Studia Universitatis "Vasile Goldiş", Seria Ştiinţele Vieţii
Vol. 24, issue 3, 2014, pp.311-315

PRELIMINARY DATA ON THE DISTRIBUTION AND FLORISTIC COMPOSITION OF WETLAND HABITATS IN SĂLAJCOUNTY

Paul-Marian Szatmari [1], Lia Mladin [1], Aurica Grec [2], Oana Sicora [1], Cosmin Ionel Sicora* [1]
[1]Biological Research Centre Jibou; [2]"Vasile Goldiş" Western University of Arad,
Zalău Branch. Romania

ABSTRACT: This paper brings new data on the distribution of habitats and plant species considered endangered and vulnerable in Romania from an unexplored valley in Sălaj County. Here we identified four types of Romanian habitats and two wetland habitats present on Natura 2000 lists (*6440 Alluvial meadows of river valleys of the Cnidion dubii* and *6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)*. The valley contains numerous plant species that are rare in Romania, five of them being included in the Romanian national red lists (*Fritillaria meleagris, Narcissus poeticus ssp. radiiflorus, Iris sibirica, Gentiana pneumonanthe, Achillea ptarmica)* (Oltean *et al*., 1994; Boşcaiu *et al*., 1994) and onespecies is protected by the Natura 2000 network in Europe *(Eleocharis carniolica).*We recommend that the existing protected area to be enlarged by 48 ha and in this way the protected area will include the populations of *Fritillaria meleagris* and *Eleocharis carniolica*, and the Natura 2000 identified habitats.

Keywords: Natura 2000, rare, protected species, wetland habitats,Poarta Sălajului.

INTRODUCTION

In recent decades botanists focused more on the study of habitats and their species, especially because of anthropogenic influences. Over time, these influences have led to changes in the environment leading to different distribution of habitats or to their disappearance. The need to preserve some areas that are still unspoiled by human activity becomes a compulsory requirement. Many species that once were found everywhere have now severely restricted distribution or are endangered (Dihoru et Negrean, 2009; Cristea *et al.*, 1996).

Some of the most affected habitats are wetlands, represented by grassy planes, meadows subjected to winter flooding. Over long periods of time the mankind was interested to clear, drain or dam wetlands, ignoring the fact the wetlands have an important role in the water cycle and in the maintaining the balance of the ecosystem. Worldwide, it is estimated that half of all existing wetlands were lost due to development of agriculture and human settlements (Mitschet Gosselink, 2000).

By ratifying the Ramsar Convention, Romania have committed to do a botanical, zoological, ecological inventory of wetlandsandto apply specific measures for the preservation, protection and their usage in accordance with the principles of sustainable development (OUG 57, 2007).

During the year 2013 several investigations were conducted in different localities near Racâş-Românaşi-Poarta Sălajului, especially in the neighboring areas of the current Natura 2000 reserves from Racâş-Hida, which was established to preserve the populations of daffodils found here. Thus, in the vicinity of this place, in the upper part of the same valley (Jernăului Valley) were found significant populations of rare and protected species.

The area consists of wet meadows with a few marshes where water remains for several months, being placed near the localities Racâş and Poarta Sălajului in Sălaj County, Romania. The importance of its conservation is not only due to rare and endangered species found here, but also because of the large number of mountain species characteristics to the wet meadows of high herbs at lower altitude. Here is indicated the presence of two species with small populations at national and European level: *Fritillaria meleagris* L. and *Narcissus poeticus* subsp. *radiiflorus* (Salisb.) Baker (Oltean *et al*., 1994; Boşcaiu *et al*., 1994).

Fig.1. Reprezentation of the studied area and the current reserve of Racâş-Hida. A - The Natural Reserve of Racâş-Hida; B - *Fritillaria meleagris* newly identified populations; C – the area proposed for inclusion in the current nearby reserve; D - important populations of *Narcissus poeticus* ssp. *radiiflorus*.

In the respective valley have not been carried out any research studies of flora. Instead, floristic researches took place nearby in the Natura 2000 protected area Racâş-Hida (www.apmsj.anpm.ro, 2010). The main purpose of these studies was to identify the populations of rare plant species and their inclusion in the Racâş-Hida Reserve in the near future. Here, we report for the first time *Fritillaria meleagris* L. populations in this area.

Correspondence: Cosmin Ionel Sicora, Biological Research Centre Jibou, Romania, cosmin.sicora@gmail.com
Article published: September 2014

MATERIALS AND METHODS

The studied area is located between Racâș and Poarta Sălajului, in the western part of the Almaș-Agrij basin river that connects the Western and Eastern Carpathians. The respective wetland stretches along a valley about 0.46 ha, called "Poiana Mică". The dominant landscape consists of valleys surrounded by hills that have a maximum altitude of 325 m. In the Poarta Sălajului-Românași-Păușa area the meadows and terraces occupy between 500 and 1000 m at 275 m altitude. From a hydrological point of view, the area belongs to the Basin of Someș River, the main collector being Almaș River with an irregular valley whose meadows and terraces are often flooded in the rainy years.

Most species were observed and identified in the field and the unknown ones were harvested and herborized, then identified according to the main identification guides (Ciocârlan, 2009, Sârbu *et al.*, 2013). The nomenclature is treated according to the special website The Plant List (http://www.theplantlist.org). In order to identify the protected species the Romanian and Central-European red lists were inspected (Dihoru et Negrean, 2009; Oltean et al, 1994; Boşcaiu *et al.*, 1994; Witkowski *et al.*, 2003, Bilz *et al.*, 2001).

The phytocoenologic survey has been used in order to recognize the plant associations and to establish the existing habitats. The name of plant associations was annotated using the handbook "*Fitocenozele din Romania*" (Sanda *et al.*, 2008), and for the Romanian habitats we use the "Habitatele din Romania" (Doniță *et al*., 2005) and the Natura 2000 interpretation manual for Romania (Gafta et Mountford, 2008).

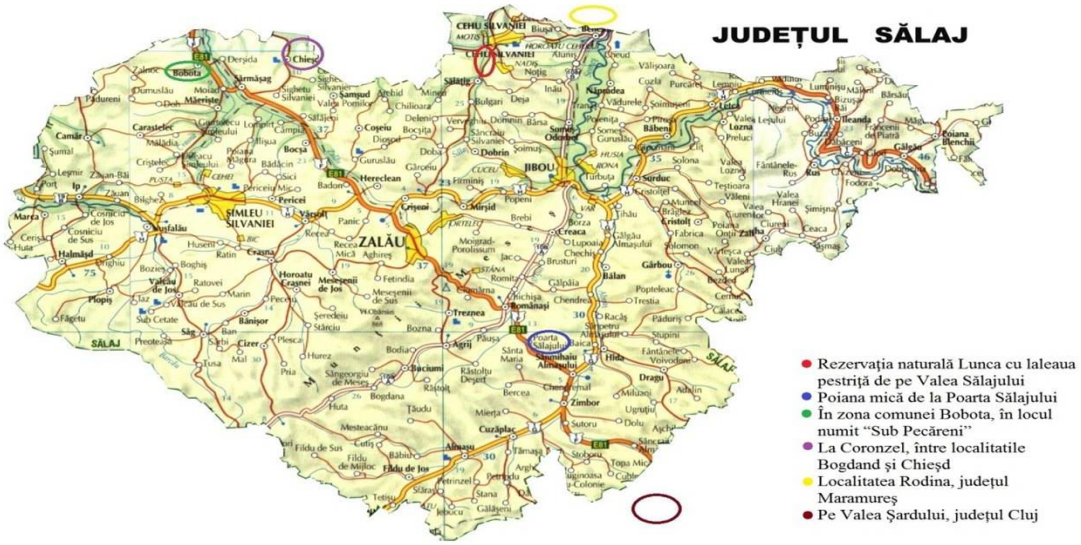

Fig. 2 The distribution of main populations of *Fritillaria meleagris* in Sălaj area

RESULTS AND DISCUSSION

Data on the station are still preliminary; they will be completed later by new research. A picture is emerging already: valley's flora, with persisting archaic plants (*Allium ericetorum* Thore, *Molinia caerulea* (L.) Moench, *Gentiana pneumonanthe* L. etc.), showcaseshere not only rare but also higher altitude species found at low altitude, which is quite typical of North-Western Romania (Karácsonyi,1987). Surrounding forests are difficult to reach, which contributed to the perpetuation of many rare or interesting species. The first scientific research on the vegetation of the area took place in early October of 2013. At that time, most species have already ended the season of growth and flowering, however observations and GPS-tagging photography were made during the whole growing season of the year 2013.

One of the most interesting rare species, considered a natural monument, is *Fritillaria meleagris* L. It is a european species of Mediterranean origin and it is listed as vulnerable on two of the Red Lists of Romanian flora (Oltean *et al.*, 1994, Boşcaiu *et al.*, 1994) and furthermore is considered endangered throughout the Carpathian mountains (Witkowski *et al*, 2003).

In figure 2 are represented all the localities from Sălaj County and neighboring counties where have been reported populations of *Fritillaria meleagris* L. No reports are recorded for Poarta Sălajului where our study took place.

Among the mountain species at low altitude is the wild garlic (*Allium ericetorum* Thore), characteristic for mountain meadows, on the rocky floors of boreal and subalpine zone (Ciocârlan, 2009, Sanda *et al.*, 1983). This species is likely to be here at one of the lowest altitude in the country. Another central European mountain species that is abundant here is *Narcissus poeticus* L. subsp. *radiiflorus* (Salisb.) Baker (*Narcissus stellaris* Haw), that prefers humid places with a cool microclimate (Sanda *et al.*, 1983). In the Romanian flora this species is considered vulnerable but not endangered (Boşcaiu *et al*., 1994), although in

the Central-European flora is considered endangered in informations about the current status of the species in Europe are insufficient (data deficient) (Bilz *et al.*, 2001).

Another three species are considered vulnerable in different Red Lists of Romania or in the Carpathian chain: *Iris sibirica* L. (Boşcaiu *et al*., 1994; Witkowski *et al*., 2003), *Gentiana pneumonanthe* L. (Boşcaiu *et al*., 1994) and *Achillea ptarmica* L. (Oltean *et al*., 1994). In the marshes that are reach in various species of *Juncus* spp. we discovered *Eleocharis carniolica* W.D.J.Koch, a rare species that is protected at European level. This species requires the designation of special areas of conservation - Natura 2000, Annex 3 (OUG 57/2007). It is mentioned as strictly protected by the Council of Europe and the Natura 2000 network - Annex 4A (Council of Europe, 1979; OUG 57/2007). Also, is considered vulnerable or endangered in all countries of the Carpathian chain (Witkowski *et al.*, 2003).

After processing the preliminary data from this valley, we identified two wetland habitats present on Natura 2000 lists. According to Doniţă *et al.*(2005), the area includes four types of Romanian habitats that will be discussed in the following parts of the paper. From this point of view, the area is particularly important, especially for preserving many rare and archaic species (Coldea *et al*., 2001; Coldea *et al*., 2003).

The first habitat we identified falls into the type *6440 Alluvial meadows of river valleys of the Cnidion dubii*. These are alluvial meadows with natural flooding regime, making the transition between hydrophilic and xerofile grassland habitat (Gafta et Mountford, 2008). This habitat type has two correspondents in Romania:

1) R3712, *Dacian communities with Deschampsia cespitosa and Agrostis stolonifera.* The edifying plant association that occupies a large part of the valley is *Agrostio stoloniferae – Deschampsietum caespitosae* Újvárosi 1947. It predominantly occupies flat or slightly inclined lands, on alluvial soils with excess of moisture. The association is particularly characteristic to mountain areas but here is at a lower altitude. The plant association could be found sometimes down to the plains from Satu Mare and Bihor (Ardelean et Karácsonyi, 2002). Characteristic and edifying species (*Deschampsia cespitosa*, *Agrostis stolonifera* and *Juncus conglomeratus*) occupy about 80-90 % of the site. Besides them, appear constant: *Ranunculus acris*, *Alopecurus pratensis*, *Trifolium pratense*, *Holcus lanatus*, *Lathyrus pratensis*, *Juncus inflexus, Gratiola officinalis, Achillea millefolium, Iris sibirica, Viola canina* etc. Conservation value of the habitat is generally low (Doniţă *et al.*, 2005), but the station described here preserves many rare species (*Iris sibirica*, *Fritillaria meleagris*, *Eleocharis carniolica* etc.) and Natura 2000 gives them a protection status (Annex 2 and 3 (OUG 57/2007)).

2) R3715, *Danubian-Pannonian grasslands of Agrostis stolonifera.* The edifying plant association is *Agrostetum stoloniferae* (Újvárosi 1941, Burduja *et al*., 1956), particularly significant in size as well. It can be found on flat orgently sloping land, but prefers all Carpathians (Witkowski *et al.*, 2003), but the Southern and Southeastern facing surfaces. This type of habitat has a high economic value, however conservative value is low (Doniţă *et al.*, 2005), unless Natura 2000 species are present in these habitats, as it is in our case. In the field, the dominant and characteristic species are: *Agrostis stolonifera, Festuca pratensis, Alopecurus pratensis, Lolium perenne, Rorippa sylvestris, Trifolium fragiferum, Elymus repens*. Other species involved in the formation of the habitat are: *Daucus carota, Lotus corniculatus, Medicago lupulina, Ranuculus repens, Lysimachia nummularia, Potentilla reptans, Eleocharis palustris, Colchicum autumnale* etc.

The second type of Natura 2000 habitat falls in *6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae).* This habitat is characteristic particularly to soils poor in nutrients, more or less humid (Gafta etMountford, 2008). Herewith, fall several types of habitats and plant associations with *Moliniacaerulea.* In our location we have identified only one, corresponding to the following Romanian habitats:

R3711, *Dacian Nardus stricta and Molinia caerulea grasslands.* The edifying association is *Nardo-Molinietum* (Gergely, 1958), within a relatively small area. It occupies mild-sloping and acidic depressions. In terms of floristic composition is dominated by*: Nardus stricta, Molinia caerulea, Juncus inflexus*. Other species are: *Agrostis stolonifera, Potentilla erecta, Achillea ptarmica, Gentiana pneumonanthe, Lysimachia nummularia, Juncus conglomeratus, Stachys officinalis, Succisa pratensis, Sanguisorba officinalis, Serratula tinctoria, Lysimachia vulgaris, Scrophularia umbrosa, Lychnisflos- cuculi, Deschampsia cespitosa, Centaurea jacea, Allium ericetorum* etc. Conservation value is moderate (Doniţă *et al*., 2005), but our site, as previously mentioned, provides shelter for many rare species. It is also a mountain habitat found here at a fairly low altitude.

A fourth type of habitat in the "Habitats from Romania" missing from Natura 2000 habitats and not having protection status is:

R3709, *Danubian communities with Juncus effusus, Juncus inflexus and Agrostis canina.* This habitat also requires conservation in the valley we have studied because it contains one rare Natura 2000 species – *Eleocharis carniolica*. Plant associations present in the habitat are *Agrostetum caninae* (Harg, 1942) and *Juncetum effuse* Soó (1931) 1949. The habitat is present on slightly concave lands and with excess moisture, sometimes permanent water is present for several months with accumulation of organic material. Phytocenoses are dominated mainly by *Juncuseffusus* and *Agrostiscanina*, but there are other species, such as *Juncusin flexus*, *Mentha longifolia*, *Carexhirta* or *Lolium perenne*. Other species are *Ranunculus acris, Juncus articulatus, Poa palustris, Lysimachia nummularia, Potentilla reptans, Ranunculus repens, Medicago lupulina, Phalaris arundinacea, Glyceria fluitans, Echinochloa crus-galli, Eleocharis palustris,*

Gnaphali umuliginosum, *Galium palustre*, etc. Conservation value is low (Doniţă et al, 2005).

Some of the issues that may affect the habitats in the area are the practicing of overgrazing, an activity that led to the destruction of many natural areas around. We also notice the installation of shrubs from the forest margins in the perimeter area we studied (*Rosa canina, Crataegus monogyna, Prunus spinosa, Pyrus pyraster*). Their expansion may lead to loss of species, and possibly colonization by drought resistant species that will lead to a change in the structure of the habitats. This could also be caused by groundwater lowering in some areas.

CONCLUSIONS

During 2013, near the village of Poarta Sălajului we have identified new populations of rare and protected plants and two Natura 2000 habitats. The main species identified and listed in the red lists are:

- *Fritillaria meleagris* (new populations for the region)(Oltean *et al.*, 1994, Boşcaiu *et al.*, 1994, Witkowski *et al.*, 2003)
- *Eleocharis carniolica* (requires the establishment of a Natura 2000 protected area according to OUG 57/2007)Annex 4A (Council of Europe, 1979; OUG 57/2007, Witkowski *et al.*, 2003)
- *Narcissus poeticus ssp. radiiflorus* (Boşcaiu *et al.*, 1994)
- *Iris sibirica* (Boşcaiu *et al.*, 1994; Witkowski *et al.*, 2003)
- *Gentiana pneumonanthe* (Boşcaiu *et al.*, 1994)
- *Achillea ptarmica* (Oltean *et al.*, 1994).

The main important Natura 2000 habitats are listed in the table 1:

Table 1.

Natura 2000 habitats in the studied area near Poarta Sălajului**.** (Annex 2: Types of natural habitats whose conservation requires the declaration of special areas of conservation (OUG 57/2007))

Type of habitat	Correspondent plant associations from the studied zone	Correspondent codes (Romanian Natura 2000 system)
6410 *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)	***** *Nardo-Molinietum,* Gergely 1958	*** R3711** Dacian *Nardus stricta* and *Molinia caerulea* grasslands
6440 Alluvial meadows of river valleys of *Cnidion dubii*	***** *Agrostio stoloniferae - Deschampsietum caespitosae* Ujvárosi 1947 ***** *Agrostetum stoloniferae* (Ujvárosi 1941) Burduja etal. 1956	*** R3712** Dacian communities with *Deschampsia cespitosa* and *Agrostis stolonifera* *** R3715** Danubian-Pannonian grasslands of *Agrostis stolonifera*

The many species still found in October in this isolatedhabitats explains the presence of unspoiled vegetation. As a result, new research is needed, which will bring new important data for the conservation of these grasslands. We advise the need for involvement of local authorities to prevent future drainage or grubbing. For all these reasons we recommend that the existing nearby Natura 2000 site to be enlarged by 48 ha and in this way the protected area will include the populations of *Fritillaria meleagris* and *Eleocharis carniolica*, and the Natura 2000 identified habitats.

REFERENCES

Ardelean, G., Karácsonyi, K. (2002) Flora şi fauna Văii Ierului (înainte şi după asanare), Editura Bion, Satu Mare.

Bilz, M., Kell, S.P., Maxted, N. and Lansdown, R.V. (2011) European Red List of Vascular Plants. Luxembourg: Publications Office of the European Union.

Boşcaiu, N., Coldea, Gh., Horeanu, C. (1994) Lista roşie a plantelor vasculare dispărute, periclitate, vulnerabile şi rare din flora României. Ocrotirea Naturii şi a Mediului Înconjurător, Bucureşti, 38 (1): 45-46.

Ciocârlan, V. (2009) Flora ilustrată a României. Ed. Ceres, Bucureşti.

Coldea, Gh., Sârbu, I., Negrean, G.(2001) Ghid pentru identificarea şi inventarierea pajiştilor seminaturale din România. Ed. „alo Bucureşti!", Bucureşti.

Coldea, Gh., Cristea, V., Negrean, G., Cristurean, I., Sârbu, I., Oprea, A., Popescu, Gh. (2003) Ghid pentru identificarea importantelor arii de protecţie şi conservare a plantelor din România. Ed. „alo Bucureşti!", Bucureşti.

Cristea, V., Denaeyer, S., Herremans, J.-P., Goia, I. (1996) Ocrotirea naturii şi protecţia mediului în România. Ed. Cluj University Press, Cluj Napoca.

Dihoru, G., Negrean, G. (2009) Cartea roşie a plantelor vasculare din România, Ed. Academiei Române, Bucureşti.

Doniţă, N., Popescu, A., Păucă-Comănescu, M., Mihăilescu, S., Biriş, I.-A. (2005) Habitatele din România. Ed. Tehnică – Silvică, Bucureşti.

Gafta, D., Mountford, J. O. (2008) Manual de interpretare a habitatelor Natura 2000 din România, Ministerul Mediului şi Dezvoltării Durabile, Cluj-Napoca.

Karácsonyi, C. (1987) Elementele florei montane in staţiuni de joasă altitudine din nord-vestul României. Studii şi Cercetări Biologie, seria Biologie Vegetală 39(2): 101-107.

Mitsch, W.J., Gosselink, J.G (2000) The value of wetlands: importance of scale and landscape setting, Ecological Economics 35 (2000) 25-33;

Oltean, M., Negrean, G., Popescu, A., Roman, N., Dihoru, G., Sanda, V., Mihăilescu, S. (1994) Lista Roşie a plantelor superioare din România. – Studii,

sinteze, documentaţi de ecologie, Academia Română, 1: 1-52.

Sanda V., Popescu A., Doltu M.I., Doniţă N. (1983) Studii şi comunicări,nr. 25 supliment, Ştiinţe naturale, Muzeul Brukenthal, Sibiu.

Sanda, V., Öllerer, K., Burescu, P. (2008) Fitocenozele din România, Ed. Ars Docendi, Universitatea din Bucureşti, Bucureşti.

Sârbu, I., Ştefan, N., Oprea, A. (2013) Plante vasculare din România, Ed. VictorBVictor, Bucureşti.

Witkowski, Z. J., Król, W., Solarz, W., Kukuła K., Okarma H., Pawłowski J., Perzanowski K., Ruzicka T., Sandor J., Stanova V., Tasenkevich L., Vlasin M. (2003)Carpathian List of Endangered Species, WWF and Institute of Nature Conservation, Polish Academy of Sciences, Vienna-Krakow.

*** apmsj.anpm.ro (2010) Gestionarea durabilă a patrimoniului natural din Aria Naturală Protejată Racâş-Hida – Sit de interes comunitar, 2010

*** Council of Europe 1979 Convention of the Conservation of European Wildlife and Natural Habitats, Bern, 19.XI.1979.

*** OUG 57, 2007 -Ordonanţa de urgenţă nr. 57 din 20 iunie 2007 privind regimul ariilor naturale protejate, conservarea habitatelor naturale, a florei şi faunei sălbatice. Guvernul României.

http://www.theplantlist.org/