

A CRITICAL EVALUATION OF THE CARPATHIAN ENDEMIC PLANT TAXA LIST FROM THE ROMANIAN CARPATHIANS

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Abstract: Although several studies on plant endemism have been carried out in the Romanian Carpathians, taxonomic inconsistencies persist, along with the insufficient availability of distribution data. Our study aims to reduce these uncertainties by having extensive coverage of available chorological data and seeking consensus among different authors as to taxonomic validity. For this reason, we have assembled a vast collection of chorological data, comprising literature sources, historical herbarium collections and field surveys covering the Romanian Carpathians. We subsequently surveyed the botanical literature from neighboring countries (Serbia, Bosnia, Bulgaria, Hungary, Ukraine, Republic of Moldova) to gain a better overview of the distribution of the taxa analyzed. We considered 132 taxa to be ‘good endemics’, having mainly two types of distribution: *Pan-Carpathian* and *South-Eastern Carpathian*. All of these are occurring in the Romanian Carpathians, many confined solely to our mountain range. A few of these taxa, namely *sub-endemics*, are characterized by an ecological optimum that allows them to grow in lowland areas, having been cited from the regions adjacent to the Carpathians. We have excluded the polymorphic genera *Hieracium*, *Alchemilla* and *Rubus* and numerous other taxa considered by various authorities at particular times to possess the characteristics of endemics but without any consensus between authors.

Keywords: endemic plants, Carpathians, taxonomic consensus, chorology, database.

Introduction

Although the number of endemics has long been one of the most disputed topics in the biogeography and conservation of the Carpathian flora, a lack of consensus still exists amongst different authors. This variability derives from two main sources: the ‘*Linnean*’ (taxonomic) and ‘*Wallacean*’ (chorological) shortfalls [36]. In the first case, highly polymorphic groups such as *Hieracium*, *Alchemilla* or *Rubus* have generated numerous taxonomic entities that could not be clearly delimited in the field, thus introducing wrong signals into biogeographical interpretation. In the second case, a lack of knowledge of the complete distribution or even misidentification of some taxa has created the same wrong signalling, either by omission (a species given as absent where it is present) or commission (species given as present where it is absent). For example, *Viola declinata*, a species endemic to the Carpathians, was long considered a Carpathian–Balkan element due to confusion with *V. dacica* in the Balkans; nevertheless, this species does not occur in either Bulgaria or Serbia [1, 9, 31, 35]. These shortfalls could be partly avoided by excluding highly variable taxa and thoroughly and critically surveying the known distribution data.

The reasons presented above have led to a variety of interpretations of endemism patterns. This situation is obvious merely by looking at the varying number of endemics cited by different authors, either for Romania: 280 (Prodan, 1939), 148 (Borza, 1947–1949), 127 (Morariu & Beldie, 1976), 130 (Beldie, 1977–1979), 169 (Sanda), 80 (Dihoru & Pârvu); or for

the Romanian Carpathians: 125 (Pawłowski, 1970), 97 (Beldie, 1967), 149 (Heltmann, 1985), 128 (Negrean & Oltean, 1989).

The spatial extent of the Carpathian endemics includes three main types of distribution: *Western Carpathian* endemics, which are confined to the western subunit of the mountain range; *Pan-Carpathian* endemics, those taxa distributed both in the South-Eastern Carpathians and Western Carpathians; and *South-Eastern Carpathian* endemics, restricted to the South-Eastern subunit of the Carpathians. The last two categories of endemics are discussed in the present study. This terminological clarification is necessary, as the scientific literature includes inconsistent terms referring to Carpathian taxa. More specifically, ‘Dacian’ elements *sensu* Borza & Boșcaiu (1965) include those taxa restricted to the historical province, while the same term was used by Beldie (1967) to refer exclusively to Carpathian–Balkan elements. From an ecological perspective, we can distinguish another type: *sub-endemic Carpathian* taxa. These are generally distributed along the Carpathian Mountain Range, along with a few lowland stations.

Another confusion that stands behind the lack of consensus regarding the Carpathian endemic status of several taxa is the positioning of the southern limit of the Carpathians. This has been considered by some authors to lie at the Danube Gorge [27]. The morphological, geological and floristic similarities between the Trans-Danubian Mountains (extending South to the Timoc Valley) and the Carpathian units to the north of them reinforce our opinion that this mountainous segment represents a constituent part of the South-Eastern Carpathians. This is in accordance with the views on the Carpathian boundaries of Mihăilescu (1963) and other geographers [27].

By having a large coverage of available chorological data from Romania and adjacent areas, we have aimed to establish a general taxonomic consensus in order to have a clearer and complete image of the Carpathian endemic taxa present in Romania.

Materials and Methods

The database was compiled using the vast literature source published between 1866 and 2011, historical herbarium collections (Natural History Museum Herbarium Sibiu – SIB, Institute of Biology, Romanian Academy Herbarium – BUCA, Babes-Bolyai University Herbarium - CL, University of Belgrade Herbarium – BEOU and Hungarian Natural History Museum Herbarium - BP) and field surveys carried out between 2003 and 2010 by the authors.

Nomenclature was validated through the use of several works: Oprea (2005), Ciocârlan (2009), Dihoru & Negrean (2009) and *Flora R.P.R.-R.S.R.* vols I–XIII, as well as two online databases: Flora Europaea (<http://rbg-web2.rbge.org.uk/FE/fe.html>) and The Plant List Database (<http://www.theplantlist.org/>).

The available toponymic and topographical information was converted into geographical coordinates for every cited location. For a precise identification, we used digital elevation models, topographic, touristic and satellite maps. The estimated accuracy of the positions varied between 20 m and 5000 m. We generated a total of 9418 distinct spatial references for the 132 validated endemic taxa.

Results and Discussion

We considered 132 endemic taxa to be valid from a taxonomic and chorological point of view. For a fuller overview of the differing and consensual opinions among several authors regarding the 132 endemic taxa considered, we present a comparison in Table 1.

From the systematic perspective, the endemic flora of the South-Eastern Carpathians is distributed across 30 families, of which *Asteraceae* is the richest (comprising 20 taxa), then *Poaceae* (17), *Brassicaceae* (15), *Caryophyllaceae* (15), *Campanulaceae* (7), *Ranunculaceae* (7), *Fabaceae* (5), *Apiaceae* (4), *Lamiaceae* (4) and *Primulaceae* (4), among others. There are 78 genera with endemic species or subspecies, with *Festuca* and *Centaurea* having both 8 endemic

taxa, *Dianthus* (6), *Campanula* (5), *Draba* (4), *Thymus* (3), *Silene* (3), *Scabiosa* (3), *Primula* (3) and *Hesperis* (3) among the richest. Also, the *Marginatus* group of *Thymus* is endemic to the Carpathians, including *T. comosus*, *T. pulcherrimus* and *T. bihoriensis*. Two genera previously considered endemic to the Romanian Carpathians (*Pietrosia* and *Polyschemone*) [38], were later taxonomically reassessed [20].

The two main types of shortfalls previously described, along with different interpretations of the southern limit of the Carpathians, have led to the previous exclusion of several taxa from the list of endemics. Taxa such as *Campanula crassipes*, *Scabiosa columbaria* subsp. *banatica*, *Athamanta turbith* subsp. *hungarica* or *Dianthus giganteus* subsp. *banaticus*, present in the Romanian Carpathians, are also distributed to the south of the Danube Gorge, in the Serbian part of the Carpathians. For this reason they were considered Carpathian–Balkan elements by one or several authors, but without any cited occurrences in the Balkan Mountains [1]. Based on the inclusion of the Trans-Danubian Mountains in the South-East Carpathian range, we consider these taxa to be endemic to the South-Eastern Carpathians.

Gypsophila petraea was considered by some authors to be a Carpathian–Balkan element. Nevertheless, this species was cited solely by Hayek (1924) under the name *G. transsilvanica*, „Bu (Rhodope)”, and later assumed to be a misidentification. In the Flora of Bulgaria, however, the species is still cited, but with a great geographical disjunction from the Carpathians (Rhodope Mountains). These data need to be further verified [33].

Galium kitaibelianum was cited from the Velika Remeta and Krušedol lowland areas in Central Serbia [20], these being the only localities outside the Carpathians.

Cerastium arvense subsp. *lerchenfeldianum* was cited from Serbia by Hayek (1924) "In glandulosis [glareosis], rupestibus. Sb", but this was later considered a misidentification [22].

Draba kotschyi was considered to be an Carpathian–Alpine element, but according to Pawłowski (1970), in the Alps, this species was mistaken for *D. norvegica* [7].

Some critical taxa were also kept on our list, but these would require further chorological investigation to complete their known distribution: *Dactylorhiza cordigera* subsp. *siculorum* and *Dactylorhiza maculata* subsp. *schurii* were considered valid according to the monograph of the genus in Romania [32], while *Plantago atrata* Hoppe subsp. *carpatica* and *Salix kitaibeliana* were retained as valid according to the IntraBioDiv project Consortium [14]

Soldanella rugosa is a newly described endemic taxon, differentiated on the basis of molecular data and geographical distribution [37].

Several sub-endemic taxa, which have their optimum in the Carpathian Mountains, extend into the adjacent lowlands: for example, *Leucanthemum waldsteinii* (cited from Bosnia, Vranica Mountain) [2], *Crocus banaticus* (cited from Serbia, lower Šabac and Kladovo Mountains) [29], *Cardamine glanduligera* (cited from in Hungary, Nagysom, and Republic of Moldova, where is considered Vulnerable) [17, 40], and *Micromeria pulegium* (Tara Mountains in Serbia) [11].

We have excluded, for various reasons, several other taxa. These were considered either to be taxonomically critical, or lacking sufficient distribution information. Among these species it is possible that future new studies would undoubtedly confirm their valid status either as good taxa or even as endemics.

We have also excluded all taxa of the genera *Hieracium*, *Alchemilla* and *Rubus* due to their critical nature, also a vast number of ‘presumed’ *Aconitum* endemics and several other taxa among which some were often discussed with regard to their endemic status or taxonomic validity: for example *Androsace villosa* subsp. *arachnoidea*, *Sorbus umbellata* subsp. *banatica*, *Stipa crassiculmis* subsp. *heterotricha*, *Ranunculus flabellifolius*, *Pyrola carpatica*, *Poa laxa* subsp. *pruinosa*, *Pinus nigra* subsp. *banatica*, *Melampyrum herbichii* and *Hypericum richerii* subsp. *transsilvanicum*.

Conclusions

A high variability of taxonomic interpretation of these biological entities can be observed. This is especially a consequence of the absence of conceptual consensus regarding the notion of species, the lack of a clear delineation of the discrete units and their encompassed natural variability.

In order to reflect realistic biogeographical patterns, a clearer delimitation of these taxonomic units is a requirement *sine qua non*, since we cannot identify the patterns and discuss the processes behind them without conceptual and nomenclatural coherence. Therefore, a taxonomic consensus was necessary when considering the analysis of patterns of endemism from the Romanian Carpathians.

We have considered as valid 132 endemic taxa distributed either along the entire Carpathian Mountain Range, or limited to the South-Eastern Carpathians. These taxa represent, with few exceptions, clear taxonomic units, unanimously recognized and with a thorough coverage of their distribution.

At the risk of omitting possible valid endemics, we have excluded several critical taxa. Further studies will definitely improve and clarify the 'pool' of Carpathian endemics, both by exploring cryptic species divergences at a molecular level and by a better sampling coverage. We also did not consider *Hieracium*, *Rubus* and *Alchemilla* because of the difficulties inherent in their identification and their probable incomplete chorology, although these genera presumably include a high number of endemics.

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Table 1: The list of endemic Carpathian plant taxa occurring in the Romanian Carpathians compared with the opinion of several authors on their status.

No.	Taxa	Distribution	Family	[1]	[2]	[3]	[4]	[5]	[6]	[7]
1	<i>Athamanta turbith</i> (L.) Brot. ssp. <i>hungarica</i> (Borbás) Tutin	SECARP	Apiaceae	D	*			*	*	*
2	<i>Heracleum carpaticum</i> Porcius	SECARP	-,,-	*	*	*	*	*	*	*
3	<i>Heracleum sphondylium</i> L. ssp. <i>transsilvanicum</i> (Schur) Brummitt	SECARP	-,,-	*	*	*	*	*	*	*
4	<i>Prangos carinata</i> Griseb. ex Degen	SECARP	-,,-	*		*		*	Prov.	CB
5	<i>Achillea oxyloba</i> (DC.) Sch.Bip. ssp. <i>schurii</i> (Sch.Bip.) Heimerl	SECARP	Asteraceae	*	*	*	*	*	*	*
6	<i>Andryala laevitomentosa</i> (Sennikov) Greuter	SECARP	-,,-	*	*	*	*	*	*	*
7	<i>Anthemis carpatica</i> Willd. ssp. <i>pyrethriformis</i> (Schur) Beldie	SECARP	-,,-	*		*	*	*	*	
8	<i>Anthemis kitaibelii</i> Spreng.	SECARP	-,,-						Prov.	*
9	<i>Carduus kernerii</i> Simk. ssp. <i>kernerii</i>	SECARP	-,,-	D	*			*	*	CB
10	<i>Carduus kernerii</i> Simk. ssp. <i>lobulatiformis</i> (Csürös & Nyár.) Soó	SECARP	-,,-		*	*		*	*	*
11	<i>Centaurea phrygia</i> L. ssp. <i>melanocalathia</i> (Borbás) Dostál	PANCARP	-,,-	*	*	*			*	*
12	<i>Centaurea phrygia</i> L. ssp. <i>carpatica</i> (Porcius) Dostál	SECARP	-,,-	*	*	*	*	*	*	*

13	<i>Centaurea phrygia</i> L. ssp. <i>rarauensis</i> (Prodan) Dostál	SECARP	--,-		*		*	*	*
14	<i>Centaurea phrygia</i> L. ssp. <i>ratezatensis</i> (Prodan) Dostál	SECARP	--,-		*	*	*	*	*
15	<i>Centaurea pinnatifida</i> Schur	SECARP	--,-		*	*	*	*	*
16	<i>Centaurea reichenbachii</i> DC.	SECARP	--,-		*	*	*	*	*
17	<i>Centaurea trichocephala</i> Bieb. ssp. <i>simonkaiana</i> (Hayek) Dostál	SECARP	--,-			*	*	*	*
18	<i>Centaurea triniifolia</i> Heuffel	SECARP	--,-					*	CB
19	<i>Doronicum carpaticum</i> (Griseb. & Schenk) Nyman	SECARP	--,-	D	*		*	Prov.	CB
20	<i>Erigeron nanus</i> Schur	PANCARP	--,-		*			*	*
21	<i>Leontodon montanus</i> Lam. ssp. <i>pseudotaraxaci</i> (Schur) Finch & P.D.Sell	PANCARP	--,-		*	*	*	*	*
22	<i>Leontodon repens</i> Schur	SECARP	--,-				*	*	*
23	<i>Leucanthemum waldsteinii</i> (Sch.Bip.) Pouzar	SUBCARP	--,-		*	*	*	*	*
24	<i>Saussurea porcii</i> Degen.	SECARP	--,-		*	*	*	*	*
25	<i>Eritrichium nanum</i> Schrader ssp. <i>jankae</i> (Simonk.) Jáv.	SECARP		<i>Boraginaceae</i>	*	*	*	*	*
26	<i>Pulmonaria filarszkyana</i> Jav.	SECARP	--,-		*	*	*	*	*
27	<i>Symphytum cordatum</i> Waldst. & Kit. ex Willd.	PANCARP	--,-		*	*	*	*	*
28	<i>Barbarea lepuznica</i> Nyár.	SECARP		<i>Brassicaceae</i>	*	*	*	Prov.	*
29	<i>Cardamine glanduligera</i> O.Schwarz	SUBCARP	--,-		*	*	*	*	*
30	<i>Cardaminopsis neglecta</i> (Schult.) Hayek	PANCARP	--,-		*	*	*	*	*
31	<i>Cochlearia borzaeana</i> (Coman & Nyár.) Pobed.	SECARP	--,-				*	*	*
32	<i>Draba doreri</i> Heuff.	SECARP	--,-		*	*	*	*	*
33	<i>Draba haynaldii</i> Stur	SECARP	--,-		*	*	*	*	*
34	<i>Draba kotschyi</i> Stur	SECARP	--,-		*			*	*
35	<i>Draba simonkaiana</i> Jav.	SECARP	--,-		*	*	*	*	Prov. *
36	<i>Erysimum witmanni</i> Zaw. ssp. <i>transsilvanicum</i> (Schur) P.W.Ball	SECARP	--,-		*	*	*	*	*
37	<i>Erysimum witmanni</i> Zaw. ssp. <i>witmanni</i>	PANCARP	--,-		*	*	*	*	*
38	<i>Hesperis moniliformis</i> Schur	SECARP	--,-		*	*	*	*	*
39	<i>Hesperis nivea</i> Baumg.	PANCARP	--,-		*	*	*	*	*
40	<i>Hesperis oblongifolia</i> Schur	SECARP	--,-		*	*	*	*	*
41	<i>Thlaspi dacicum</i> Heuff. ssp. <i>banaticum</i> (R.Uechtr.) Jáv.	SECARP	--,-		*	*	*	*	*
42	<i>Thlaspi dacicum</i> Heuff. ssp. <i>dacicum</i>	SECARP	--,-		*	*	*	*	*
43	<i>Campanula carpatica</i> Jacq.	PANCARP		<i>Campanulaceae</i>	*	*	*	*	*
44	<i>Campanula crassipes</i> Heuffel	SECARP	--,-	D			*	*	CB
45	<i>Campanula rotundifolia</i> L. ssp. <i>kladniana</i> (Schur) Witasek	SECARP	--,-					Prov.	*
46	<i>Campanula rotundifolia</i> L. ssp. <i>polymorpha</i> (Witašek) Tacik	PANCARP	--,-		*	*		Prov.	*
47	<i>Campanula serrata</i> Hendrych	PANCARP	--,-	D				*	*
48	<i>Phyteuma tetramerum</i> Schur	SECARP	--,-		*	*	*	*	*
49	<i>Phyteuma vagneri</i> Kerner	SECARP	--,-		*	*	*	*	*
50	<i>Cerastium arvense</i> L. ssp. <i>lerchenfeldianum</i> (Schur) Asch. & Graebn.	SECARP		<i>Caryophyllaceae</i>	*	*	*	*	*
51	<i>Cerastium transsilvanicum</i> Schur	SECARP	--,-		*	*	*	*	*
52	<i>Dianthus callizonus</i> Sch. et Kot.	SECARP	--,-		*	*	*	*	*

53	<i>Dianthus giganteus</i> d'Urv. ssp. <i>banaticus</i> (Heuff.) Tutin	SECARP	-,,-	*	*	*	*	*	*
54	<i>Dianthus glacialis</i> Haenke. ssp. <i>geldius</i> (Schott, Nyman & Kotschy) Tutin	SECARP	-,,-	*				*	*
55	<i>Dianthus henteri</i> Heuff. ex Griseb. & Schenk	SECARP	-,,-	*	*	*	*	*	*
56	<i>Dianthus spiculifolius</i> Schur. ssp. <i>spiculifolius</i>	SECARP	-,,-	*	*	*	*	*	*
57	<i>Dianthus tenuifolius</i> Schur	SECARP	-,,-	*	*	*	*	*	*
58	<i>Gypsophila petraea</i> (Baumg.) Rchb.	SECARP	-,,-	*		*	*		CB
59	<i>Lychnis nivalis</i> Kit.	SECARP	-,,-	*	*	*	*	*	*
60	<i>Minuartia hirsuta</i> (M.Bieb.) Hand.-Mazz. ssp. <i>cataractarum</i> (Janka) Soó	SECARP	-,,-	*	*		*		*
61	<i>Minuartia verna</i> L. ssp. <i>oxypetala</i> (Woloszczak) G.Halliday	SECARP	-,,-	*		*	*	*	*
62	<i>Silene dinarica</i> Sprengel	SECARP	-,,-	*	*	*	*	*	*
63	<i>Silene nutans</i> L. ssp. <i>dubia</i> (Herbich) Zapal.	PANCARP	-,,-	*	*	*	*	*	*
64	<i>Silene zawadzki</i> Herbich	SECARP	-,,-	*	*	*	*	*	*
65	<i>Sempervivum montanum</i> L. ssp. <i>carpaticum</i> Wettst. ex Hayek	PANCARP							Prov. *
66	<i>Scabiosa columbaria</i> L. ssp. <i>banatica</i> (Waldst. & Kit.) Diklić	SECARP							CB
67	<i>Scabiosa columbaria</i> L. ssp. <i>pseudobanatica</i> (Schur) Jáv. & Csapody	SECARP	-,,-				*	*	*
68	<i>Scabiosa lucida</i> Vill. ssp. <i>barbata</i> Nyár.	SECARP	-,,-	*	*		*		*
69	<i>Euphorbia carpatica</i> Woloszczak	SECARP				*	*	*	Prov. *
70	<i>Astragalus pseudopurpureus</i> Gusul.	SECARP				*	*	*	*
71	<i>Astragalus roemeri</i> Simonk.	SECARP	-,,-	*	*	*	*	*	*
72	<i>Genista tinctoria</i> L. ssp. <i>oligosperma</i> (Andrae) Borza	SECARP	-,,-	*	*	*		*	*
73	<i>Oxytropis carpatica</i> R.Uechtr.	PANCARP	-,,-	*	*	*	*		*
74	<i>Trifolium medium</i> L. ssp. <i>sarosiense</i> (Hazsl.) Simonk.	PANCARP	-,,-	*				*	
75	<i>Gentiana cruciata</i> L. ssp. <i>phlogifolia</i> (Schott & Kotschy) Tutin	SECARP				*	*	*	*
76	<i>Crocus banaticus</i> Gay	SUBCARP				*			*
77	<i>Luzula alpinopilosa</i> (Chaix) Breistr. ssp. <i>obscura</i> Frohner	PANCARP						*	*
78	<i>Clinopodium pulegium</i> (Rochel) Bräuchler	SUBCARP				*	*	*	CB
79	<i>Thymus bihoriensis</i> Jalas	SECARP	-,,-	*	*	*	*	*	*
80	<i>Thymus comosus</i> Heuff. ex Griseb.	SECARP	-,,-	*	*		*	*	*
81	<i>Thymus pulcherrimus</i> Schur	PANCARP	-,,-	*	*	*	*		*
82	<i>Linum uninerve</i> (Rochel) Jáv.	SECARP				*	*	*	*
83	<i>Ornithogalum orthophyllum</i> Ten. ssp. <i>acuminatum</i> (Schur) Zahar.	SECARP					*	*	*
84	<i>Tulipa hungarica</i> Borbas	SECARP	-,,-	D	?		*		Prov. *
85	<i>Syringa josikaea</i> J.Jacq. ex Rchb.	SECARP				*	*	*	*
86	<i>Dactylorhiza cordigera</i> (Fries) Soó ssp. <i>siculorum</i> (Soó) Soó	SECARP						*	*
87	<i>Dactylorhiza maculata</i> (L) Soo ssp. <i>schurii</i> (Klinge) Soó	PANCARP	-,,-					*	*
88	<i>Papaver alpinum</i> L. ssp. <i>corona-sancti-stephani</i> (Zapal.) Borza	SECARP				*	*	*	*
89	<i>Plantago atrata</i> Hoppe ssp. <i>carpatica</i> (Pilg.) Soó	PANCARP							*
90	<i>Armeria pocutica</i> Pawł.	SECARP				*	*	*	Prov. *

91	<i>Alopecurus pratensis</i> L. ssp. <i>laguriformis</i> (Schur) Tzvelev	SECARP	Poaceae	*	*	*	*	*
92	<i>Festuca bucegiensis</i> Markgr. - Dann.	SECARP	-, -			*	*	*
93	<i>Festuca carpatica</i> F. G. Dietr.	PANCARP	-, -	*	*	*	*	*
94	<i>Festuca nitida</i> Kit. ssp. <i>flaccida</i> (Schur) Markgr.-Dann.	SECARP	-, -			*	*	*
95	<i>Festuca pachyphylla</i> Degen ex Nyár.	SECARP	-, -		*	*	*	*
96	<i>Festuca porcii</i> Hackel	SECARP	-, -	D	*		*	*
97	<i>Festuca rupicola</i> Heuffel. ssp. <i>saxatilis</i> (Schur) Rauschert	PANCARP	-, -			*	*	*
98	<i>Festuca versicolor</i> Tausch. ssp. <i>dominii</i> Krajina	SECARP	-, -			*	*	*
99	<i>Festuca versicolor</i> Tausch. ssp. <i>versicolor</i>	PANCARP	-, -	*	*		*	*
100	<i>Helictotrichon decorum</i> (Janka) Henrard	SECARP	-, -	*	*	*	*	*
101	<i>Koeleria macrantha</i> (Ledeb.) Schult. ssp. <i>transsilvanica</i> (Schur) A. Nyár.	SECARP	-, -			*	*	*
102	<i>Poa granitica</i> Braun-Blanq. ssp. <i>disparilis</i> (Nyár.) Nyár.	SECARP	-, -	*	*	*	*	*
103	<i>Poa rehmannii</i> (Asch. & Graebn.) Woloszczak	SECARP	-, -	*	*	*	*	*
104	<i>Sesleria heuflerana</i> Schur ssp. <i>heuflerana</i>	SECARP	-, -		*	*	*	*
105	<i>Stipa danubialis</i> Dihoru & Roman	SECARP	-, -			*	*	*
106	<i>Trisetum fuscum</i> Schultes	PANCARP	-, -	*	*		*	*
107	<i>Trisetum macrotrichum</i> Hackel.	SECARP	-, -	*	*	*	*	*
108	<i>Primula auricula</i> L. ssp. <i>serratifolia</i> (Rochel) Jáv.	SECARP	Primulaceae	*	*		*	*
109	<i>Primula elatior</i> L. ssp. <i>leucophylla</i> (Pax) Hesl.-Harr.f. ex W.W.Sm. & H.R.Fletcher	SECARP	-, -	*	*	*	*	*
110	<i>Primula wulfeniana</i> Schott ssp. <i>baumgarteniana</i> (Degen & Moesz) Lüdi	SECARP	-, -	*	*	*	*	Prov. *
111	<i>Soldanella rugosa</i> L.B.Zhang	SECARP	-, -					*
112	<i>Aconitum lycoctonum</i> L ssp. <i>moldavicum</i> (Hacq.) Jalas	PANCARP	Ranunculaceae	*	*	*	*	*
113	<i>Aconitum tauricum</i> Wulf. ssp. <i>hunyadense</i> (Degen) Ciocârlan	SECARP	-, -	*	*	*		*
114	<i>Aquilegia nigricans</i> Baumg ssp. <i>subscaposa</i> (Borbás) Soó	SECARP	-, -	*	*	*	*	*
115	<i>Aquilegia transsilvanica</i> Schur	SECARP	-, -	*	*	*	*	*
116	<i>Delphinium simonkaianum</i> Pawł.	SECARP	-, -		*	*	*	*
117	<i>Hepatica transsilvanica</i> Fuss	SECARP	-, -	*	*	*	*	*
118	<i>Ranunculus carpaticus</i> Herbich	PANCARP	-, -	*	*	*	*	*
119	<i>Rosa villosa</i> L. ssp. <i>coziae</i> (Nyár.) Ciocârlan	SECARP	Rosaceae			*	*	*
120	<i>Sorbus borbasii</i> Jav.	SECARP	-, -			*	*	*
121	<i>Sorbus dacica</i> Borbas	SECARP	-, -	*	*		*	*
122	<i>Asperula carpatica</i> Morariu	SECARP	Rubiaceae			*	*	*
123	<i>Galium baillonii</i> D.Brândza	SECARP	-, -		*		*	*
124	<i>Galium kitaibelianum</i> Schult. & Schult.f.	SECARP	-, -	D			*	CB
125	<i>Salix kitaibeliana</i> Willd.	PANCARP	Salicaceae		*			*
126	<i>Thesium kernerianum</i> Simonk.	SECARP	Santalaceae	*	*	*	*	*
127	<i>Chrysosplenium alpinum</i> Schur	SECARP	Saxifragaceae	*		*	*	*
128	<i>Saxifraga mutata</i> L. ssp. <i>demissa</i> (Schott & Kotschy) D.A.Webb	SECARP	-, -	*	*	*	*	*
129	<i>Melampyrum saxosum</i> Baumg.	SECARP	Scrophulariaceae	*	*	*	*	*
130	<i>Pedicularis baumgarteni</i> Simonk.	SECARP	-, -	*	*	*	*	*

131	<i>Viola declinata</i> Waldst. & Kit.	SECARP	Violaceae	D	*			*	*
132	<i>Viola jooi</i> Janka	SECARP	-,,-		*	*	*	*	*

List of abbreviations and the sources used for direct comparison of the endemic status of taxa: [1] Beldie (1967), [2] Pawłowski (1970), [3] Morariu & Beldie (1976), [4] Heltmann (1985), [5] Negrean & Oltean (1989), [6] Tutin *et al.* (1964–1980), [7] Ciocârlan (2009); abr.: * (considered a valid Carpathian endemic by the cited author/s), SUBCARP (Sub-Carpathian endemic), SECARP (South-Eastern Carpathian endemic), PANCARP (Pan-Carpathian endemic), **CB** (Carpathian–Balkan element), **D** (Dacian element *sensu* Beldie), **Prov.** (Provisional taxonomic status), **?** (critical taxon, needs to be evaluated).

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O EVALUARE CRITICĂ A LISTEI ENDEMITELOR CARPATICE DIN FLORA CARPAȚILOR ROMÂNIEI

(Rezumat)

Deși până în prezent au fost efectuate câteva studii asupra plantelor endemice din Carpații românești, există încă inconsistențe taxonomice. În același timp, datele privind distribuția acestora sunt insuficiente. Prin urmare, prezentul studiu își propune să reducă din aceste neajunsuri prin culegerea unor date corologice cu acoperire largă, de asemenea și să obțină un consens în ceea ce privește validitatea taxonomică propusă de diverși autori. Din acest motiv, s-a elaborat o bază de date corologică care cuprinde surse bibliografice, colecții istorice de herbar, precum și informații preluate din teren, toate cu referire la aria Carpaților românești. În plus, s-a inventariat și literatura botanică a teritoriilor învecinate (Serbia, Bosnia, Bulgaria, Ungaria, Ucraina, Republica Moldova), în vederea realizării unei imagini de ansamblu, relevante, asupra distribuției taxonilor cuprinși în analiza noastră. Am considerat 132 de taxoni drept „endemite valide”, având în linii mari două tipuri de distribuție: *Pan-carpatică* și *Sud-Est carpatică*. Toate aceste endemite sunt prezente în Carpații Românești, multe dintre ele fiind limitate doar la această regiune. Un număr redus de taxoni, și anume cei sub-endemici, se caracterizează printr-un optim ecologic care le permite să vegeteze în zone cu altitudini joase, fiind citați din regiuni aflate în vecinătatea Carpaților. Am exclus genurile polimorfe *Hieracium*, *Alchemilla* și *Rubus*, de asemenea și alți taxoni considerați de diferiți autori, în anumite perioade, ca îndeplinind condiția de endemite, însă neexistând un consens real între opiniile acestora.