

MANAGEMENT OF BIODIVERSITY IN THE EMERALD SITE "POHREBENI"

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Received June 2024; Accepted July 2024; Published August 2024;

DOI: <https://doi.org/10.31407/ijeess14.302>

ABSTRACT

The object of this study is the Emerald Site "Pohrebeni" which was created to conserve the biodiversity and natural habitats of European importance. The research is focused on establishing the protection status and level of growth and development of flora and fauna species in their natural habitats, and served as scientific source in the creation of the Management Plan of this Site. In order to achieve this goal, field and laboratory researches were carried out. As a result, twelve rare plant species and nineteen animal species protected through national and international instruments were highlighted. Among the animal species, five of them are also protected at European level. The level of development of herbaceous species is dependent on the density of the trees, season, climatic conditions, etc. At the end of spring, the layer of herbaceous species in the referenced area registered a rich development. The abundance of rare species ranges from *Very numerous specimens* (75-100%) to *Very few specimens* (<10%). The species *Delphinium fissum* and *Cephalanthera longifolia* were only reported once, which warns of their vulnerability. Based on the results, the Management Plan of the Emerald Site "Pohrebeni" was developed. The Plan included the management actions for the sustainable conservation of biodiversity, such as the integrated conservation of the rare species together with their natural ecosystems and the monitoring of the level of conservation of species recorded only once and those protected at European level. Another important measure included in the Plan is the continuous informing of the general public about the importance of biodiversity conservation.

Key words: Emerald Site Pohrebeni, biodiversity management, European protected species, Management Plan.

INTRODUCTION

The rapid changes faced by the biosphere require the strengthening of all efforts for the protection of the biodiversity. In this sense, the governments of different countries adopted and elaborated various legislative acts for the biodiversity protection. Among them, in the Republic of Moldova the Emerald Network was created [13], which aims at the sustainable conservation of rare species and habitats of European interest.

In order to achieve the objectives of this tool a Management Plan is needed in all the 61 Sites of the Emerald Network, including the "Pohrebeni" Site. This Plan will enable the sustainable development of human communities and the conservation of rare species together with their habitats and other valuable components. For the development

of such a Plan, periodic assessments of the state of biological diversity are necessary. The obtained results [18] were the basis for the formulation of management actions for the sustainable conservation of biological diversity in the "Pohrebeni" Emerald Site.

MATERIALS AND METHODS

The study object is the "Pohrebeni" Emerald Site, where scientific research was carried out in the field and in the laboratory during the year 2023.

The field researches: evaluation of the reference area in the main phenological phases of development of the ephemeral, annual and perennial vegetation and the periods of fauna development with the inventory of rare species, using the transect method [12]. Recording the abundance of valuable species according to the Braun-Blanquet methodology [3]. Collection of samples for research in the laboratory, taking into account the recommendations of the authors Doniță & Doniță, 1975 [11].

The laboratory researches: determining the systematic belonging of species by using MBS-10 and Micmed-5 microscopes, the determinants [15] and specialized literature [9, 14, 16, 17]. Establishing the degree of rarity and the endangered status of flora and fauna species, taking into account the IUCN Criteria and national, regional and international normative acts [1,2,4-8,10].

RESULTS

The "Pohrebeni" Emerald Site is founded on the basis of the protected area of national interest - the Pohrebeni Landscape Reserve. The Site presents a forest massif located on a surface with a hilly relief, with an altitude varying between 170 and 300 meters and includes a diversity of forest and swamp meadow ecosystems. On the hilly surface of the area the *Quercus petraea* was observed as a predominant species, and *Quercus robur* at lower altitudes.

The valuable elements present in the "Pohrebeni" Emerald Site, which deserve attention and monitoring are: the landscape, tree species, rare species of animals and plants.

The landscape elements are presented by the hilly, fragmented relief, with frequent variations in altitude, the forest and marshy meadow ecosystems and the lake from around the Site.

The tree species. The main species are: *Quercus petraea* (48%) and *Quercus robur* (10%). Among the accompanying species, these are the predominant ones: *Tilia cordata* (11%), *Fraxinus excelsior* (15%) and *Carpinus betulus* (16%) (Figure 1). The tree species *Quercus petraea* with *Tilia cordata* and *Fraxinus excelsior* and the shrub species *Staphylea pinnata* are of conservation interest.

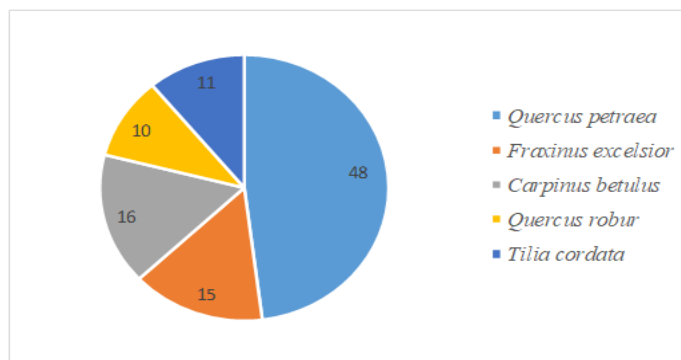


Figure 1. Composition of the tree species in „Pohrebeni” Emerald Site

Rare species. Along with common species, numerous species of flora and fauna with different levels and status of protection have been identified.

Among the detected herbaceous plant species, we encountered those found in the country's Red Book: vulnerable species - *Galanthus nivalis*, *Cephalanthera damasonium*, *Cephalanthera longifolia*; the critically endangered species - *Delphinium fissum* and the rare species from the spontaneous flora of the Republic of Moldova - *Epipactis helleborine*, *Platanthera bifolia*, *Lilium martagon*, *Tulipa biebersteiniana* etc.

Some of the mentioned species are also protected at regional and international levels, as well as being enlisted in the Red Books of neighboring countries (Romania and Ukraine) and on the Lists of Environmental Conventions (Fig. 2).

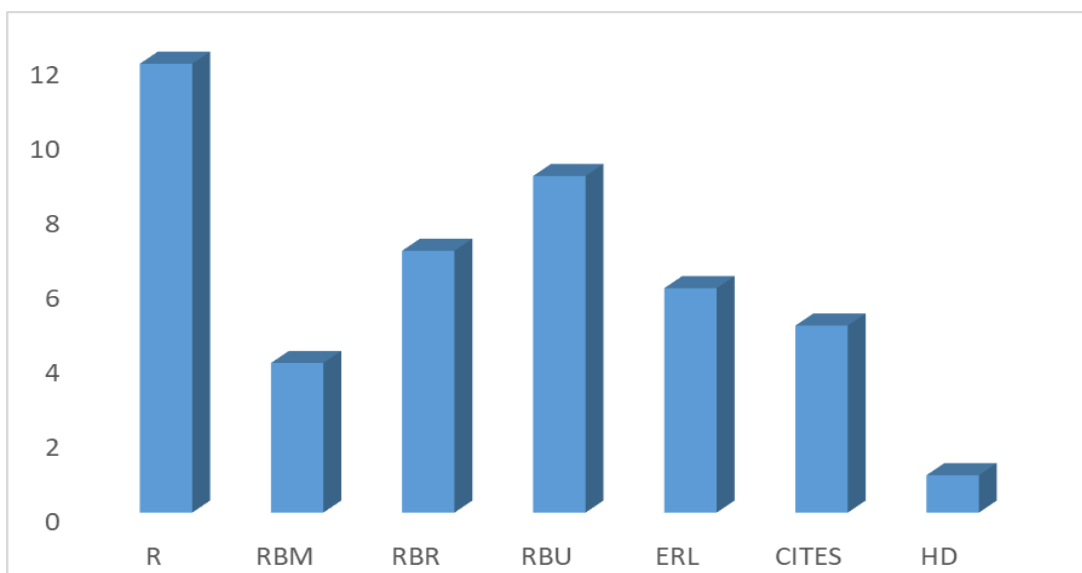


Figure 2. The number of plant species with different protection status

Abbreviations in Fig. 1 and 2. R= rare species on the territory of the Republic of Moldova; RBM=Red Book of the Republic of Moldova; RBR = Red Book of Romania; RBU=Red Book of Ukraine; ERL= European Red List; CITES=Convention Washington; CBern= Convention Bern; HD = Habitats Directive; EN= Emerald Network.

Most of the investigated surfaces recorded a maximum degree of coverage with grassy species. The species *Convallaria majalis* and *Polygonatum latifolium* recorded the highest abundance (60-70%).

A significant abundance, of around 30%, was recorded by the species *Lilium martagon* and *Euphorbia amygdaloides*, followed by *Asparagus officinalis* and *Tulipa biebersteiniana* – with an abundance of 15% and *Dentaria bulbifera* – with 10%. Some species, such as *Delphinium fissum* and *Cephalanthera longifolia* were recorded only once, which warns us about their vulnerability.

The plants species registered only once have a discontinuous distribution within the area. The fragmentation of the areas in fact is alarming, which warns us about the vulnerability and decline of the respective species.

In this situation, it is necessary to apply effective measures to protect the disintegrating populations and to prevent the degradation or destruction of specific habitats.

Table 1. Abundance of plant species

No.	Species name	The coverage	Abundance
1	<i>Convallaria majalis</i>	75-100%	Very numerous specimens
2	<i>Polygonatum latifolium</i>		
3	<i>Lilium martagon</i>	25-50%	Less numerous specimens
4	<i>Euphorbia amygdaloides</i>		
5	<i>Asparagus officinalis</i>	10-25%	Few specimens
6	<i>Tulipa biebersteiniana</i>		
7	<i>Dentaria bulbifera</i>		
8	<i>Delphinium fissum</i>	(<10%) Single specimens	Very few specimens
9	<i>Cephalanthera longifolia</i>		

The Emerald site "Pohrebeni" is a favorable habitat for numerous species of wild fauna. Among the reported species we mention: mammals: *Capreolus capreolus*, *Lepus europaeus*, *Sus scrofa*, *Felis silvestris*, *Mustela nivalis*, *Martes martes*, *Talpa europaea*, *Mustela putorius*, *Meles meles*; reptiles: *Anguis fragilis*, *Lacerta viridis*, *Natrix natrix*, *Coronella austriaca*; amphibians: *Triturus cristatus*, *Bombina bombina*, *Pelobates fuscus*, *Bufo viridis*, *Hyla arborea*, *Rana esculenta*; insects: *Lucanus cervus*, *Carabus violaceus*, *Xylocopa valga*, *Iphiclides podalirius*, *Mantis religiosa*, *Megascolia maculata*, *Hamearis lucina*, *Hesperia comma*, *Aglais urticae*, *Leptidea morsei*, *Euphydryas maturna*, *Maculinea arion* etc. Most of the mentioned species are rare species with multiple protection status (Fig. 3).

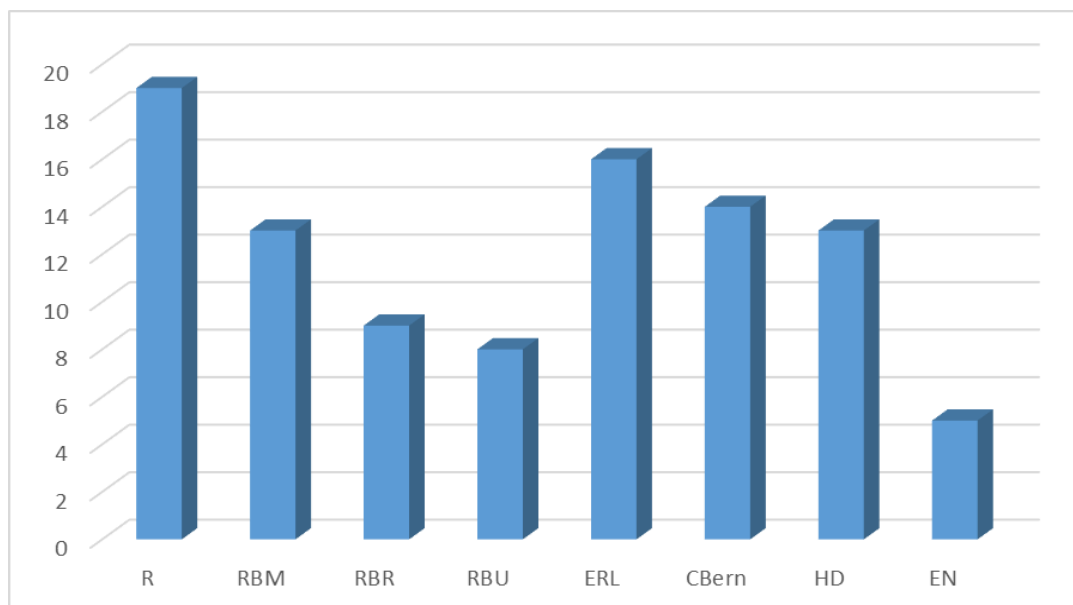


Figure 3. The number of animal species with different protection status.

Since the Emerald Network is a special tool for the protection of Europe's natural environment, we highlight the species identified in the Emerald "Pohrebeni" Site, which are on the Reference List of animal species of Union interest (Annex 3, Law no. 225/ 2022), such as:

Amphibians: 1166 *Triturus cristatus*, 1188 *Bombina bombina*.

Insects: 1052 *Euphydryas maturna*, 4036 *Leptidea morsei*, 1083 *Lucanus cervus*.

Based on the obtained results, managerial actions for the sustainable conservation of biological diversity in the "Pohrebeni" Emerald Site were formulated.

CONCLUSIONS

- The conservation of the forest sectors of European importance in the territory of the "Pohrebeni" Emerald Site, which provide natural habitats and ecological niches for rare and endangered species, can be achieved by implementing appropriate management and undertaking concrete measures including:
- Application of all possible measures to preserve natural habitats to maintain an ecological balance between the links of the food chain.
- Management of rare species of flora and fauna together with the ecosystems in which they are integrated and monitoring the state of conservation of the plant species registered in single specimens: *Delphinium fissum* and *Cephalanthera longifolia* and of those of fauna protected at European level: *Bombina bombina*, *Triturus cristatus*, *Lucanus cervus*, *Euphydryas maturna* and *Leptidea morsei*.
- Prohibition of collecting rare species of plants and animals.
- Planning activities for purchasing food and water for animals.
- Continuous informing of the general public about the management of the Site and measures related to the conservation of habitats and species.
- Organization and implementation of a patrolling system and inspection of the "Pohrebeni" Emerald Site.
- Periodic monitoring and evaluation (once every 10 years) of the conservation status of rare species and the quality of environmental components.

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