

Distribution of *Amelanchier ovalis* Medik. in the Romanian Carpathians – a critical overview

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SUMMARY. This study proposes a critical analysis of the distribution of the rare plant species *Amelanchier ovalis* Medik. in the Romanian Carpathians. The species was mentioned as sporadically distributed in this part of Carpathians, but we found no evidence that the plant was ever collected and deposited in public herbaria. Besides herbarium material, a critical analysis of available botanical literature concurred to the same conclusion: the presence of *Amelanchier ovalis* in all previously mentioned localities in the Romanian Carpathians can not be supported by any concrete data and, therefore, can be considered as doubtful. The paper reports the recent discovery of *Amelanchier ovalis* in a new area in the Eastern Carpathians (Vrancea Mountains, Putna-Vrancea Natural Park). A detailed description of plant communities in which the species grows is also provided.

Additionally, new sites with *Hieracium telekianum* Boros & Lengyel (Eastern Carpathian endemic and rare species) are also reported in Vrancea Mountains.

Keywords: *Amelanchier ovalis*, Chorology, Red Book, Romanian Carpathians, threatened species

Introduction

Romanian flora includes many species whose presence is uncertain and should be reconfirmed (e.g. *Dianthus diutinus* Kit., *Euphorbia paralias* L., *Thesium ebracteatum* Hayne, *Ledum palustre* L., *Ophrys fusca* Link, *Osmunda regalis* L., etc.) (Sârbu *et al.* 2013). Two of these species (*Saussurea porcii* Degen and *Jasione orbiculata* Griseb. ex Velen.) have been recently reconfirmed in Rodna (Eastern Carpathians) and, respectively, in Retezat Mountains (Southern Carpathians) (Mátis *et al.*, 2014; Bartók 2014).

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One of this species is *Amelanchier ovalis* Medik., which until recently was not confirmed by herbarium material in Romanian flora, although in some botanical works is listed as sporadically distributed (Ciocârlan, 2009; Oprea, 2005).

Genus *Amelanchier* was described in 1789 by Friedrich Casmir Medicus, German botanist and physician (Medicus, 1789). *Amelanchier* is a genus of shrubs and small trees belonging to the subfamily *Pomoideae* of the *Rosaceae* and includes ornamental species (chiefly from North America) and a single species widely distributed in Europe - *Amelanchier ovalis* (Jones, 1946).

This is a slender often scaly-barked shrub. Leaves are 2-5 x 1.5-3 cm, ovate, oblong to obovate or almost orbicular, rounded or emarginated at apex, lanate beneath when young. Flowers are entomophilous, in erect lanate racemes (rarely solitary or paired) appearing shortly in advance of the foliage, or as the leaves unfold. Pedicels (1-2 cm long) are bracteate at the base and bearing a second bract at or near the middle. Hypanthium is campanulate or urceolate, lanate at first, soon glabrous. Petals 5, white, or rarely pink, oblanceolate to narrowly oval, are 4-6(-8) times longer than sepals. Sepals are lanceolate, 2-2.5 mm long. Stamens (10-20) are short, inserted on the rim of the calyx. Styles 2-5, are free; carpels 2-5. Fruit is globose, 6-8 mm in diameter, glabrous or slightly tomentose at apex, red when young, bluish-black and with bloom when ripe (Strid, 1986; Franco, 1992).

Amelanchier ovalis naturally occurs in Western, Central and Southern Europe, Asia Minor and along the north coast of Africa, in the forest zone, rocky slopes along streams, and grassy subalpine meadows on calcareous bedrock, at 400-1100-2200 m (Strid, 1986). The flowering period is April to June.

In the Romanian Carpathians, *A. ovalis* was reported to grow in several massifs (Rodna, Ceahlău, Hășmaș, Bârsa, Retezat, Trascău and Bihor Mountains - Buia 1956, Oprea 2005), but most of these localities were recorded in XIXth century, without recently confirmed populations. In the Romanian Floras and checklists it was considered as a sporadic element (Oprea, 2005; Ciocârlan, 2009) or a rare species (Sârbu *et al.*, 2013). In the Red Lists elaborated for Romanian Flora, *A. ovalis* is considered a “Rare Species” (Oltean *et al.*, 1994; Dihoru and Dihoru, 1994) or placed in the “Insufficiently Known” (K) zoological category (Boșcaiu *et al.*, 1994) The species is not included in the Red Book of Vascular Plants of Romania (Dihoru and Negrean, 2009).

The main goal of this study was to clarify the distribution of *Amelanchier ovalis* in Romania, based on a detailed review of the available data concerning the presence of the species in this part of Carpathians. Moreover, the discovery of new sites for this species is reported and the phytocoenotic context in which *A. ovalis* grows is characterised by original field data.

Material and methods

Our investigations were based on recent field studies, analysis of herbarium material stored at CL, BP, BUC, BUCA, BUCF, BVS, SIB, I, IAGB, IASI, CRAI (acronyms according to Thiers 2015), as well as literature data.

All existing herbarium material was revised and all available information from botanical literature was critically compiled in order to clarify the distribution of *Amelanchier ovalis* in the Romanian Carpathians. Several field surveys were made between 2003 and 2016 in Ceahlău Mts., Hășmaș Mts., Rodna Mts. (Eastern-Carpathians); Bucegi Mts., Piatra Craiului Mts., Piatra Mare Mt., Postăvaru Mt., Retezat Mts. (Southern Carpathians); Trascău Mts., Bihor Mts. (Apuseni Mountains) where the species was reported.

Phytosociological characteristics of newly discovered sites with *Amelanchier ovalis* were studied according to the Braun-Blanquet approach (Braun-Blanquet, 1932). Species names follow Flora Europaea (Tutin *et al.*, 1992-1994) when author's name not indicated.

Results and discussions

1. Distribution of *Amelanchier ovalis* in the Romanian Carpathians

1.1. Historical considerations

1.1.1. Munții Rodnei (Rodna Mountains, Eastern Carpathians)

This important hotspot of alpine flora in Romania is very well studied from botanical point of view, but no botanist cited the species in Rodna Mountains. A single herbarium material was found in BUCA (no. 52130), with this information on the voucher's label: "Munții Rodnei, leg. I. Prodan, 1896". Carefully studying the label, it was clear that it was not the Prodan's handwriting. Most probably the specimen was mislabelled and the plant has not been collected from that range. Moreover, Prodan (1939) did not mention *A. ovalis* from Rodna Mountains in a work published after the supposed collections. In the same publication he clearly stated that, in Transylvania, the plant is possibly present only in Bihor Mountains.

The species was not mentioned in other botanical monographs of famous botanists like Porcius (1878), Schur (1866), Simonkai (1886), Soó (1944), Coldea (1990). We could neither find *A. ovalis* in different parts of this mountain range that were investigated (A. Bartók, pers. obs. 2003, 2004, 2005, 2009, 2010, 2012, 2013, 2014, 2015, 2016).

1.1.2. Munții Ceahlău (Ceahlău Mountains, Eastern Carpathians)

Ceahlău Mountains represent maybe the most intensively investigated region by the botanists, considering the whole range of Eastern Carpathians. The first mentions of *A. ovalis* from this massif date back to XIXth century, when J. Edel (1853) cited the species from the higher part of Ceahlău, but without exact location. In his floristical synthesis, Brândză (1883) mentioned *A. ovalis* in Ceahlău Mountains quoting Edel, from rocky cliffs in forests, without exact locality.

Later, Grecescu (1906), in his article about vascular plants of Ceahlău, specified that serviceberry is wrongly published by Edel from this area because, in his opinion, the species does not grow spontaneously in Carpathians.

Despite that, in Romanian botanical literature (e.g. Prodan, 1939; Buia, 1956; Dumitriu-Tătăranu, 1961; Zanoschi, 1971; Beldie, 1977; Chifu *et al.*, 1987; Mititelu *et al.*, 1989; Manoliu *et al.*, 2002; Oprea, 2005; Chifu *et al.*, 2006; Ciocârlan, 2009; Sârbu *et al.*, 2013) snowy mespilus is listed for the Ceahlău Mountains, but the data referred to the same old and doubtful sources.

In this mountain range the presence of snowy mespilus was never confirmed by herbarium material. We could not trace any herbarium specimen of *Amelanchier ovalis* from Ceahlău Mountains. Also, we could not find serviceberry in this mountain group (A. Bartók, pers. obs. 2003, 2004, 2005, 2006, 2007, 2009, 2015, 2016).

1.1.3. **Munții Hășmaș** (Hășmaș Mountains, Eastern Carpathians)

Amelanchier ovalis was first listed in this mountain group by Schur (1859) from Öcsém Peak (*Ecsém Teteje*). Even Schur no longer mentioned the species in Hășmaș Mountains in his *Enumeratio Plantarum Transsilvaniae*, published in 1866. Moreover, according to Soó (1940), Schur's data from Öcsém Peak should be removed. Recently, in a comprehensive monograph of flora and vegetation of Hășmaș Mountains Nechita (2003) mentioned the snowy mespilus's presence in this mountain range, but only referring to the Schur's data (Schur, 1859b).

The flora of Hășmaș Mountains is relatively well explored and other floristical or phytosociological publications (Soó, 1943; Nechita and Mititelu, 1996; Nechita, 2000) did not mention the occurrence of *A. ovalis* in this mountain range.

We could not find snowy mespilus in Hășmaș Mountains (A. Bartók, pers. obs. 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2011, 2013, 2014, 2015) and also we were unable to trace herbarium specimens of this taxon from that mountain range in any public herbaria.

1.1.4. **Munții Bârsei** (Bârșa Mountains, Southern Carpathians)

Schur (1866) listed *Amelanchier ovalis* (under *Aronia rotundifolia*) in this mountain group, around Brașov.

Bârșa Mountains (including Piatra Mare and Postăvaru) represent one of the most intensively investigated region by botanists, considering the whole range of Carpathians, but *A. ovalis* was not mentioned in any subsequent monographs about the flora of this area (Römer, 1905; Fink, 1975, 1977; Buiculescu, 1989; Danciu and Parascan 2000; Danciu and Pop 2008).

Only Dumitriu-Tătăranu (1961), Hager (1985) and Oprea (2005) cited snowy mespilus from Bârsei Mountains according to Schur (1866).

Amelanchier ovalis could not be observed in Bârsa Mountains (A. Bartók, pers. obs. 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015) and also we were unable to trace herbarium specimens of snowy mespilus from that mountain range in all checked herbaria.

1.1.5. **Munții Retezat** (Retezat Mountains, Southern Carpathians)

Baumgarten (1816) was the first and only author that mentioned snowy mespilus (under *Amelanchier mespilus*) in this mountain range, but without exact locality. Simonkai (1886) cited this taxon in Retezat Mts. after Baumgarten, but he questioned its presence in that range.

Other more recent publications about the flora of Retezat (Csűrös, 1956; Nyárády, 1958; Csűrös, 1971) did not mention *A. ovalis* in this mountain group. We could neither find any herbarium voucher of this species from the Retezat Mts. or in the field, in different investigated parts of this mountain range (A. Bartók, pers. obs. 2003, 2004, 2005, 2006, 2007, 2009, 2010, 2012, 2013, 2014, 2015).

1.1.6. **Munții Trascău** (Trascău Mountains, Apuseni Mountains)

Amelanchier ovalis was mentioned twice in flora of this mountain group, by Schur (1859a) and Pavai (1862). Schur cited the presence of snowy mespilus in Piatra Cetii Peak. Pavai noticed the species on Piatra Caprei Peak, in a phytocoenosis composed by *Quercus cerris* L., *Sorbus aria* (L.) Crantz, *Sorbus torminalis* (L.) Crantz and *Rhamnus saxatilis* Jacq.

Csató (1896) mentioned *Amelanchier ovalis* in the monograph of Alsófehér vármegye (Alba Iulia county), but he only referred to the Pavai and Schur's data.

The flora of Piatra Cetii and Piatra Caprei Peaks is relatively well studied (e.g. Ghișa *et al.*, 1965; Pop *et al.*, 1960) but the species was not found by any botanist in the last century.

We could not trace any herbarium specimen of *A. ovalis* from this area. Also we could not find snowy mespilus near Piatra Cetii and Piatra Caprei Peaks nor in other parts of this mountain range (A. Bartók, pers. obs. 2003, 2004, 2005, 2006, 2007, 2009, 2010, 2011, 2012, 2013, 2014, 2015). Several other recent botanical investigations in these points failed as well to find this species (A.S. Bădărău, P.D. Turtureanu - personal communications).

1.1.7. **Munții Bihor** (Bihor Mountains, Apuseni Mountains)

Kerner (1863) recorded for the first time this species in Bihor Mountains, but without exact locality. He specified only a phytocoenosis composed by *Cytisus falcatus* Walst. & Kit., *Cotoneaster tomentosus* Lindl., *Spiraea ulmifolia* Scop., *Sorbus aria* (L.) Crantz, *Salix silesiaca* Willd and *Amelanchier ovalis* Medik.

Later, Hayek (1916) mentioned a list of species including *A. ovalis* from this mountain range (Piatra Batrina, Piatra Galbina, Piatra Muncelu). Similarly, Jávorka (1927) referred to Batrina (Piatra Bătrâna) as the certain place in Transylvania where the species occurred.

The subsequent botanical works no longer mentioned *A. ovalis* in Bihor Mountains (Simon, 1966; Pop and Hodișan, 1962; Pop *et al.*, 1965; Coldea *et al.*, 2008).

We could not trace any herbarium specimen from the Bihor Mountains in all checked herbaria. Moreover we could neither find *A. ovalis* in this mountain range (A. Bartók, pers. obs. 2009, 2013, 2014; P.D. Turtureanu and M. Pușcaș, pers. obs. 2016).

As a synthesis, the present investigations suggest that the occurrence of snowy mespilus in the aforementioned mountains remains unproved by clear data. Confusion of the species, mislabelled material make all these sites to be uncertain for the actual *Amelanchier ovalis* chorology.

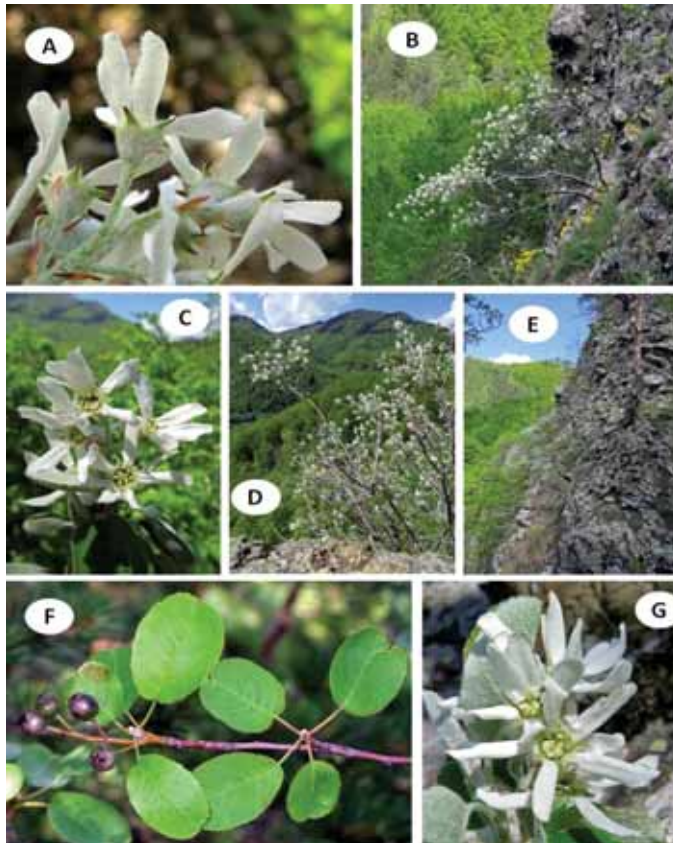


Figure 1. *Amelanchier ovalis* in Vrancea Mts.: A, C, G – The flowers, B, D, E – Habitus and habitat, F – Fruits (Original photos by A. Bartók and A. Indreica).

1.2. *New localities for Amelanchier ovalis in South-Eastern Carpathians*

Munții Vrancei (Vrancea Mountains, Eastern Carpathians)

Botanists never mentioned the species in this mountain group. The area is relatively well studied from botanical point of view (e.g. Pașcovschi and Leandru, 1955, Mititelu *et al.*, 1996; Ștefan *et al.*, 1997) but *A. ovalis* is not listed among the present species.

Amelanchier ovalis was discovered by A. Indreica in Vrancea Mountains in 25.07.2011, close to Lepșa locality (Vrancea county), on the left side of Putna river cross to the Putna Waterfall, on a ridge under Locoșeilor Peak. The site was revisited in 2015 by A. Indreica and A. Bartok. In August 2016, the species was observed by P.D. Turtureanu and M. Pușcaș on Piatra Ciutei, a site not far from the former. Currently these are the only certain locations of *Amelanchier ovalis* in the Romanian Carpathians.

The collected material has been deposited in the Transilvania University of Brașov - Faculty of Silviculture Herbarium, Brașov (BVS no. 64671, 64672) and in the „A. Borza” Botanical Garden Herbarium, Cluj-Napoca (CL no. 665394, 666333).

2. Habitat description by recent field observations

In Romanian botanical literature, *A. ovalis* is ascribed to *Berberidion*, *Quercetalia pubescentis* or *Fraxino-Cotinetalia* syntaxa (Chifu *et al.*, 2006; Sârbu *et al.*, 2013). From Natura 2000 habitats perspectives, this taxon is considered character species for the habitat 40A0 Subcontinental peri-Pannonic scrub (Gafta and Mountford, 2008); other authors (Oprea *et al.*, 2010) included *A. ovalis* in the species list of the habitat 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*), probably based on the note of Brandza (1883) who indicated as habitat for *Amelanchier* “*rocky clefts inside the subalpine forests*”.

We discovered recently *A. ovalis* in the Putna-Vrancea Natural Park between Lepșa and Tulnici localities. Here it grows in communities on rocky sites in a forested landscape, on steep conglomerate rocks and cliffs, with south or south-west aspect and altitudes between 600-700 m. In the investigated phytocoenoses (Table 1), *Amelanchier ovalis* and *Carex humilis* are dominant species seconded by *Aurinia saxatilis*, *Thymus comosus*, *Seseli gracile*. Since the cover of shrub layer is very scarce and the number of relevés is small we refrain to define such communities as a shrub association. Without any doubt, these phytocoenoses with *Amelanchier* belong to dry and saxicolous type, as it is revealed by accompanying species, community structure, aspect and slope of the site. This makes them closer to *Berberidion vulgaris* Br.-Bl. ex Tüxen 1952 alliance. At the level of association, the decision is hard to take since in Europe *Amelanchier ovalis* is quite frequent in many vegetation types, especially in southern and western Europe (Faucault and Julve 2001).

The snowy mespil also grows inside forest habitats, on rocky outcrops and steep slopes. One releve of oak forest belonging to *Cytiso nigricantis-Quercetum petraeae* Paucă 1941 is given below:

Releve number (EU-RO-007 database) 5276, altitude 640 m, aspect S, slope 50°, rocks at surface 15%; releve area 400 m²; date 25.07.2011; location between Lepșa and Tulnici (Vrancea county).

Tree layer (80%): *Quercus petraea* 5, *Fraxinus excelsior* +, *Pinus sylvestris* +, *Carpinus betulus* +.

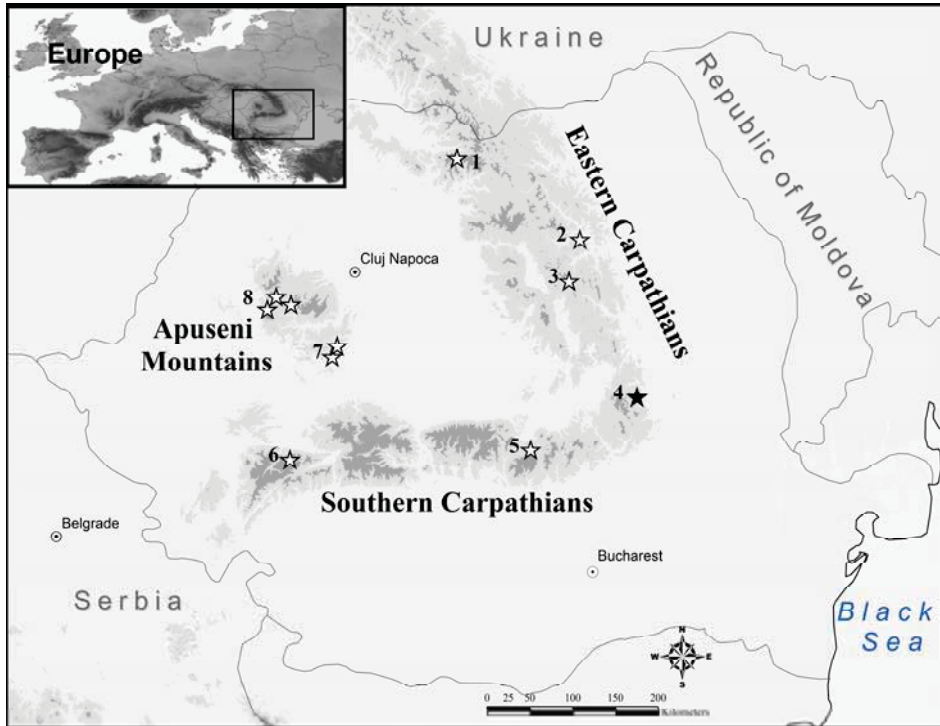


Figure 2. Chorological map of *Amelanchier ovalis* in the Romanian Carpathians:

1-Rodna Mts.; 2-Ceahlău Mts.; 3-Hășmaș Mts.; 4-Vrancea Mts.; 5-Bârsa Mts.,
6-Retezat Mts., 7- Trascău Mts., 8-Bihor Mts. The black star represents
the certain location, the white stars represent the uncertain locations.

Shrub layer (1%): *Amelanchier ovalis* +, *Rosa canina* +, *Corylus avellana* +.

Herb layer (40%): *Luzula luzuloides* 2, *Poa nemoralis* 1, *Silene nutans* ssp.
dubia 1, *Hieracium murorum* 1, *Campanula persicifolia* 1, *Genista tinctoria* 1,
Calamagrostis arundinacea 1, *Lychnis viscaria* 1, *Lembotropis nigricans* +,
Chamaecytisus hirsutus +, *Sedum telephium* ssp. *maximum* +, *Digitalis grandiflora* +,

Hieracium sabaudum +, *Hieracium umbellatum* +, *Hieracium lachenalii* +, *Galium schultesii* +, *Veronica chamaedrys* +, *Clinopodium vulgare* +, *Trifolium medium* +, *Coronilla varia* +, *Galium mollugo* agg. +, *Campanula rapunculoides* +, *Seseli gracile* +, *Asplenium trichomanes* +, *Asplenium septentrionale* +, *Polypodium vulgare* +, *Thymus comosus* +, *Cardaminopsis arenosa* +, *Erysimum odoratum* +, *Rubus canescens* +, *Verbascum lychnitis* +, *Solidago virgaurea* +, *Salvia glutinosa* +, *Phleum montanum* +, *Cnidium silaifolium* +, *Lapsana communis* +, *Festuca rupicola* +, *Hypericum perforatum* +, *Galeopsis tetrahit* +, *Fallopia dumetorum* +.

Table 1.

Communities with *Amelanchier ovalis* on rocky sites near Lepşa (Vrancea county)

Relevé no.	1	2	3
Altitude (m, a.s.l.)	680	700	700
Aspect	SSW	WSW	SSW
Slope (°)	70-80	70	70
Cover (%)	15	15	15
Shrub layer			
<i>Amelanchier ovalis</i>	1	2	1-2
<i>Pinus sylvestris</i>	.	+	.
<i>Juniperus communis</i>	+	.	.
<i>Fraxinus excelsior</i>	.	.	+
<i>Rosa tomentosa</i>	+	.	.
<i>Sorbus aucuparia</i>	+	.	.
Herb layer			
<i>Lembotropis nigricans</i>	+	+	+
<i>Aurinia saxatilis</i>	1	1	+
<i>Carex humilis</i>	2	1	1
<i>Sempervivum zeleborii</i>	+	+	1
<i>Dianthus spiculifolius</i>	+	1	+
<i>Galium album</i>	+	+	+
<i>Asplenium septentrionale</i>	+	+	+
<i>Thymus comosus</i>	1	2	.
<i>Seseli gracile</i>	1	1	.
<i>Sedum telephium</i> ssp. <i>maximum</i>	+	+	.
<i>Erysimum odoratum</i>	+	.	+
<i>Chamaecytisus hirsutus</i>	+	+	.
<i>Peucedanum oreoselinum</i>	+	+	.
<i>Poa nemoralis</i>	+	.	.
<i>Silene nutans</i> ssp. <i>dubia</i>	+	.	.
<i>Hieracium telekianum</i>	.	+	.
<i>Cardaminopsis arenosa</i>	.	+	.

Place and date of relevés: 1-3. Vrancea Mts. (Eastern Carpathians), Putna-Vrancea Natural Park, near Putna waterfall, conglomerate rocks, 9.V.2015. Releve area: 25 m².

Moss layer (30%): *Hypnum cupressiforme* 2, *Polytrichum juniperinum* 2, *Rhytidium rugosum* +, *Leucodon sciuroides* +, *Abietinella abietina* +, *Polytrichum formosum* +, *Leucobryum glaucum* +, *Dicranum scoparium* +.

In Vrancea Mountains *Amelanchier ovalis* starts to bloom in late April (early May) and fructifies starting with late June.

It is important to underline that during our research in Putna-Vrancea Natural Park we discovered two small populations of *Hieracium telekianum* Boros & Lengyel, an Eastern Carpathians endemic plant, known to the present only from Harghita and Ciomatu Mountains. One population has been identified together with *A. ovalis* and the other was discovered in Tișiței Gorges by S. I. Bartók. The collected material has been deposited in the „A. Borza” Botanical Garden Herbarium, Cluj-Napoca (CL no. 665395).

3. Recommended IUCN threat category

Only one small area that contains populations of *Amelanchier ovalis* is certainly known in the Romanian Carpathians, in a restricted part of the Vrancea Mountains. The place where the species occurs is included in Putna-Vrancea Natural Park.

On the basis of new chorological data and estimation of the number of individuals (between 100 and 200) and populations condition, we can define *Amelanchier ovalis* as IUCN CR C2a(i) (IUCN, 2012) in Romania.

We therefore recommend the establishment of a special protected area for this species and the inclusion of *Amelanchier ovalis* in the next edition of the Romanian Red Book of Vascular Plants as Critically Endangered (CR).

Conclusions

Based on the critical analysis of the occurrence of *Amelanchier ovalis* in the Romanian Carpathians it appears that the species is very rare and deserves more attention from botanists and nature conservation authorities.

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