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PRELIMINARY RESEARCHES ON NATURAL HABITATS FROM PIETRICICA MOUNTAIN (PIATRA CRAIULUI NATIONAL PARK)

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Abstract
In this paper a characterization of some natural habitats from Pietricica Mountain (Piatra Craiului National Park) was maded. There were analyzed five types of habitats, according to NATURA 2000 classification, as follows: 4060 Alpine and boreal heaths, 4070 Bushes with Pinus mugo and Rhododendron hirsutum (Mugo-Rhododendretum hirsuti), 6170 Alpine and subalpine calcareous grasslands, 6430 Hydrophilous tall-herb fringe communities of plains and of the montane to alpine levels and 9410 Acidophilous Picea forests of the montane to alpine levels (Vaccinio-Piceetea).*

Keywords: natural habitats, Pietricica Mountain, Piatra Craiului National Park

1. INTRODUCTION

The Pietricica Mountain represents the southern extending of Piatra Craiului ridge from Șaua Funduri going through the bottoms: La Arsură (1853 m), Pietricica (1764 m), Gruiul Mirii (1582 m), Sub Pietricica (1241 m), Plaiul Mare (1297 m), Plaic (1172 m) and ending in the northern of Podu Dâmboviței depression, at the confluence of Dâmbovița river with Dâmbovicioara by limestone bridges Plaiul Mare and Plaicul (http://zarnesti.net/piatra-craiului/prezentare-generala/).
The Jurasic limestones are calcareous sediments that forms the huge stack of limestone of the Pietricica Mountain. Conglomerates with grit-clay ciment are on the eastern slope of the Pietricica Mountain (http://www.carpati.org/ghid_montan/muntii/piatra_craiului-37/geologie/).
The Pietricica Mountain is crossed by a series of valleys with streams that flow their waters into Dâmbovicioara basin (Urzicaru Valley, Copilului Valley, Muierii Valley, Trăsnită Valley, Ursului Valley) or Dâmbovița basin (Largă Valley).
The Piatra Craiului Mountains represent some of the most studied mountains from our country in terms of flora, vegetation, fauna, geology etc. A large number of famous botanists will deal with the study of the massif's flora: Kotschy (1853), Schur (1866), Fuss (1866), Simonkai (1886), Römer (1898, 1904), Brândză (1898), Beldie (1952) and many more. More recently a large number of flower specialists and plant sociologists have turned their attention towards this territory: Boșcaiu et Täuber (1977), Morariu (1978, 1980), Cristian-Comes et Täuber (1977), Halda (1976), Sanda et Popescu (1976, 1977, 1980), Drăghici (1980), Alexiu (1986) and Mihăilescu (2001) still bring

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important contributions to the knowledge regarding the massif's flora and vegetation (http://www.pcrai.ro/lang-ro/6/Parcul/istoricul_cercetarii-12.html).

2. MATERIAL AND METHOD

There have been made phytosociological surveys in the field, in accordance with the method of Central-European School from Zürich-Montpellier adapted to the characteristics of the vegetal layer from our country to identify the natural habitats from Pietricica Mountain. The scientific names of plants species have been validated according to database developed by the Kew Royal Botanical Garden-England and Missouri Botanical Garden-USA (The Plant List-http://www.theplantlist.org/).
The identification and characterization of the natural habitats from Pietricica Mountain was undertaken both on the basis of our observations in the field in May-June 2015, and by consulting literature (Oltean et al., 1994; Sanda et al., 2001; Coldea, 1991; Doniță et al., 2005; Chifu et al., 2006; Sanda et al., 2008; Gafta et Mountford coord., 2008). For each habitat we have indicated the Natura 2000 code (Gafta et Mountford coord., 2008) and corresponding code of the classification system of habitats from Romania (Doniță et al., 2005).
The natural habitats have been classified taking into account: correspondence with CORINE, EMERALD, PALAEARCTIC HABITATS, EUNIS classification systems, correspondence with plant associations, site description, community structure and floristic composition.

3. RESULTS AND DISCUSSIONS

The preliminary inventory of the natural habitats from Pietricica Mountain was finalized with identification of five types of natural habitats according to Natura 2000 classification, one of them being a site of community interest as follows: 4060 Alpine and boreal heaths, 4070* Bushes with *Pinus mugo* and *Rhododendron hirsutum* (*Mugo-Rhododendretum hirsuti*), 6170 Alpine and subalpine calcareous grasslands, 6430 Hydrophilous tall-herb fringe communities of plains and of the montane to alpine levels and 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*).

4060 Alpine and boreal heaths

(**R3617** Dwarf bushes of white dryas (*Dryas octopetala*))

Correspondence:
EMERALD: 31.4 Alpine and boreal heaths
CORINE: 31.491High montane *Dryas* mats
PAL.HAB: 31.49152 South-eastern Carpathian *Dryas* mats
Plant associations: *Dryadetum octopetalae* Csürös *et al*. 1956 (Syn.: *Salix reticulata-Dryas octopetala* ass. Beldie 1967, *Achilleo schurii-Dryadetum* (Beldie 1967) Coldea 1984).
Site description: These coenoses are edified by oligothermal species, neutrophilous, chionophilous and calciphile, being identified at an altitude of 1800 m on Pietricica Peak, on western, north-western slopes with an inclination of 45-60^0. The characteristic soils are superficial rendzinas, rich in humus, with neutral and low acidic reaction.
Community structure: The edified groups of *Dryas octopetala* have a saxicolous character. The stratification is reduced, phytoindividuals of white dryas do not exceed 10-15 cm length, being accompanied by juvenile of *Juniperus communis* var. *saxatilis, Rhododendron myrtifolium* and *Pinus mugo*. The herbs that rises above the bushes and have a coverage of approximately 20% are

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represented by characteristic species from *Seslerietalia* order (*Carex sempervirens, Polygonum viviparum, Galium anisophyllon, Ranunculus oreophilus, Leontopodium alpinum, Gentiana verna*).
Floristic composition: Edifying and characteristic species: *Dryas octopetala, Achillea oxyloba* ssp. *schurii*. Other important species: *Polygala amara, Ranunculus oreophilus, Sesleria bielzii, Potentilla aurea* ssp. *chrysocraspeda, Juniperus communis* var. *saxatilis, Polygonum viviparum, Soldanella hungarica* ssp. *major, Salix retusa, Gentiana verna, Primula elatior, Cardamine glanduligera, Vaccinium vitis-idaea, Saxifraga luteo-viridis, Galium anisophyllon, Saxifraga mutata* ssp. *demissa, Selaginella selaginoides, Rhododendron myrtifolium, Carex sempervirens, Pinus mugo, Leontopodium alpinum*.

Figure 1. Dryadetum octopetalae Csürös et al. 1956

4070* Bushes with *Pinus mugo* and *Rhododendron hirsutum* (*Mugo-Rhododendretum hirsuti*)
(**R3105** South-eastern carpathian bushes of *Pinus mugo* and *Rhododendron myrtifolium*)
Correspondence:
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
Plant associations: *Rhododendro myrtifolii-Pinetum mugi* Borza 1959, em. Coldea 1995 (Syn.: *Pinetum mugi carpaticum* auct. rom., *Calamagrostio villosae-Pinetum mugi* Sanda *et* Popescu 2002).
Site description:
The phytocoenoses with *Pinus mugo* are typically to subalpine level from Romanian Carpathian being identified on Pietricica Peak (1790 m), on slopes with north-western and western exposition. These groupings have developed on strongly inclined slopes (50-60^0), with substrate formed by conglomerates and limestones. It prefers podzolic superficial soils with an acidic reaction.

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Community structure: The *Pinus mugo* scrubs with rhododendron realize a coverage of 80-100%, including oligothermal, oligotrophic and acidophilous species. *Pinus mugo* is the monodominant species of shrub layer, accompanied by disseminated phytoindividuals of *Salix silesiaca, Sorbus aucuparia, Juniperus communis* var. *saxatilis, Picea abies* juv.. The bushes are represented by *Rhododendron myrtifolium, Vaccinium myrtillus, V.vitis-idaea, Salix retusa, Dryas octopetala*.
Among the herbaceous species are noted: *Luzula luzuloides, Homogyne alpina, Calamagrostis villosa, Primula halleri, Cardamine glanduligera*.

Figure 2. Rhododendro myrtifolii-Pinetum mugi Borza 1959, em. Coldea 1995

Floristic composition: Edifying and characteristic species: *Rhododendron myrtifolium, Pinus mugo, Calamagrostis villosa*. Other important species: *Sorbus aucuparia, Salix silesiaca, Picea abies, Veratrum album, Vaccinium vitis-idaea, V. myrtillus, Juniperus communis* var. *saxatilis, Luzula luzuloides, Dryas octopetala, Homogyne alpina, Cardamine glanduligera, Soldanella hungarica* ssp. *major, Valeriana tripteris, Galium anisophyllon, Potentilla aurea* ssp. *chrysocraspeda, Gentiana verna, Ranunculus oreophilus, Doronicum columnae, Asplenium viride, Salix retusa.*

6170 Alpine and subalpine calcareous grasslands

(**R 3612** South-eastern carpathian grasslands with *Carex sempervirens* and *Sesleria bielzii*)
Correspondence:
EMERALD:-
CORINE: 36.43 Stepped and garland grassland
PAL.HAB 1999: 36.43921 East Carpathian sesleria-evergreen sedge grasslands
EUNIS: E4.4392 East Carpathian calciphile stepped grasslands
Plant association: *Seslerio bielzii-Caricetum sempervirentis* Puşcaru *et al.* 1956 (Syn.: *Seslerietum bielzii transsilvanicum* Borhidi 1956, 1958)
Site description: This type of grasslands vegetate on Pietricica Peak at 1782-1800 m, on limestone rocks and slopes with western, north-western exposition and inclination of 60-80^0.

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Community structure: The floristic nucleous of this endemic habitat is formed by herbaceous species from *Seslerion* alliance and *Seslerietalia* order (*Ranunculus oreophilus, Anthyllis vulneraria* ssp. *alpestris, Galium anisophyllon, Carex sempervirens, Polygonum viviparum, Leontopodium alpinum, Dianthus spiculifolius, Linum extraaxilare, Thymus comosus*).
Floristic composition: Edifying and characteristic species: *Carex sempervirens, Sesleria bielzii*. Other important species: *Ranunculus oreophilus, Polygala amara, Bupleurum falcatum, Galium anisophyllon, Pimpinella saxifraga, Linum extraaxilare, Polygonum viviparum, Primula elatior, Cruciata glabra, Potentilla aurea* ssp. *chrysocraspeda, Rhododendron myrtifolium, Gentiana verna, Soldanella hungarica* ssp. *major, Luzula luzuloides, Vaccinium vitis-idaea, V. uliginosum, Salix retusa, Anthoxanthum odoratum, Thymus comosus, Leontopodium alpinum, Anthyllis vulneraria* ssp. *alpestris, Campanula cochlearifolia, Dryas octopetala, Dianthus spiculifolius, Androsace villosa* ssp. *arachnoidea*.

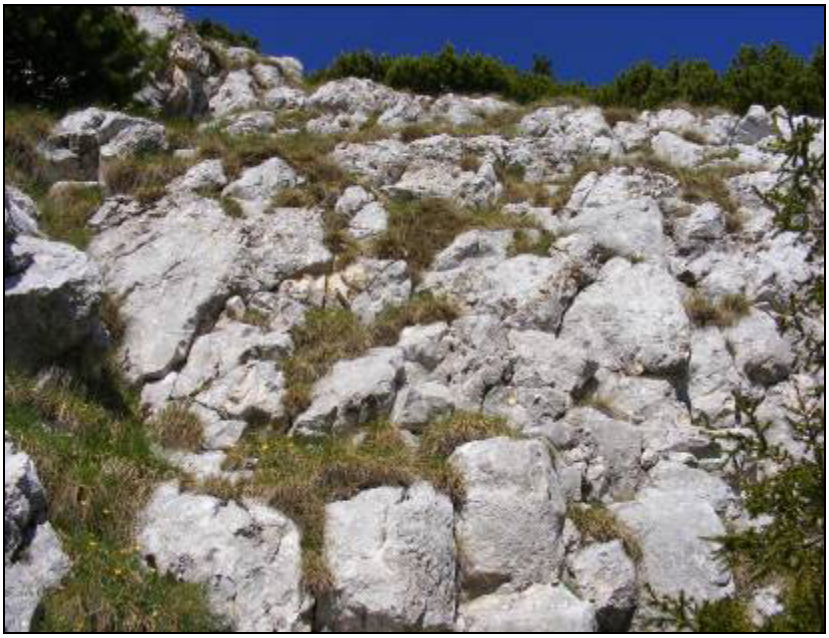

***Figure 3. Seslerio bielzii-Caricetum sempervirentis* Puşcaru *et al.* 1956**

6430 Hydrophilous tall-herb fringe communities of plains and of the montane to alpine levels (**R3708** Geto-Dacian communities with *Angelica sylvestris, Crepis paludosa* and *Scirpus sylvaticus*; **R3714** Geto-Dacian communities with *Filipendula ulmaria, Geranium palustre* and *Chaerophyllum hirsutum*)

Correspondence:
EMERALD: 37.7 Humid tall herb fringes
CORINE: 37.211 Cobbage thistle (*Cirsium oleraceum* meadows)
PAL. HAB. 1999: 37.814 Carpathian herb communities; 37.716 Continental mixed riverine screens
EUNIS: E5.5143 Carpathian monk shoad communities; E5.414 Continental river bank tall-herb communities dominated by *Filipendula*.
Plant associations: *Scirpetum sylvatici* Ralski 1931 emend. Schwich 1944; *Chaerophyllo hirsuti-Filipenduletum* Niemann *et al*. 1973.

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Site description: Phytocoenoses dominated by *Chaerophyllum hirsutum* and those with *Scirpus sylvaticus* are located in stations with alluvial, pseudogley soils and siliceous rocks, in marshy areas, along streams.
Community structure: The vegetal groupings with *Scirpus sylvaticus*, in some areas (Muierii Valley) are connected with those edified by *Filipendula ulmaria* and *Chaerophyllum hirsutum* at 1140 m altitude. There are meso-hygrophilous coenoses that indicate mesotrophic to eutrophic biotopes, low acid-neutrophilous, mesothermal. Along the touristic route to the Pietricica chalet, the phytocoenoses that are well developed in the ecological ambiance of mountain streams are dominated by *Chaerophyllum hirsutum* whose coverage can reach up to 70%.
The herbaceous layer is formed by taxa characteristics to tall herbs (*Rumex alpinus, Senecio ovatus, Chaerophyllum hirsutum, Doronicum austriacum, Cirsium waldsteinii, Stellaria nemorum, Tozzia carpathica, Athyrium distentifolium, Myosotis sylvatica*) and mesophilous, meso-hygrophilous meadows (*Lychnis flos-cuculi, Equisetum palustre, Myosotis scorpioides, Caltha palustris, Geum rivale, Filipendula ulmaria*).

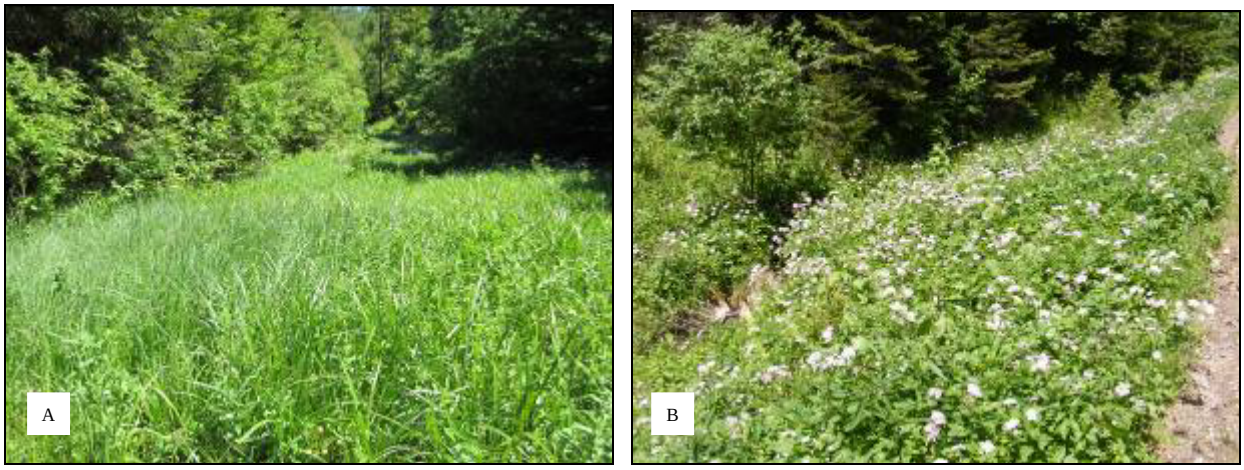

Figure 4. A- Scirpetum sylvatici Ralski 1931 emend. Schwich 1944;
B-Chaerophyllo hirsuti-Filipenduletum Neimann et al. 1973

Floristic composition: Edifying and characteristic species: *Scirpus sylvaticus, Filipendula ulmaria, Chaerophyllum hirsutum*. Other important species: *Doronicum austriacum, Mentha longifolia, Caltha palustris, Ranunculus repens, Myosotis scorpioides, M. sylvatica, Equisetum palustre, Cardamine amara, Taraxacum officinale, Alchemilla xanthochlora, Geum rivale, Hypericum maculatum, Stellaria nemorum, Euphorbia amygdaloides, E. carniolica, Chrysosplenium alternifolium, Cardamine impatiens, Juncus effusus, Urtica dioica, Rumex alpinus, R. arifolius, Lychnis flos-cuculi, Campanula patula* ssp. *abietina, Geranium phaeum, Carex rostrata, C. remota, C. hirta, Prunella vulgaris, Epilobium hirsutum, Ajuga reptans, Veronica beccabunga, Bellis perennis, Athyrium distentifolium, Picea abies* (juv.), *Rubus idaeus, R. hirtus, Cirsium waldsteinii, Lamium maculatum, Aegopodium podagraria, Anthriscus sylvestris, Cruciata laevipes, Senecio ovatus, Salix silesiaca, Populus tremula, Symphytum cordatum, Tussilago farfara, Daphne mezereum, Gentiana asclepiadea, Petasites hybridus, Tozzia carpathica, Acer pseudoplatanus, Gymnocarpium dryopteris, Betula pendula.*

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9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*)
(**R4203** Păduri sud-est carpatice de molid (*Picea abies*) cu *Soldanella hungarica*)

Correspondence:
EMERALD: !42.21 Alpine and Carpathian subalpine spruce forest
CORINE:-
PAL.HAB.: 42.21626 Carpathian subalpine *Soldanella* spruce forest
EUNIS: G3.1B62 Eastern Carpathian subalpine spruce forest
Plant association: *Soldanello majori-Piceetum* Coldea *et* Wagner 1998
Site description: These plant communities are growing in upper mountain level on siliceous and limestone rocks. These coenoses are developed on ridges, slopes of 5-10^0 inclination degree, with northern exposition, at altitude above 1500 m.
Community structure: The tree layer is formed by spruce (*Picea abies*) whose canopy is 0,8-0,9. There are specimens of mountain ash (*Sorbus aucuparia*) an sycamore (*Acer pseudoplatanus*). The herbaceous layer realizes a coverage of 40%, being dominated by *Oxalis acetosella, Vaccinium myrtillus, Soldanella hungarica* ssp. *major, Cardamine glanduligera* and numerous species of bryophytes.

***Figure 5. Soldanello majori-Piceetum* Coldea *et* Wagner 1998**

Floristic composition: Edifying species: *Picea abies.* Characteristic species: *Soldanella hungarica* ssp. *major*. Other important species: *Homogyne alpina, Primula elatior, Oxalis acetosella, Luzula sylvatica, Anemone nemorosa, Stellaria nemorum, Myosotis sylvatica, Rumex arifolius, Polystichum lonchitis, P. aculeatum, Taraxacum officinale, Doronicum austriacum, Sorbus aucuparia, Cardamine glanduligera, C. bulbifera, Senecio ovatus, Rubus idaeus, Mycelis muralis, Saxifraga stellaris, Vaccinium myrtillus, V. vitis-idaea, Hypericum maculatum, Hieracium transylvanicum, Fragaria vesca, Huperzia selago, Veronica urticifolia, Euphorbia amygdaloides, Asplenium viride, Galium odoratum, Ribes uva-crispa, Allium ursinum, Geum rivale, Adenostyles alliariae, Athyrium filix-femina, Symphytum tuberosum, Acer pseudoplatanus, Polygonatum verticillatum, Valeriana montana, Veronica officinalis, Gymnocarpium dryopteris.*

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4. CONCLUSIONS

The five natural habitats identified in 2015 in the Pietricica Mountain (Piatra Craiului National Park) are distinguished by the following features:

- Alpine and boreal heaths habitat is characterized by a very high value of conservation that is given by the rare and vulnerable species identified therein, such as: *Leontopodium alpinum, Salix retusa, Achillea oxyloba* ssp. *schurii, Rhododendron myrtifolium, Saxifraga mutata* ssp. *demissa.*
- Bushes with *Pinus mugo* and *Rhododendron hirsutum* occupy important areas on the steep slopes of the ridge Pietricica, being in a good state of conservation. Plant communities with *Rhododendron myrtifolium* shelter representative populations of rare species as *Primula halleri* and *Salix retusa*.
- The steep slopes of the subalpine level from Pietricica Mountain ensure optimal conditions for development of alpine and subalpine grasslands. We found rare, vulnerable and not threatned taxa in this habitat such as: *Leontopodium alpinum, Thymus comosus, Dianthus spiculifolius, Rhododendron myrtifolium, Salix retusa, Androsace villosa* ssp. *arachnoidea*.
- *Tozzia carpathica* was identified in phytocoenoses with *Scirpus sylvaticus*. This species is listed in Annex II of Habitats Directive, Annex 3b of OUG 57/2007 and Red list of vascular plants from Romania.
- There was identified a new plant association for Piatra Craiului National Park (*Soldanello majori-Piceetum* Coldea *et* Wagner 1998) whose coenoses vegetate in Pietricica Mountain.

5. REFERENCES

Chifu, T., Mânzu, C., Zamfirescu, O. (2006). Flora şi vegetaţia Moldovei (România). Editura Universităţii Al. I. Cuza, Iaşi.

Coldea, Gh. (1991). Prodrome des associations vegetales des Carpates du sud-est (Carpates Roumaines). Documents phytosociologiques. 1: 317-539, Camerino.

Cristea, V., Gafta, D., Pedrotti, F. (2004). Fitosociologie. Editura Presa Universitară Clujeană, Cluj-Napoca.

Doniţă, N., Popescu, A., Comănescu Paucă, M., Mihăilescu, S., Biriş, I.A. (2005). Habitatele din România. Editura Tehnică Silvică, Bucureşti.

Gafta, D., Mountford, O. coord. (2008). Manual de interpretare a habitatelor Natura 2000 din România. Editura Risoprint, Cluj-Napoca.

Mihăilescu, S. (2001). Flora şi vegetaţia Masivului Piatra Craiului. Editura Vergiliu, Bucureşti.

Oltean, M., Negrean, G., Popescu, A., Roman, N., Dihoru, Gh., Sanda, V., Mihăilescu, S. (1994). Lista roşie a plantelor superioare din România. Institutul de Biologie al Academiei Române, Bucureşti.

Pop, O. ed. (2007). Parcul Naţional Piatra Craiului. Sit Natura 2000. Editura Universităţii Transilvania, Braşov.

Sanda, V., Popescu, A., Stancu, D. (2001). Structura cenotică şi caracterizarea ecologică a fitocenozelor din România. Editura Conphis, Bucureşti.

Sanda, V., Öllerer, K., Burescu, P. (2008). Fitocenozele din România. Sintaxonomie, structură, dinamică şi evoluţie. Editura Ars Docendi, Bucureşti.

Sârbu, I., Ştefan, N., Oprea, A. (2013). Plante vasculare din România. Determinator ilustrat de teren. Editura Victor B Victor, Bucureşti.

****, 2007, Ordonanţa de Urgenţă nr. 57 din 20 iunie 2007 privind regimul ariilor naturale protejate, conservarea habitatelor naturale, a florei şi a faunei sălbatice, Anexa 3b. MO nr. 442/29 iunie.

****, 1952-1969. *Flora R.P.R.-R.S.R.*, Ed. Academiei Române, Bucureşti.

http://www.pcrai.ro/lang-ro/6/Parcul/istoricul_cercetarii-12.html.

http://www.theplantlist.org/.

http://www.carpati.org/ghid_montan/muntii/piatra_craiului-37/geologie/.

http://zarnesti.net/piatra-craiului/prezentare-generala/.