THE FLORA AND VEGETATION OF THE CAPRA GLACIER CIRQUE, THE FĂGĂRAȘ MASSIF

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Abstract. The Capra glacier cirque is located in the Southern Carpathians, on the southern slope of the Făgăraș Massif, in its central portion. The Capra glacier cirque was formed during the Quaternary glaciation and is located at an altitude of 2.230 m. The lake occupies an area of 1.8 ha, has an almost round shape and its maximum depth is 10-11 m. The relevant literature includes no data regarding the flora and vegetation of this glacier cirque. In the paper, we provide a floristic summary, having identified 142 taxa (cormophyte) and 18 vegetal associations (phytocoenoses). We also show that the phytocoenoses from the Capra glacier cirque have an arctic-alpine nature, being mostly acidophilous, because crystalline schists are widely spread here. The climate is harsh, of an alpine type, with an average annual temperature below 0˚C, with abundant precipitations mostly in the form of snow (over 1.200 mm/year) and strong winds that blow mainly from the west and northwest.

Keywords: Capra glacier cirque, Făgăraş Mountains, vegetal associations, floristic summary.

Rezumat. Flora și vegetația circului glaciar Capra, Masivul Făgăraș. Circul glaciar Capra este situat în Carpații Meridionali, pe versantul sudic al Masivului Făgăraș, în partea centrală a acestuia. Circul glaciar Capra a fost format în timpul glaciațiunii cuaternare și se află situat la 2.230 m altitudine. Lacul ocupă o suprafață de 1,8 ha, are o formă aproape rotundă și atinge adâncimea maximă de aproximativ 10-11 m. În literatura de specialitate nu sunt date referitoare la flora și vegetația circului glaciar Capra. În lucrarea de față, am realizat conspectul floristic identificând 142 taxoni (cormofite) și 18 asociații vegetale (fitocenoze). De asemenea am arătat că fitocenozele au un caracter arctic-alpin, fiind predominant acidofile, deoarece în această zonă șisturile și calcarele cristaline au o largă răspândire. Climatul este aspru, de tip alpin, cu temperatură medie anuală în jur de 0˚C, cu precipitații abundente cele mai multe sub formă de zăpadă (peste 1.200 mm/an) și vânturi puternice care bat mai ales din vest și nord-vest.

Cuvinte cheie: circul glaciar Capra, Munții Făgăraș, asociații vegetale, conspect floristic.

INTRODUCTION

The Argeș county is located in the central-southern part of the country, on the upper reaches of the Argeș River. To the North, it borders the Făgăraș Mountains, which unite the Argeș county with the Sibiu and Brașov counties (ALEXIU, 2008). The Capra glacier cirque is located in the Southern Carpathians, on the southern slope of the Făgăraș Massif, in its central portion. The Capra glacier cirque was formed during the Quaternary glaciation and is located at an altitude of 2.230 m. The lake occupies an area of 1.8 ha, has an almost round shape and the maximum depth is 10-11 m. From the Capra cirque, the Capra stream (tributary of the Argeș river) stems, which in just a few meters forms another small lake called Căprița (Photo 1). Further, the stream descends to the south and forms the spectacular Capra waterfall before the Transfăgărășan.

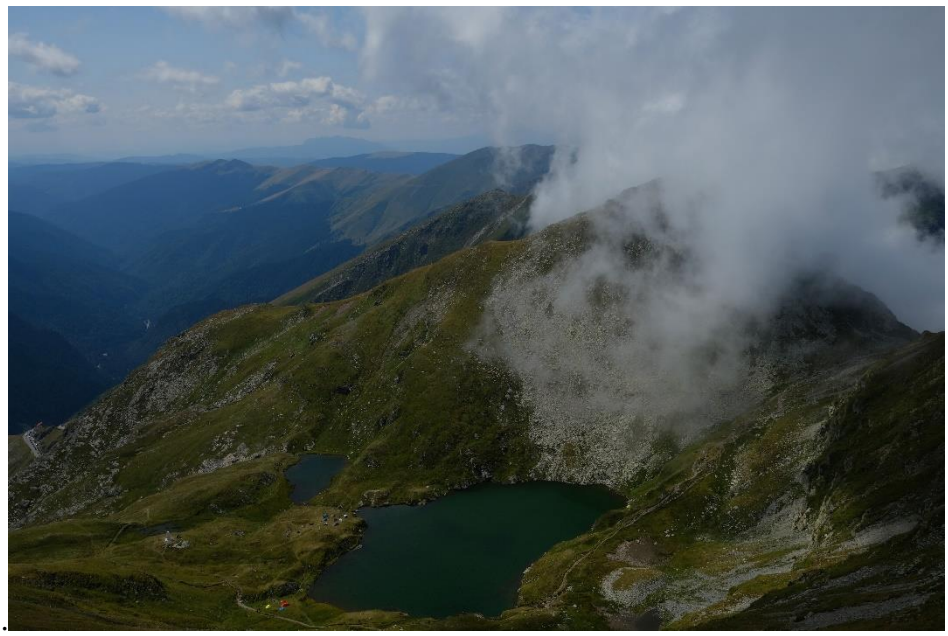

Photo 1. The Capra and Căprița glacier cirques – Făgăraș Massif (original D. Stancu).

The specialized literature includes no data regarding the flora and vegetation of this glacier cirque. In the paper, we provide the floristic summary and phytocenoses identified in the studied area. We also show that the phytocoenoses from Capra glacier circus have an arctic-alpine character, being predominant silicophilous (acidophilous), because crystallin schists are widely spread here. The climate is of a harsh, alpine type with average annual temperatures below 0°C, with abundant precipitation mostly in the form of snow (over 1.200 mm/year) and strong winds that blow mainly from the west and northwest.

Having an alpine-subalpine position, the Capra glacier cirque is characterized by a specific vegetation of a circumpolar shade Arctic-Alpine and Carpathian, in which alpine meadow phytocenoses of the *Juncetea trifidi* class predominate, primarily with crown pastures (*Primulo-Caricetum curvulae*) and alpine meadows (*Potentillo ternatae-Festucetum sudeticae*) and the characteristic coenoses of the snowdrops of the *Salicetea herbaceae* class and of rock brambles of the *Thlaspietea rotundifolii* class. Most of these phytocenoses are silicophilic (acidophilic). The mentioned coenoses mostly have an alpine character, the subalpine floor being characterized by very large plant groups, namely subalpine bushes of the *Vaccinio-Piceetea* class and altitude weeds of the *Betulo-Adenostyletea* class. The fountain groups of the *Montio-Cardaminetea* class occupy very small areas in some micro-depressions and around Capra Lake.

MATERIALS AND METHODS

The plant nomenclature follows "Flora Europaea" (***. cf. http://rbg-web2.rbge.org.uk/FE/fe.html) and Plante vasculare din Romînia - determinator ilustrat de teren (SÂRBU et al., 2013). The vegetation was studied using the principles of central-European geobotanical school of surveying the vegetation (BRAUN-BLANQUET, 1964). The phytocoenological framing of the vegetation follow various authors (SCHNEIDER-BINDER, 1980; COLDEA, 1991; SANDA et al., 1997).

RESULTS AND DISCUSSION

In the paper, we will present first the taxa which will be accompanied by the bioforms, geoelements, ecological indices, coenology and sozological categories (CIOCÂRLAN, 2000). After that, we will present the plant associations found in the studied area.

142 taxa were identified. The following abbreviations have been used:

- for Bioforms: Th - Therophytes, Ht – Hemitherophytes,Hd – Hydrophytes, H - Hemicriptophytes, G - Geophytes, HH - Hydato-Helophytes, Ch - Chamephytes, Ph – Phanerophytes;
- for Geoelements: Adv - Adventitious, Alp - Alpine, Balc - Balcanic, Carp - Carpathic, Dac - Dacic, Cauc - Caucasian, Circ - Circumpolar, Cosm - Cosmopolitan, E - European, Ec - Central European, Eua - Eurasiatic, Arct-alp- Arctic-alpine, Pan - Panonic, Pont - Pontic, Anat - Anatolian, Atl - Atlantic, end - endemic.
- For sozological categories: End-endemic in Romania; R-rare.

FLORA:

POLYPODIOPHYTA (PTERIDOPHYTA) **PHYLUM**
LYCOPODIATATE CLASS
LYCOPODIALES ORDER Dumort.

LYCOPODIACEAE FAMILY Michx. ex. DC.

Huperzia selago (L.) Schrank et Mart. – Ch, Cosm, $U_{3,5}T_2R_2$, *Vaccinio-Piceetea*

SELAGINELLALES ORDER Prantl

SELAGINELLACEAE FAMILY P. Beauv.

Selaginella selaginoides (L.) P. Beauv. – Ch, Circ, $U_4T_1R_4$, *Seslerion bielzii*

Selaginella helvetica (L.) Spring – Ch, Eua, $U_4T_{3,5}R_{4,5}$, *Caricion davallianae, Seslerion bielzii*

POLYPODIATAE CLASS
POLYPODIALES ORDER Mett. ex A. B. Frank

POLYPODIACEAE FAMILY Bercht. et J. Presl.

Asplenium ruta-muraria L. – H, Eua, $U_{1,5}T_3R_5$, *ASplenietea trichomanis*

Gymnocarpium robertianum (Hoffm.) Newman – G, Circ, $U_{1,5}T_3R_5$, *Thlaspietea rotundifolii*

PINOPHYTA (GYMNOSPERMATOPHYTA) **PHYLUM**
PINATAE CLASS (CONIFERAE)
PINALES ORDER Dumort.

CUPRESSACEAE FAMILY Rich. ex Bartl.

Juniperus communis L. ssp. *alpina* (Suter) Čelak. – Ph, Circ(Arct-alp), $U_{2,5}T_{1,5}R_4$, *Junipero-Pinetalia mugi*

MAGNOLIOPHYTA (ANGIOSPERMATOPHYTA**) PHYLUM**
MAGNOLIATAE CLASS (DICOTYLRDONATAE)
RANUNCULALES ORDER Dumort.

RANUNCULACEAE FAMILY Juss.

Aconitum napellus L. ssp. *tauricum* (Wulfen) Gáyer – H, Alp-Carp, $U_3T_{2,5}R_4$, *Adenostylion alliariae*
Aconitum toxicum Rchb. – H, Carp-Balc, $U_4T_{2,5}R_{4,5}$, *Adenostyletalia*
Anemone narcissiflora L. ssp. *narcissiflora* – G, Circ(Arct-alp), $U_{3,5}T_{1,5}R_4$, *Seslerietalia, Elyno-Seslerietea*
Caltha palustris L. – H, Circ, $U_5T_2R_0$, *Calthion palustris*
Pulsatilla alba Rchb. – H, Alp-Carp, $U_3T_2R_{2,5}$, *Caricion curvulae, Potentillo ternatae-Nardion*
Ranunculus crenatus Wald. et Kit. – H, Alp-Carp-Balc, $U_4T_1R_4$, *Salicetea herbaceae*, R.
Ranunculus montanus Willd. – H, Carp-Balc, $U_{2,5}T_4R_4$, *Potentillo ternatae-Nardion*
Ranunculus oreophilus M. Bieb. – H, Alp-E, $U_{2,5}T_4R_4$, *Elyno-Seslerietea*

CARYOPHYLLALES ORDER Perleb

CARYOPHYLLACEAE FAMILY Juss

Arenaria biflora L. – Ch, Eua-Arct-alp, $U_4T_1R_2$, *Salicion herbaceae*
Cerastium alpinum L. ssp. *alpinum* – Ch, Eua-Arct-alp, $U_{2,5}T_1R_3$, *Thlaspietalia rotundifoliae, Seslerietalia*
Cerastium fontanum Baumg. ssp. *fontanum* – Ch, Eua, $U_3T_0R_0$, *Potentillo ternatae-Nardion*
Cerastium transsilvanicum Schur. ssp. *transsilvanicum* – Ch, End, $U_3T_{1,5}R_4$, *Seslerietalia*, R
Dianthus glacieris Haenke ssp. *glacieris* – H, Alp-Carp, $U_{3,5}T_1R_2$, *Androsacetalia alpinae*, R
Dianthus glacieris Haenke ssp. *gelidus* Schott, Nym. et Kotsc. – H, End, $U_{3,5}T_1R_2$, *Androsacion alpinae*, R
Dianthus tenuifolius Schur – H, Carp, $U_2T_{3,5}R_4$, *Seslerietalia*, End
Minuartia sedoides (L.) Hiern. – H, Alp-E, $U_{2,5}T_{1,5}R_0$, *Caricetalia curvulae*
Minuartia verna (L.) Hiern. – Ch, Circ, $U_2T_0R_0$, *Seslerietalia*
Silene acaulis (L.) Jacq. ssp. *acaulis* – Ch, Circ, $U_{2,5}T_1R_4$, *Androsacion alpinae*
Silene dinarica Spreng. – Ch, End, $U_2T_1R_0$, *Silenion dinaricae, Silenion lerchenfeldianae*, R
Silene vulgaris (Moench) Garcke ssp. *vulgaris* – H, Eua, $U_3T_3R_4$, *Arrhenatheretalia*
Stellaria nemorum L. – H, E, $U_{3,5}T_3R_3$, *Alno-Ulmion*

POLYGONALES ORDER Dumort.

POLYGONACEAE FAMILY Juss.

Polygonum bistorta L. – G, Eua, $U_4T_{2,5}R_3$, *Molinietalia, Calthion*
Polygonum viviparum L. – G, Circ(Arct-alp), $U_3T_2R_3$, *Caricion curvulae*
Rumex alpinus L. – H, Alp-Carp-Balc, $U_{3,5}T_2R_0$, *Rumicion alpini*
Rumex scutatus L. – H, Alp-E, $U_{2,5}T_0R_4$, *Thlaspietea rotundifolii*, R

ROSALES ORDER Perleb

CRASSULACEAE FAMILY DC.

Rhodiola rosea L. - H, Circ(Arct-alp), $U_2T_{1,5}R_0$, *Adenostyletalia, Androsacetalia wandelii*
Sedum anuum L. – Th, Eua, $U_3T_{1,5}R_{2,5}$, *Sedo-Scleranthion*
Sedum alpestre L. – Ch, Alp-E, $U_3T_{1,5}R_{2,5}$, *Androsacetalia alpinae, Salicion herbaceae*
Sedum atratum L. – Ch, Alp-E, $U_3T_{1,5}R_4$, *Thlaspietea, Seslerietalia*
Sempervivum marmoreum Griseb. – Ch, Carp-Balc, $U_{1,5}T_{2,5}R_{2,5}$, *Seslerion rigidae*

ROSACEAE FAMILY Juss.

Alchemilla glabra Neygenf. – H, E(mont), $U_{3,5}T_{2,5}R_0$, *Rumicion alpinae, Adenostylion*
Alchemilla glaucescens Wallr. – H, E, $U_{2,5}T_{2,5}R_{2,5}$, *Potentillo ternatae-Nardion*
Alchemilla xanthoclora Rothm. – H, E, $U_{3,5}T_2R_2$, *Arrhenatheretalia, Adenostylion*
Dryas octopetala L. – Ch, Circ(Arct-alp), $U_{2,5}T_0R_4$, *Thlaspietea, Elyno-Seslerietea*
Geum montanum L. – H, Alp-E, $U_3T_{1,5}R_{1,5}$, *Salicion herbaceae, Calamagrostion villosae*
Potentilla ternata Koch. – H, Carp, $U_3T_{1,5}R_3$, *Potentillo ternatae-Nardion , Caricetea curvulae*
Potentilla erecta (L.) Räusch. – H, Eua, $U_4T_1R_0$, *Potentillo ternatae-Nardion, Cynosurion*

SAXIFRAGALES ORDER Dumort.

SAXIFRAGACEAE FAMILY Juss.

Chrysosplenium alpinum Schur – H, Carp, $U_{3,5}T_3R_{3,5}$, *Androsacetalia alpinae, Montio-Cardaminetea*
Parnassia palustris L. ssp. *palustris* – H, Circ, $U_4T_2R_4$, *Caricetalia davallianae*
Saxifraga adscendens L. ssp. *adscendens* – Th, Circ, $U_{1,5}T_{1,5}R_0$, *Potentillion caulescentis*
Saxifraga aizoides L. – Ch, Eua, $U_{4,5}T_0R_4$, *Montio-Cardaminetea*
Saxifraga androsacea L. – Ch, Eua, $U_4T_1R_4$, *Veronicion baumgarteni, Arrhenatheretalia*
Saxifraga bryoides L. – Ch, Alp-E, $U_3T_1R_2$, *Androsacion alpinae*
Saxifraga paniculata Mill. – Ch, Eua(Arct-alp), $U_{1,5}T_{1,5}R_4$, *Thlaspietea, Caricetalia curvulae*
Saxifraga stellaris L. ssp. *stellaris* – Ch, Circ-Alp, $U_5T_{1,5}R_3$, *Montio cardaminetea*

FABALES ORDER Bromhead

FABACEAE FAMILY Lindl.

Oxytropis carpatica R. Uechtr. – H, Carp(End), $U_{2,5}T_{1,5}R_4$, *Elyno-Seslerietea*, R

Trifolium repens L. ssp. *ochranthum* Nyar. – H, Carp-Balc, $U_{3,5}T_0R_0$, *Potentillo ternatae-Nardion*

LINALES ORDER Baskerville

LINACEAE FAMILY S.F. GRay

Linum catharticum L. ssp. *catharticum* – H, E, $U_3T_2R_4$, *Molinietalia, Caricion davallianae*

Linum extraaxilare Kit. – H, Carp-Balc, $U_{2,5}T_0R_4$, *Caricion curvulae, Seslerietalia*

APIALES ORDER Nakai

APIACEAE FAMILY Lindl.

Chaerophyllum hirsutum L. – H, E, $U_{4,5}T_2R_0$, *Adenostylion, Calthion*

Ligusticum mutellina (L.) Crantz – H, Alp-E, $U_{3,5}T_{1,5}R_3$, *Calamagrostion villosae, Salicetea herbaceae*

Pipinela saxifraga L. ssp. *alpestris* (Spreng.) Koch. – H, Alp-E, $U_{4,5}T_2R_0$, *Festuco-Brometea*

THEALES ORDER Lindl.

HYPERICACEAE FAMILIY Juss.

Hypericum richeri Vill. ssp. *grisebachii* (Boiss.) Nym. – H, Alp-Carp-Balc, $U_3T_{2,5}R_3$, *Festucion pictae*

VIOLALES ORDER Perleb

VIOLACEAE FAMILY Batsch.

Viola biflora L. - H, Circ, $U_{3,5}T_2R_4$, *Cystopteridion, Thlaspietea*

Viola declinata Wald. et K. – H, Carp(End), $U_3T_2R_2$, *Potentillo ternatae-Nardion*

CAPPARALES ORDER Hutch.

BRASSICACEAE FAMILY Burnett

Alyssum repens Baumg. ssp. *repens* – Ch, Carp-Balc, $U_2T_3R_4$, *Asplenio-Festucion pallentis*

Arabis alpina L. ssp. *alpina* – H, Eua(Arct-alp), $U_{3,5}T_2R_4$, *Cystopteridion, Thlaspietea*

Biscutella laevigata L. - H, Ec, $U_0T_0R_4$, *Bromo-Festucion pallentis*

Cardamine pratensis L. ssp. *pratensis* – H, Circ, $U_5T_2R_0$, *Magnocaricion, Arrhenatheretalia*

Cardaminopsis halleri (L.) Hayek. ssp. *ovirensis* (Wulf.) Hegi et Em. Sch. – H, Alp-Carp-Balc, U_4T_3R3, *Arrhenatheretalia*

Draba kotschyi Stur – H, Alp-Carp, $U_2T_{1,5}R_3$, *Gypsophilion petraeae*, End

Kernera saxatilis (L.) Rchb. – H, E(Alp), $U_2T_{1,5}R_0$, *Asplenion rutae-murariae*

Thlaspi dacicum Heuff. – Th, Carp(End), $U_2T_{1,5}R_0$, *POtentillo-Nardion*

SALICALES ORDER Lindl.

SALICACEAE FAMILY Mirb.

Salix herbacea L. – Ch, Circ(Arct-alp), $U_{3,5}T_2R_4$, *Salicion herbaceae*

Salix kitaibeliana Willd. – Ch, Carp(end), $U_{3,5}T_{1,5}R_4$, *Arabidion*

Salix reticulata L. – Ph, Circ (Arct-alp), $U_{3,5}T_2R_4$, *Arabidion*

ERICALES ORDER Dumort.

ERICACEAE FAMILY Juss.

Bruckenthalia spiculifolia (Salisb.) Rchb. – Ph(Ch), Carp-Balc, $U_{2,5}T_{2,5}R_{1,5}$, *Rhododendro-Vaccinion*

Loiseleuria procumbens (L.) Desv. – Ch, Circ(Arct-alp), $U_2T_{1,5}R_3$, *Loiseleurio-Vaccinietea*

Rhododendron myrtifolium Schott et Kotschy – Ch(Ph), Carp-Balc, $U_3T_0R_2$, *Rhododendro-Vaccinion*

Vaccinium myrtillus L. – Ch(Ph) Circ, $U_0T_2R_1$, *Loiseurio-Vaccinietea*

PRIMULALES ORDER Dumort.

PRIMULACEAE Family Vent.

Cortusa matthioli L. – H, Eua, $U_4T_2R_3$, *Adenostyletalia*

Primula minima L. – H, Alp-E, $U_3T_{1,5}R_{1,5}$, *Caricetalia curvulae, Salicion herbaceae*

Soldanella pusilla Baumg. ssp. *pusilla* – H, Carp-Balc(End), $U_4T_2R_0$, *Salicion herbaceae, Juncetea trifidi*, R

GENTIANALES ORDER Lindl.

GENTIANACEAE FAMILY Juss.

Gentiana acaulis L. – H, Alp-E, $U_3T_2R_2$, *Juncetea trifidi, Potentillo ternatae-Nardion*, R

Gentiana frigida Haenke – H, Alp-Carp, $U_3T_{1,5}R_{1,5}$, *Salicion herbaceae, Caricion curvulae*, R

Gentiana nivalis L. – Th, Circ(Arct-alp), $U_3T_1R_3$, *Seslerietalia*

DIPSACALES ORDER Dumort.

DIPSACACEAE FAMILY Juss.

Scabiosa lucida Vill. ssp. *barbata* Nyar. – H, Carp(End), $U_3T_2R_4$, *Elyno-Seslerietea, Seslerietalia*, R

SOLANALES ORDER Dumort.

BORAGINACEAE FAMILY Juss.

Cerinthe glabra Mill. – H, Alp-E, $U_3T_0R_4$, *Thlaspion rotundifolii*,R
Myosotis alpestris F.W.Schmidt – H, Circ(Arct-alp), $U_2T_{1,5}R_3$, *Elyno-Seslerietea, Thlaspietea*
Myosotis scorpioides L. – H, Eua, $U_5T_3R_0$, *Calthion*

LAMIALES ORDER Dumort.

LAMINACEAE FAMILY Juss.

Acinos alpinus (L.) Moench ssp. *alpinus* – H, Alp-Carp, $U_3T_0R_5$, *Papavero-Thymion pulcherimi*
Thymus pulcherrimus Schur – H, Carp(End), $U_2T_{1,5}R_3$, *Papavero-Thymion pulcherrimi*, R

SCROPHULARIACEAE FAMILY Juss.

Veronica baumgartenii Roem. et Schult. – H, Carp, $U_{2,5}T_{1,5}R_3$, *Veronicion baumgarteni*, R

LENTIBULARIACEAE FAMILY Rich.

Pinguicula alpina L. – H, Eua, $U_4T_0R_4$, *Montio-Cardaminetea,* R

PLANTAGINALES ORDER Lindl.

PLANTAGINACEAE FAMILY Juss.

Plantago gentianoides Sibth. et Sm. – H, Carp-Balc-Anat, $U_4T_2R_3$, *Salicion herbaceae, Caricion fuscae*

CAMPANULALES ORDER Rchb. Fil.

CAMPANULACEAE FAMILY Juss.

Campanula abietina Griseb. – H, Carp-Balc(Subend.), $U_{3,5}T_2R_2$, *Calamagrostietalia villosae*
Campanula alpina Jacq. – H, Alp-Carp, $U_3T_{1,5}R_{2,5}$, *Caricetalia curvulae*
Camapnula cochleariifolia Lam. – H, Alp-E, $U_4T_0R_4$, *Thlaspietea, Seslerietea*
Phyteuma confusum A.Kern. – H, Alp-Carp-Balc, $U_3T_2R_2$, *Carivtalia curvulae*, R

ASTERALES ORDER Lindl.

ASTERACEAE FAMILY Dumort.

Achillea distans Willd. ssp. *distans*– H, Alp-Carp-Balc, $U_{2,5}T_3R_4$, *Nardo-Festucetum commutatae*
Achillea oxyloba (DC.) Sch. Bip. ssp. schurii (Sch. Bip.) Heim. – H, Carp(End), $U_{3,5}T_2R_{2,5}$, *Artemisietea*, R
Anthemis carpatica Willd. ssp. *carpatica* – H, Alp-Carp-Balc, $U_2T_{1,5}R_3$, *Papavero-Thymion pulcherrimi*
Artemisia eriantha Ten. – Ch, Alp-Carp-Balc, $U_{1,5}T_1R_{2,5}$, *Asplenietea trichomanis, Seslerietalia*
Doronicum austriacum Jacq. – G, E, $U_{3,5}T_2R_3$, *Adenostyletalia,*
Doronicum carpaticum (Gris. et Sch.) Nyman – G, Alp-E, $U_4T_{1,5}R_0$, *Thlaspietea rotundifolii* R, Subend
Erigeron alpinus L. – H, Eua, $U_3T_1R_0$, *Juncetea trifidi, Seslerietalia*, R
Gnaphalium supinum L. – H, Circ (Arct-alp), $U_4T_{1,5}R_2$, *Salicion herbaceae*
Hieracium alpinum L. – H, Circ(Arct-alp), $U_3T_2R_1$, *Caricetalia curvulae, Juncetea trifidi*
Hieracium bifidum Kit. – H, Ec, $U_2T_2R_4$, *Asplenietea, Seslerietalia*
Homogyne alpina (L.) Cass. – H, E, $U_{3,5}T_{2,5}R_{2,5}$, *Calamagrostion villosae*
Leontodon croceus Haenke ssp. *rilaensis* (Hay.) Sell – H, Carp, $U_4T_{1,5}R_2$, *Potentillo ternatae-Nardion*, R
Leucanthemopsis alpina (L.) Heywood – H, Carp, $U_4T_1R_{1,5}$, *Salicion herbaceae, Caricion curvulae*, R
Leucanthemum rotundifolium (Willd.) DC. – H, Carp, $U_4T_2R_3$, *Mulgedio-Aconietea, Chrysanthemo-Piceion*
Pilosella aurantiaca (L.) Sch. Bip. ssp. *aurantiaca* – H, Alp-Carp, $U_{3,5}T_2R_4$, *Potentillo ternatae-Nardion*
Senecio abrotanifolius L. ssp. *carpathicus* (Herb.) Nym. – H, Carp-Balc, $U_{2,5}T_{1,5}R_{2,5}$, *Juncion trifidi*, R
Senecio squalidus L. ssp. *rupestris* (W. et K.) Greuter – H, Ec, $U_2T_0R_{2,5}$, *Thlaspietalia, Rumicion alpini*
Senecio subalpinus Koch – H, Alp-Carp-Balc, $U_{3,5}T_2R_3$, *Calthion, Rumicion alpini*
Solidago virgaurea L. ssp. *minuta* (L.) Arcang. – H, Circ, $U_3T_2R_3$, *Origanetalia, Epilobietea angustifolii*
Taraxacum panalpinum Soest – H, Eua(Alp), $U_2T_{2,5}R_{2,5}$, *Salicion herbaceae, Rumicion alpini*

LILIATAE CLASS (MONOCOTILEDONATAE)
LILIALES ORDER Perleb.

ALLIACEAE FAMILY J.G. Agardh.

Allium schoenoprasum L. ssp. *sibiricum* (L.) Čelak – G, Circ(Arct-alp), $U_{4,5}T_2R_0$, *Seslerietalia*

JUNCALES ORDER Dumort.

JUNCACEAE FAMILY Juss.

Juncus trifidus L. ssp. *trifidus* – H, Circ(Arct-alp), $U_{2,5}T_2R_2$, *Juncetea trifidi*

Juncus triglumis L. - H, Circ(Arct-alp), $U_5T_{1,5}R_2$, *Caricetalia fuscae, Caricetea nigrae*
Luzula alpinopilosa (Chaix) Breistr. – H, Circ (Arct-alp), $U_{2,5}T_2R_{2,5}$, *Caricetalia curvulae*
Luzula spicata (L.) DC. ssp. *spicata* – H, Circ(Arct-alp), $U_{2,5}T_{1,5}R_{2,5}$, *Caricetalia curvulae*

CYPERALES ORDER Hutch.

CYPERACEAE FAMILY Juss.

Carex atrata L. – H, Circ(Arct-alp), $U_3T_{1,5}R_3$, *Caricion curvulae*
Carex curvula All. – H, Alp(E), $U_{2,5}T_1R_{1,5}$, *Caricion curvulae*
Carex pyrenaica Wahl. – H, Circ-alp, $U_2T_{1,5}R_4$, *Androsacion alpinae, Salicetea herbaceae*
Carex sempervirens Vill. – H, Alp-E, $U_3T_{1,5}R_4$, *Juncetea trifidi, Elyno-Seslerietea*

POALES ORDER Small **(GRAMINALES)**

POACEAE FAMILY (R. Br.) Barnh. Juss.

Agrostis capillaris L. – H(G), Circ, $U_0T_0R_0$, *Molinio-Arrhenatheretea, Brometalia erecti*
Agrostis rupestris All. – H, Alp-E, $U_{2,5}T_1R_{1,5}$, *Potentillo ternatae-Nardion, Juncetea trifidi*
Anthoxanthum odoratum L. – H, Eua, $U_0T_0R_0$, *Brometalia erecti, Molinio-Arrhenatheretea*
Bellardiochloa variegata (Lam.) Kerguelen – H, Alp-E, $U_3T_2R_{4,5}$, *Elyno-Seslerietea, Poion alpinae*
Deschampsia caespitosa (L.) P. Beauv. – H, Cosm, $U_4T_0R_0$, *Molinio-Arrhenatheretea, Deschampsion*
Deschampsia flexuosa (L.) Trin. – H, Circ, $U_2T_0R_1$, *Calamagrostietalia villosae, Potentillo ternatae-Nardion*
Festucav amethystina L. ssp. *amethystina* – H, Alp-Ec, $U_2T_3R_{4,5}$, *Bromo-Festucion pallentis*, R
Festuca supina Schur – H, Eua(Arct-alp), $U_2T_0R_2$, *Caricetalia curvulae*
Festuca versicolor Tausch – H, Carp-Sudet, $U_2T_1R_{4,5}$, *Seslerion albicantis*, R
Nardus stricta L. – H, Eua, $U_0T_0R_{1,5}$, *Potentillo ternatae-Nardion*
Oreochloa disticha (Wulfen) Link – H, Alp-Carp, $U_3T_1R_{1,5}$, *Caricion curvulae*, R
Phleum alpinum L. ssp. *alpinum* – H, Circ-alp, $U_3T_2R_0$, *Poion alpinae, Rumicion alpini*
Poa alpina L. – H, Circ(Arct-alp), $U_3T_0R_0$, *Poion alpinae*
Poa cenisia All. ssp. *contracta* Nyar. – H, Carp-Balc, $U_{3,5}T_{1,5}R_{4,5}$, *Poo contractae-Oxyryetum digynae*, R
Poa media Schur – H, Carp-Balc, $U_3T_2R_0$, *Juncetea trifidi*
Sesleria bielzii Schur – H, Carp-Balc, $U_{2,5}T_{2,5}R_{4,5}$, *Festuco saxatilis-Seslerion bielzii*, R
Sesleria rigida Heuff. ex Rchb. ssp. *rigida* – H, Carp-Balc, $U_{2,5}T_2R_{4,5}$, *Seslerion rigidae*
Trisetum alpestre (Host.) P. Beauv. – H, Alp-Carp, $U_{2,5}T_2R_0$, *Androsacion alpinae, Elyno-Seslerietea*, R

As we seen in table 1, hemicryptophytes predominate in the Capra glacier cirque (72.6%) followed by camefits (18.7%), bioforms specific to arctic-alpine regions.

Table 1. Bioforms specific to arctic-alpine regions.

Bioform	H	Ch	T	G	Ph	Total
Nr. species	102	26	3	7	4	142
%	71.8	18.3	2.1	4.9	2.8	100

Regarding the floristic elements (Table 2), it is noteworthy that Circumpolar species predominate (26.4%), followed by Alpine-European (15%), Eurasian (14.2%) and Carpathian-Balkan ones (12.1%). The other species, including the endemic ones (8.5%), have a balanced participation, a fact that reflects the geographical position of the Capra glacier cirque and the local geomorphological characteristics. 27 rare species, which represent 19% from the total, are also found.

Table 2. The floristic elements of the Capra glacier cirque.

Geoelements	Circ	Eua	Alp-E	Carp-Balc	End	Alp-Carp	Alp-Carp-Balc	E	Carp
Nr. species	37	20	21	19	12	9	8	8	8
%	26	14	14.7	13.3	8.4	6.3	5.6	5.6	5.6

From the point of view of ecological indices (Table 3), we find that the flora of the Capra glacier cirque has a mesophilic 40.2%), microthermal (38.8%), acid-neutrophilic character (33.09 %).

Table 3. The ecological indices.

Humidity indices	U_0	$U_{1-1,5}$	$U_{2-2,5}$	$U_{3-3,5}$	$U_{4-4,5}$	U_5	Total
Nr. species	6	7	44	57	23	5	142
%	4.2	4.9	30.9	40.1	16.1	3.5	100

Temeperature indices	T_0	$T_{1-1,5}$	$T_{2-2,5}$	$T_{3-3,5}$	$T_{4-4,5}$	T_5	Total
Nr. species	21	55	51	12	3	-	142
%	14.7	38.7	35.9	8.4	2.1		100

Soil reaction indices	R_0	$R_{1-1,5}$	$R_{2-2,5}$	$R_{3-3,5}$	$R_{4-4,5}$	R_5	Total
Nr. species	28	13	30	21	46	4	142
%	19.7	9.1	21.1	14.7	32.3	2.8	100

VEGETATION:

ASPLENIETEA TRICHOMANIS (Br.-Bl. in Meier et Br.-Bl. 1934) Oberd. 1977
Potentiletalia caulescentis Br.-Bl. in Br.-Bl. et Jenny 1926
Cystopteridion (Nordh. 1936) J.L.Rich 1972
1. ***Asplenio – Cystopteridetum fragilis*** Oberd. (1939) 1949

THLASPIETEA ROTUNDIFOLII Br.-Bl. 1948
Androsacetalia alpinae Br.-Bl. in Br.-Bl. et Jenny 1926
Veronicion baumgartenii Coldea 1991
2. ***Saxifrago bryoidis – Silenetum acaulis*** Boșcaiu, Täuber et Coldea 1977
3. ***Veronico baumgartenii-Saxifragetum bryoidis*** Boșcaiu, Täuber et Coldea 1977

Androsacion alpinae Br.-Bl. 1926
4. ***Minuartio-Silenetum acaulis*** Pușcaru et al. 1956
5. ***Oxyrietum digynae*** Br.-Bl. 1947

SALICETEA HERBACEAE Br.-Bl. 1947
Salicetalia herbaceae Br.-Bl. in Br.-Bl. et Jenny 1926
Salicion herbaceae Br.-Bl. in Br.-Bl. et Jenny 1926
6. ***Salicetum herbaceae*** Rübel 1911 em. 1933
7. ***Soldanello pusillae-Plantaginetum gentianoidis*** Boșcaiu 1971
8. ***Poo supinae-Cerastietum cerastoidis*** (Söry 1954) Oberd. 1957

CARICETEA CURVULAE Br.-Bl. 1948
Caricetalia curvulae Br.-Bl. in Br.-Bl. et Jenny 1926
Caricion curvulae Br.-Bl. in Br.-Bl. et Jenny 1926
9. ***Primulo-Caricetum curvulae*** Br.-Bl. 1926 em. Oberd. 1957
10. ***Potentillo ternatae-Festucetum supinae*** Boșcaiu 1971
11. ***Loiseleurietum procumbentis*** (Kerner 1963) Rübel 1931

SESLERIETEA ALBICANTIS Br.-Bl. 1948 em. Oberd. 1978
Sesleretalia albicantis Br.-Bl. in Br.-Bl. et Jenny 1926
Festuco saxatilis - Seslerion bielzii (Pawl. et Walas 1949) Coldea 1984
12. ***Seslerio bielzii-Caricetum sempervirentis*** Pușcaru et al. 1956
13. ***Festucetum versicoloris*** Pawl. et al. 1935

MONTIO CARDAMINETEA Br.-Bl. et Tx. 1943
Montio- Cardaminetalia Pawl. 1928 em. Zechmeister 1993
Cardamino-Montion Br.-Bl. 1926
14. ***Chrysosplenio alpini-Saxifragetum stellaris*** Pawl. et Walas 1949

Cratoneurion commutati W. Koch. 1928
15. ***Doronico carpatici-Saxifragetum aizoidis*** Coldea (1986) 1990

BETULO-ADENOSTYLETEA Br.-Bl. et Tx. 1943
Adenostyletalia Br.-Bl. 1931
Adenostylion alliariae Br.-Bl. 1926
16. ***Aconitetum taurici*** Borza 1934

Calamagrostion villosae Pawl. 1928
17. ***Phleo alpini-Deschampsietum villosae*** (Krajina 1933) Coldea 1983

VACCINIO-PICEETEA Br.-Bl. et al. 1939
Vaccinio-Piceetalia Br.-Bl. et al. 1939
Pinion mugo Pawl. 1928
18. ***Campanulo abietinae-Vaccinietum myrtillin*** (Buia et al. 1962) Boșcaiu 1971 (Annex 1)

CONCLUSIONS

In the paper we identified 18 vegetal associations (phytocoenoses). We note that, in the Capra glacier cirque, the characteristic plant associations of rock crevices, grottoes, snow drifts, meadows and alpine bushes, as well as high-altitude springs predominate. In conclusion, the vegetation in the Capra glacier cirque is very similar to that of the glacier cirques in the Făgăraș massif, being part of its specifics (STANCU, 2005).

We carried out these studies for a better knowledge of the glacier cirques in the Făgăraș massif, both from the point of view of flora and vegetation.

The establishment of the Făgăraș Natural Park is being considered, and to achieve this, the biodiversity must be inventoried and the endemic, rare, vulnerable species must be marked.

The protection, conservation and sustainable use of the natural heritage are objectives of major public interest and at the same time fundamental objectives of the environmental protection policy and of the national strategy for

sustainable development. We cannot ignore the activities that can change the status of these plants over time. That is the reason why we made this inventory of species and phytocoenoses from the Capra cirque.

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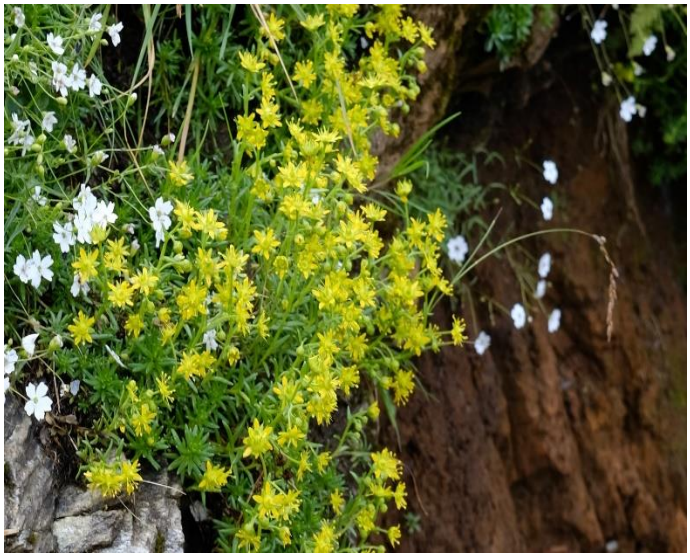
Annex 1. Vegetal associations from the Făgăraș Massif.

Anthemis carpatica Willd. ssp. *carpat* (original D. Stancu).



Sedum anuum L. (original D. Stancu).

Campanula abietina Griseb. (original D. Stancu).

Aconitum napellus L. ssp. *tauricum* (Wulfen) Gáyer
(original D. Stancu)

Cersatium alpinum L. ssp. *alpinum*
(original D. Stancu)

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