

## THE PRESERVATION OF NATURE AND BIODIVERSITY IN THE COUNTY OF CLUJ

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### **Abstract**

*This study aims to describe the plant species belonging to wild flora spread on the territory of the county of Cluj. From the 17 studied regions a number of 295 plant species were inventoried, of which one specie of national interest, 12 species of national communitarian interest, and 3 species of communitarian interest, which are protected according to the annexe of the OUG 57/2007 with subsequent modifications and fulfilling and to the international conventions and directives. From 112 potential types of habitats were identified from the 357 types described in the booktext "The Habitats from Romania", and among these 111 types have correspondence in the European systems of classification, while one type was not found, R 4213 South – East spruce forests (*Picea abies*) with *Doronicum columna*, respectively.*

**Key words:** biodiversity, conservation

### **INTRODUCTION**

The county of Cluj is described by a representative relief with large variety. The relief forms are harmoniously combined, 30% belong to mountain areas (Apuseni Mountins), and the rest is almost equally divided in lower relief forms (hills, plateaus, highlands).

The county of Cluj is located in the contact area of three major geographical units: **Apuseni Mountins**, **Someșan Plateau**, crossed by the Someș River, with altitudes between 500-600 m and **Transilvanyan Plane** located between Someș and Mureș (a hilly area, relatively plane with short valleys where ponds were arranged).

In Europe, the human activity forms the biodiversity even from the time when the agriculture and livestock rearing were in extension. The agricultural and industrial revolutions determined dramatically and accelerated changes in field uses, intensifying of agriculture, urbanization and field abandon.

In exchange, they led to the loss of many practices (e.g., traditional agricultural methods) that help to maintain of the landscapes rich in biodiversity.

Due to geographical position and because in some areas of the county the traditional agriculture is still practiced, Cluj is a county with large biological diversity, expressed both at ecosystem and specie levels.

According to IUNP (International Union for Nature Preservation) category, in the county of Cluj, there are 24 natural protected areas of national importance, which also are nominated in the III<sup>rd</sup> section of the Law no. 5/2000 for approval of the Plan of national territory arrangement and also in the annexes of the Govern Decisions (HG) 2151/2004, 1581/2005 and 1143/2007. The total surface of these protected areas occupies 6424.7 ha, representing 0.3% of the total area of the county of Cluj.

## MATERIAL AND METHOD

Concerning the identification of the plant species belonging to wild flora and distributed by the territory of the county of Cluj, a number of 295 plant species were inventoried, of which one specie of national interest, 12 species of national an communitarian interest, and 3 species of communitarian interest, which are protected according to the annexe of the OUG 57/2007 with subsequent modifications and fulfilling and to the international conventions and directives (the Convention from Berna, the Directive Habitats).

We can mention the following protected species: *Dracocephalum austriacum* (Dragonhead), *Iris aphylla*, *Iris humilis*, *Cypripedium calceolus* (lady's slipper orchid), *Liparis loeselli* (fen orchid), *Ferula sadleriana*, *Ligularia sibirica* (Siberian rocket), *Serratula lycopifolia*, *Syringa josikea* (wild lilac), *Sphagnum sp.* (peat moss), *Eleocharis carniolica*, *Galanthus nivalis* (snowdrop), *Achillea impatiens*, *Arnica montana* (mountain arnica), *Campanula serrata*, *Crambe tataria* (Tatarian sea-kale), *Astragalus peterfii*.

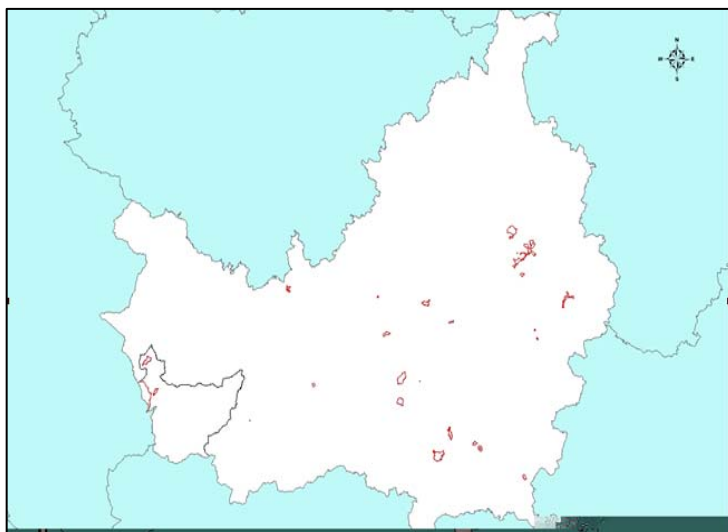


Fig. 1 The distribution of the natural protected areas of national interest from the county of Cluj

## RESULTS AND DISCUSSIONS

In the county of Cluj, the areas of the habitats of national and communitarian interest are of different size, from several square meters up to thousands hectares. the natural habitats specific for the bio-geographical space of the county are: sweet waters habitats (water streams, natural and antropic lakes); pasture and bush habitats (alluvial pastures of rivers, limed pastures, alpine and subalpine pastures, juniper, mountain and timbered meadows); peat and swamp habitats (oligotroph and mezotroph swamps); rocky and cave habitats (rocky and limed bents, natural caves and excavations); forest habitats (old forests, timbers pastures, alpine and subalpine forests, forests with stalk oaks, alluvial forests, mixed forests).

A number of 112 potential types of habitats were identified from the 357 types described in the booktext "The Habitats from Romania" (8 swamp habitats, steppe,

halophile bushes and forests; 34 habitats of bushes and pastures; 42 forest habitats; 13 swamp and swamp fields habitats; 5 sweet waters habitats; 7 debris, rocky and cave habitats; 3 agricultural fields and artificial landscapes habitats).

Among these 112 types of habitats, 111 types have correspondence in the systems of classification presently existent in Europe, and only one type of habitat is not found among these: the habitat with the code R 4213 South – East spruce forests (*Picea abies*) with *Doronicum columnae* (table 1).

The description of the habitats was performed using the correspondence with the systems of description used in Europe, especially with those of the OUG 57/2007 with subsequent alterations and fulfilling, concerning the regimen of the natural protected areas, preservation of the natural habitats, of the wild flora and fauna, and of the international directive "The Habitat Directive" 92/43/EEC, as well as of the textbook "The Habitats from Romania" and alterations according to the amendments proposed Romania and Bulgaria to the Habitat Directive (92/43/EEC) – 2006 by Nicolae Doniță, Aurel Popescu et.al., Editura Tehnică Silvică as well as the The textbook of Interpretation of the Nature 2000 Habitats from România – 2008 coordinated by Dan Gafta, Owen Mountford.

Table 1

## The list of the habitats of communitarian interest from the county of Cluj

No.	Region	Types of habitats	Species of communitarian interest
1.	Apuseni (Counties of Cluj, Alba, Bihor)	3220 – The herbaceous vegetation from the shores of the mountain rivers; 3240 – Wood vegetation with <i>Salix eleagnos</i> along the mountain rivers 3260 – Water courses from plane areas, up to mountain ones with vegetation made up of <i>Ranunculus fluitans</i> and <i>Callitriche</i> - <i>Batrachion</i> 4030 – Dry European bushes; 4060 – Alpine and boreal bushes; 5130 – Groups of <i>Juniperus communis</i> on bushes or limed pastures; 6110* - Limed rupicol communities or basophile pastures made of <i>Alyso-Sedion albi</i> ; 6150 – Boreal and alpine pastures on silica substrate; 6170 – Limed alpine and subalpine pastures; 6190 – Panonic rocky pastures ( <i>Stipo-Festucetalia pallentis</i> ); 6210* - Semi natural dry pastures and facieses with bushes on limed substrate ( <i>Festuco Brometalia</i> ); 6230* - Mountain pastures of <i>Nardus</i> species on silica substrates; 6410 – Pastures with <i>Molinia</i> on limed, peat or clay soils ( <i>Molinion caeruleae</i> ); 6430 - Woodside communities with high hydrophilic grass in the planes up to mountain and alpine levels; 6510 – Low altitude pastures ( <i>Alopecurus pratensis Sanguisorba officinalis</i> ); 6520 – Mountain meadows; 7110* - Active peat; 7120 – Degraded peat able of natural regeneration; 7150 – Plateau communities of <i>Rhynchosporion</i> on peat substrates; 8110 – Silica debris from the mountain up to alpine level ( <i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i> ); 8120 – Lime debris and shivers from the mountain up to alpine level ( <i>Thlaspietalia rotundifoliae</i> ); 8210 – Rocky versants with chasmophytic vegetation on limed rocks; 8220 – Rocky versants with chasmophytic vegetation on silica rocks; 8310 – Caves where public access is forbidden 9110 – Beech forests of <i>Luzulo-Fagetum</i> type; 9130 – Beech forests of <i>Asperulo-Fagetum</i> type; 9150 – Middle European beech forests of <i>Cephalanthero-Fagion</i> ; 9180 – Forests of <i>Tilio-Acerion</i> on sharp versants, debris and cloughs; 91D0* - Peat with forestry vegetation; 91E0* - Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ); 91Q0 – Relictal forests with <i>Pinus sylvestris</i> on lime substrate; 91V0 – Dacic beech forests ( <i>Symphyto-Fagion</i> ); 91Y0 – Dacic beech and hornbeam forests 9410 – Acidophil forests <i>Picea abies</i> from mountain area ( <i>Vaccinio-Piceetalia</i> ); 9420 – Forests of <i>Larix decidua</i> and/or <i>Pinus cembra</i> from mountain area.	1902 <i>Cypripedium calceolus</i> 1903 <i>Liparis loeselii</i> 2186 <i>Syringa josikaea</i> 4070 <i>Campanula serrata</i> 4116 <i>Tozzia carpathica</i>
2	Căian	40A0* - Sub-continental, peri-panonic forests; 6240* - Sub-panonic steppe pastures; 9110* - Silvo steppe Euro-siberian vegetation with <i>Quercus spp.</i>	2132 <i>Astragalus pteridii</i> 4067 <i>Echium russicum</i> 4091 <i>Crambe tatarica</i>
3	Cheile Turenilor	40A0* - Sub-continental, peri-panonic bushes; 6110* - Limed rupicol communities or baziphite pastures of <i>Alyso-Sedion albi</i> ; 8210 – Rocky versants with chasmophytic vegetation on limed rocks.	

4	Cheile Turzii	6110* - Limed rupicol communities or baziphite pastures of <i>Alyso-Sedion albi</i> ; 6190 – Panonic pastures of rocks ( <i>Stipo-Festucetalia pallentis</i> ); 6210* - Semi natural dry pastures and bushes on lime substrates ( <i>Festuco Brometalia</i> ); 6240* - Steppe sub panonic pastures; 6430 – Woodside communities with high hydrophilic grass from pasture up to mountain and alpine level; 8120 – Limed debris and lime shivers from the mountain level up to alpine level ( <i>Thlaspietia rotundifolia</i> ); 8210 – Rocky versants with chasmophytic vegetation on lime rocks; 9110 – Beech forests of <i>Luzulo-Fagetum</i> of type; 9130 – Beech forests of <i>Asperulo-Fagetum</i> of type; 91E0* - Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ).	1477 <i>Pulsatilla patens</i> 1689 <i>Dracocephalum austriacum</i> 2170 <i>Ferula sadleriana</i> 4067 <i>Echium russicum</i> 4087 <i>Serratula lycopifolia</i> 4097 <i>Iris aphylla</i> ssp. <i>hungarica</i> 4098 <i>Iris humilis</i> ssp. <i>arenaria</i>
5	Coasta Lunii (Jud. Cluj și Mureș)	6240* - Sub-panonic steppe pastures	4091 <i>Crambe tataria</i>
6	Fănațele Clujului – Copârșaic	6240* - Sub-panonic steppe pastures; 6510 – Low altitude pastures ( <i>Alopecurus pratensis Sanguisorba officinalis</i> )	1477 <i>Pulsatilla patens</i> 4067 <i>Echium russicum</i> 4087 <i>Serratula lycopifolia</i> 4091 <i>Crambe tataria</i> .
7	Făgetul Clujului - Valea Morii	7210* - Lime swamps with <i>Cladium mariscus</i> ; 7230 – Alkaline swamps; 9170 – Oak and hornbeam forests with <i>Galio-Carpinetum</i> .	4068 <i>Adenophora lilifolia</i> 1758 <i>Ligularia sibirica</i> 1898 <i>Eleocharis carniolica</i> 1903 <i>Liparis loeselii</i>
8	Lacul Știucilor - Sic - Puini - Valea Legiilor	1530* - Panonic and potosarmatic salted pastures and swamps; 3150 – Natural eutrophic lakes with vegetation of <i>Magnopotamion</i> or <i>Hydrocharition</i> type; 40A0* - Peri-panonic sub continental bushes; 6240* - Steppe sub panonic pastures; 6430 - Woodside communities with high hygrophilous grass from pasture up to mountain and alpine level; 91H0* - Panonic forest vegetation with <i>Quercus pubescens</i> ; 91H0* - Euro-siberian silvo steppe vegetation with <i>Quercus spp.</i> ; 91Y0 – Oak and hornbeam Dacic forests	4067 <i>Echium russicum</i>
9	Molhașurile Căpățânei (Jud. Cluj și Alba)	7110* - Active peat; 91D0* - Peat with forests vegetation; 9410 – Acidophil forests with <i>Picea abies</i> from mountain area ( <i>Vaccinio-Piceetia</i> ).	
10	Muntele Mare (Jud. Cluj și Alba)	3220 – Grass vegetation from the shores of the mountain rivers; 6230* - Mountain pastures of <i>Nardus</i> rich in species on silica substrates; 7110* - Active peat.	
11	Pădurea de stejar pufos de la Hoia	91H0* - Panonic forest vegetation with <i>Quercus pubescens</i>	
12	Sărăturile Ocna Vechi	1310 – Salicornia and other annual species communities which occupy the wet and sandy areas; 1530* - Panonic and ponto-sarmatic salty pastures and swamps	1389 <i>Meesia longiseta</i> 1903 <i>Liparis loeselii</i> 4087 <i>Serratula lycopifolia</i>
13	Someșul Rece	6150 – Boreal and alpine pastures on silica substrate; 6520 – Mountain meadows; 7110* - Active peat; 9110 – Beech forests with <i>Luzulo-Fagetum</i> ; 9130 – Beech forests with <i>Asperulo-Fagetum</i> ; 91D0* - Peat with forest vegetation; 91E0* - Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ); 9410 - Acidophil forests with <i>Picea abies</i> from mountain area ( <i>Vaccinio-Piceetia</i> ).	

14	<b>Suatu – Ghiriș</b>	40A0* - Sub continental peri-panonic bushes; 6240* - Steppe sub panonic pastures; 6510 – Low altitude pastures ( <i>Alopecurus pratensis Sanguisorba officinalis</i> ); 9110* - Euro-siberian silvo steppe vegetation with <i>Quercus spp.</i>	2132 <i>Astragalus peterfi</i> 4067 <i>Echium russicum</i> 4098 <i>Iris humilis</i> ssp. <i>arenaria</i>
15	<b>Trascău</b> (Jud. Cluj și Alba)	6170 – Alpine and subalpine lime pastures; 6190 – Rocky panonic pastures ( <i>Stipo-Festucetalia pallentis</i> ); 8120 - Limed debris and lime shivers from the mountain level up to alpine level ( <i>Thlaspietia rotundifolia</i> ); 9110 - Beech forests with <i>Luzulo-Fagetum</i> ; 9130 - Beech forests with <i>Asperulo-Fagetum</i> ; 915 – Beech middle European forests <i>Cephalanthero-Fagion</i> ; 9170 – Oak and hornbeam forests <i>Galio-Carpinetum</i> ; 91H0* - Panonic forest vegetation with <i>Quercus pubescens</i> ; 91V0 - Beech Dacic forests ( <i>Symphyto-Fagion</i> ); 91Y0 - Oak and hornbeam Dacic forests; 9410 - Acidophil forests with <i>Picea abies</i> from mountain area ( <i>Vaccinio-Piceetia</i> ); 9420 - <i>Larix decidua</i> forests and/or <i>Pinus cembra</i> from mountain areas.	
16	<b>Valea Florilor</b>	1530* - Salty panonic and onto-sarmatic pastures and swamps; 40A0* - Sub continental peri-panonic bushes; 6240* - Steppe sub panonic pastures.	4067 <i>Echium russicum</i> 4091 <i>Crambe tataria</i>
17	<b>Valea Ierii</b>	9110 - Beech forests with <i>Luzulo-Fagetum</i> ; 9130 - Beech forests with <i>Asperulo - Fagetum</i> ; 9170 - Oak and hornbeam forests <i>Galio-Carpinetum</i> type; 91E0* - Alluvial forests with <i>Alnus glutinosa</i> și <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ); 9410 - Acidophil forests with <i>Picea abies</i> from mountain area ( <i>Vaccinio-Piceetia</i> ).	

\* priority communitarian area

## CONCLUSIONS

The inventory of the habitats from the county of Cluj and limitroph areas (counties of Alba and Bihor) was performed by studying the most representative areas, from the point of view of interest flora. A number of 17 regions were studied. A number of 112 potential types of habitats were identified from the 357 types described in the booktext "The Habitats from Romania", and among these 111 types have correspondence in the European systems of classification, while one type was not found, R 4213 South – East spruce forests (*Picea abies*) with *Doronicum* columnna, respectively. The list of the habitats of communitarian interest from the county of Cluj revealed the possibilities of emphasizing the main particularities of this region from the point of view of possibilities of biodiversity preservation.

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