# THE MAIN ALPINE AND SUBALPINE HABITATS IN RÂIOSU & BUDA MOUNTAINS, FĂGĂRAŞ MASSIF

**STANCU Daniela Ileana**

**Abstract.** During the last two decades, various systems of classification of the habitats have been completed in Europe. The purpose of this action was to highlight the diversity of the ecosystems that represent the spontaneous living coverage, part of it natural, which is still present on the continent. Some of these classification systems are more detailed; for example CORINE (1991), DEVILLERS & DEVILLERS (1996, 1999) and EUNIS (1997-2005), while others are brief, including only those types of habitat whose preservation needs the endorsement of some specific measures, for example EMERALD (2000), Habitats Directive (1992, amended in 1992 and 2002). As a member of the European Union, Romania is obliged to implement NATURA 2000, which is a pan-European network for the conservation of nature, whose goal is to protect the natural habitats, as well as the wild flora and fauna, conformable to the stipulations of the Birds Directive (79/49/EEC) and Habitats Directive (92/43/EEC). The paper presents a list of the main alpine and subalpine habitats identified in Râiosu and Buda Mountains, Făgăraş Massif.

**Keywords:** habitats, NATURA 2000, habitat of community interest, vegetation level, Râiosu and Buda Mountains.

**Rezumat. Principalele habitate prioritare alpine şi subalpine din Munţii Râiosu şi Buda, Masivul Făgăraş.** În ultimele două decenii au fost elaborate, la nivel european, mai multe sisteme de clasificare a habitatelor, având ca scop evidenţierea diversităţii ecosistemelor ce alcătuiesc învelişul viu spontan, în parte natural, care s-a mai păstrat pe continent. Unele dintre aceste sisteme de clasificare sunt mai detaliate, de exemplu CORINE (1991), DEVILLERS & DEVILLERS (1996, 1999) şi EUNIS (1997-2005), iar altele mai sumare, incluzând numai acele tipuri de habitate a căror conservare necesită adoptarea unor măsuri specifice, de exemplu EMERALD (2000), Directiva Habitate (1992, amendată în 1992 şi 2002). România, în calitate de stat membru al Uniunii Europene, are obligaţia de a implementa reţeaua NATURA 2000, o reţea pan-europeană pentru conservarea naturii, în scopul protejării habitatelor naturale, a florei şi faunei sălbatice, conform prevederilor Directivei Păsări (79/49/EEC) şi Directivei Habitate (92/43/EEC). Lucrarea prezintă o listă cu principalele habitate prioritare alpine şi subalpine din Munţii Râiosu şi Buda, Masivul Făgăraş.

**Cuvinte cheie:** habitate, NATURA 2000, habitat de interes comunitar, etaj de vegetatie, Munţii Râiosu şi Buda.

## INTRODUCTION

The vegetation of Romania presents a stressed variability because of the fact that our country is situated in the cross point of three big floristic sub-regions: Euro-Siberian, Pontian-Sarmatian and Euxinian as well as because of the influence of the Carpathian belt, which determines the existence of the levels of vegetation (BORZA & BOŞCAIU, 1965)., However, today it is rather hard to set the natural limits of the levels of vegetation because of the anthropo-zoogene factors, which considerably modified these limits.

This is why, the delimitation of the vegetation levels and sub levels of the two mountains where the research was performed took into account both the potential woody vegetation and the secondary herbal one, which presents a zonal character and installed after the forest and bushes clearing (COLDEA, 1990).

The subalpine level 1400 - 2200 m has got a large amplitude; the junipers and the juniper trees that appear at the upper limit of the forests are the characteristic feature of this level. Both the junipers and the juniper trees play an important role in fixing the soil by stopping the erosion provoked by grazing. It also regulates the hydrological regime and it is also valuable as landscape. The ericaceous bushes (*Rhododendro kotschyi-Pinetum mugo, Campanulo abietinae-Vaccinietum myrtilli*) that are found especially in patches up to 2000 m represent another characteristic of it. The vegetation characteristic of the limestone scree is also abundant.

The alpine level 2200-2435 m, includes the mountain pockets situated beyond the trees vegetation clime limits, where the vegetation consists preponderantly of short shrubs and alpine meadows and rocks and blocks.

The short shrubs form an almost continuous belt, which could be found as patches of *Vaccinium myrtillus* associated with *Dryas octopetala,* up to crests and high plateaus in the lower area of the level, above the juniper trees, especially on the northern slopes. Chionophilous associations from the alliances *Salicion herbaceae* and *Salicion retusae,* as well as saxicolous associations from the order *Thlaspietalia rotundifolii* could also be found on these slopes and in the glacial circuses. The alpine meadows from the orders *Caricetalia* and *Seslerietalia*, which alternate with *Nardus (Violo declinatae-Nardetum*) are the characteristic of the southern and eastern slopes of the two mountains (STANCU, 2005).

The hygrophilous vegetation is varied from both the physiognomic and floristic viewpoint; it is represented by the vegetation of the subalpine springs and rivulets, the vegetation of the alluvial gravel and sands. The two investigated mountains are situated at the northern tip of Argeş County and form a part of the southern slope of Făgăraş Massif.
Buda mountain with 2431 m altitude, separates at the north Buda lake at 2055 m altitude. The other mountain we have studied is Râiosu mountain, 2395 m altitude, which is a continuation of Buda mountain, forming an almost continuous ridge separated by a small shelf called Poliţa lui Vodă.

## MATERIAL AND METHODS

During the last two decades, various systems of classification of the habitats have been completed in Europe. The purpose of this action was to highlight the diversity of the ecosystems that represent the spontaneous living coverage, part of it natural, which is still present on the continent.

Some of these classification ~~is~~ are more detailed; for example CORINE (1991), DEVILLERS & DEVILLERS (1996, 1999) and EUNIS (1997-2005), while others are brief, including only those types of habitat whose preservation needs the endorsement of some specific measures, for example EMERALD (2000), Habitats Directive (1992, amended in 1992 and 2002).

In Romania, the issue of establishing of the habitats has dated since 1991, when over 240 types were identified. During the years, the number of the identified habitats has increased. Thus, in 1995, there were recorded 986 entrances, belonging to 7 hierarchic levels of classification. In 2005, it was performed the first attempt of a unitary description of the main types of habitats from Romania, most of them being included in the systems of classification CORINE (1991) and PALEARCTIC HABITATS (1996, 1999).

As a member of the European Union, Romania is obliged to implement NATURA 2000, which is a pan-European network for the conservation of nature, whose goal is to protect the natural habitats, as well as the wild flora and fauna, conformable to the stipulations of the Birds Directive (79/49/EEC) and Habitats Directive (92/43/EEC).

## RESULTS AND DISCUSSIONS

The following habitat types were identified:

1. Shrubs & meadows
   - ❖ Temperate heaths and scrubs

**Habitats of Romania R3101 -** South-Eastern Carpathian dwarf azalea heaths (*Loiseleuria procumbens*). **Habitat of community interest.**

**Correspondences**:

**NATURA 2000**: 4060 Alpine and boreal heaths

**EMERALD**: 31 Temperate heath and scrub, 31.4 Alpine and Boreal heaths

**CORINE**: 31.411 *Loiseleuria* heaths

**PAL.HAB**: 31.4113 Carpathian dwarf azalea heaths

**Vegetal associations***: Cetrario - Loiseleurietum procumbentis* BR.-BL. et al., 1939 (Syn. *Loiseleurietum procumbentis* PUSCARU et al., 1956).

The phytocoenosis is edified by oligothermic, xerophilous, acidophilous, oligotrophic plants and it has an eco-protective role by diminishing the deflation from the alpine peaks. It also has a criotherm character as it is very resistant to freezing after the strong winds blow away the snow layer. The edifying species *Loiseleuria procumbens* has repent stems and the shrubby layer is not very high (STANCU, 2005).

**Habitats of Romania R3104 -** South-Eastern Carpathians alpenrose scrubs (*Rhododendron myrtifolium*) with bilberry (*Vaccinium myrtillus*). **Habitat of community interest.**

**Correspondences**:

**NATURA 2000**: 4060 Alpine and Boreal heaths

**EMERALD**: 31.424 Carpathian Kotschy`s alpenrose heaths

**CORINE**: 31.4 Alpine and Boreal heaths

**PAL.HAB**: 31.424 Carpathian Kotschy`s alpenrose heaths

**EUNIS:** F2.224 Carpathian *Rhododendron kotschyi* heaths

**Vegetal associations**: *Rhododendro myrtifolii-Vaccinietum* BORZA (1955) 1959 EM. BOŞCAIU 1971 (Syn: *Rhodoretum kotschyi* auct. rom., *Rhodoreto-Juncetum trifidi* RESMERIŢĂ 1974 - *saxifragetosum panniculatae* HOREANU ET VIŢALARIU 1991).

The phytocoenosis are edified by alpine, circumboreal, acidophilous species. The shrub layer is dominated by *Rhododendron myrtifolium, Vaccinium gaultherioides, Vaccinium myrtillus, Vaccinium vitis-idaea.*

**Habitats of Romania R3105** - South-Eastern Carpathians juniper scrubs (*Pinus mugo*) with alpenrose (*Rhododendron myrtifolium*). **Habitat of community interest.**

**Correspondences**:

**NATURA 2000**: 4070 Bushes with *Pinus mugo* and *Rhododendron myrtifolium*

**EMERALD**: 31.4 Alpine and Boreal heaths

**CORINE**: -

**PAL.HAB**: 31.561 Subalpine mountain pine scrub and 31.562 Carpathian alpenrose mountain pine scrub

**EUNIS**: F2.46 Carpathian *Pinus mugo* scrub; F2.461+F2.462

**Vegetal associations**: *Rhododendro myrtifolii-Pinetum mugi* BORZA 1959 EM. COLDEA 1995 (Syn: *Pinetum mugi carpaticum* auct. rom., *Calamagrostio villosae-Pinetum mugi* SANDA & POPESCU 2002).

In Râiosu Mountain, above the upper limit of the forest to the alpine pockets, *Pinus mugo* coenoses are met. They form shrubby zonal vegetation, as large belts that have an important role in soil fixing (SANDA & POPESCU, 1998). These scrubs populate both the crystalline layer and the calcareous one. There are old coenoses, quartered almost exclusively in the South-Eastern Carpathians, but radiating to Stara Planina in the North of the Balkans.

**Habitats of Romania R3110 -** Alpine green alder scrub (*Alnus viridis*) South-Eastern Carpathians scrubs
**Correspondences**:
**NATURA 2000**: -
**EMERALD**: 31.4 Alpine and Boreal heaths
**CORINE**: 31.611 Alpine green alder scrub
**PAL.HAB**: 31.62152 Hercynio-Carpathian Silesian willow brush
**EUNIS**: F2.3112 Carpathian green alder scrub

**Vegetal associations**: *Salici-Alnetum viridis* COLIC et al. 1962 (Syn.: *Alnetum viridis austro-carpaticum* BORZA 1959).

In the territory were the researches were performed the *Alnus viridis* with *Salix silesiaca* scrubs is almost exclusively found on rocks, both calcareous and crystalline. It grows especially on the crystalline rocks, within valleys, next to waterfalls where the atmosphere is water suspensions saturated. Because of the adaptations to the subalpine level climate due to its branches elasticity, *Alnus viridis* is the wooden species which vegetates on the banks of the torrents from the abrupt slopes where it plays an important eco-protective role (BOŞCAIU, 1971).

**Habitats of Romania R3111 -** South-Eastern Carpathians bilberry scrubs (*Vaccinium myrtillus*). **Habitat of community interest.**
**Correspondences**:
**NATURA 2000**: 4060 Alpine and Boreal heaths
**EMERALD**: 31.4 Alpine and Boreal heaths
**CORINE**: 31.412 Alpine *Vaccinium* heaths
**PAL.HAB**: 31.4122 Carpathian dwarf *Vaccinium* wind heaths
**EUNIS**: F2.2122 Carpathian dwarf *Vaccinium* wind heaths

**Vegetal associations**: *Campanulo abietinae-Vaccinietum* (BUIA et al. 1962) BOŞCAIU 1971(Syn.: *Vaccinietum myrtilli* BUIA et al. 1962, *Junceto trifidi-Vaccinietum myrtilli* RESMERIŢĂ 1976, *Melampyro saxosi-Vaccinietum myrtilli* COLDEA 1990).

The phytocoenosis is edified by arctic-alpine, circumboreal, oligothermic, oligotrophic, acidophilous species. In the floristic structure of these coenoses, there could be found both forest boreal species and transgressive elements from the alpine meadows. This fact shows the secondary character of the *Vaccinium myrtillus* coenoses.

Alpine & subalpine meadows

**Habitats of Romania R3602** - *Carex curvula* grassland and *Primula minima* South-Eastern Carpathian
**Correspondences**:
**NATURA 2000**: -
**EMERALD**: -
**CORINE**: 36.341 *Carex curvula* grassland
**PAL.HAB**: 36.3413 Carpathian *Carex curvula* grassland
**EUNIS**: E4.34 Alpigenous acidophilous grassland

**Vegetal associations**: *Primulo-Caricetum curvulae* BR.-BL. 1926 EM.OBERD. 1957 (Syn.: *Caricetum curvulae* BROCKM. –JER. 1907).

It is a typical association for the subalpine level where the species *Carex curvula* dominates the high plateaus of Râiosu and Buda Mountains, on low trophicity acid soils and chiono-mesophylous regime; it forms various size meadows.

**Habitats of Romania R3604** - South-Eastern Carpathian *Festuca airoides* grasslands (*Festuca supina*) and *Potentilla ternata.*
**Correspondences**:
**NATURA 2000**: -
**EMERALD**: -
**CORINE**: 36.34 Crooked-sedge swards and related communities
**PAL.HAB**: 36.34322 Eastern Carpathian *Festuca airoides* grasslands
**EUNIS**: E4.3432 Carpathian *Festuca airoides* grasslands

**Vegetal associations**: *Potentillo chrysocraspedae-Festucetum airoidis* BOŞCAIU 1971 (Syn : *Festucetum supinae* Domin 1933; *Potentillo (ternatae)-Festucetum supinae* BOŞCAIU 1971; *Festucetum supiane* VICOL et al. 1971)

Widely spread on the alpine level of Buda Mountain where *Festuca airoides* forms large meadows on mild peaks and on the low inclined slopes. It occupies little profound poorly acid or very acid humus rich soils. The result of

the action of the anthropo-zoogene factor' through the intensive grazing is the degradation of the *Festuca airoides* edified meadows and their evolution to *Nardetum strictae.*

**Habitats of Romania R3608 -** South-Eastern Carpathian meadows *Scozonera rosea* & *Festuca nigrescens* **Habitat of community interest.**
**Correspondences**:
**NATURA 2000**: 6230 Species -rich *Nardus* grasslands, in siliceous substrates in mountain area
**EMERALD**: -
**CORINE**: 36.31 Alpic mat-grass swards and related communities
**PAL.HAB**: 36.3172 Eastern Carpathian mat-grass swards
**EUNIS**: E4.31 Alpic *Nardus stricta* swards and related communities; E4.3172 Eastern Carpathian mat-grass swards

**Vegetal associations**: *Scorzonero roseae-Festucetum nigricantis* (PUŞCARU et al. 1956) COLDEA 1978 (Syn.: *Festucetum rubrae fallax* Puşcaru et al. 1956; *Festucetum rubrae montanum* CSÜRÖS ET RESMERIŢĂ 1960).

*Festuca nigrescens* edified meadow, known in the older papers as *Festuca rubra* ssp. *fallax* & *Festuca rubra* ssp. *commutata*, secondary grows on the subalpine level of Buda Mountain, after the clearing of the spruce fir of limit and the juniper trees. Under the pressure of pastoral activity, these coenoses evolve to the *Nardus stricta* edified meadows.

**Habitats of Romania R3609** - Matweed (*Nardus stricta*) and *Viola declinata* South-Eastern Carpathian **Communitarian interest habitat.**
**Correspondences**:
**NATURA 2000**: 6230 Species –rich *Nardus* grasslands, in siliceous substrates in mountain area
**EMERALD**: -
**CORINE**: 36.31 Alpic mat-grass swards and related communities
**PAL.HAB**: 36.3172 Eastern Carpathian mat-grass swards
**EUNIS**: E4.31 Alpic *Nardus stricta* swards and related communities; E4.3172 Eastern Carpathian mat-grass swards

**Vegetal associations**: *Violo declinatae-Nardetum* SIMON 1966 (Syn.: *Nardetum strictae montanum* RESMERIŢĂ ET CSÜRÖS 1963; *Nardetum strictae alpinum* BUIA et al. 1962; *Nardetum alpigenum austro - carpaticum* BORZA 1959).

Oligotrophic, xerophilous, acidophilous habitat. The *Nardus stricta* layer is widely spread because of the intense pastoral activity from Râiosu and Buda Mountains.

**Habitats of Romania R3610** - *Poa media* South-Eastern Carpathian meadows
**Correspondences**:
**NATURA 2000**: -
**EMERALD**: -
**CORINE**: 36.31 Alpic mat-grass swards and related communities
**PAL.HAB**: 36.3172 Eastern Carpathian mat-grass swards
**EUNIS**: E4.31 Alpic *Nardus stricta* swards and related communities

**Vegetal associations**: *Poëtum mediae* CSÜRÖS et al. 1956

The *Poa media* phytocoenoses are found on the alpine level of Buda and Râiosu mountains covering the little inclined slopes where the snow persists late in spring providing a moderate humidity to the soil. The soils are acid and often rich in nutrients. The characteristic and edifying species is *Poa media*, which could cover up to 75%.

**Habitats of Romania R3612 -** Sesleria-evergreen sedge grasslands (*Carex sempervirens*) and *Sesleria*-evergreen sedge grasslands (*Sesleria bielzii*) South-Eastern Carpathian meadows. **Habitat of community interest.**
**Correspondences**:
**NATURA 2000**: 6170 Alpine and subalpine calcareous grassland
**EMERALD**: -
**CORINE**: 36.43 Stepped and garland grassland
**PAL.HAB**: 36.43921 Eastern Carpathian *Sesleria*-evergreen sedge grasslands
**EUNIS**: E4.4392 Eastern Carpathian calciphilous stepped grasslands

**Vegetal associations**: *Seslerio bielzii-Caricetum sempervirentis* PUŞCARU et al. 1956 (Syn.: *Seslerietum bielzii transsilvanicum* BORHIDI 1956,1958); *Poo alpinae-Alyssetum repentis* BELDIE 1967.

Puzzling habitat because the surface where it grows are not even (DONIŢĂ et al., 2005). It grows on the northern and northeastern exposed slopes of Râiosu Mountain, on basic soils. The coenoses is remarkable for its rich floristic diversity. It populates mainly the mountain ridges from the rocks.

**Habitats of Romania R3615** - South-Eastern Carpathian Alpic acid dwarf willow snow-patch (*Salix herbacea*)
**Correspondences**:
**NATURA 2000**: 6170 Alpine and subalpine calcareous grassland
**EMERALD**: -
**CORINE**: -36.1112 Alpine acid dwarf willow snow-patch communities

**PAL.HAB**: 36.1112 Alpic acid dwarf willow snow-patch communities
**EUNIS**: F2.111 Alpic acid dwarf willow snow-patch communities

**Vegetal associations**: *Salicetum herbaceae* BR.-BL. 1913.

The chiono-hygrophilous phytocoenoses of this association vegetates on the northern and northwestern exposure of Râiosu and Buda Mountains, mostly in the small depressions, where the snow lasts in the glacial circus late in summer. The high humidity soil is superficial, rocky. *Salix herbacea*, the edifying species, is a repent sub-shrub having the stems buried; only the annual with leaves and flowers ramifications are outside.

**Habitats of Romania R3616** - South-Eastern Carpathian willow snow-patch communities (*Salix retusa, Salix reticulata*) dwarf shrubs
**Correspondences**:
**NATURA 2000**: -
**CORINE**: -36.122 Calcareous espalier willow snow-patch communities
**PAL.HAB**: 36.12211 Alpide (*Salix retusa, Salix reticulata*) snowbed communities
**EUNIS**: (F2.1211)

**Vegetal associations**: *Salicetum retuso-reticulatate* BR.-BL. 1926 (Syn.: *Salicetum retusae* BUIA et al. 1962; *Salicetum reticulatae* PUŞCARU et al. 1956).

Edified chionophilous coenoses of *Salix retusa* and *Salix reticulata* which often cohabits with *Dryas octopetala*, are frequent in the calcareous abrupt slopes of Buda Mountains. The floristic diversity of these coenoses is high.

**Habitats of Romania R3617** - *Dryas* mats dwarf shrubs (*Dryas octopetala*). **Habitat of community interest.**
**Correspondences**:
**NATURA 2000**: 4060 Alpine and Boreal heaths
**EMERALD**: 31.4 Alpine and Boreal heaths
**CORINE**: -31.491 High mountain *Dryas* mats
**PAL.HAB**: 31.49152 South-Eastern Carpathian *Dryas* mats
**EUNIS**: F2.2915 Carpatho-balkanide *Dryas* mas

**Vegetal associations**: *Dryadetum octopetalae* CSÜRÖS et al. 1956 (Syn.: *Achilleo schurii-Dryadetum* (BELDIE 1967) COLDEA 1984), *Salicetum retuso-reticulatae* BR.-BL. 1926, *Dryadetum octopetalae* BR.-BL. 1926 (according to PUŞCARU, 1969).

The association grows on the alpine level of Râiosu Mounatin and in Poliţa lui Vodă, in stations exposed to the wind, permanently covered with snow in winter. The characteristic and edifying species are *Achillea schurii, Dryas octopetala* and *Salix reticulata.* Sometimes *Dryas octopetala* is more spread than *Salix reticulata,* which is always present. This association represents a transition unit between the alpine tundra vegetation and the meadows from the abrupt and shady slopes (DONIŢĂ et al., 2005).

Hydrophilous grasslands and tall herb fringe communities

**Habitats of Romania R3701** - South-Eastern Carpathian tall weeds communities with *Aconitum tauricum* **Habitat of community interest.**
**Correspondences**:
**NATURA 2000**: 6430 Hydrophilous tall herb fringe communities of plain and of the mountain to alpine levels
**EMERALD**: -
**CORINE**: - 37.8 Subalpine and alpine tall herbs communities
**PAL.HAB**: 37.81432 East Carpathian monkshood communities
**EUNIS**: E5.5143 Carpathian monkshood communities

**Vegetal associations**: *Aconitetum taurici* BORZA 1934 EX COLDEA 1990.

The association was identified in the glacial circus situated under Poliţa lui Vodă, in the southern side of Buda Mountain. Here the cryocrate species, which started to vegetate during the glacial era, predominate.

**Habitats of Romania R3703** - South-Eastern Carpathian tall weeds communities with *Cirsium waldsteinii* and *Heracleum sphondylium* ssp. *transsilvanicum***. Habitat of community interest.**
**Correspondences**:
**NATURA 2000**: 6430 Hydrophilous tall herb fringe communities of plain and of the mountain to alpine levels
**EMERALD**: -
**CORINE**: -37.8 Subalpine and alpine tall herbs communities
**PAL.HAB**: 37.814 Carpathian tall herb communities
**EUNIS**: E5.514 Carpathian tall herb communities

**Vegetal associations**: *Cirsio waldsteinii-Heracleetum transsilvanici* PAWL. ET WALAS. 1949 (Syn.: *Cardueto-Heracleetum palmati* BELDIE 1967).

It vegetates in wet and cold alluvial-colluvial soils rich in nutrients. Hydrophilic requirements are satisfied as soil humidity and the ambient pressure.

**Habitats of Romania R3704 -** South-Eastern Carpathian tall weeds communities with *Senecio subalpinus* and *Rumex alpinus*. **Habitat of community interest.**
**Correspondences**:
**NATURA 2000**: 6430 Hydrophilous tall herb fringe communities of plain and of the mountain to alpine levels
**EMERALD**: -
**CORINE**: 37.88 Alpine dock communities
**PAL.HAB**: 37.88 Alpine dock communities
**EUNIS**: E5.58 Alpine *Rumex* communities

**Vegetal associations**: *Senecioni-Rumicetum alpini* HORV. 1918 EM. COLDEA (1986) 1990 (Syn: *Rumicetum alpini* auct. rom.; *Urtico dioicae-Rumicetum alpini* (ŞERBĂNESCU 1939, TODOR ET CULICĂ 1967) corr. OLTEAN ET DIHORU 1986; *Chenopodietum subalpinum* BR.-BL. 1944).

The *Rumex alpinus* edified coenoses persists for long time even where the sheepfold have gone. This persistence is possible because of the abundance of the nitrogen compounds from the soil resulted from the dejections, and because of their strong rhizome that can reach 13 years of age. The phytocoenoses of this association are found on the subalpine and upper alpine levels of Râiosu Mountain, where it covers surfaces rich in nutrients because of the long time the flock of sheep stay here.

2. Swamps & Swampy lands
Swamps, water springs

**Habitats of Romania R5416** - South-Eastern Carpathian springs and water springs communities with *Saxifraga stellaris, Chrysosplenium alpinum* and *Philonotis seriata*
**Correspondences**:
**NATURA 2000**: -
**EMERALD**: 54.1 Springs
**CORINE**: 54.11 Soft water springs
**PAL.HAB**: 54.11124 Alpine *Philonotis-Saxifraga stellaris* springs
**EUNIS**: C2.11 Soft water springs

**Vegetal association**: *Chrysosplenio alpini-Saxifragetum stellaris* PAWL. ET WALAS. 1949 (Syn.: *Philonotido-Saxifragetum stellaris* BOSCAIU 1971, *Epilobio anagallidifolii-Saxifragetum alpini* REJMANEK & REJMANKOVA 1979) *Swertio punctaate-Saxifragetum stellaris* Coldea (1995-1996) 1997.

Fontinal habitat; it characterizes the vegetation of springs and rivulets from the subalpine level. The characteristic and edifying species are South-Eastern Carpathian endemite *Chrysosplenium alpinum* and the alpine element *Saxifraga stellaris*, which cover in average 35-50%.

**Habitats of Romania R5419** - South-Eastern Carpathian springs and rivulets communities with *Doronicum carpaticum, Saxifraga aizoides, Chrysosplenium alpinum* and *Achillea schurii.* **Habitat of community interest.**
**Correspondences**:
**NATURA 2000**: 7220 Petrifying springs with tufa formations (*Cratoneurion*)
**EMERALD**: 54.12 Hard water springs
**CORINE**: 54.12 Hard water springs
**PAL.HAB**: 54.1226 Carpathian oriental leopardsbane communities
**EUNIS**: C2.12 Hard water spring

**Vegetal association**: *Doronico carpatici-Saxifragetum aizoidis* COLDEA (1986) 1990.

(Syn.: *Saxifragetum aizoidis* auct. rom., *Saxifragetum aizoidis* BOSCAIU 1971 non HORVAT 1935; *Saxifragetum moschatae-aizoidis* BOSCAIU 1971)

The coenoses where met on the edge of the Buda Rivulet that flows among the crystalline schists and the calcareous sunny slabs, situated on the southern slope of Buda Mountain and on the edge of the Râiosu Rivulet from the western slope of Râiosu Mountain. The edifying and characteristic species, i.e. *Doronicum carpaticum* and *Saxifraga aizoides* cover 35-50%.

**Habitats of Romania R5421 -** South-Eastern Carpathian springs and rivulets communities with *Chrysosplenium alternifolium* and *Cardamine amara.*
**Correspondences**:
**NATURA 2000**: -
**EMERALD**: 54.1 Springs
**CORINE**: 54.11 Soft water springs
**PAL.HAB**: 54.11124 Alpine *Philonotis-Saxifraga stellaris* springs
**EUNIS**: C2.11 Soft water springs

**Vegetal association**: *Chrysosplenio-Cardaminetum amarae* MAAS 1959.

Sciaphilous coenoses dominated by *Cardamine amara* and *Chrysosplenium alternifolium*; frequent around springs. As the altitude increases, the composition of these communities is dominated by species from the Adenostyletalia order.

3. Limestone scree, rocks and continental sands
Limestone scree

**Habitats of Romania R6105** - South-Eastern Carpathian communities Siliceous screes of the mountain to the snow level with *Saxifraga bryoides, Silene acaulis* and *Veronica baumgartenii.* **Habitat of community interest.**
**Correspondences**:
**NATURA 2000**: 8110 Siliceous screes of the mountain (*Androsacetalia aplinae* and *Galeopsetalia ladani*)
**EMERALD**: 61 Screes
**CORINE**: 61 Screes
**PAL.HAB**: 61.11522 Southern Carpathian saxifrage-speedwell screes
**EUNIS**: H2.31 Alpine siliceous screes

**Vegetal association**: *Saxifrago bryoides-Silenetum acaulis* BOŞCAIU et al. 1977; *Veronico baumgartenii-Saxifragetum bryoidis* BOSCAIU et al. 1977.

Rather compact phytocoenoses growing well on the debris resulted after the desegregation of the crystalline schists in places where the snow is abundant in winter. The characteristic and edifying species of these open coenoses are *Silene acaulis* and *Saxifraga bryoides* that cover 15 - 60% depending on the soil layer.

**Habitats of Romania R6109** - South-Eastern Carpathian communities Calcareous and calchist screes with *Papaver corona-sancti-stephani, Cerastium lerchenfeldianum* and *Cerastium transsilvanicum.* **Habitat of community interest.**
**Correspondences**:
**NATURA 2000**: 8120 Calcareous and calchist screes of the mountain to alpine levels (*Thlaspietalia rotundifolii*)
**EMERALD**: 61 Screes
**CORINE**: 61 Screes
**PAL.HAB**: 61.2421 Eastern Carpathian xerophilous poppy screes
**EUNIS**: H2.44 Carpathian calcareous screes

**Vegetal association**: *Cerastio lerchenfeldiani-Papaveretum* BOŞCAIU, TĂUBER ET COLDEA 1977 (Syn.: *Papavero-Cystopteridetum* CSÜRÖS et al. 1956; *Papaver pyrenaicum-Linaria alpina* ass. PUSCARU et al. 1956, *Papavero-Linarietum alpinae* PUSCARU et al. 1956, *Papaver pyrenaicum-Viola alpina* ass. E. PUSCARU et al. 1981) *Cerastio transsilvanici-Galietum lucidi* BOSCAIU M. et al. 1996.

The edified *Papaver alpinum* ssp. *corona-sancti-stephani* phytocoenoses are rather frequent on the limestone scree and mobile calcareous blocks from Râiosu Mountain and Polita lui Voda. The characteristic and edifying species is the Carpathian endemite *Cerastium arvense* ssp. *lerchenfeldianum*. On the sunny limestone, there are rather frequent the following species: *Acinos alpinus, Thymus pulcherrimus, Arabis alpina, Senecio rupestris, Poa alpine*, etc.

**Habitats of Romania R6110 -** South-Eastern Carpathian communities Calcareous and calchist screes with *Acinos alpinus* and *Galium anisophyllon*. **Habitat of community interest.**
**Correspondences**:
**NATURA 2000**: 8120 Calcareous and calchist screes of the mountain to alpine levels (*Thlaspietalia rotundifolii*)
**EMERALD**: 61 Screes
**CORINE**: 61 Screes
**PAL.HAB**: 61.2423 East Carpathian calamint screes
**EUNIS**: H2.44 Carpathian calcareous screes

**Vegetal association**: *Acino-Galietum anisophylii* BELDIE 1967 (Syn.: *Calamintha baumgartenii-Galium anisophyllum* BELDIE 1967).

It is one of the most representative associations of the limestone screes from the Romanian Carpathians. It populates the small limestone screes from the feet of the rocks from Buda and Râiosu Mountains, which go to the edification of the association *Seslerio haynaldianae-Caricetum sempervirentis.*
Continental rocks and rocks to date.

**Habitats of Romania R6206** - South-Eastern Carpathian communities of the fissures of the rocky and calcareous cliffs with *Cystopteris fragilis, Campanula carpatica, Saxifraga cuneifolia* and *Valeriana sambucifolia*
**Correspondences**:
**NATURA 2000**: -
**EMERALD**: 6 Inland rocks, screes and sands
**CORINE**: 62 Inland cliffs and exposed rocks
**PAL.HAB**: 62 Inland cliffs and exposed rocks
**EUNIS**: H3 Inland cliffs and exposed rocks habitats

**Vegetal association**: *Asplenio-Cystopteridetum fragilis* OBERD. (1936) 1949 (Syn.: *Valeriana sambucifolia-Poa nemoralis* ass. BELDIE 1967, *Saxifraga cuneifolia-Campanula carpatica* SOZ. ZOLYOMI 1931, *Valeriano montanae-Cortusetum matthioli* BOSCAIU ET TAUBER 1978).

Sciaphilous association that vegetates in the fissures and coasts of the calcareous rocks where there is a high degree of humidity because of the waters of infiltration. The coenoses of this association are found on small surfaces from the subalpine level of Râiosu and Buda Mountains. The most populated are the calcareous rocks and the shady and wet stations from the subalpine level of the two mountains.

Chionophilous vegetation

**Habitats of Romania R6303** - South-Eastern Carpathian chionophilous communities with *Luzula alpino-pilosa*
**Correspondences**:
**NATURA 2000**: -
**EMERALD**: -
**CORINE**: -
**PAL.HAB**: 36.1114 *Luzula spadicea* snow patch communities
**EUNIS**: E4.113 *Luzula spadicea* snow patch communities
**Vegetal association**: *Luzuletum alpino-pilosae* BR.-BL. 1926 (Syn.: *Luzuletum spadiceae* BR.-BL. 1926 *retezaticum* BORZA 1934).

Chiono-petrophilous edified coenoses of *Luzula alpino-pilosa* are met at the feet of the limestone scree from the northern slope of Râiosu Mountain and on the northwestern one of Buda Mountain where there is the possibility of the accumulation of humus and where the snow lasts for a long time. *Poa supina* and *Festuca airoides* are two of the accompanying species frequently and widely spread.

**Habitats of Romania R6304** - South-Eastern Carpathian chinophilous communities with *Ranunculus crenatus* and *Soldanella pusilla*
**Correspondences**:
**NATURA 2000**: -
**EMERALD**: -
**CORINE**: -
**PAL.HAB**: 36.1113 Alpic acid cudweed snow-patch communities
**EUNIS**: -

**Vegetal association**: *Soldanello pusillae-Ranunculetum crenati* (BORZA 1931) BOŞCAIU 1971 (Syn.: *Soldanello pusillae-Plantaginetum gentianoides* RESMERITA 1976, *Agrostetum alpinae-Gnaphalietum supini* Resmerita 1975) *Soldanello hungaricae-Ranunculetum crenati* COLDEA 1985 (Syn.: *Agrosteto alpinae-Ranunculetum crenati* RESMERITA 1975).

It is a chiono-petrophilous association having a mesophilous character; it is found on the limestone scree covered for a long time by snow on the northern slope of Buda glacial circus and on the southwestern slope windy protected of Râiosu Mountain. The two characteristic species *Soldanella pusilla* and *Ranunculus crenatus* are accompanied by other species: *Primula minima, Plantago gentianoides, Cerastium cerastoides, Sedum alpestre, Gnaphalium supinum*, etc.

**Habitats of Romania R6306** - South-Eastern Carpathian chionophilous communities with *Poa supina* and *Cerastium cerastioides*
**Correspondences**:
**NATURA 2000**: -
**EMERALD**: -
**CORINE**: -
**PAL.HAB**: 36.1113 Alpic acid cudweed snow-patch communities
**EUNIS**: -

**Vegetal association**: *Poo supinae-Cerastietum cerastioidis* (SÖRY 1954) OBERD. 1957; *Poo supinae-Cerastietum cerastoides chrysosplenietosum alpinae* COLDEA 1985.

The association is widely spread in the Alps and the Carpathians and grows especially where the leaks resulted from melting snow produce humus accumulation on which nitrophilous species such as *Poa supina, Cerastium cerastoides, Taraxacum alpinum* grow. We identified chionophilous coenoses in a place where snow maintains for a long time at the foot of Râiosu Mountain, at the base of a limestone scree con. We also identified this association on Buda Mountain, not distant from Buda Lake, i.e. in the glacial circus. Beside the edifying species, other species are found: *Plantago gentianoides, Nardus stricta, Soldanella pusilla, Ranunculus crenatus, Geum montanum*, etc.

## CONCLUSIONS

In the paper, there were described 27 alpine and subalpine habitats. 14 of these are habitats of community interest, with high conservation value such as: South-Eastern Carpathian dwarf azalea heaths (*Loiseleuria procumbens*), South-Eastern Carpathians alpenrose scrubs (*Rhododendron myrtifolium*) with bilberry (*Vaccinium myrtillus*), South-Eastern Carpathians juniper scrubs (*Pinus mugo*) with alpenrose (*Rhododendron myrtifolium*), South-Eastern

Carpathians bilberry scrubs (*Vaccinium myrtillus*), South-Eastern Carpathian meadows *Scozonera rosea* and *Festuca nigrescens*, Matweed (*Nardus stricta*) and *Viola declinata* South-Eastern Carpathian, Sesleria-evergreen sedge grasslands (*Carex sempervirens*) and *Sesleria*-evergreen sedge grasslands (*Sesleria bielzii*) South-Eastern Carpathian meadows, *Dryas* mats dwarf shrubs (*Dryas octopetala*), South-Eastern Carpathian tall weeds communities with *Aconitum tauricum*, South-Eastern Carpathian tall weeds communities with *Cirsium waldsteinii* and *Heracleum sphondylium* ssp. *transsilvanicum*, South-Eastern Carpathian tall weeds communities with *Senecio subalpinus* and *Rumex alpines*, South-Eastern Carpathian springs and rivulets communities with *Doronicum carpaticum, Saxifraga aizoides, Chrysosplenium alpinum* and *Achillea schurii*, South-Eastern Carpathian communities Siliceous screes of the mountain to snow level with *Saxifraga bryoides, Silene acaulis* and *Veronica baumgartenii,* South-Eastern Carpathian communities Calcareous and calchist screes with *Papaver corona-sancti-stephani, Cerastium lerchenfeldianum* and *Cerastium transsilvanicum*, South-Eastern Carpathian communities Calcareous and calchist screes with *Acinos alpinus* and *Galium anisophyllon*.

These habitats, which contain protected species, relict species, endemic species are threatened by numerous negative anthropogenic impacts.

Knowing the different habitat types, their distribution and extent is very important to develop a management plan for the two studied mountains. This plan is necessary to improve the conservation status of habitats and species through a series of strategic actions following the increasing ecological database and to educate the population.

## REFERENCES


BORZA AL. & BOŞCAIU N. 1965. *Introducere în studiul covorului vegetal.* Edit. Academiei R.S.R., Bucureşti. 340 pp.

BOŞCAIU N. 1971. *Vegetaţia fontinală din munţii Ţarcu, Godeanu şi Cernei.* Studii şi Comunicări Ştiinţele Naturii Muzeul Brukenthal. Sibiu. 133 pp.

COLDEA GH. 1990. *Munţii Rodnei. Studiu geobotanic.* Edit. Academiei. Bucureşti. 183 pp.

DONIŢĂ N., POPESCU N., PAUCĂ-COMANESCU MIHAELA, MIHĂILESCU SIMONA, BIRIŞ IOVU-A. 2005. *Habitatele din România.* Edit. Tehnică Silvică. Bucureşti. 496 pp.

DEVILLERS PIERRE, DEVILLERS-TERSCHUREN JEAN, VANDER CHARLES. 1996. *Palearctic Habitats*. PHYSIS Data Base. Royal belgium Institute of Natural Sciences. Last update 1999.

SANDA V. & POPESCU A. 1998. *Conspectul cormofitelor spontane din România.* Edit. Universităţii Bucureşti. 336 pp.

STANCU DANIELA ILEANA. 2005. *Flora şi vegetaţia munţilor Râiosu şi Buda, masivul Făgăraş.* Edit. Universităţii din Piteşti. 226 pp.

***. 1991. CORINE Biotopes Manual - Habitats of the European Community. EUR 12587/3, Office for Official Publications of the European Communities.

***. Birds Directive 79/409/EEC – Council Directive 92/43/EEc on the conservation of the wild birds.

***. EUNIS-EUROPEAN NATURE INFORMATION SYSTEM. http://eunis.eea.eu.int (accesed March 10, 2013).

***. Habitats Directive 92/43/EEc – Council Directive 92/43/EEc on the conservation of natural habitats and of wild fauna and flora (OJ L 206,22.7.92).

***. Natura 2000. O.U.G. 57/20.06.2007 privind regimul ariilor naturale protejate.



**Stancu Daniela**
Argeş County Museum, Romania.
E-mail: stancuileana@yahoo.com



Received: March 29, 2013
Accepted: April 25, 2013