. Bujorean, I. Prodan, M. Haret, N. Iacobescu, P. Cretzoiu, E.I. Nyárády, while the foreign ones include A. Richter, A. Berker, C. Baenitz, H. Bourdot, J. Neuwirth, S. Forstner, Wolff.

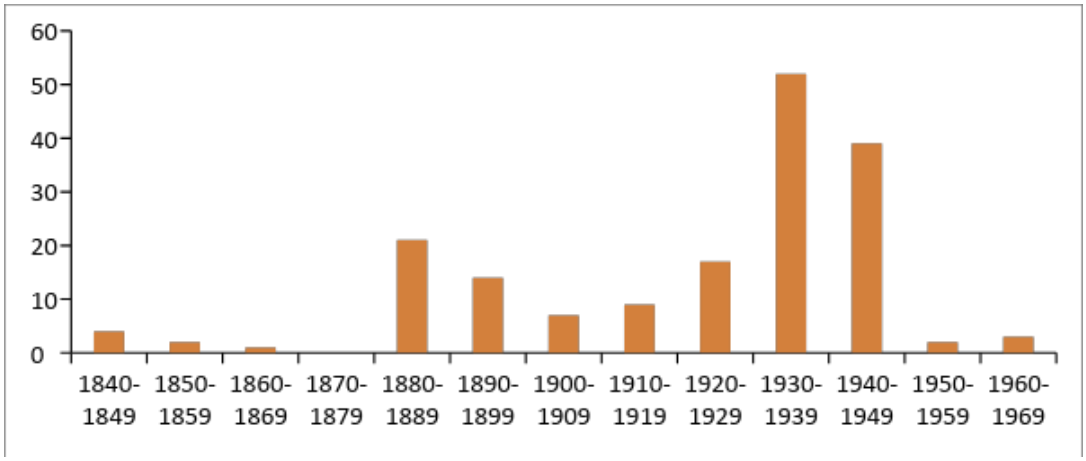

Fig. 6 Harvesting periods for *Polygonum* plants from INCDS Herbarium

CONCLUSIONS

The Polygonum plants are characterised by the presence of numerous bioactive compounds such as flavonoid, tannin and phenolic acid. Most of the plants are used in treating different medical conditions, such as heart failure, renal failure, hemorrhoids, leucorrhoea, scrofula, acute respiratory infection and epistasis.

"Al. Beldie" Herbarium from INCDS Bucharest contains plates belonging to certain *Polygonum* species, as follows: *16%* are represented by *Polygonum aviculare* L., 12% by *Polygonum*

lapathifolium L. 10% by *Polygonum bistorta* L. and 8% by *Polygonum convolvulus* L.. The plants were kept in a good conservation state.

The plants were gathered between 1842 and 1966, reaching a maximum in the period 1930-1939, with a number of 52 plates. The oldest plant dates back to 1842 and was harvested by I. Morariu. Amongst the renowned Romanian botanists who have gathered the plants were Al. Beldie, S. Pașcovschi, C.C. Georgescu, G. Bujorean, I. Prodan, M. Haret, N. Iacobescu, P. Cretzoiu and E.I. Nyárády. The plants were gathered from Bucegi Mountains, Retezat Mountains, Cluj, Constanța, Valea Prahovei, Caraș-Severin, Timișoara etc.

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