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RARE PLANTS IN STÂNIȘOARA MOUNTAINS (EASTERN CARPATHIANS)

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Abstract: In the natural ecosystems from the Stânișoara Mountains (Eastern Carpathians), there have been identified a number of 145 rare vascular plant species, belonging to 98 genera and 38 families.

Keywords: vascular flora, rare plants, Stânișoara Mountains.

Introduction

The Stânișoara Mountains are situated in the central part of Eastern Carpathians (Romania), on the flysch area, between the valleys of Bistrița and Moldova rivers. The area of its is around 2000 sq. Km; the maximum altitude is of 1531 m (in Bivolu peak); the mean altitude is of 800 m, with an energy of relief of 300-400 m, and a general relief declivity of 17° (**Fig. No. 1**).

There are developed an extremely varied structural lithologic conditions. The structures were formed in a long-lasting tectonic process, starting in Lower Cretaceous period (with the emergence of the geosynclinal flysch) and finishing in the Sarmatian period.

Regarding the relief induced by the action of the exogenous processes, the Stânișoara Mountains display the next morphosculptures types: fluvial denudational, fluvial, denudational, periglacial, lacustrine, and anthropical.

An important part of the slope morphology was played by land slides. Its development was favoured by the presence of rock clusters on account of which thick deluvial covers were formed. It is the case of two major landslides, nowadays, in the area of the middle basin of Cuiejdol stream.

On the basis of the evolution and genesis, the geographers [5] pointed out three major relief units, namely: the Suha Mountains, the Sabasa Mountains, and the Neamțu Mountains.

The vegetation: a large part of the area is covered by the mixed forests (coniferous and broadleaved deciduous forests); only on small patches, there are stands of coniferous forests; along the rivers and streams are alluvial forests; large area are covered by natural meadows, though they have a secondary origin [2].

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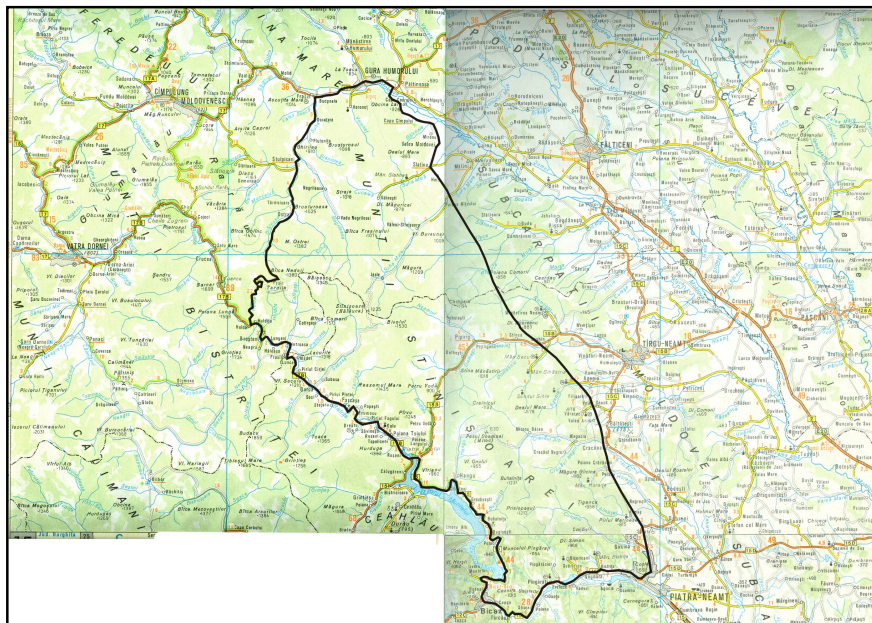


Fig. No. 1 Map of the Stânișoara Mountains (Eastern Carpathians)

Material and methods

Our field investigations began in 2006. We carried out intensive field surveys over the whole territory, in order to identify flora and vegetation of the Stânișoara Mountains. The surveys were made on transects, most of them on West–East directions. They included all the relief forms and vegetation types in the area. The vascular plants identification was performed according to works such as: Săvulescu, Tr., 1952-1976 – Flora R. P. Române-R. S. România [10], I-XIII, Beldie, Al., 1977-1979 – Flora României. Determinator ilustrat al plantelor vasculare, I-II [1], and Ciocârlan, V., 2000 – Flora ilustrată a României, Pteridophyta et Spermatophyta [3].

Further, all the rare plant species present into the flora of Stânișoara Mountains, are categorised according to their registration category, under some international regulations (e. g. *Habitat Directive* 92/43/EEC [12], *Bern Convention* [12], other (e. g. Walter K. S. & Gillet J. H., 1998 [11]; Oldfield S., Lusty C. & MacKinven A., 1998 [8], [14] or at <http://www.ec.europa.eu/environment/nature/legislation/habitatsdirective>; <http://www.conventions.coe.int> [17]) (column no. 4 in the **Table no. 1**) or internal documents as Romanian Red List [9] (column no. 6 in the Table no. 1) and into the national regulations [15, 16] (column no. 7 in the Table no. 1). For each species, a certain category is applied to, being accompanied by their threaten degree according to IUCN [11], their endemic status into the romanian flora, and localities where these species have been identified by other authors or by ourselves.

The zoological categories applied to our species are made according to our field investigations, having in mind their population status, their distribution on the scale of the Stânișoara Mts., their threatened status, and so on. It means that we follow our own investigations in designation those threatened categories (column no. 3 in the Table no. 1).

In the column no. 5 in the Table no. 1, there are given the endemic status of species identified by us in Stânișoara Mountains. In the the column no. 8 of the Table no. 1, each species is given on the localities where it was identified in the Stânișoara Mountains.

Abbreviations: **HD** (*Habitat Directive 92/43/EEC*), **BC** (*Bern Convention*, 1979), **RRL** (*Romanian Red List*, 1994 [9]), **GRL** (*Global Red List*), **WLT** (*World Tree Red List*, 1998), **IUCN** (International Union for Conservation of Nature – Red List Categories and Criteria, 2003) [14]; **R** (a rare plant in Romania, according to [9]); **nt** (a plant is not threatened in Romania, according to [9]); **K** (not enough known in Romania, according to [9]).

Results and discussions

There have been identified 900 vascular species on the whole area of Stânișoara Mountains, some of them, being pretty rare on the surveyed territory.

A number of 145 species are listed in our paper only, being considered by us as pretty rare in the flora of the above mentioned territory.

A first category is those 21 plant species, which are considered to be a priority to preserve, on a short and medium term. They are registered under some international regulations, as: *Habitat Directive 92/43/EEC* (Dir. Hab.) [13], *Global Red List* (GRL), *World Tree Red List* (WLT, 1998), *Bern Convention* (BC, 1979) [12]. Some of these international regulations are also adopted by the Romanian Government, as different laws or resolutions [16] (see the columns no 7 in the Table no. 1).

A second category comprise those endemic and near-endemic plants in the vascular flora of Romania, being met the Stânișoara Mountains also, requiring conservation measures. Thus, we have identified 31 vascular plant species of this category on that territory (3% from the whole number of the plant species in the Stânișoara Mountains) (see the columns no 5 in the Table no. 1).

A third category is those species registered on the Romanian Red List [9], also. There are 93 species (10.33% of the flora of Stânișoara Mountains) (see the columns no 6 in the Table no. 1).

The last but one analyzed category in our paper is those species which are reflected into the romanian legislation concerning the preserving of them, 9 species (1% – see the columns no 7 in the Table no. 1).

A last category of plants are those of other rare plants, not yet mentioned in the other categories, which are to be met in a few localities only, in the Stânișoara Mountains (see the columns no 8 in the Table no. 1).

Table no. 1 The rarest plant species registered in the Stânișoara Mountains

	1	2	3	4	5	6	7	8
No. crt.	Family	Taxon name	Sozo-logical category	International Regulations	Endemism status in Romania	Red Data List of Romania (Oltean & al., 1994)	Recorded in national legislation	Distribution in Stânișoara Mts.
1	<i>Asteraceae</i>	<i>Achillea oxyloba</i> (DC.) Sch. Bip. subsp. <i>schurii</i> (Sch. Bip.) Heimerl	LR	BC	near End.	R	-	Târnița Mare Rocks
2	<i>Asteraceae</i>	<i>Arnica montana</i> L. subsp. <i>montana</i>	VU	Dir. Hab. 92/43, Annex Vb	-	VU	[15, 16]	Southern of Târnița Pass, Borca, Côtârğași, near the „Peștele” Monastery, Fârcașa along the homonymous stream, Crucea, Satu Mare
3	<i>Aspleniaceae</i>	<i>Asplenium adulterinum</i> Milde	VU	Dir. Hab. 92/43 Annex IIb	-	R	[15, 16]	Bicaz Mountains [7] ?
4	<i>Campanulaceae</i>	<i>Campanula patula</i> L. subsp. <i>abietina</i> (Griseb.) Simonk.	LR	BC, App. 5/1998	near End.	-	-	frequent in Stânișoara Mountains
5	<i>Campanulaceae</i>	<i>Campanula serrata</i> (Kit.) Hendrych	LR	Dir. Hab. 92/43 Annex IIb, Annex IVb	near End.	-	[15, 16]	frequent in Stânișoara Mountains
6	<i>Orchidaceae</i>	<i>Cypripedium calceolus</i> L.	EN	HD 92/43 Annex IIb; BC App. I	-	VU/R	[15, 16]	Nemțșor water basin [7], Pietroasa, Sabasa
7	<i>Amaryllidaceae</i>	<i>Galanthus nivalis</i> L.	VU	Dir. Hab. 92/43, Annex Vb	-	nt	[15, 16]	Pietroasa, along the valley of Sabasa stream
8	<i>Brassicaceae</i>	<i>Hesperis oblongifolia</i> Schur	VU	GRL	near End.	R	-	Târnița Mare Rocks
9	<i>Pinaceae</i>	<i>Larix decidua</i> Mill. subsp. <i>carpatica</i> (Domin) Šiman	VU	WLT 1998	near End.	R	[15, 16]	„Piatra Pinului” at Gura Humorului (cultivated ?)
10	<i>Lycopodiaceae</i>	<i>Lycopodium annotinum</i> L.	-	Hab. Dir. 92/43, Annex Vb	-	-	[15, 16]	Pietroasa
11	<i>Lycopodiaceae</i>	<i>Lycopodium clavatum</i> L.	-	Hab. Dir. 92/43, Annex Vb	-	-	[15, 16]	Pietroasa, Târnița Pass

12	<i>Lycopodiaceae</i>	<i>Lycopodium selago</i> L.	-	Hab. Dir. 92/43, Annex Vb	-	-	[15, 16]	Pietroasa, the natural reserve „Piatra Pinului” at Gura Humorului, Plutonita Monastery, Tarnita Mare Rocks
13	<i>Typhaceae</i>	<i>Typha shuttleworthii</i> Koch & Sonder	LC	BC, App. I/1998	-	VU/R	-	Văleni [7], Pângărați
14	<i>Ranunculaceae</i>	<i>Aconitum moldavicum</i> Hacq. subsp. <i>moldavicum</i>	LC		near End.	-	-	Nemțșor river basin [7], Tarnita Mare Rocks, the valley of Fărcașa stream
15	<i>Ranunculaceae</i>	<i>Aquilegia vulgaris</i> Schur	NT		-	-	-	the valley of Fărcașa stream
16	<i>Rubiaceae</i>	<i>Asperula carpatica</i> I. Morariu	NT		End.	R	-	Tarnita Mare Rocks
17	<i>Campanulaceae</i>	<i>Campanula carpatica</i> Jacq.	VU	BC	near End.	R	-	Tarnita Mare Rocks, Tarnita Pass, Pietroasa, the valley of Fărcașa stream, between Satu Mare and Cojoci
18	<i>Asteraceae</i>	<i>Centaurea pinnatifida</i> Schur subsp. <i>pinnatifida</i>	NT		End.	R	-	Tarnita Mare Rocks
19	<i>Caryophyllaceae</i>	<i>Dianthus spiculifolius</i> Schur	LC		near End.	R	-	Tarnita Mare Rocks
20	<i>Caryophyllaceae</i>	<i>Dianthus tenuifolius</i> Schur	NT		near End.	nt	-	Crucea, Holda under the Tarnita Mare Rocks Peak, between Satu Mare and Cojoci
21	<i>Poaceae</i>	<i>Helictotrichon decorum</i> (Janka) Henrard	LC	BC	End.	nt	-	Tarnita Mare Rocks
22	<i>Ranunculaceae</i>	<i>Hepatica transsilvanica</i> Fuss	LC		near End.	nt	-	Nemțșor river basin [7], Borca, Cuiejdol lake
23	<i>Brassicaceae</i>	<i>Hesperis moniliformis</i> Schur	NT		End.	R	-	Tarnita Mare Rocks
24	<i>Asteraceae</i>	<i>Hieracium pojoritense</i> Wol.	LC		near End.	R	-	Tarnita Mare Rocks
25	<i>Poaceae</i>	<i>Poa rehmannii</i> (Asch. & Graebn.) Wol.	LC		near End.	R	-	Tarnita Mare Rocks, between Satu Mare and Cojoci
26	<i>Primulaceae</i>	<i>Primula elatior</i> (L.) Hill subsp. <i>leucophylla</i> (Pax) Hesel.-Harr. f. ex W. W. Sm. & H. R. Fletcher	LC		near End.	R	-	Pângărați [7], Southern of the Tarnita Pass, under Tarnita Mare Rocks, Boboiești, Petru Vodă, Crucea

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27	Caryophyllaceae	<i>Silene nutans</i> L. subsp. <i>dubia</i> (Herbich) Zapal.	LC		near End.	R	-	Mount Cozla [7], Broșteni, Târnița Pass, the valley of Holdița stream, Târnița Mare Rocks, between Satu Mare and Cojoci
28	Caryophyllaceae	<i>Silene zawadzkyi</i> Herbich	LC		near End.	R	-	Târnița Mare Rocks
29	Primulaceae	<i>Soldanella hungarica</i> Simonk. subsp. <i>hungarica</i>	LC		near End.	-	-	Borca
30	Boraginaceae	<i>Symphytum cordatum</i> Waldst. & Kit. ex Willd.	LC		near End.	-	-	Pângărați [7], Nemțșor river basin [7]
31	Violaceae	<i>Viola jooi</i> Janka	VU		near End.	R	-	Mount Cozla [7]
32	Pinaceae	<i>Abies alba</i> Mill.	EN	BC	-	EN	-	everywhere in Stânișoara Mts.
33	Orchidaceae	<i>Anacamptis pyramidalis</i> (L.) Rich.	VU		-	VU/R	-	Borca
34	Apiaceae	<i>Angelica archangelica</i> L.	VU		-	VU	-	cited from Pângărați [2], Borca [2] and Hangu [7], but not found by us
35	Brassicaceae	<i>Cardamine glanduligera</i> O. Schwarz	LC		-	-	-	Nemțșor river basin [7], Bisericiani, Pângărați
36	Asteraceae	<i>Centaurea phrygia</i> L. subsp. <i>melanocalathia</i> (Borbás) Dostál	NT	BC	near End.	R	-	Poiana Comarnicului [4]
37	Orchidaceae	<i>Cephalanthera damasonium</i> (Mill.) Druce	NT		-	nt	-	Bourului Hill [2], Poiana Strugăria [2], Jacotele Hill [2], Nemțșorului valley [2]
38	Orchidaceae	<i>Cephalanthera longifolia</i> (L.) Fritsch	NT		-	nt	-	Agapia stream at homonymous Monastery; the valley of Almășel stream; Cuiejd
39	Orchidaceae	<i>Cephalanthera rubra</i> (L.) Rich.	VU		-	R	-	Pângărați, Tarcău, Nemțșor stream [6]
40	Ranunculaceae	<i>Cimicifuga europaea</i> Schipcz.	VU		-	R	-	Vadu Negrișei
41	Asteraceae	<i>Cirsium decussatum</i> Janka	VU	BC	-	R	-	Doroteia, Côtârğași, near the Monastery „Pește” at Côtârğași, Crucea Talienilor, Plutonita Monastery, Sabasa

42	<i>Asteraceae</i>	<i>Cirsium furiens</i> Griseb. & Schenk	LC	BC	near End.	nt	-	Borca, Piatra Neamț on Cârlomanul hill
43	<i>Orchida- ceae</i>	<i>Coeloglossum viride</i> (L.) Hartm.	VU		-	R	-	Nemțișor river basin [7]
44	<i>Orchida- ceae</i>	<i>Corallorhiza trifida</i> Châtel.	VU		-	R	-	Nemțișor river basin [7]
45	<i>Orchida- ceae</i>	<i>Dactylorhiza incarnata</i> (L.) Soó subsp. <i>incarnata</i>	VU		-	R		Nemțișor river basin [7]
46	<i>Orchida- ceae</i>	<i>Dactylorhiza maculata</i> (L.) Soó subsp. <i>maculata</i>	VU		-	R	-	Pietroasa
47	<i>Orchida- ceae</i>	<i>Dactylorhiza majalis</i> (Rchb.) P. H. Hunt & Summerh.	VU		-	R	-	Cuiejdî-Gârcina [7], Pietroasa
48	<i>Orchida- ceae</i>	<i>Dactylorhiza sambucina</i> (L.) Soó	VU		-	R	-	Nemțișor river basin [7], Piatra Neamț on Cârlomanul hill [7]
49	<i>Caryophy- llaceae</i>	<i>Dianthus barbatus</i> L. subsp. <i>compactus</i> (Kit.) Heuff.	VU		-	R	-	Pângărați [herbarium of Botanic Garden of Iași], Târnița Pass, Chiril
50	<i>Caryophy- llaceae</i>	<i>Dianthus collinus</i> Waldst. & Kit. subsp. <i>glabriusculus</i> (Kit.) Thaisz	VU		-	R	-	Nemțișor river basin [7], Gârcina [6], Pângărați [7], Viișoara
51	<i>Caryophy- llaceae</i>	<i>Dianthus superbus</i> L. subsp. <i>alpestris</i> Kablik ex Čelak.	VU		-	R	-	Pietroasa, Muncel, Chiril
52	<i>Dipsaca- ceae</i>	<i>Dipsacus strigosus</i> Willd.	VU		-	R	-	Plutonita, Poiana Mărului, Găinești, Slatina Monastery, Plutonita Monastery, Agapia stream at the homonymous monastery
53	<i>Orchida- ceae</i>	<i>Epipactis atrorubens</i> (Hoffm.) Besser	VU		-	R	-	Nemțișor river basin [7], Borca, Târnița Mare Rocks, Sabasa, Leșul Ursului

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54	<i>Orchida- ceae</i>	<i>Epipactis helleborine</i> (L.) Crantz	VU		-	R	-	Nemțșor river basin [7], Pângărați [7], Crăcăoani [7], Cuiejdii-Gărcina [7], Văleni- Stănișoara, Fărcașa on the homonymous stream, Agapia stream at the homonymous monastery, Văratec, Cuiejdii lake, Târnița Mare Rocks
55	<i>Orchida- ceae</i>	<i>Epipactis palustris</i> (L.) Crantz	VU		-	R	-	Nemțșor river basin [7], Cuiejdii-Gărcina [7]
56	<i>Orchida- ceae</i>	<i>Epipactis purpurata</i> Sm.	VU		-	R	-	Piatra Neamț on Cărlomanul Hill [6]
57	<i>Orchida- ceae</i>	<i>Epipogium aphyllum</i> Sw.	VU		-	R	-	Nemțșor river basin [7], Slatina, Ciumărna stream at Găinești
58	<i>Scrophula- riaceae</i>	<i>Euphrasia coerulea</i> Hoppe & Fürnr.	VU		-	R	-	Holda under Târnița Mare Rocks Peak
59	<i>Poaceae</i>	<i>Festuca carpatica</i> F. Dietr.	VU		near End.	R	-	Târnița Mare Rocks
60	<i>Poaceae</i>	<i>Festuca versicolor</i> Tausch subsp. <i>versicolor</i>	VU		-	R	-	Târnița Mare Rocks
61	<i>Orchida- ceae</i>	<i>Gymnadenia conopsea</i> (L.) R. Br. subsp. <i>conopsea</i>	VU		-	R	-	Pângărați [6], Nemțșor river basin [7], Voronet river valley
62	<i>Orchida- ceae</i>	<i>Gymnadenia odoratissima</i> (L.) Rich.	VU		-	R	-	Nemțșor river basin [7]
63	<i>Orchida- ceae</i>	<i>Herminium monorchis</i> (L.) R. Br.	VU		-	R	-	Nemțșor river basin [7]
64	<i>Brassica- ceae</i>	<i>Hesperis matronalis</i> L. subsp. <i>cladotricha</i> (Borbás) Hayek	VU		-	R	-	Zugreni Gorges
65	<i>Asteraceae</i>	<i>Leontopodium nivale</i> (Ten.) Hand.-Mazz. subsp. <i>alpinum</i> (Cass.) Greuter	VU		-	VU/R	-	Târnița Mare Rocks
66	<i>Asteraceae</i>	<i>Leucanthemum rotundifolium</i> (Willd.) DC., non Opiz	VU	BC	-	R	-	Băta Oblânc, Sabasa valley
67	<i>Orchida- ceae</i>	<i>Listera ovata</i> (L.) R. Br.	VU		-	R	-	Nemțșor river basin [7]
68	<i>Orchida- ceae</i>	<i>Listera cordata</i> (L.) R. Br.	VU		-	R	-	

69	<i>Caryophyllaceae</i>	<i>Lychnis viscaria</i> L. subsp. <i>atropurpurea</i> (Griseb.) Chater	VU		-	R	-	Neamț Monastery [7]
70	<i>Scrophulariaceae</i>	<i>Melampyrum saxosum</i> Baumg.	VU		near End.	R	-	Târnița Mare Rocks
71	<i>Monotropaceae</i>	<i>Monotropa hypophaea</i> Wallr.	VU		-	-	-	Almășel stream valley, Almaș, „Valea Mare” stream valley at Bistrița
72	<i>Orchidaceae</i>	<i>Neottia nidus-avis</i> (L.) Rich.	VU		-	R	-	Piatra Neamț on Cărlomanul hill [7], Pângărați [6], Nemțișor river basin [7], Borca, Voroneț stream valley, the natural reserve „Piatra Pinului” at Gura Humorului, Holda near Târnița Mare Rocks, Agapia stream at the homonymous Monastery, Văratec, Cuișediu
73	<i>Orchidaceae</i>	<i>Nigritella nigra</i> (L.) Rchb. f. subsp. <i>rubra</i> (Wettst.) Beauverd	VU		-	VU/R	-	Nemțișor river basin [6]
74	<i>Boraginaceae</i>	<i>Omphalodes scorpioides</i> (Haenke) Schrank	VU		-	R	-	Cozla Mountain [6]
75	<i>Orchidaceae</i>	<i>Orchis coriophora</i> L. subsp. <i>coriophora</i>	VU		-	R	-	Piatra Neamț on Cărlomanul hill [7], Nemțișor river basin [7]
76	<i>Orchidaceae</i>	<i>Orchis laxiflora</i> Lam. subsp. <i>elegans</i> (Heuff.) Soó	VU		-	R	-	Bâta lake [7]
77	<i>Orchidaceae</i>	<i>Orchis militaris</i> L.	VU		-	R	-	Cozla Mountain [7], Pângărați [6], Pietroasa
78	<i>Orchidaceae</i>	<i>Orchis morio</i> L. subsp. <i>morio</i>	VU		-	R	-	Pângărați [7], Nemțișor river basin [6]
79	<i>Orchidaceae</i>	<i>Orchis purpurea</i> Huds.	VU		-	R	-	Pângărați [6]
80	<i>Orchidaceae</i>	<i>Orchis tridentata</i> Scop. subsp. <i>tridentata</i>	VU		-	R	-	Pângărați [6]
81	<i>Orchidaceae</i>	<i>Orchis ustulata</i> L.	VU		-	R	-	Nemțișor river basin [6]
82	<i>Scrophulariaceae</i>	<i>Pedicularis exaltata</i> Besser	VU		-	R	-	Sihla hermitage [10], Agapia Monastery [10]

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83	<i>Campanulaceae</i>	<i>Phyteuma tetramerum</i> Schur	VU		near End.	R	-	Fărcașa
84	<i>Pinaceae</i>	<i>Pinus sylvestris</i> L.	VU		-	R	-	Nemțșor river basin [7], "Piatra Pinului" nature reserve
85	<i>Orchidaceae</i>	<i>Platanthera bifolia</i> (L.) Rich.	VU		-	R	-	Pângărați [6], Nemțșor river basin [7], Borca, Tarnița Pass, Piatra Neamț on Cozla Hill
86	<i>Polygalaceae</i>	<i>Polygala alpestris</i> Rchb.	DD		-	K	-	Tarnița Mare Rocks
87	<i>Ranunculaceae</i>	<i>Ranunculus carpaticus</i> Herbich	VU		near End.	R	-	Pângărați [6], Borca
88	<i>Polygonaceae</i>	<i>Rumex arifolius</i> All. (<i>R. alpestris</i> Jacq.) f. <i>carpaticus</i> Zapal.	DD		-	-	-	Stânișoarei Mountains [10] ?
89	<i>Grossulariaceae</i>	<i>Ribes alpinum</i> L.	VU		-	R	-	Tarnița Mare Rocks
90	<i>Salicaceae</i>	<i>Salix aurita</i> L.	VU		-	R	-	South of Tarnița Pass
91	<i>Asteraceae</i>	<i>Saussurea discolor</i> (Willd.) DC.	VU		-	R	-	Tarnița Mare Rocks
92	<i>Sparganiaceae</i>	<i>Sparganium minimum</i> Wallr.	VU		-	R	-	Negrileasa in the „Bolătău” lake
93	<i>Liliaceae</i>	<i>Streptopus amplexifolius</i> (L.) DC.	VU		-	R	-	„Daniil Sihuștru” Monastery, Vadul Negrilesei, Piatra Neamț on Cărlomanul hill
94	<i>Asteraceae</i>	<i>Tanacetum macrophyllum</i> (Waldst. & Kit.) Sch. Bip.	VU	BC	-	R	-	Cuiejdii
95	<i>Taxaceae</i>	<i>Taxus baccata</i> L.	CR		-	VU/R	-	Pietroasa, Borca (cultivated ?), Biserici-Viișoara [6], Pângărați [6]
96	<i>Orchidaceae</i>	<i>Traunsteinera globosa</i> (L.) Rchb.	VU		-	R	-	Nemțșor river basin [7], Tarnița Pass, Fărcașa on the homonymous stream
97	<i>Fabaceae</i>	<i>Trifolium spadiceum</i> L.	VU		-	R	-	Crucea
98	<i>Poaceae</i>	<i>Trisetum alpestre</i> (Host) P. Beauv.	VU		-	R	-	Tarnița Mare Rocks

99	<i>Ranunculaceae</i>	<i>Trollius europaeus</i> L. subsp. <i>europaeus</i>	VU		-	R	-	Poiana Teiului [7], Biserici-Viișoara [7], Nemțișor river basin [7], Văleni [7], Pângărați [7], Borca, Southern of the Tarnița Pass, Voroneț stream valley, Cotârğași, near the „Peștele” Monastery, Văleni-Stănișoara, Fărcașa on the homonymous valley, Boboiești, Pârâul Cârjei village
100	<i>Typhaceae</i>	<i>Typha shuttleworthii</i> W. D. J. Koch & Sond.	VU		-	VU/R	-	between Agapia Monastery and Secu Monastery
101	<i>Liliaceae</i>	<i>Veratrum album</i> L. subsp. <i>album</i>	LC		-	-	-	South of the Tarnița Pass
102	<i>Scrophulariaceae</i>	<i>Veronica catenata</i> Pennell	VU		-	R	-	Crăcăoani [7]
103	<i>Scrophulariaceae</i>	<i>Veronica fruticans</i> Jacq.	VU		-	R	-	South of the Tarnița Pass
104	<i>Ranunculaceae</i>	<i>Aquilegia vulgaris</i> L.			-	-	-	Fărcașa along the homonymous stream
105	<i>Ranunculaceae</i>	<i>Aconitum napellus</i> L. subsp. <i>tauricum</i> (Wulfen) Gayer			-	-	-	Tarnița Mare Rocks
106	<i>Liliaceae</i>	<i>Allium senescens</i> L. subsp. <i>montanum</i> (F. W. Schmidt) Holub			-	-	-	Tarnița Mare Rocks
107	<i>Primulaceae</i>	<i>Androsace lactea</i> L.			-	-	-	Tarnița Mare Rocks
108	<i>Asteraceae</i>	<i>Anthemis cotula</i> L.			-	-	-	Pângărați
109	<i>Ranunculaceae</i>	<i>Aquilegia nigricans</i> Baumg. subsp. <i>nigricans</i>			-	VU	-	Tarnița Mare Rocks
110	<i>Rosaceae</i>	<i>Aruncus dioicus</i> (Walter) Fernald			-	-	-	Holdița, Holda, Tarnița Pass
111	<i>Asteraceae</i>	<i>Aster alpinus</i> L.			-	-	-	Tarnița Mare Rocks
112	<i>Asteraceae</i>	<i>Bidens cernua</i> L.			-	-	-	Leșul Ursului, Găinești, Văleni-Stănișoara, Secu river valley, Plutonita Monastery, Negrileasa

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113	Poaceae	<i>Bromus riparius</i> Rehmman			-	-	-	Slătioara
114	Callitricheaceae	<i>Callitriche cophocarpa</i> Sendtn.			-	-	-	Slatina, Văleni-Stănișoara, Negrileasa in "Bolătău" lake
115	Campanulaceae	<i>Campanula rotundifolia</i> L. subsp. <i>polymorpha</i> (Witašek) Tacik			near End.	-	-	Găinești
116	Cyperaceae	<i>Carex humilis</i> Leyss.			-	-	-	Târnița Mare Rocks
117	Asteraceae	<i>Carpesium cernuum</i> L.			-	-	-	Piatra Neamț on Cărlomanul hill and on Cozla hill
118	Gentianaceae	<i>Centaurium pulchellum</i> (Sw.) Druce			-	-	-	Doroteia
119	Caryophyllaceae	<i>Dianthus collinus</i> Waldst. & Kit. subsp. <i>collinus</i>			-	R	-	The forest „Codrii de Aramă”, Piatra Neamț on Pietricica Hill
120	Caryophyllaceae	<i>Dianthus deltoides</i> L.			-	-	-	Satu Mare (Suceava county)
121	Oenotheraceae	<i>Epilobium dodonaei</i> Vill.			-	-	-	Piatra Neamț, Agapia
122	Brassicaceae	<i>Erysimum witmannii</i> Zaw.			near End.	-	-	Târnița Mare Rocks
123	Scrophulariaceae	<i>Euphrasia salisburgensis</i> Funk			near End.	R	-	Târnița Mare Rocks
124	Fagaceae	<i>Fagus taurica</i> Popl.			-	-	-	Cotârğași, near „Peștele” Monastery, towards Sihăstria Monastery, Agapia stream at the homonymous Monastery, Pângărați valley
125	Poaceae	<i>Festuca ovina</i> L.			-	-	-	Târnița Mare Rocks
126	Rubiaceae	<i>Galium rotundifolium</i> L.			-	-	-	Ciumârna stream at Găinești, Slatina, Slătioara
127	Cistaceae	<i>Helianthemum oelandicum</i> (L.) DC. subsp. <i>rupifragum</i> (A. Kern.) Breistr.			-	-	-	Târnița Mare Rocks
128	Brassicaceae	<i>Hesperis matronalis</i> L. subsp. <i>matronalis</i>			-	-	-	Târnița Mare Rocks
129	Poaceae	<i>Lolium multiflorum</i> Lam.			-	-	-	Voroneț valley
130	Lamiaceae	<i>Mentha × piperita</i> L.			-	-	-	Agapia
131	Lamiaceae	<i>Mentha spicata</i> L.			-	-	-	Agapia
132	Poaceae	<i>Molinia caerulea</i> (L.) Moench subsp. <i>caerulea</i>			-	-	-	Potoci

133	<i>Orobanchaceae</i>	<i>Orobanche minor</i> Sm.			-	-	-	Târnița Mare Rocks
134	<i>Orobanchaceae</i>	<i>Orobanche loricata</i> Rchb.			-	-	-	Târnița Mare Rocks
135	<i>Aspleniaceae</i>	<i>Polystichum aculeatum</i> (L.) Roth			-	-	-	Târnița Mare Rocks, Leșul Ursului
136	<i>Rosaceae</i>	<i>Potentilla cinerea</i> Chaix ex Vill.			-	-	-	Târnița Mare Rocks
137	<i>Ranunculaceae</i>	<i>Ranunculus flammula</i> L.			-	-	-	Văleni-Stănișoara
138	<i>Ranunculaceae</i>	<i>Ranunculus serpens</i> Schrank subsp. <i>nemorosus</i> (DC.) G. López			-	-	-	Crucea Talienilor
139	<i>Grossulariaceae</i>	<i>Ribes rubrum</i> L. s. str.			-	-	-	Târnița Mare Rocks
140	<i>Cyperaceae</i>	<i>Scirpus setaceus</i> L.			-	-	-	Poiana Mărului
141	<i>Scrophulariaceae</i>	<i>Scrophularia umbrosa</i> Dumort.			-	-	-	Sihla
142	<i>Santalaceae</i>	<i>Thesium alpinum</i> L.			-	-	-	Târnița Mare Rocks
143	<i>Typhaceae</i>	<i>Typha laxmannii</i> Lepech.			-	-	-	Pângărați
144	<i>Scrophulariaceae</i>	<i>Veronica persica</i> Poir.			-	-	-	Pârâul Cârjei village
145	<i>Scrophulariaceae</i>	<i>Veronica scutellata</i> L.			-	-	-	Văleni-Stănișoara

Some of the rarest plants are given here, as the next ones: *Achillea oxyloba* (DC.) Sch. Bip. subsp. *schurii* (Sch. Bip.) Heimerl, *Hesperis oblongifolia* Schur, *Typha shuttleworthii* Koch & Sonder, *Asperula carpatica* I. Morariu, *Centaurea pinnatifida* Schur subsp. *pinnatifida*, *Dianthus spiculifolius* Schur, *Helictotrichon decorum* (Janka) Henrard, *Hepatica transsilvanica* Fuss, *Hesperis moniliformis* Schur, *Hieracium pojoritense* Wol., *Silene zawadzki* Herbich, *Soldanella hungarica* Simonk. subsp. *hungarica*, *Viola jooi* Janka, *Anacamptis pyramidalis* (L.) Rich., *Centaurea phrygia* L. subsp. *melanocalathia* (Borbás) Dostál, *Cimicifuga europaea* Schipcz., *Leontopodium nivale* (Ten.) Hand.-Mazz. subsp. *alpinum* (Cass.) Greuter, *Leucanthemum rotundifolium* (Willd.) DC., non Opiz, *Melampyrum saxosum* Baumg., *Monotropa hypophegea* Wallr., *Omphalodes scorpioides* (Haenke) Schrank, *Orchis laxiflora* Lam. subsp. *elegans* (Heuff.) Soó, *Polygala alpestris* Rchb., *Ranunculus carpaticus* Herbich, *Ribes alpinum* L., *Salix aurita* L., *Saussurea discolor* (Willd.) DC., *Sparganium minimum* Wallr., *Tanacetum macrophyllum* (Waldst. & Kit.) Sch. Bip., *Trifolium spadiceum* L., *Trisetum alpestre* (Host) P. Beauv., *Veronica fruticans* Jacq., *Veronica catenata* Pennell, *Veronica fruticans* Jacq., *Aquilegia vulgaris* L., *Aconitum napellus* L. subsp. *tauricum* (Wulfen) Gáyer, *Allium senescens* L. subsp. *montanum* (F. W. Schmidt) Holub, *Androsace lactea* L., *Aquilegia nigricans* Baumg. subsp. *nigricans*, *Aster alpinus* L., *Bromus riparius* Rehmman, *Dianthus deltoides* L., *Erysimum witmannii* Zaw., *Euphrasia salisburgensis* Funck, *Helianthemum oelandicum* (L.) DC. subsp. *rupifragum* (A. Kern.) Breistr., *Hesperis matronalis* L. subsp. *matronalis*, *Ranunculus flammula* L., *Ranunculus serpens* Schrank subsp. *nemorosus* (DC.) G. López, *Ribes rubrum* L. s. str., *Scirpus setaceus* L., *Scrophularia umbrosa* Dumort., *Thesium alpinum* L., *Typha laxmannii* Lepech., *Veronica scutellata* L., *Veronica persica* Poir., and so on. Thus, these species are to be met in one or two localities, only; also, their populations

are pretty small and, in some particular cases, are in danger to disappear, as the anthropic impact are quite high in that area (Stânișoara Mountains). Though, these species play a very important role in the floristic spectra of that area.

Other species are doubtfull present for our region, though they were cited in here, e. g.: *Rumex arifolius* All. (*R. alpestris* Jacq.) f. *carpaticus* Zapal., which was cited into the Romanian Flora [10] from Stânișoara Mountains, but without an accurate statement localities.

Some of the species are threatened by the human impacts, especially by clearing forests, grazing, fires (e. g. the yew).

On the territory of the Stânișoara Mountains there are three protected area only, namely: 1. Natural Park “Vânători Neamț”; 2. Nature Reserve “Piatra Pinului” at Gura Humorului; 3. Nature Reserve Pângărați.

We shall propose to the local authorities (Suceava county – Regional Environment Protected Agency) an other area, which deserve to be protected in the future. It is situated nearby the Crucea village, at Târnița Mare Rocks. Those rocks are situated at a maximum altitude of 1431 m. The importance of this place consists in the existence of a second place of the endemic species *Asperula carpatica* in the Eastern Carpathians.

Conclusions

- The previous floristic data over the Stânișoara Mountains (Eastern Carpathians) has been very poor and entirely unmeaningful, previous of this study.
- Our investigations, during the period of 2005 – 2008, concluded in registering over 900 different vascular plant species.
- Apart of these 145 plants are pretty rare in the field.
- A number of 21 species from the Stânișoara Mountains are registered under the international regulations, as: *Habitat Directive 92/43/EEC* (Dir. Hab.), *Global Red List* (GRL), *World Tree Red List* (WLT, 1998), *Bern Convention* (BC, 1979).
- A number of 31 species are endemic and near Endemic in the flora of Romania, being met in a few places in Stânișoara Mountains, only.
- A number of 93 species from the Stânișoara Mountains are listed into the Romanian Red List of vascular plants.
- Other 55 plant species are very rare in the flora of Romania, being met in various localities in Stânișoara Mountains.

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