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XXVII

Seria Ştiinţele Naturii

2017

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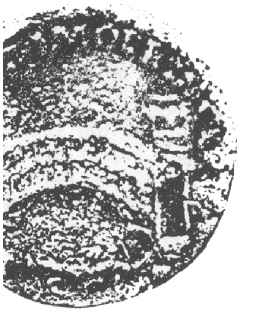

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CUPRINS / CONTENTS / SOMMAIRE / INHALT

"THE FOSSIL REEF FROM BAHNA". THE VALORIZATION OF PALEONTOLOGICAL HERITAGE FROM MEHEDINŢI COUNTY

Florina Diaconu

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"THE FOSSIL REEF FROM BAHNA". THE VALORIZATION OF PALEONTOLOGICAL HERITAGE FROM MEHEDINŢI COUNTY

Abstract: The paper presents the possibilities to valorization and promotion of paleontological heritage from Mehedinţi County preserved at the Natural Sciences Department of Iron Gates Region Museum. The purpose of the exhibition was the knowledge of coral reef from Bahna basin. The paleontological heritage of the Bahna site represents one of the most significant heritages of this kind in România requiring a better and a more responsible protection.
Keywords: paleontological heritage, reef of coral, Bahna, Mehedinţi County, Romania

Introduction

In general, the valorization and promotion of museum heritage depends on the concrete work done in a museum. The museum collections, such as those of paleontology are part of national heritage and an exceptional value. Research and knowledge of this heritage is a permanent concern of the Iron Gates Region Museum, is actually a consequence of the role and place of the museum in contemporary society.

In this context, to educate youth in the spirit of the paleontological heritage protection and respect for "the testimonies of the past", the natural sciences department of Iron Gates Region Museum organized the exhibition "The fossil reef from Bahna".

The Bahna site (Mehedinţi County), declared a protected area of national importance, included in Iron Gates Natural Park, a true open-air geological museum. In the areal of this park there are a number of well-known geological and paleontological sites at European and national level.

Bahna site was declared by HCM 1625/1955 an area of 10 hectares in the basin depression Bahna-Orşova, between Bahna and Iloviţa, the area of the Creeks Curchia and Lespezi.

Iloviţa, Curchia and Lespezi are the protected paleontological reserves inside this basin (Bleahu et al., 1976). From these areas were reported (Marinescu, 1961; Marinescu & Marinescu, 1962; Marinescu, 1965) over 400 species fossil of Badenian (16 million years). First reported in the Bahna site, Curchia Valley is classical for the richness and variety of fossils which it contains. The limestones are of the recifal origin with numerous coral (Photo 1).

Lespezi Site is on the Valley Lespezi Creek (Photo 2), a tributary of the Curchia, with deposits similar to those of the Curchia. The Iloviţa Site is situated on the Racovaţ Valley, tributary to Bahna River and limestone is well exposed enriched by corals (Photo 3).

Photo 1. Corals in deposits limestone from Lespezi Valley

Photo 2. Corals in deposits limestone from Curchia Valley

Photo 3. Corals in deposits limestone from Racovăţ Valley

Material and methods

The paleontological heritage preserved at Iron Gates Region Museum, with 1842 pieces, representing almost 9,47% of the heritage of the Natural Sciences Department. From Bahna site come 668 pieces (36,26 % of all parts) and only 1% are corals. This heritage was valorized using various specific museum means: temporary exhibitions, presentations within the various activities of the educational projects, publicity materials, etc.

In temporary exhibitions "The fossil reef from Bahna" exposed samples of limestone where the coral is the main constituent of these rocks (*Favia magnifica* (Pl. I fig. 1; Pl. II fig. 5), *Syzygophyllia brevis* (Pl. I figs. 2–4), *Heliastrea conoidea* (Pl. II figs. 1–2), *Solenastraea distans* (Pl. II figs. 3–4).

To further enhance the value of the Bahna heritage, there were also posters with explanatory texts and pictures of the coral species representative of this area (Photo 4).

Results and discussions

The exhibition "*The fossil reef from Bahna*", dedicated to the Earth Day celebrations (22 April), was organized in multifunctional Pavilion of the museum (20–11.06.2017) (Photo 5). The purpose of the exhibition was the knowledge of coral reef from Bahna basin.

The exhibition includes fossil remains of some creatures that lived in Mehedinţi County about 16 million years ago. At that time, the Bahna area was covered by the great Miocene, which had clear and warm water at temperatures

above 20 degrees Celsius, which favored the development of a lush, reef life where the corals were predominant.

Photo 4. Image of exhibition "The fossil reef from Bahna"

Photo 5. Aspects from the opening exhibition "*The fossil reef from Bahna*"

Bahna, site of special scientific interest, deserves a very attentive and careful protection (Popa, 2003). First of all, this protection should be undertaken by continuous monitoring of the sites realized by the park rangers. The awareness of local people activities on the importance of the site are frequent, but geological education is still very necessary for the locals, as they should be the first keepers of these natural values "inherited" over time. This natural "inheritance" is ethical decision and responsibility of society's to deliver a healthy environment, with complex and complicated biological components of future generations (Strategia Heritage).

Because the natural "inheritance" of Bahna site to be transmitted "unharmed" from generation to generation done the following steps:

– Pop & Sălăgeanu (1965) stated the most important outcrop, Curchia, monument of nature;

– Marinescu (1965) recommend protection by law of Bahna deposits, especially those from Curchia and Lespezi, attracted attention to the chaotic collect made by occasional visitors. Just keep in private collections fossil material collected should give it to the institutions in the field enriching scientific heritage;

– Paveloiu et al. (1982) propose to take conservation measures to avoid damaging the outcrop from Curchia through abusive and disordered collections;

– Popa (2003) highlight the Bahna site with a rich and well-preserved fauna of vertebrates and invertebrates Badenian in the paleontological heritage of the Iron Gates Natural Park. This park is an important area for geoconservation in Romania, as its geological heritage is among the richest in the South Carpathians;

– Diaconu (2004, 2006) presented the scientific importance of the paleontological reserves of Mehedinţi County, including that of Bahna; Diaconu (2013) propose conservation measures, having regard to anthropic pressures and threats geodiversity to natural park area including Bahna site; Diaconu (2014) presents the possibilities of scientific and cultural-educational valorization of paleontological heritage from Bahna preserved at the Natural Sciences Department of Iron Gates Region Museum

– Tiţa (2009), in his doctoral thesis, realized a monograph concerning stratigraphy and biostratigraphy of the Badenian formations from Bahna;

– implementation of projects with European funded that had as main objective the preservation and promotion of natural values of Iron Gates Natural Park, including Bahna site. Ex. the project "Ecological education through recreation-ecotourism in the Iron Gates Natural Park" (2005–2006), the project "Eco and ethno-cultural cross border interferences" (2006–2008).

Conclusions

The temporary exhibition "*The fossil reef from Bahna*" was one of the most effective ways to scientific and cultural-educational valorization of paleontological

heritage from Mehedinţi, since the exhibition is the most frequent and most important way of promoting the heritage of a museum.

The paleontological heritage of the Bahna site represents one of the most significant heritages of this kind in România, including Mehedinţi. Such values deserve a better and a more responsible protection. Fortunately, by establishing protected area Iron Gates Natural Park, the illegal collecting of fossils and destruction of the geological heritage values will be considerably reduced.

Through paleontological heritage valorization of Bahna site, it aims to present their scientific importance a unique fossil area, one of the oldest and most interesting areas, out of the România, high scientific value, being very rich in corals, and especially the fauna of fossil gastropods.

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Plate I

Fig. 1 *Favia magnifica*

Fig. 2 *Syzygophyllia brevis*

Fig. 3 *Syzygophyllia brevis*

Fig. 4 *Syzygophyllia brevis*

Plate II

Fig. 1 *Heliastrea conoidea*

Fig. 2 *Heliastrea conoidea*

Fig. 3 *Solenastraea distans*

Fig. 4 *Solenastraea distans*

Fig. 5 *Favia magnifica*

CONSIDERATIONS ON THE LIMIT BETWEEN SUBCARPATHIANS AND THE GETIC PIEDMONT IN ROVINARI MINING BASIN REGION

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CONSIDERATIONS ON THE LIMIT BETWEEN SUBCARPATHIANS AND THE GETIC PIEDMONT IN ROVINARI MINING BASIN REGION

Abstract: The boundary between the Subcarpathians and the Getic Plateau is in the south of Câmpu Mare-Tg. Jiu-Câlnic Depression, starting with Bran Hill and Somaneşti Hill (which is a Getic Piedmont witness of erosion). In the delimitation of the Subcarpathians from the Getic Piedmont, we have unconditionally maintained geological-geographic, dynamic or genetic direction. The two geographic entities are completely different from the point of view of the genesis, the lithological structure of the tectonics and the origin of the material constituting the sedimentary cover of these relief forms.

In the area, during the Quaternary period, a whole series of phenomena developed: the modification of the course of some rivers, catchments, erosions that led to the fragmentation of the relief and the appearance of some witnesses of erosion.

Keywords: control of erosion, capture, monoclinic structures, fluviatile sculptogenesis.

1. Framing in the region: Subcarpathians

Subcarpathians delimit on the North the Pliocene – Quaternary deposits in the studied area.

They are made up of neogenic formations with cut structures and most of them with monoclinic structures. The foundation is made up of the crystalline-Mesozoic area sinking in along the Peri-Carpathian fault. The northern area of Bran Hill was affected by an accentuated subsistence movement that conditioned its filling with pelitic and pseftic deposits.

The sedimentation cycle ended with Cândeşti deposits, fluvial – lakes, made up of gravel and sands with both cross-stratifications and clays. The predominant tectonic style is that plicative of regular and rare cuties.

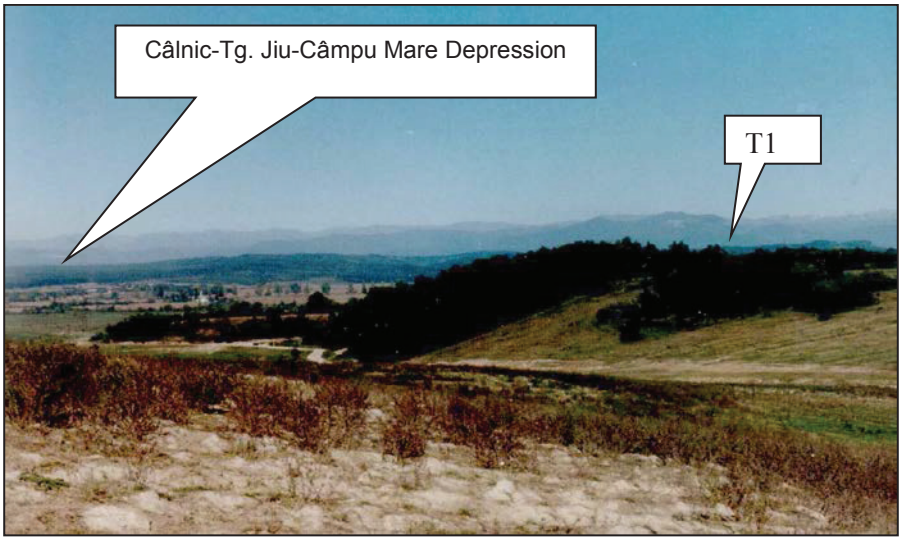

Fig. 1. The old terrace and the upper terrace between
Câlnic and Şomăneşti Villages, Tismana River

From a morphological point of view, the northern boundary of Rovinari Basin is made up of Câlnic – Tg. Jiu – Câmpu Mare intra-hill depression (Fig. 1), which is a synclinal of tectonic and erosion nature and the northern hilly peaks are a huge monocline, inclining towards south with 30–40^0.

The drillings for oil in Tg. Jiu depression also intercepted layers of lignite. From the sculptogenetic point of view, the fluvial type modeling predominates, associated with complementary processes.

2. Getic (Piedmont) Plateau

There are two completely opposite directions of thinking in the demarcation of Subcarpathians by the Getic Plateau, these being:

– Geological – geographic, dynamic or genetic direction – the bases of this direction are placed by the geologists G. Munteanu – Murgoci, L. Mrazec, S. Athanasiu, I. Simionescu, the French geographer Emm. de Martonne, continued by G. Vâlsan, P. Coteţ, Gh. Pop.

– The geographic direction with static, descriptive, morphographic or morphometric character, followed by V. Mihăilescu, T. Morariu, L. Badea.

We totally support the geological and geographical, dynamic side and direction in this paper, represented by the geographer Coteţ (1973). In this context, Bran Hills are part of the Getic Plateau. These are very fragmented, especially the eastern part from Ţîrculeşti to Tg. Cărbuneşti.

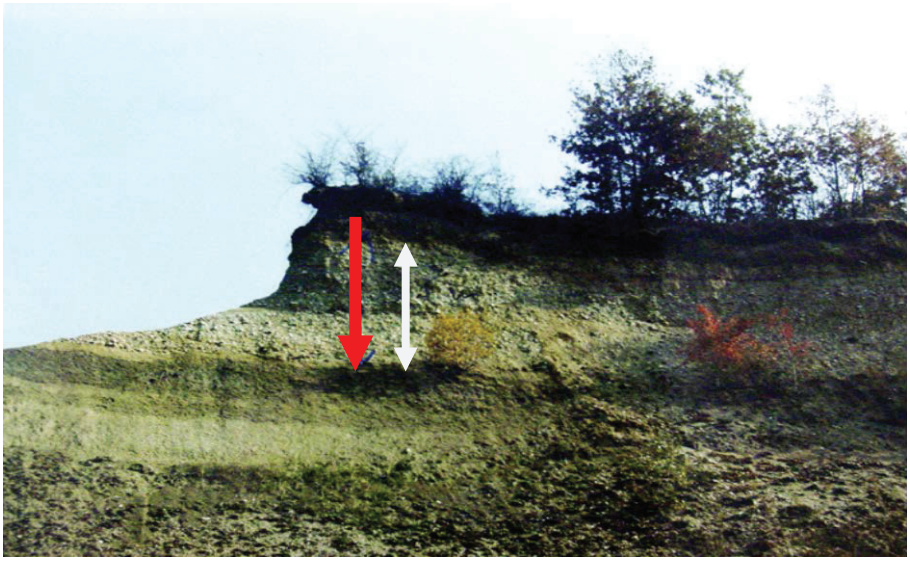

Fig. 2. The high terrace of Jiu River, Rovinari – East open pit

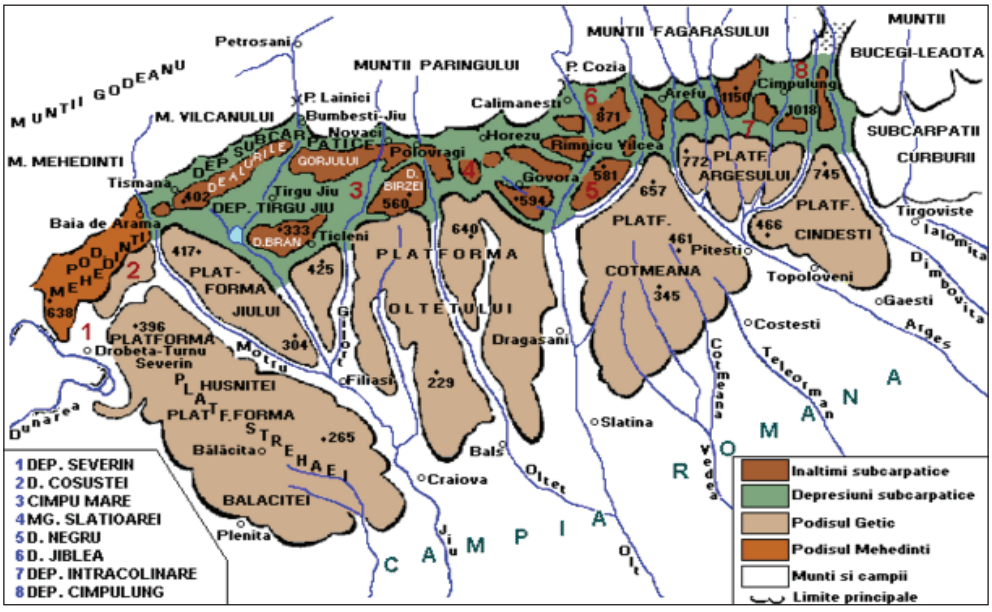

Fig. 3. Getic Piedmont in the descriptive geography concept

Getic Piedmont is the term referring to genesis, lithological composition, the origin of the material constituting the sedimentary cover of this relief. As Badea (1970) also mentioned, about 30% of the territory of Oltenia is covered by the Quaternary fluvial terraces (Fig. 3, 5, 6).

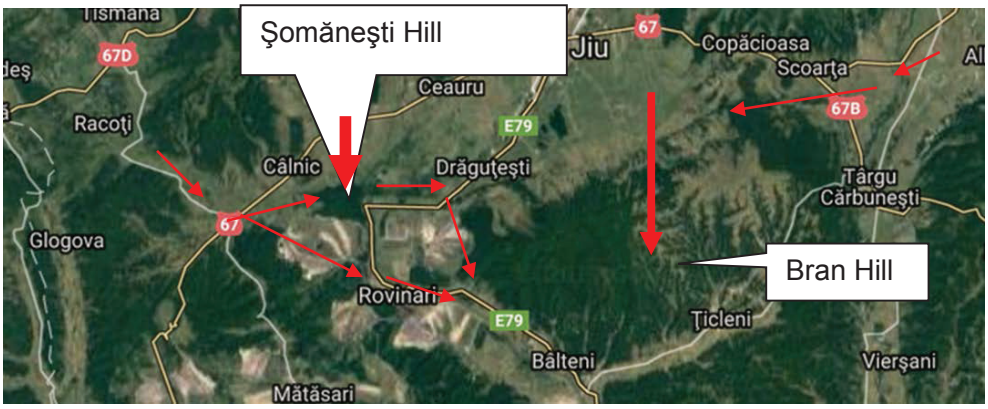

Fig. 4. Şomăneşti Hill-witness of erosion

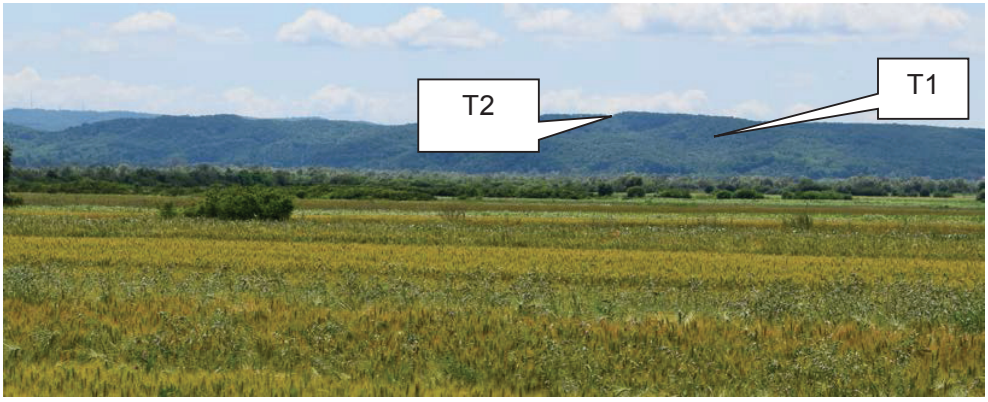

Fig. 5. Şomăneşti Hill – entrance to Piedmont Getic-witness of erosion, seen from Câlnic-Tg. Jiu Depression

Fig. 6. Rovinari Thermo-electric Power Station; behind Jiu Platform, view from Tg. Jiu Depression.

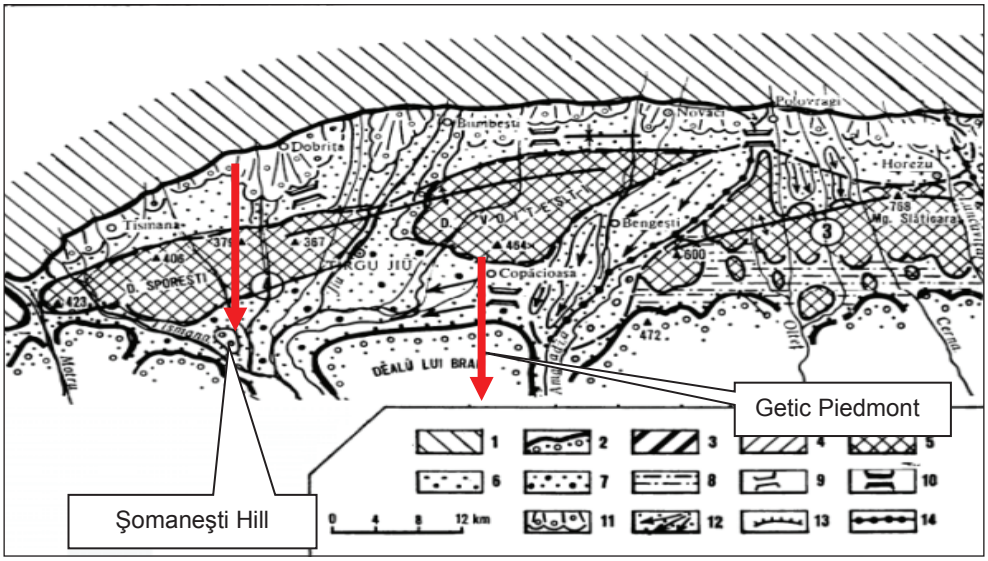

Fig. 7 Getic subcarpathians and their subdivisions:
1- the crystalline mountain; 2 – limit for the Getic Piedmont; 3 – hills on Paleogene and Miocene deposits, monocline or poorly folded; 4 – hills on Neogene deposits, monocline or poorly folded; 5 – hills on folded Neogene deposits; 6 – tectonic and contact Carpathian depressions; 7 – intracolinar accumulation depressions; 8 – subsequent erosion depressions; 9 – erosion deposits; 10 – deposits in areas of accumulation; 11 – piedmont accumulation glaciers; 12 – glaciers and terraces of accumulation, intracolinar; 14 – limits of regions.

The limit between Subcarpathians and Getic Piedmont (Coteţ, 1973).

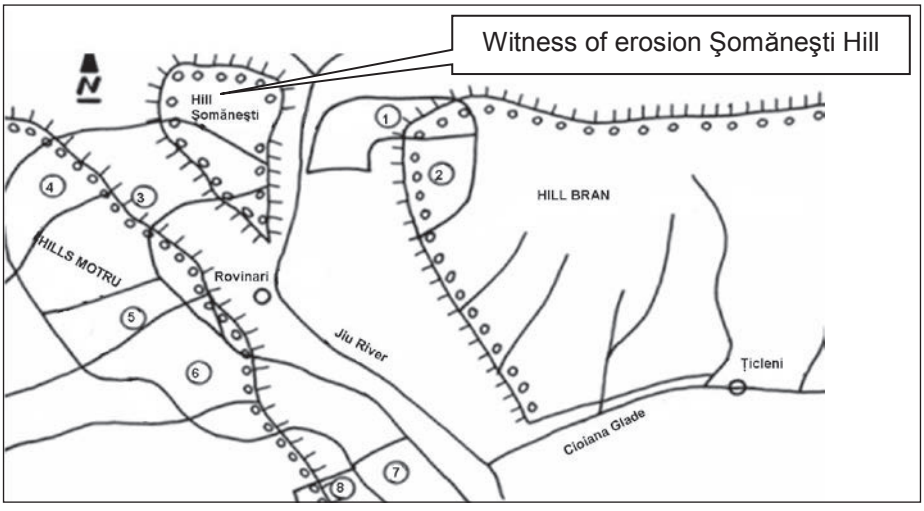

Fig. 8. Getic Piedmont with the main exploitations up to date (1. Gârla, 2. Rovinari-East, 3. Tismana I, 4.Tismana II, 5. Pinoasa, 6. Rosia, 7. Peşteana North, 8. Urdari

The maximum altitude is 333.4 in the western part of Bran Hills, at "La Poarta Cerului" peak. Badea (1963) believes that the Getic Piedmont is developing to the south of V. Cioiana, motivating the height of Poienile Peak, of 425.0 m, so a difference of about 100 m from Bran Hill.

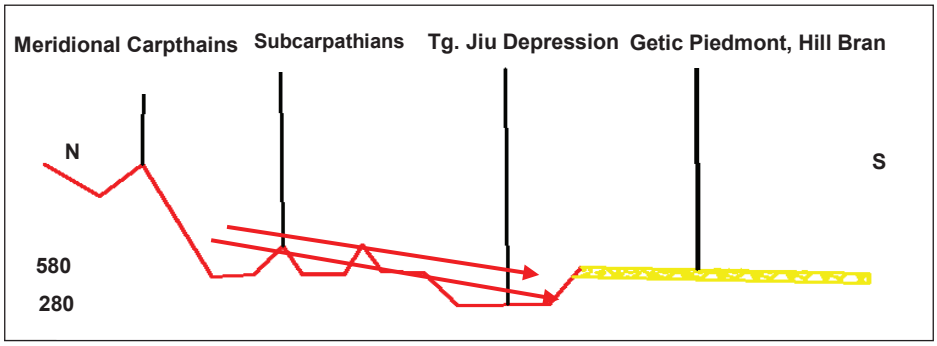

Fig. 9 Drawing of Getic Piedmont supply field

There were several remarkable phenomena in this area, during the Quaternary period, which most often escaped to the geographers in the category of static and descriptive direction. Next, we will try to prove what happened at the boundary between Subcarpathians and Getic Piedmont.

Let's take Bran Hill as a case study, which will give us an image of what happened at the boundary between Romania and Quaternary (Fig. 9). Bran Hill, seen from Tg-Jiu Depression.

Eight terraces of the Paleo – Jiu were opened in Rovinari – East quarry. The terraces develop from Bran Hill from SE to NW to Jiu Meadow (Fig. 10).

Fig. 10. The bridge of the old terrace slopes in the same direction, which proves that the subsidence has been manifested from Willafranchian to the present in the area.

Badea (1970) mentions 9 terraces in the area, of which the first in a geographical sense at 2 – 3 and 4 – 6 m. We, as we have already said, have identified 8 terraced levels starting from Bran Hill, as follows:

	Height from basic level	**Approx. odds of lands**
T_1	– 130 – 150 m	(+ 290 m)
T_2	– 105 – 115 m	(+ 265 m)
T_3	– 75 – 80 m	(+ 240 m)
T_4	– 60 – 70 m	(+ 230 m)
T_5	– 35 – 40 m	(+ 200 m)
T_6	– 20 – 25 m	(+ 180 m)
T_7	– 6 – 10 m	(+ 170 m)
T_8	– 4 – 6 m	(+ 160 m)

The terrace T_1 was not opened to exploitation but it can be seen on the ground, being the high terrace.

The terrace T_2 is the high terrace developed to the east of Rovinari career guard channel.

The terrace T_3 forms the final billow career. All these three terraces are affected by the Terrace fault.

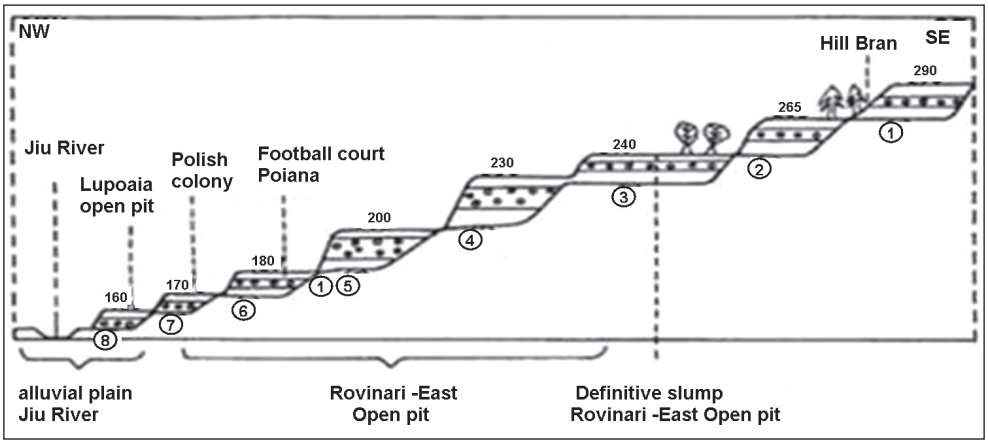

Fig. 11. Draw with the terraces on the left side of Jiu River at the entrance to Getic Piedmont

The terraces of Jiu River in Gârla and Rovinari-East Careers (Fig. 2, Fig. 11).

The saddle from Scoarţa is an old course of Gilort River (Roşu, 1967, from Coteţ, p. 295).

The same phenomenon happened with the old course of Tismana River, in the saddle of Câlnic on the western part of Câlnic-Tg.Jiu-Câmpu Mare Depression.

South of Somanesti Hill, a capture of a little stream took place until the old course of Tismana River was deflected through the current Tismana career.

Tismana River was deflected on its old bed, north of Şomăneşti Hill for the exploitation of the lignite in Tismana I and Tismana II perimeters (Fig. 8).

Conclusions

Bran Hill is part of Getic Piedmont for the following reasons:

– Cândeşti deposits are made up of psamitic and pelican rocks coming from Getic Subcarpathians, namely Badenian, Sarmatian, Meotian, Pontian.

– The sedimentary material is formed mainly of gravel, sand, sandy clays with Sarmatian fauna remain.

– Structurally, the deposits from Bran Hill and Şomăneşti Hill are typically of the piedmont area of Oltenia, namely Dacian, Romanian and Quaternary deposits, forming a slightly monoclinic to the south.

– Getic Subcarpathians are formed from Badenian-Pontian buried warehouses, sometimes appearing diapirism (Săcelu).

– In the studied, Getic Piedmont area consists of Dacian-Romanian-Quaternary deposits relatively horizontal, slightly monoclinic.

– Şomăneşti Hill is a witness of erosion of Getic Piedmont (Fig. 4).

– South of Şomăneşti Hill, there was a capture of a little stream until the old course of Tismana River was deflected through the current Tismana career.

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CONSIDERATIONS ON THE PIETRELE ROŞII SITE (HUSNICIOARA AREA, MEHEDINŢI COUNTY, ROMANIA)

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CONSIDERATIONS ON THE PIETRELE ROŞII SITE (HUSNICIOARA AREA, MEHEDINŢI COUNTY, ROMANIA)

Abstract: The paper presents the research history of the outcrops from the Pietrele Roşii site (Mehedinţi County) and steps taken to protect them. Among the outcrops described, only the Romanian fauna in the DJ 607A is included in Law 5/2000.

Keywords: Early Pliocene, Pietrele Roşii site, Mehedinţi County, Romania

Introduction

From a territorial and administrative point of view, the Pietrele Rosii site is located in the commune of Husnicioara, Mehedinţi County, and is delimited by the Opraneşti Hill to the north, by the Marmanu Hill to the east, by the Copcii Valley to the south and the Depression of Severin to the west.

The access to the fossiliferrous site is on the Cerneţi-Husnicioara DJ 607A county road. This area (Opraneşti Hill) includes some sandy deposits in which lamellibranchiata fossils are often visible; if, in the past, their age was considered to belong to the Middle Romanian, nowadays their age is thought to belong to the Early Romanian (Pelendavian) (Andreescu et al., 2011, 2013).

Geomorphological setting

From geomorphological point of view, the Pietrele Roşii site protected area is located at the western limit of the Coşuştea Hills, a unit that is part of the

Getic Piedmont. The region exposes an advanced fragmentation of the relief due to erosion of a river network trended NW-SE (Cucu Popova, 1980). The land degradation during heavy rains followed by floods and the erosion of banks are actual processes increasing in the Coşuştea Hills, where Husnicioara area is included. These processes put their fingerprint on the outcrops in The Pietrele Roşii area.

Geological setting

The outcrops from Pietrele Roşii expose Late Miocene-Pliocene (i.e. Pontian, Dacian and Romanian) deposits. The Pontian ones are cropping out in the Purcel Creek ("Ogaşul lui Purcel") area, nearby the Husnicioara Mining Enterprise from Copcii Valley. The Dacian and Romanian deposits are predominantly sandy with coal and fossiliferous level intercalations.

Between the Danube and the Motru rivers, the outcrops with Dacian deposits are much less numerous as compared to those in which Pontian deposits appear but they are best known due to the exploration activities performed with coal drillings as well as the mining activities in the Husnicioara open pit.

Previous researches

The Pietrele Roşii fossilliferous area located near the DJ 607A county road was initially described by Giorgescu (1987) which reports the presence the following species: *Pristinunio pristinus* (Bielz), *P. davilai* (Porumbaru) and *Jaskoa strurdzae* (Cobălcescu) and leaf imprints: *Salix integra*, *Acer saxonum, Populus latior rotunda*.

Subsequently, Meilescu (1996) presented the stratigraphy of the Pliocene deposits within the Pietrele Roşii-Husnicioara area. Thus, at the crossroads of DJ 607A county road (towards the former Mine nr. 2) and the Husnicioara open pit, he reports the existence of two lumachelle levels with *Viviparus* sp. from the Early Dacian. The assemblages of the lower lumachelle include: *Viviparus glogovensis* Ştefănescu*, V. motruensis* Ştefănescu*, V. argesiensis* (Sabba)*, V. craiovensis* (Tournouer), *Psilunio sibiensis* Penecke, *Unio* sp., *Valvata (Cincina) crusitensis* Fontannes *Lythoglyphus acutus michaeli* Cobălcescu*, Dreissena polymorpha* Pallas. As for the upper lumachelle, it was shown to include *Viviparus glogovensis* Ştefănescu.

Sometime after that, Pătruţoiu (2000) identified new species of molluscs in the same outcrop situated on the road to Husnicioara open pit: *Unio haekeli* (Penecke), *U. kukuljevici* (Brusina), *Viviparus bifarcinatus bifracinatus* (Brusina), *V. mammatus* (Sabba), *V. craiovensis* (Tournour), *Hyriopsis* sp.

The same outcrop situated in the vecinity of the road leading to the Husnicioara open pit, within the same Pietrele Rosii area, (Diaconu (2002)

identifies a mollusc fauna dating from the Dacian age. The Upper Dacian (Parscovian) was highlighted (Ticleanu et al. 1982) along the valley of the Dedovita stream (in the vecinity of the area under observation) on the basis of a fossil flora and petrographic similarities.

In the Romanian deposits from Pietrele Roşii which are situated at about 500 m from the fossiliferous point mentioned above, Meilescu (1996) reports the existence of the lumachele with *Pristinunio pristinus* (Bielz), *P. davilai* (Porumbaru) şi *Lythoglyphus* sp.

In his doctoral thesis "*Plio-Pleistocene paleontological reserves from Oltenia*" Pătruțoiu (2010) performs an analyzed of the Pietrele Roşii site from the point of view is the protection regime.

Another outcrop which presents a faunistic and lithologic similarity to those from the Pietrele Rosii and Husnicioara Quarry was signalled (Diaconu 20000) on the Husnicioara Valley, in the vecinity of the village with the same name, in the Giurgesti forest. The faunistic assemblage that was indentified is as follows: *Unio rakovacianus* (Brusina), *Rytia brandzae* Sabba, *Pristinunio pristinus* (Bielz), *P. davilai* (Porumbaru), *Viviparus dezmanianus* (Brusina), *V. mammatus* (Sabba) and *V. bifarcinatus stricturatus* (Neumayer) (Diaconu, 2005, 2006).

The paleontological content identified in the deposits from Pietrele Roşii site found in the collection of the Iron Gates Region Museum is illustrated in Plate I (Figs. 1–7) and Plate II (Figs. 1 – 5).

The protection history of the Pietrele Roşii site

The Pietrele Rosii site used to enjoy an initial protection regime ensured by the Decision of the Mehedinţi County Council nr. 26/November 4th 1994. Law 5/2000 regarding the approval of the National Land Management Plan (section II – protected areas) includes only the outcrop on the DJ 607A road in the category 2.0 (Reservations and Natural Monuments, code 2,626) on a 1 hectare surface.

The paleontologic content mentioned in the preposition listed in Annex III of Law nr. 5/2000 for the Pietrele Rosii site is only the one reported by Giorgescu (1987).

As evaluation of conservation status

Within the Husnicioara perimeter, Romanian deposits are present in the areas of Pietrele Rosii (Giorgescu 1987), Husnicioara open pit, (Meilescu 1994) and Giurgesti (Diaconu 2000). The Pietrele Roşii site is covered by the material originating from land slides and it is poorer in the number of species it includes, as compared to the quarry deposits (Meilescu 1996, Diaconu 2002). Neither outcrop can be identified nowadays (Patrutoiu 2010). The one in the vicinity of the DJ 607A county road was closed due to the erection of the supporting wall against land

slides and the area is now covered with vegetation which makes any fossiliferous level identification an impossible one.

The outcrop situated in the vicinity of the road leading to the Husnicioara-West Quarry has been affected by the deposits of rubbish coming from the discommissioned buildings belonging to Mine nr 2 as well as by various landslides.

The fact that the Pietrele Rosii site is characterized by a reduced number of species – which can also be found in other fossiliferous points – together with the one that there were significant changes that took place at the surface the land have both led to the conclusion that the spot should no longer be entered into the list of protected areas (Patrutoiu 2010, pag 173).

The Standard Form specifies the fact that certain activities that have been carried out in the area have had a negative impact on the protected area: mining activities on a permanent basis, collections of biological material and sporadic poaching.

There is no Management plan intended to manage the protected area but there is however a planned control activity of the Agency for the Environment Protection of Mehedinţi County. As far as improvements and/or facilities are concerned, paths and access roads have been reported as being present. As for the requisition orders, they should include enclosures, warning, explanatory and direction boards, marked tourist routes, camping sites, waste collection facilities, fireplaces, etc

With regards to the deterioration of the protected area, one has reported the soil erosion due to natural causes and which is characterizes by continuous evolutionary dynamics, a fact that was also reported during the month of May 2016 when the landslide which took place in the Pietrele Roşii area affected about 500 m of the DJ 607A county road. The landslide sand includes unionidae fragments, possibly *Pristinunio* sp.

Conclusions

The majority of the Pliocene fossiliferous deposits in Mehedinţi County are characterized by the presence of surface outcrops which are exposed to natural erosion factors. On the other hand, human interventions have led to the disappearance of paleontological sites: on the contrary, there are numerous cases when mineral resource exploitation have led to the identification of new fossiliferous sites which have subsequently become protected natural areas.

Romanian and Dacian fossiliferous outcrops are generally settled in sands, rocks that are vulnerable to external agents and with a high geomorphological risk. They can be easily destroyed by the exploitation for construction materials.

Recent geomorphological phenomena (crushes, landslides. vegetation invasion as well as human interventions have seriously affected the Pietrele Rosii fossiliferous site.

Pietrele Rosii from Mehedinti County is the sole fossiliferous spot dating back to the Romanian era. It is protected by law and included in Annex 3 to Law nr. 5/2000.

Taking into account that the Romanian and Dacian era deposits from Pietrele Rosii are valuable from a stratigraphic point of view, all the more so as, as a result of the excavation works in the Husnicioara Quarry, numerous cronostratographic and cartographic marks, we support the proposal that it be maintained as a fossiliferous one, on the list of protected areas.

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Plate I

Fig. 1. *Viviparus motruensis* Ştefănescu

Fig. 2. *Viviparus achatinoides achatinoides Deshayes*

Fig. 3. *Viviparus argesiensis* Ştefănescu

Fig. 4. *Pristinunio davilai* Porumbaru

Fig. 5. *Pristinunio davilai* Porumbaru

Fig. 6. *Pristinunio davilai* Porumbaru

Fig. 7. *Pristinunio pristinus* (Bielz)

Plate II

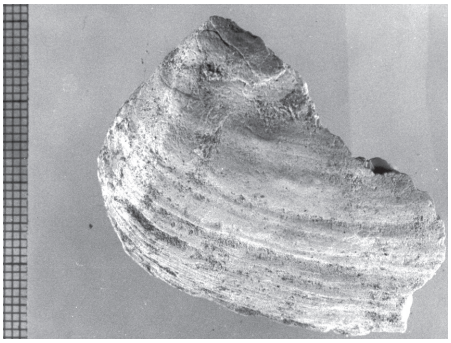

Fig. 1. *Hyriopsis krejcii* Wenz

Fig. 2. *Hyriopsis krejcii* Wenz

Fig. 3. *Unio rumanus* Tournuer

Fig. 4–5. *Jaskoa sturdzae* (Cobălcescu)

NEW HABITATS FOR THE SPECIES GEN. *PULSATILLA MILL*

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NEW HABITATS FOR THE SPECIES GEN. *PULSATILLA MILL*

Abstract: The genus *Pulsatilla* Mill. includes about 35 species of perennial grassy herbaceous plants from Ranunculaceae family widely spread in the Northern Hemisphere, especially North America, Europe and Asia. It predominantly populates the meadows and prairies in the regions with temperate, subtropical and less cold climate (Gilearov, 1989).

For the flora of the Republic of Moldova the bibliographic sources Gheideman, 1975, and Negru et al., 2002, show 3 species (*Pulsatilla nigricans, P. granis, and P. montana*), while in the Red Book of the Republic of Moldova (2015) includes *P. granis* and *P. patens*. Recently, March 28, 2017, we have registered new habitats for 2 species of genus *Pulsatilla – P. nigricans, P. grandis* in the Lopatna defile, located between the villages of Lopatna and Mârzeşti in the district of Orhei.

Keywords: *Pulsatilla*, habitats, abundance, ecology, protection.

Introduction

Taxonomy. The systematic position of genus *Pulsatilla* is determined by such peculiarities as multiple segmented perianth; plumy and much elongated fruity styles, while the flowers show nectariferous staminoides (Beldie, 1977; Gheideman, 1975).

The genus *Pulsatilla* is sometimes considered an under-genus within the genus *Anemones* or as an informal "group" within the *Pulsatilloides*, the under-genus section *Anemone* (Hoot et al., 1994).

Common names include windflower, parsley, saffron, Easter flower, and meadow anemone. Several species are appreciated ornamental plants due to fine-cut leaves, bell-shaped solitary flowers, and bushy seed heads. The loveliest part of the flower is made of sepals, not petals. It blooms with early spring flowers, which leads to the common name of Pasque Flowers, referring to Easter.

The natural environment of the forest district Susleni and the forest body "Lopatna"

Geomorphology. According to the forestry arrangement of January 1, 2007, the geomorphologic territory is situated on the Nistru Plateau, which belongs to the geomorphologic region Moldavian Plateau, characterized by high hills and hillocks whose slopes swiftly and rarely steeply descend to the south and south-east. The relief energy, due to fragmentation, has high values on the Nistru River banks and their affluent streams (the Draghinici, the Lopatna, and the Matca etc.). The altitude of the land varies between 5 and 275 m, of which 43% are in the category 200–400 m. The Lopatna forest body is also located in the Lopatna defile (242.2 ha) (the area of the plots is 5 – 72.4 ha, 6 – 56.4 ha, and 7 – 113.4 ha (Fig. 1).

Geology. From a geological point of view, the substrates that formed the forest soil are made up of clay and loam deposits. The Lopatna brook has dug a real defile revealing the Sarmatian limestone substrate (Fig. 2). Thus, the Lopatna forest body is situated on steep slopes and on rocky banks of Sarmatian limestone with affleurement.

Such quaternary denude slopes, uncovered with collapses and steep cliffs, give a picturesque look to the place where they fit perfectly in a harmonious correlation with the forest, bushy and herbaceous vegetation preserved in time and space, and produce a pleasant effect on the admirers.

Fig. 1. The Lopatna forest body (photo by A. Begu)

Fig. 2. Sarmatian limestone substrate (photo by A. Begu)

Hydrology. The level of the groundwater in the Nistru meadow ranges from 1 to 4 m while in the floodplains of its tributaries it decreases to 15 – 25 m. The hydrographic network is under the direct influence of the precipitation regime in this area being quite limited because the flow of the streams is not permanent. Thus, the forest vegetation is very dependent on the hydrological regime, and water is almost always a limiting factor for it.

Climatology. After the geo-botanic division of the Republic of Moldova, the

investigated territory belongs to the Bessarabian under-province in the European Province of Mixing Deciduous Forest.

The thermal and precipitation regime has the following indices: the average annual temperature is 9°C; the average annual rainfall is 445 mm; the predominant winds are from the northwest; the absolute maximum temperature slightly exceed 40°C; the first frost at ground level was recorded at the end of September, while in the air at the beginning of October; the late spring frost was recorded at the beginning of May.

The climate, in general, is favourable to the development of the main species such as sessile oak, common oak mixed with hornbeam, lime, ash, paltin, tatarian maple and other species. There is a clear tendency towards aridization of the overall climate in the area.

Materials and methods

In field conditions there was used the *direct counting* of plants on a certain surface and the abundance of plants by the Braun-Blanquet Method (1964). In our case for density assessment methodology it was recorded the number of plants on the exact surface they occupy.

Photo images were shot in the flowering and seed dispersal phase and plant specimen of the 2 species were herborized according to classical methods of herborisation.

In laboratory conditions there were used both national and regional plant determinants, were consulted the Red Books, the Red List of Europe, the Annexes to the Environmental Conventions etc. There were determined the position in the space and the altitude above sea level from the satellite imagery of that territory.

Results and discussions

Location and quantitative indices of the habitats of the investigated species

The species described in this paper were found in two types of natural ecosystems: forest and steppe. Both ecosystem types are located on the limestone slope of the Lopatna defile, which passes through the stepped sector, the Lopatna forest body and adjacent agricultural fields reaching the right bank of the Dniester River

Fig. 3. Satellite image of the Lopatna defile (from Google map, 2017)

(Fig. 3). The slope has south-eastern exposure and altitude ranging from 50 to 250 m, while the degree of inclination varies from 40 to 60 degrees.

***Pulsatilla grandis*/*P. vulgaris* ssp. *grandis* (Wender.) Zamels.**

Location. *Pulsatilla grandis* was recorded in a forest clearing and occupied its south-eastern sector with an area of 8x10 m = 80 m^2, the rest of the clearing (about 300 m^2) being occupied by *P. nigricans*. This habitat is located in parcel 6, sub-parcel D (Figs. 4 and 5), which is classified as "shortcuts" aged 30 and productivity class IV. The neighbouring sectors are populated downstream by sessile oak (*Quercus petraea*) – sub-parcel F, while upstream by blending – sub-parcels B; C; E.

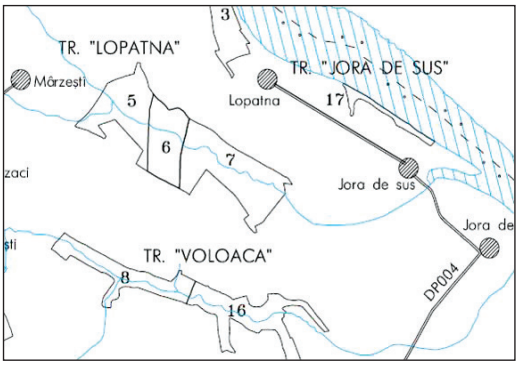

Fig. 4. Scheme of forests in the research area (from ICAS, 2008)

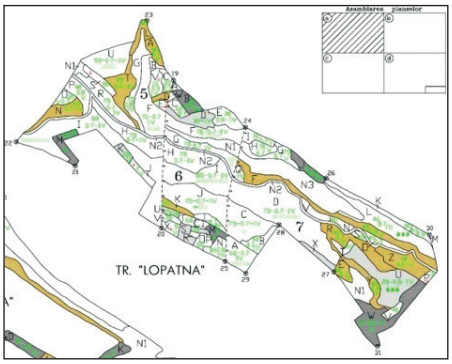

Fig. 5. Scheme of forest composition (from ICAS, 2008)

Quantitative habitat indices. The first images were made on March 18, 2017, when the flowers were still closed and the determination was premature (Fig. 6). Subsequently, on March 28, 2017 there were numbered about 70 bushes of *Pulsatilla grandis* in a very good state of development and mass blooming phase (Figs. 7 and 8).

Fig. 6. The appearance of flowers on 18.03.2017

Fig. 7. Unopened erect flowers (photo by A. Begu)

Fig. 8. Opened flowers

According to the IUCN Red List (2016), the species has the status of "least threatened" Least Concern (LC). This European endemic has a relatively narrow distribution and is classified as being threatened in various countries on the outskirts of its territory, such as Germany, the Czech Republic, Slovenia, Slovakia and Ukraine, and included in several protected areas (Fig. 9).

However, the bastion of the species is Hungary and, despite a wide range of threats, it is unlikely to disappear in the near future. Population monitoring is highly recommended. It is already included in several protected areas.

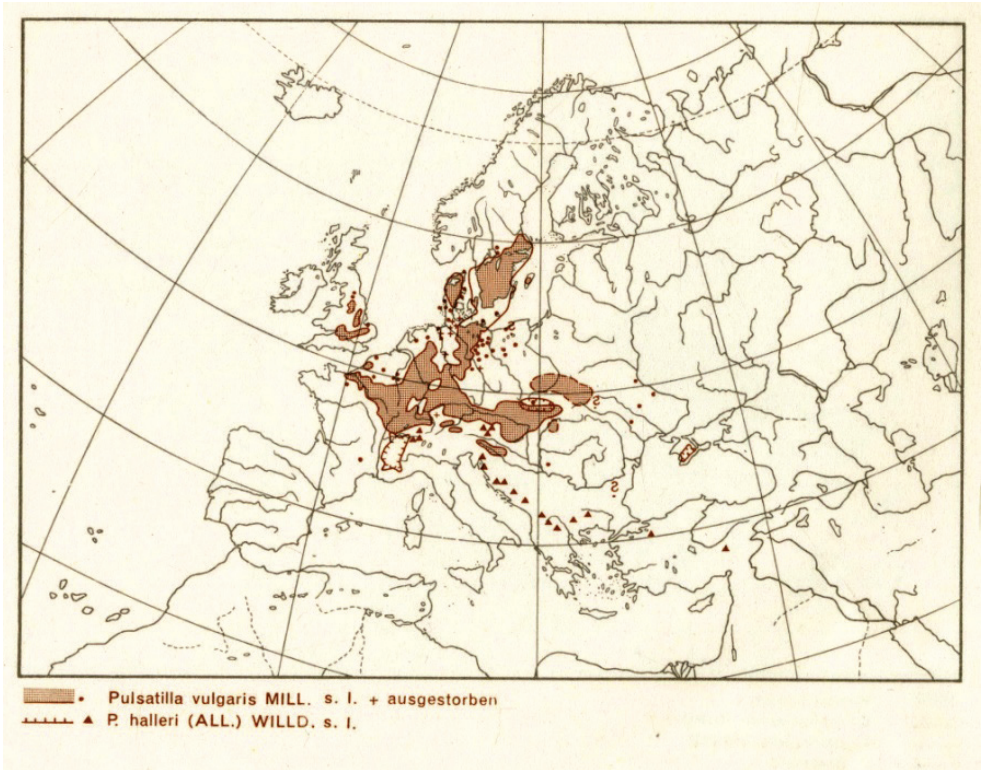

Fig. 9. The area of the European endemic *Pulsatilla grandis* (Google Image, 2017)

The species is also included as endangered species in the Red Book of the Republic of Moldova (Fig. 10). Besides the forest meadows a few bushes were also recorded on the steppe section uphill forest (Fig. 11).

Habitat and Ecology. It prefers dry, stony and oak meadows, open thermophilic affleurement and pine forests (Commission of the European Communities, 2009). It also grows in Shrubland, sometimes on deforestation or orchards and is found among the vegetation of *Quercetae pubescenti-petrae* class or in steppes in *Festuco-Brometea* class communities.

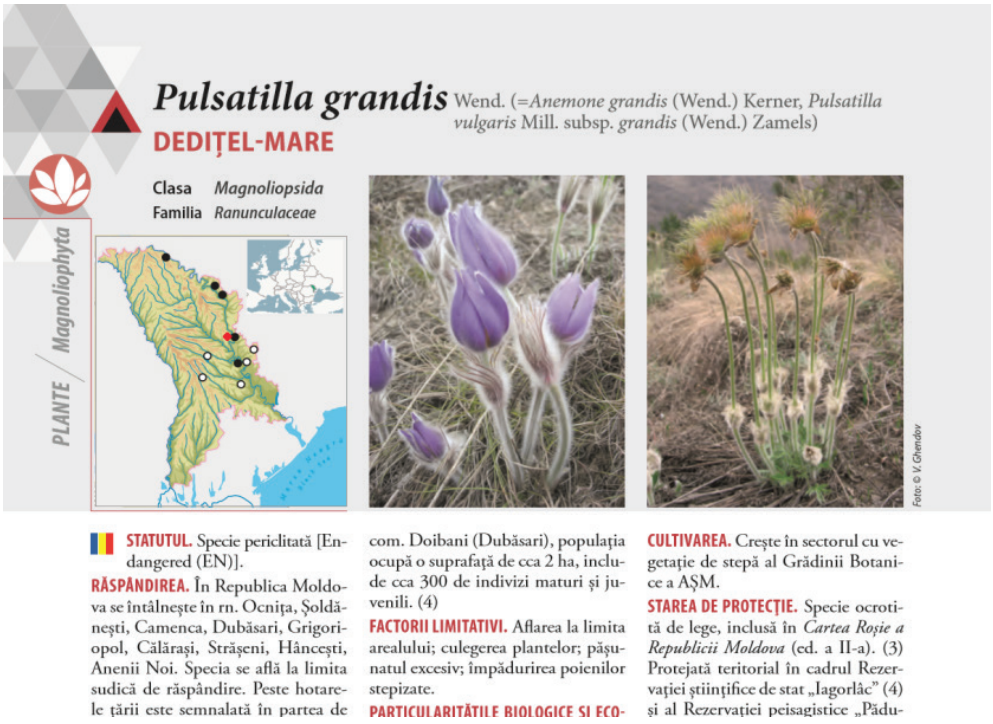

Fig. 10. The Red Book of the Republic of Moldova, 2015

In Slovakia, this plant is found in dry lands, rocky slopes and meadows, and rarely in the clearing of oak forests on various substrates (andesites, dolomites, limestone etc.) from the depression breech to the submountain vegetation.

Conservation actions. *Pulsatilla grandis* is included in Appendix II of the Habitats Directive and in accordance with Appendix I to the Convention on the Conservation of Wildlife and Natural Habitats (Bern Convention, 1979). The species is protected in Hungary, but is not listed as threatened on the Red List. It is also classified as the least worried in Croatia (Nikolić and Topić, 2005). In the Czech Republic (Holub and Procházka, 2000), Germany (Ludwig and Schnittler, 1996) and Slovenia (Skoberne, 1996) it is classified as endangered on the national Red List and protected at national level. In Slovakia it is classified as vulnerable (Mereďa & Hodálová, 2011). It is included in the Red Book of Ukraine (Diduch, 2009) as vulnerable.

The most sites are included in protected areas and sites Natura 2000.

We have harvested mature seeds of *P. grandis* and have sown in different sectors of the defile on various forms of meso-relief and different altitudes (Figs.12, 13 and 14). Soil samples were taken from real habitats populated by both species on decimetre layers up to 0.5 m. At the moment the analyses have not yet been carried out due to the lack of money.

Fig. 11. Solitary shrubs in the stepped sector (photo by A. Begu)

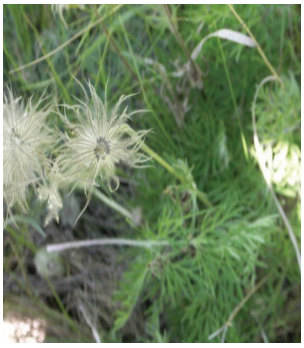

Fig. 12. Seeds of *P. grandis*

Fig. 13. Seedling (photo by A. Begu)

Fig. 14. Seed marking

***Pulsatilla nigricans* Störck (*P. pratensis* (L.) Mill.; *Anemone pratensis* L.)**

Of the total surface area of about 380 m^2, only about 80 m^2 (8x10m) in the South East were populated by the *Pulsatilla grandis* species. The rest of the surface, about 300 m^2, was occupied by *Pulsatilla nigricans* (Fig. 15) with an abundance of approx. 80%. In three clearings in the South East sector of parcel 6 were still recorded multiple copies of *P. nigricans* with abundance from 20 to 70%, with a total area of about 400 m^2. The calcareous slope with both species in parcel 6 has an inclination of about 35–40 degrees, the altitude varies between 50–250 m, and the species is recorded in the altitude range of 130–140 m.

Fig. 15. *Pulsatilla nigricans* at flowering (photo by A. Begu)

According to Flora Europaea, published by Royal Botanic Garden Edinburgh (accessed 2017), *Pulsatilla nigricans* Störck is synonymous with *Pulsatilla pratensis* (L.) Mill. and *Anemone pratensis* L., for which we find the following information:

***Pulsatilla pratensis* (L.) Mill.** Synonyms: *Pulsatilla nigricans* Störck; *Anemone pratensis* L.

Family: Ranunculaceae, Genus: *Pulsatilla,* Species: *pratensis*

Reference: Gard. Dict. ed. 8 no. 2 (1768).

Distribution: Au Bu Cz Da Ge Hu Ju No Po Rm Rs (B, C, W, E) Su; C. & E. Europe, extending westwards to S.E. Norway, W. Denmark and N.W. Yugoslavia (Figs. 16 and 17).

European Endemic.

It is found on the Red List of Romania; European Red List; The Bern Convention. In the Republic of Moldova it is considered a rare species – R.

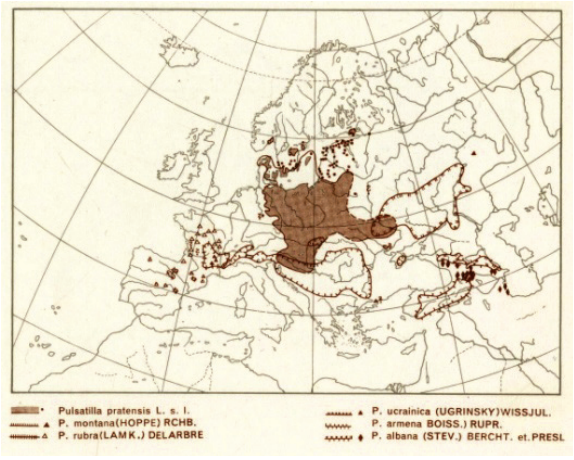

Fig. 16. Area of some species gen. *Pulsatilla*
(Google Image, 2017)

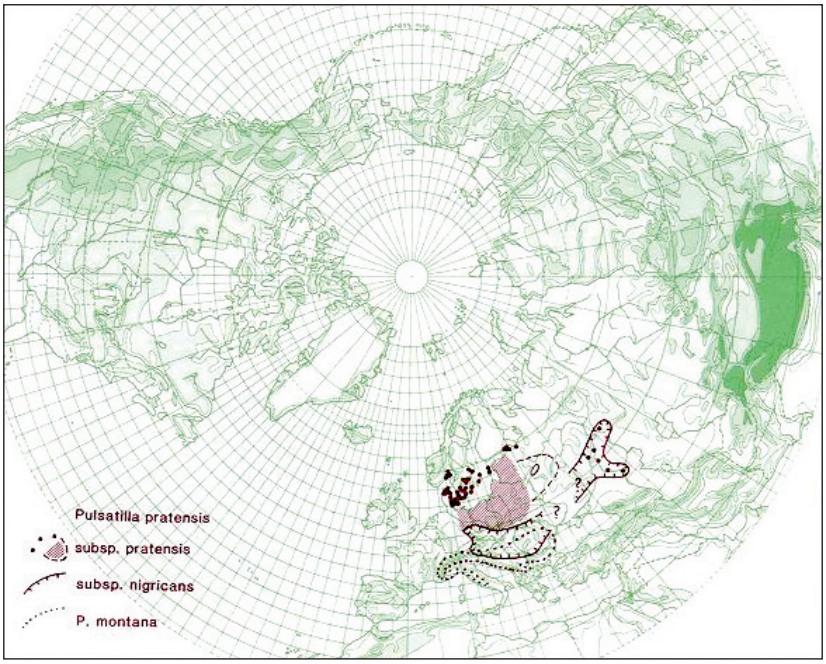

Fig. 17. Area of the species *Pulsatilla nigricans* (Google Image, 2017)

Conclusions and recommendations

1. The Lopatna defile represents favourable habitats for the species of genus *Pulsatilla* that are located in forest and stepped ecosystems.

2. The habitat registered by us for *P. grandis* is the 6th on the territory of the Republic of Moldova.

3. After carrying out soil laboratory analyses, assessing the results of the artificial seedling and checking other ecological factors impacting on the genus *Pulsatilla* there will be developed measures to conserve and expand the areas populated by *P. grandis* and *P. nigricans*.

4. There will be scientifically substantiated the foundation of the state protected area in the category of Botanical Nature Monument.

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CONTRIBUTION TO THE STUDY OF VEGETATION IN OROIU (MUREŞ COUNTY)

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CONTRIBUTION TO THE STUDY OF VEGETATION IN OROIU (MUREŞ COUNTY)

Abstract: The study area belongs to Oroiu village which is part of the Band commune and stretches on the Transylvanian Lowland. The main objective was to analyze the plant associations identified in this area and highlight the presence of rare, vulnerable or threatened species. By doing so, the work contributes to a better understanding of the flora and vegetation diversity of this area. From a floral and phytosociological point of view this area has historically been studied less

Three plant associations that were included in the Festuco-Brometea class: *Rhinantho rumelici-Brometum erecti* (Resmeriţă et Spârchez 1963), Sanda et Popescu 1999*, Stipetum pulcherrimae* Soo 1942 and *Botriochloetum ischaemi* I. Pop 1977 were identified*.*

Adonis vernalis, Salvia nutans and *Orchis coriophora* in the studied phytocoenoses were identified. These plants are among the species on the national red lists for endangered species.

Keywords: phytosociology, plant associations, Transsylvanian Plain.

Introduction

Festuco-Brometea grasslands, present in almost the entire European continent, are among the most species-rich plant communities in Europe and contain a large number of rare and endangered species (Calaciura & Spinelli, 2008).

Dry grasslands of highly diverse vegetation types are of great importance for livestock production in rural areas

The main objective of this paper is to improve the overall picture of the flora and vegetation diversity in this area. Historically little data has been compiled on the floristic and phytosociologic composition of this area.

Particularly, the plant associations identified in this area have been described and the presence of some rare, vulnerable or endangered species has been reported.

The studied area is surrounding the village of Oroiu which belongs to the Band commune. It is located in the SE part of the Transylvanian Plain; here the specific relief of this region is characterized by medium altitude hills, with wide valleys and low altitude hillocks, with moderate or steep slopes. The geological substratum is made up of sarmatian deposits which include marl and sands, with intercalations of sandstone and dacite tuffs.

By its geographic location, the area is characterized by a continental forest-steppe climate, with average annual rainfall of about 600 mm / year and annual average temperatures of 8.3 ° C.

The studied grasslands occur on south, south-east and west facing slopes with altitudes between 400–460 m. In the past this region was covered by oak forests. The potential vegetation according to Kun & al. (2004) is forest-steppe/ forest. At present, small remnants of oak-hornbeam (*Quercus petraea*, *Carpinus betulus*) woods and also some cultivated *Pinus sylvestris* woods grow on hilltops or on north-facing slopes, while the remaining area is occupied by large agricultural fields and grasslands.

Material and method

Fieldwork and data processing methodologies are those elaborated by J. Braun-Blanquet, adapted for regional conditions by Borza.

The research was carried out in the period from 2012–2017. As a result three plant associations framed in the Festuco-Brometea class were identified. The assignment of relevés to specific plant associations has been carried out according to Coldea (2012). Species nomenclature follows Sârbu & all (2013).

For each syntaxonomic unit the study mentions: the floristic composition, the biological structure, the phytogeographical structure, and ecological behavior, reflected by the ratio of the ecological indices (L, U, T, R, N, S). These were graphically represented in bioforms spectrum, geoelements spectrum and ecological spectrum. Also, the distribution of diploid and poliploid species was also plotted.

The phytocoenosis were framed in Natura 2000 habitat types according to Gafta & Mountford, 2008 and Doniţă & al. (2005, 2006).

In determining endangered, rare or vulnerable species, the National Red Lists (Boscaiu & all., 1994, Dihoru&Negreanu, 2009, Dihoru & Dihoru, 1993–1994, Oltean & all., 1994) and the latest version of sozological categories published in the *IUCN Red List Categories* booklet (Biltz & all., 2011) were consulted.

Results and discussion

Following field research three plants associations have been identified that were included in the Festuco-Brometea class:

FESTUCO-BROMETEA Br.-Bl.et R.Tx.ex Klika et Hadač 1944
Brometalia erecti Br.-Bl. 1936
Cirsio-Brachypodion pinnati Hadač et Klika in Klika et Hadač 1944
Rhinantho rumelici-Brometum erecti (Resmeriță et Spârchez 1963) Sanda et Popescu 1999
Festucetalia valesiacae Br.-Bl.et R.Tx.ex Br.-Bl.1949
Festucion valesiacae Klika 1931
Stipetum pulcherrimae Soó 1942
Botriochloetum ischaemi I. Pop 1977

Rhinantho rumelici-Brometum erecti (Resmeriță et Spârchez 1963) Sanda et Popescu 1999

Natura 2000 habitat: 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometea*) (*important orchid sites)
CLAS. PAL.: 34.31 până la 34.34
HdR R3404, R3408, R3413

Phytocoenoses with *Bromus erectus* are sporadically distributed in Transylvania where a subatlantic influence is still encountered in the regional climate. That is why these phytocoenoses meet intra-zonal in the grasslands dominated by *Brachypodium pinnatum*, which is why the xerophilous species predominate in their structure compared to the mesophilic species (Coldea 2012).

In the studied area, the phytocoenoses of this association populate slopes with a southwestern exposure and a 10-degree inclination, as well as planar surfaces located at the top of the hills at altitudes of 400–460 m.

In the floristic composition, besides the edifying species *Bromus erectus*, there is a remarkable number of species characteristic of the syntaxons that subordinate the association: the Festuco-Brometea class, the order Brometalia erecti and the Cirsio-Brachypodion pinnati alliance, along with numerous transgressive species of the Molinio-Arrhenatheretea class.

The number of component species is relatively low (71 taxons), but their density is high, reaching 95–100% coverage. The dominant species are: *Bromus erectus, Rhinanthus rumelicus, Asperula cynanchica, Onobrychis viciifolia, Pimpinella saxifraga, Knautia arvensis, Leucanthemum vulgare*, species that compose the upper layer. The lower layer, which is less represented, consists of: *Thymus pannonicus, Stellaria graminea, Medicago lupulina* etc. (Table 1).

Analyzing the phytocoenoses of the association according to the main ecological indices (Fig. 1), we can see that, in terms of light, predominantly the

plants that grow generally in well lit places, but also occurring in partial shade (L_7–43.66%) followed by light-loving plants, that only exceptionally for a short time can withstand shade (L_8–38.02%). Regarding the humidity index, most species are mezo-xerophilic, dry-site indicator, more often found on dry ground than in moist places (U_3–36.62%, U_4–35.21%) and mesophilic species, moist-site indicators, that grow mainly on fresh soils of average dampness (U_5–16.08%). In terms of temperature preferences, eurithermophilic species (T_x–56.33%) predominate, followed by plants spread in temperate, sub-mountainous areas, mezotermophilous species (T_5–16.90% and T_6–25.35%). A large number of species are spread on neutral or weakly acid to weakly basic soils (R_7–40.84%); along with the amphitolerant, euriphile species (R_x–47.88%). Considering the amount of nitrogen in the soil, we note the large number of oligomezotrophic species (moderately nitrofile), plants indicator of more or less infertile sites spread on poorly supplied soils (N_3–31.42%), followed by oligotrophic species (N_2–17.14%).

In the spectrum of bioforms (Fig. 2), the predominance of hemicryptophytes (71.83%), followed by geophytes (11.27%) and therophytes (5.63%), is in line with the thermal and hydric preferences of the species.

Along with the Eurasians (54.92%), the European species (24.32%) as well as the Ponto-Mediterranean and Ponto-Pannonic elements (12.67%) participate in the composition of the spectrum of the geoelements (Fig. 3).

The kariological spectrum (Fig. 4) is dominated by the polyploid species (48.57%), the diploid ones being 38.57%.

In the younger age, the fodder value of *Bromus erectus* grassland is favorable, but it is poor in the post-emergence period. The conservation value of these grasslands is moderate.

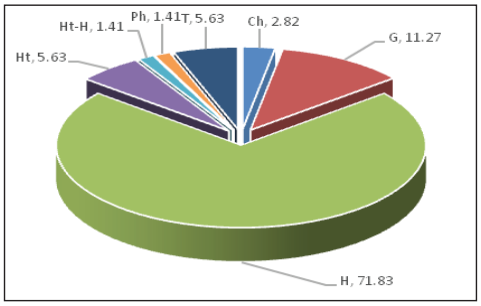

Fig. 1. Ecological indexes of *Rhinantho rumelici-Brometum erecti* association

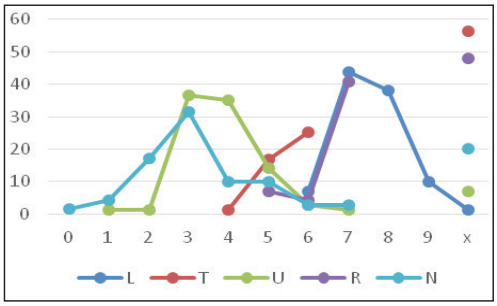

Fig. 2. Bioform spectrum of *Rhinantho rumelici-Brometum erecti* association

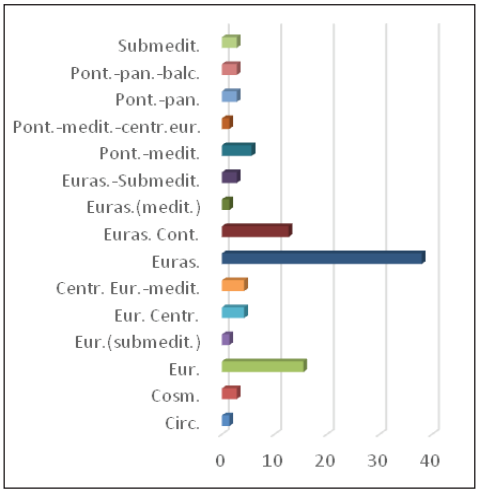

Fig. 3. Floristical elements of *Rhinantho rumelici-Brometum erecti* association

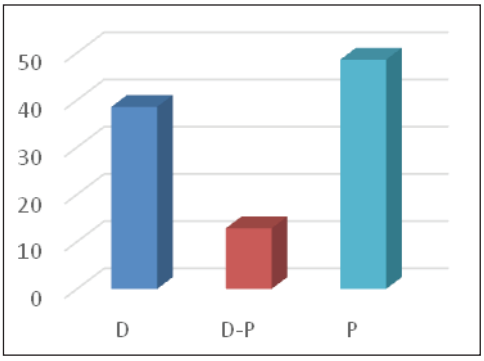

Fig. 4. Karyologic spectrum of *Rhinantho rumelici-Brometum erecti* association

Table 1 – The association *Rhinantho rumelici-Brometum erecti* (Resmeriță et Spârchez 1963) Sanda et Popescu 1999

Relevée	**1**	**2**	**3**	**4**	**5**	
Altitude	**460**	**450**	**457**	**400**	**415**	
Exposure	**-**	**-**	**-**	**SV**	**-**	
Inclination	**-**	**-**	**-**	**10**	**-**	
Surface	**100**	**100**	**100**	**100**	**100**	
Coverage	**100**	**100**	**100**	**100**	**95**	**K**
Car. Ass.						
Bromus erectus	4	3	3	4	3	V
Rhinanthus rumelicus	3	3	4	1	2	V
Cirsio-Brachypodion & Brometalia						
Anthoxanthum odoratum	-	-	+	+	+	III
Brachypodium pinnatum	+	+	+	+	+	V
Briza media	-	-	+	+	+	III
Bromus inermis	-	-	+	-	-	I
Carex humilis	-	+	-	+	-	II
Carlina vulgaris	-	-	-	+	+	II
Centaurea scabiosa ssp. scabiosa	-	+	+	+	+	IV
Gentiana cruciata	-	-	-	+	+	II
Linum perenne	-	-	+	-	+	II
Onobrychis viciifolia	+	+	-	+	+	IV
Polygala comosa	+	-	-	+	+	III
Scorzonera purpurea	-	+	+	-	-	II
Trifolium pannonicum	-	-	+	-	+	II

Veronica teucrium	-	-	+	+	+	III
Festucetalia valesiacae						
Adonis vernalis	1	+	1	+	+	V
Astragalus onobrychis	-	-	+	+	-	II
Elymus hispidus	-	-	+	-	+	II
Festuca rupicola	-	+	-	+	+	III
Medicago minima	+	-	+	-	+	III
Polygala major	+	+	+	-	+	IV
Salvia austriaca	-	+	-	+	-	II
Scabiosa ochroleuca	-	-	+	+	+	III
Stipa pulcherrhima	+	-	+	-	-	II
Thymus pannonicus	+	+	1	+	+	V
Festuco-Brometea						
Ajuga genevensis	-	+	+	+	+	IV
Anthericum ramosum	+	-	-	-	+	II
Asperula cynanchica	+	+	+	+	+	V
Carex praecox	-	-	+	-	+	II
Dianthus carthusianorum	-	-	+	-	+	II
Echium vulgare	+	-	-	-	-	I
Eryngium campestre	+	+	+	+	-	IV
Euphorbia cyparissias	-	+	+	+	+	IV
Euphrasia stricta	+	-	+	+	+	IV
Filipendula vulgaris	-	-	+	-	+	II
Fragaria viridis	-	+	+	+	+	IV
Galium verum	+	+	+	+	+	V
Medicago falcata	+	-	+	+	-	III
Muscari tenuiflorum	+	-	+	-	-	II
Pimpinella saxifraga	+	+	+	+	+	V
Salvia pratensis	-	+	+	-	+	III
Stachys germanica	+	+	+	+	+	V
Stachys recta	+	+	-	-	+	III
Molinio-Arrhenatheretea						
Achillea millefolium	+	-	+	+	+	IV
Cerastium holosteoides	-	-	+	-	-	I
Crepis biennis	+	-	-	-	-	I
Cynosurus cristatus	+	+	+	+	+	V
Dactylis glomerata	+	-	+	+	-	III
Daucus carota	-	+	-	-	-	I
Festuca pratensis	-	-	+	-	-	I
Knautia arvensis	+	-	+	+	+	IV
Leucanthemum vulgare	+	+	+	+	+	V
Lotus corniculatus	+	+	+	+	+	V
Orchis coriophora	-	-	-	+	-	I
Plantago lanceolata	+	+	+	-	-	III

Plantago media	+	+	+	+	+	V
Prunella vulgaris	+	-	+	+	+	IV
Ranunculus polyanthemos	+	+	-	+	+	IV
Stellaria graminea	+	-	+	+	+	III
Veronica chamaedrys	+	+	-	-	-	II
Variae syntaxa						
Asparagus officinalis	-	-	+	-	+	II
Crataegus monogyna	-	-	+	-	+	II
Cruciata laevipes	-	+	+	+	+	IV
Galium album	-	-	+	-	-	I
Gymnadenia conopsea	-	-	+	-	+	I
Hieracium umbellatum	-	-	+	-	-	I
Melampyrum arvense	-	+	-	-	-	I
Ornithogalum umbellatum	+	+	-	-	-	II
Primula veris	-	+	-	+	-	II
Trifolium medium	+	-	-	-	+	II

Dare of relevés: R1 – 09.06.2012, R2 – 20.05.2012, R3 – 05.06.2017, R4 – 6.05.2013, R5 – 02.06.2015, Oroiu.

Stipetum pulcherrimae Soó 1942

Natura 2000 habitat: 62C0* Ponto-Sarmatic steppes
CLAS. PAL.: 34.92
HdR R3406, R3407, R3409, R3418–3421

Coenoses of *Stipa pulcherrima* are frequently found in Transylvania in the form of fragments of vegetation on small surfaces ranging from several hundred square meters up to 2–3 hectares, on the hillsides unfit for agriculture and on the lands where the forest was cut (Doniţă & all. 2005).

In the studied territory, the association occupies the upper third of the slopes with western and south-western exposure, strongly inclined (30–45 degrees) and clay-loamy soil.

The studied phytocoenoses show coats and medium coverage of 85–90%. A number of 73 taxa are registered in the association's structure. Static conditions and floral composition are similar to those of *Stipa pulcherrima* coenoses described in the Transylvanian Plain (Kovacs 2008–2009, Oroian 1993, Oroian & Sămărghiţan 2006, Sămărghiţan 2007, 2010, 2013), but the high anthropic pressure and excessive grazing make these coenoses a higher degree of ruderalization.

Along with the dominant species *Stipa pulcherrima*, which meet high coverage and constancy, and with its characteristic habitus imparts a distinct physiognomy to these phytocoenoses, can meet 50% of the species characteristic of Festucion valesiacae alliance, Festucetalia valesiacae order and the Festuco-Brometea class. Along with these there are species characteristic of the

Cirsio-Brachypodion alliance and the Molinio-Arrhenatheretea class from the neighboring grasslands (Table 2). At the base of the slopes there are shrubs with *Rosa canina* and *Crataegus monogyna.*

Depending on the ecological preferences of the species that make up the association, the predominance of the plants that grow generally in well-lit places, but also occurring in partial shade (L_7–45.83%) and the light-loving ones, which only rarely bear shade (L_8–26.39%), mezoterm species spread in plains and hillocks (T_6–38.89%) and euriterms (T_x–47.22%). Plants that are dry-site indicator, more often found on dry ground than in moist places (U_3–29.17%) and more or less moist-site indicator, mainly on fresh soils of average dampness (U_4–38.89%) are dominant, showing the conditions of this association in terms of humidity factor. As for the soil reaction, the plants of this association prefer neutral soils, from weakly acid to weakly basic conditions; (R_7–52.78%), with a significant percentage being encountered also eurionics (R_x–44.44%). Using the trophic index which uses nitrogen in the soil as a general indicator fertility, the species that prefer soils poor in nitrogen, more or less infertile sites (N_3–26.47%) are predominant. With significant frequency occur also the plants spread on very low nitrogen soils, extremely infertile sites (N_1–11.76%) and those with intermediate requirements between poor and very poor in nitrogen soil (N_2–19.12%) (Fig. 5).

The bioforms spectrum (Fig. 6) is dominated by hemicryptophytes (69.86%). It is noted the presence of a relatively high percentage of phanerophytes (9.5%) of the tendency to extend the hedges.

The geoelements spectrum (Fig. 7) reveals the prevalence of Eurasian elements (45.20%) followed by European and Central European (28.76%). Significant frequencies include Ponto-Mediterranean and Ponto-Pannonic species (8.22%).

In the karyological spectrum (Fig. 8) the diploid species predominate 52.77% followed by the polyploids 34.72%.

Under the influence of grazing and soil erosion, these grasslands turn into grasslands dominated by *Dichantium ischaemum*.

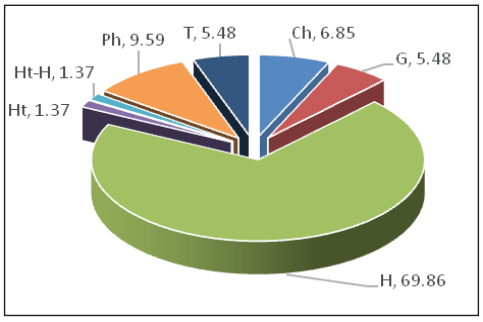

Fig. 5. Ecological indexes of *Stipetum pulcherrimae* association

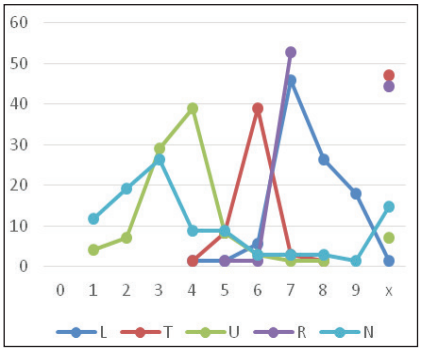

Fig. 6. Bioform spectrum of *Stipetum pulcherrimae* association

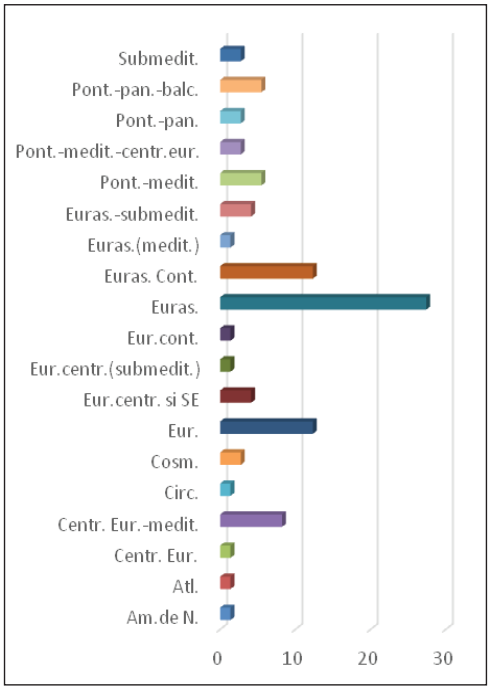

Fig. 7. Floristical elements of *Stipetum pulcherrimae* association

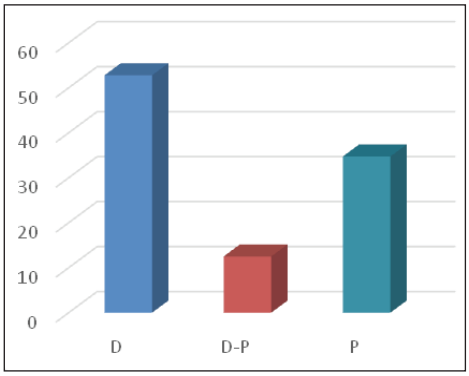

Fig. 8. Karyologic spectrum of *Stipetum pulcherrimae* association

Table 2 – The association *Stipetum pulcherrimae* Soó 1942

Relevée	**1**	**2**	**3**	**4**	**5**	
Altitude	**457**	**460**	**457**	**450**	**462**	
Exposure	**SV**	**V**	**SV**	**V**	**SV**	
Inclination	**30**	**40**	**40**	**45**	**35**	
Surface	**100**	**100**	**100**	**100**	**100**	
Coverage	**90**	**85**	**90**	**90**	**90**	**K**
Stipa pulcherrima	4	4	4	3	3	V
Festucion valesiacae						
Achillea setacea	+	-	-	-	-	I
Astragalus austriacus	+	-	-	-	-	I
Dichantium ischaemum	-	+	-	-	-	I
Dorycnium pentaphyllum ssp. herbaceum	-	+	+	-	+	III
Festuca valesiaca	-	+	1	+	+	IV
Oxytropis pilosa	-	-	-	+	+	II
Salvia nutans	-	-	-	+	-	I
Festucetalia valesiacae						
Adonis vernalis	+	-	-	+	+	III
Campanula sibirica	-	+	+	-	+	III

Cytisus albus	-	+	-	-	-	I
Linum flavum	-	-	-	+	-	I
Lotus corniculatus	+	+	+	-	+	IV
Medicago minima	-	-	-	+	+	II
Muscari tenuiflorum	-	-	-	+	+	II
Nonea pulla	+	-	-	-	-	I
Polygala major	-	-	-	+	-	I
Potentilla arenaria	-	+	-	-	+	II
Salvia nemorosa	+	-	-	+	-	II
Scabiosa ochroleuca	-	-	+	-	+	II
Thymus pannonicus	+	+	+	-	+	IV
Festuco-Brometea						
Anthyllis vulneraria	-	-	+	-	+	II
Artemisia campestris	-	+	-	-	+	II
Asperula cynanchica	-	-	-	+	+	II
Carex caryophyllea	+	-	-	+	+	III
Eryngium campestre		+	+	-	-	II
Euphorbia cyparissias	+	-	+	+	+	IV
Filipendula vulgaris	-	-	+	+	-	II
Fragaria viridis	+	+	+	+	+	V
Galium verum	+	+	-	+	+	IV
Muscari comosum						
Peucedanum cervaria	-	-	-	+	-	I
Pimpinella saxifraga	-	-	-	+	-	I
Plantago lanceolata	-	+	+	-	+	III
Plantago media	-	-	-	+	+	II
Stachys germanica	-	+	+	-	+	III
Stachys recta	-	-	-	+	-	I
Teucrium chamaedrys	+	-	-	-	+	II
Trifolium campestre	+	+	-	+	-	III
Cirsio-Brachypodion						
Brachypodium pinnatum	-	+	-	-	+	II
Ferulago sylvatica	-	-	-	+	+	II
Inula ensifolia	-	+	-	-	+	II
Onobrychis viciifolia	+	-	-	+	-	II
Molinio-Arrhenatheretea						
Achillea millefolium	+	-	-	-	+	II
Ajuga reptans	-	-	-	+	-	I
Anthoxanthum odoratum	+	+	-	-	+	III
Briza media	+	-	-	-	+	II
Dactylis glomerata	+	-	-	-	+	II
Prunella vulgaris	-	+	-	-	+	II
Ranunculus polyanthemos	+	-	-	+	+	III
Stellaria graminea	-	-	+	-	+	II

Variae syntaxa						
Ajuga chamaepithys	-	-	+	-	-	I
Artemisia absinthium	+	-	-	-	-	I
Astragalus glycyphyllos	+	-	-	-	-	I
Cerinthe minor	-	-	-	+	-	I
Clematis vitalba	-	-	-	+	-	I
Convolvulus arvensis	+	-	-	-	-	I
Coronilla varia	-	-	-	+	-	I
Crataegus monogyna	+	+	+	+	-	IV
Cruciata laevipes	+	-	-	+	+	III
Galium album	+	-	-	-	+	II
Hieracium pilosella	-	-	+	-	+	II
Hieracium umbellatum	+	-	-	-	-	I
Hippophae rhamnoides	+	-	-	-	-	I
Prunus avium	-	-	-	+	-	I
Potentilla recta	-	-	-	+	-	I
Primula veris	-	-	-	+	+	II
Robinia pseudacacia	-	-	-	+	-	I
Rosa canina	+	+	-	+	+	IV
Rubus caesius	+	-	-	+	-	II
Salvia verticillata	-	+	-	-	+	II
Thalictrum aquilegifolium	-	-	-	+	-	I
Trifolium alpestre	-	-	-	+	-	I

Date of relevés: R1 – Oroiu, 20.05.2012, R2 – 09.06.2012, R3 – 05.06.2017, R4 – 06.05.2013, R5 – 02.06.2015

***Botriochloetum ischaemi* I. Pop 1977**

Natura 2000 habitat: 6240 Sub-pannonic steppic grasslands
CLAS. PAL.: 34.315
HdR R3414, R3415, R3501

The *Dichantium ischaemum* grasslands come from xerophilous and xero-mesophilous phytocoenoses of the Festucetalia valesiacae order subject to intensive grazing and soil erosion. The structure of these phytocoenoses is characterized by the presence of a small number of species. Besides the high abundance-dominance of the species *Dichantium ischaemum*, is noticed the presence of the group of characteristic species of the associations that it has substituted. (Pop, 1977; Pop et al., 2002).

In the studied territory, the phytocoenoses of this association have been identified on gradual slopes with eastern and southeastern exposition.

Of the 57 taxa that make up the flora structure of the association, over 50% are species characteristic of Festucion valesiacae *(Festuca valesiaca, Dorycnium pentaphyllum ssp. Herbaceum, Kengia serotina, Carex humilis* etc.), Festucetalia

valesiacae (*Scabiosa ochroleuca, Salvia nemorosa, Campanula sibirica, Thymus pannonicus, Onobrychis arenaria*) and the Festuco-Brometea class (*Fragaria viridis, Eryngium campestre, Asperula cynanchica, Filipendula vulgaris, Euphorbia cyparissias, Pimpinella saxifraga, Centaurea scabiosa, Phleum phleoides, Stachys germanica, Carex caryophyllea*) (Table 3).

The stationary conditions in which this association develops favor a large number of light-loving species that grow generally in well-lit places, but also occurring in partial shade (L_7–50.88%), alongside which some light-loving species (L_8–29.82%). The thermal regime is favorable for the development of the species of plains and hillocks (29.82%) and the euriterms (54.39%).

Considering the moisture factor, the species that prefer dry soils (U_3–35.09%) and those more or less moist-site indicator, mainly on fresh soils of average dampness (U_4–36.84%) are dominant.

Most species of this association are eurionic or neutrophilic (45.61% each) in terms of preference to soil reaction and prefer poor nitrogen soils, more or less infertile sites (N_3–37.04%) to very poor in nitrogen, extremely infertile sites (N_2–20.37 %) (Fig. 9).

In the spectrum of bioforms (Fig. 10) predominate the hemicryptophytes (77.19%); also, a remarkable number of phanerophytes and geophytes (5.26%) meet.

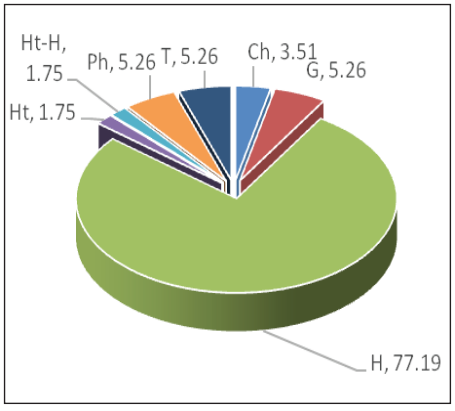

Fig. 9. Ecological indexes of *Botriochloetum ischaemi* association

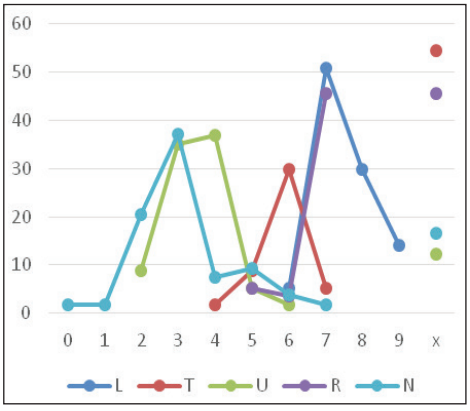

Fig. 10. Bioform spectrum of *Botriochloetum ischaemi* association

In the spectrum of floral elements (Fig. 11), the largest participation has the Eurasian species (59.38%) with which many European and Central European species (22.81%) meet. Due to the xerophilous character of these grasslands, their composition includes a number of Ponto-Pannonic and Ponto-Mediterranean species (14.03%).

Kariological analysis (Fig. 12) indicates a high number of diploid species (47.37%). Polyploid species are present at 33.33%, and diplo-polyploids 19.30%.

Animals consume the dominant species only in younger stages. Therefore, the economic value of these grasslands is low. The edifying species is important, however, for its role in preventing or ending erosion of the slopes, due to rapid regeneration and high soil comprehension, drought resistance and animal dung.

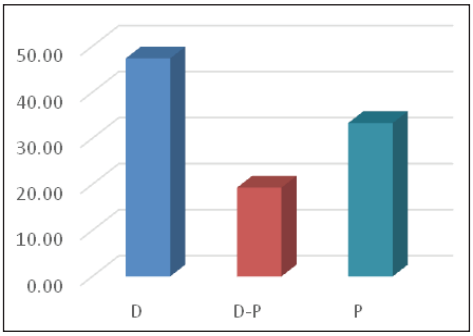

Fig. 11. Floristical elements of *Botriochloetum ischaemi* association

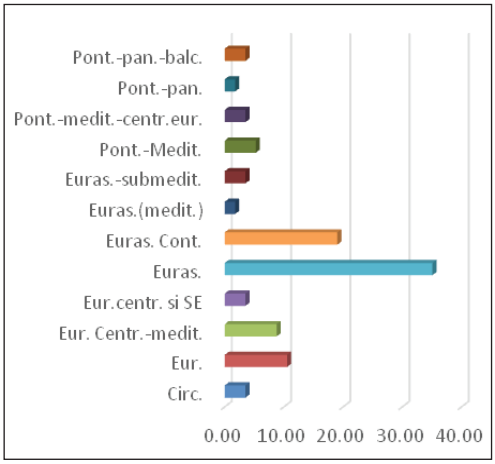

Fig. 12. Karyologic spectrum of *Botriochloetum ischaemi* association

Table 3 – The association *Botriochloetum ischaemi* I. Pop 1977

Relevée	**1**	**2**	**3**	**4**	**5**	
Altitude	**324**	**360**	**320**	**400**	**385**	
Exposure	**E**	**E**	**SE**	**SE**	**E**	
Inclination	**20**	**15**	**20**	**10**	**10**	
Surface	**100**	**100**	**100**	**100**	**100**	
Coverage	**100**	**100**	**95**	**100**	**100**	**K**
Car.Ass.						
Dichantium ischaemum	3	4	3	4	4	V
Festucion valesiacae						
Festuca valesiaca	2	1	1	+	+	V
Dorycnium pentaphyllum ssp. herbaceum	+	+	+	-	+	IV
Kengia serotina	+	-	-	-	-	I
Carex humilis	+	-	+	+	-	III
Astragalus austriacus	+	-	-	+	-	II
Festucetalia valesiacae						
Scabiosa ochroleuca	+	+	+	+	+	V
Salvia nemorosa	+	+	-	+	+	IV
Campanula sibirica	+	+	+	+	+	V
Thymus pannonicus	+	+	+	+	+	V

Onobrychis arenaria	+	-	-	+	-	II
Scorzonera hispanica	+	-	-	-	+	II
Muscari tenuiflorum	+	-	+	-	+	III
Festuco-Brometea						
Fragaria viridis	+	+	+	+	+	V
Eryngium campestre	+	-	-	+	-	II
Stachys recta	+	-	-	-	+	II
Asperula cynanchica	+	+	+	+	+	V
Filipendula vulgaris	+	-	+	+	+	IV
Plantago media	-	+	-	-	+	II
Euphorbia cyparissias	+	+	+	+	+	V
Trifolium montanum	+	+	+	+	+	V
Thalictrum minus	+	-	-	+	-	II
Pimpinella saxifraga	+	+	+	+	+	V
Dianthus carthusianorum	+	+	+	+	+	V
Galium verum	+	+	-	-	+	III
Centaurea scabiosa	+	+	-	-	+	III
Acinos arvensis	+	-	-	-	-	I
Phleum phleoides	+	-	-	+	+	III
Stachys germanica	+	+	-	+	-	III
Carex caryophyllea	+	+	-	-	-	II
Cirsio-Brachypodion & Brometalia						
Briza media	+	+	+	+	+	V
Anthoxanthum odoratum	-	+	+	+	+	IV
Ononis arvensis	-	+	+	-	+	III
Inula ensifolia	+	-	+	-	-	II
Molinio-Arrhenatheretea						
Achillea millefolium	+	+	+	+	+	V
Agrostis capillaris	+	+	-	-	+	III
Dactylis glomerata	+	+	+	+	+	V
Knautia arvensis	+	+	-	+	+	IV
Lotus corniculatus	+	+	+	+	+	V
Stellaria graminea	+	+	+	+	+	V
Plantago lanceolata	+	+	+	+	+	V
Variae syntaxa						
Agrimonia eupatoria	+	+	+	-	+	IV
Ajuga chamaepytis	+	-	-	-	+	II
Cichorium intybus	+	+	+	+	+	V
Clinopodium vulgare	+	+	+	-	+	IV
Coronilla varia	+	+	+	+	+	V
Crataegus monogyna	+	+	-	-	+	III
Cruciata glabra	+	+	+	-	-	III
Cruciata laevipes	-	+	-	+	+	III
Falcaria vulgaris	+	-	-	-	+	II

Melampyrum cristatum	+	-	-	-	-	I
Potentilla recta	+	+	+	-	+	IV
Prunus spinosa	+	+	-	-	-	II
Rosa canina	+	+	+	-	+	IV
Salvia verticillata	+	+	+	-	-	III
Trifolium alpestre	+	-	-	+	-	II
Trifolium medium	+	+	+	-	-	III

Date of relevés: R1 – 09.06.2012, R2 – 25.07. 2017, R3 – 05.06.2017, R4 -06.05.2013, R5 – 02.06.2015

Among the species on the national red lists, in the studied phytocoenoses we identified: *Salvia nutans, Adonis vernalis* and *Orchis coriophora*.

Most of the grasslands of the site have a medium or low conservation status only the conservation status of habitat 6210* is good.

The potential threats/risk factors estimated following the field studies, are particularly caused by anthropogenic factors: overgrazing, extension of crops, ruderalization of vegetation, In the absence of management interventions the impact of short-term risk factors will have the effect of restricting the characteristic plant communities in favour of ruderal assemblages and a sharp decrease in the number of rare species.

Conclusions

In the study area dry and xero-mesophilic grasslands occur frequently. Due to the high anthropic pressure caused mainly by the extension of crops and overgrazing, these grasslands are poorer in species than other conenoses in the Transylvanian Plain described in literature. Also the number of rare, threatened or endemic species is lower.

Three plant associations were identified: *Rhinantho rumelici-Brometum erecti* (Resmeriţă et Spârchez 1963) Sanda et Popescu 1999, *Stipetum pulcherrimae* Soó 1942 and *Botriochloetum ischaemi* I. Pop 1977.

These conenoses were framed in three types of Natura 2000 Habitats: 62C0* Ponto-Sarmatic steppes, 6210* Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometea*) (*important orchid sites), 6240 Subpannonic steppic grasslands.

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Fig. 13. *Adonis vernalis* in Oroiu

Fig. 14. *Rhinantho rumelici-Brometum erecti* association

Fig. 15. *Stipetum pulcherrimae* association

THE IMPORTANT NATURAL AREAS FOR SOME THREATENED PLANT SPECIES IN THE REPUBLIC OF MOLDOVA

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THE IMPORTANT NATURAL AREAS FOR SOME THREATENED PLANT SPECIES IN THE REPUBLIC OF MOLDOVA

Abstract: Twenty-two natural protected areas and four representative ecosystems located on the territory of the Republic of Moldova in the Danube River Basin are the object of investigation.
The ecosystems were evaluated in the main phenological development phases of vegetation. The rare species were identified and their abundance was described.
It has been established that the investigated ecosystems contain a rich diversity of plant species and serve as important conservation areas for 17 threatened species. New growing areas have been registered for some of them. The abundance of threatened species is less than 10% in most cases. This imposes the strengthening of the protection measures for the investigated areas.
Keywords: protected areas, representative ecosystems, threatened species, abundance, important plant areas.

Introduction

The biodiversity conservation is an imperative of the time imposed by the anthropic impact that during the last period has its imprint on all aspects of human life: social, economic, environmental quality etc. All these aspects interact with each other, the quality of the environment being the determining factor that influences the quality and diversity of the Earth's creatures. As a result, many species of plants and animals are threatened with extinction.

In this context, a number of international and national policies are being developed to conserve biodiversity. Among these is the Program for the Identification of Important Plant Areas (IPAs) (Anderson, 2002), which supports

the extension of Protected Area Networks, the Natura–2000 Network and the implementation of the Global Strategy for Plant Conservation, 2002. The implementation of these policies is also in line with the obligations of our state meanwhile the national strategic tools for protecting and preserving biodiversity being the lists of endangered or rare plant and animal species and the Red Book of the Republic of Moldova which are elaborated according to the Red List of the International Union for the Conservation of Nature (Version 3.1: IUCN, 2002 and Version 3.0: IUCN, 2003).

In the context of sustainable development, the key for preserving the areas of interest of rare species is to find and explore the links between conservation and development. Plants are an ideal tool to address this challenge because just as society needs plants, plants need society.

Although plants are of fundamental importance for the balance of ecosystems and the upbringing of man's livelihood sources, the data regarding plant distribution and protection status are still incomplete. Traditionally in the Republic of Moldova the favorable places for conservation of rare species are the natural protected areas, especially the Natural Forest Reservations (NFR), that are the categories of protected areas which aim to ensure optimal conditions for protection and recovery of species and plant and animal communities of national significance.

Knowing the favorable areas for threatened plant species, both within and outside the protected natural area network, it will focus on the conservation management of these species along with their habitats.

Being identified at nationally level using the standard criteria, the important areas for plants can gain international value. Identification of IPAs provides reference data that can be used to define the objectives of Natura 2000, Emerald, EC Habitats (DH) Actions and other European Nature Conservation Legislation.

Materials and methods

The study of natural ecosystems was carried out in the main ephemeral phenophases of ephemeroidal, annual and perennial vegetation. Less known plants have been herborized. The collection of samples took into account the recommendations of Doniţa & Doniţă 1975.

The MBS–10, Micmed–5 microscopes and specialized literature were used to determine the systematic belonging of the species (*Negru, 2007, Gheideman,* 1975).

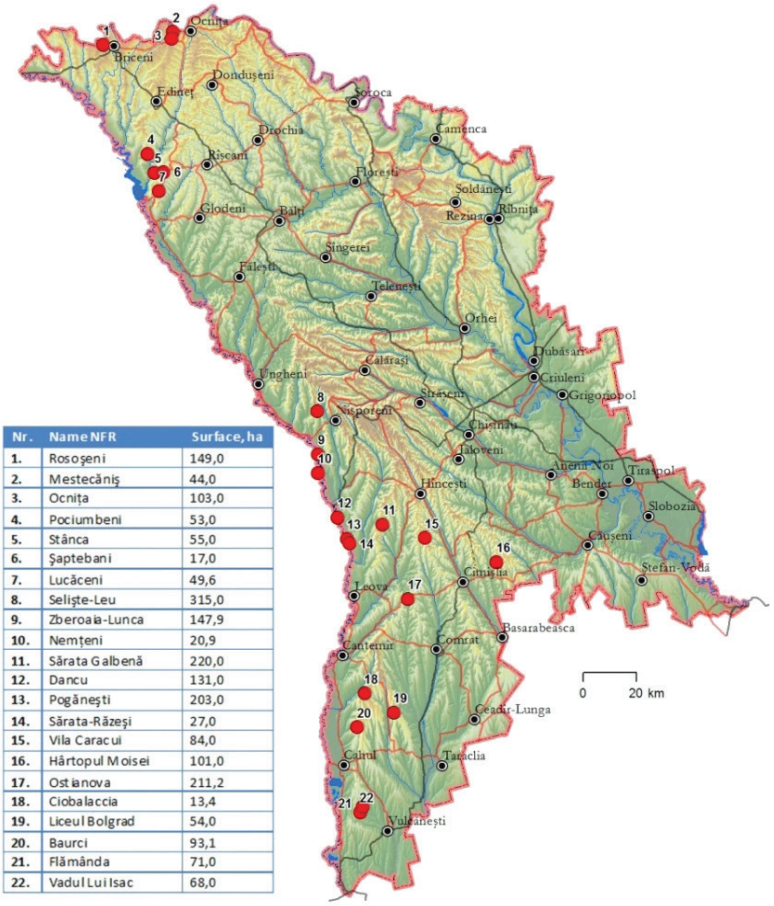
The threat category of rare species was determined in accordance with IUCN classifier (Vie et al., 2009), while the protection status at national, regional and international level according to the Red Book of the Republic of Moldova, 2015; List of Rare Plants from Spontaneous Flora of the Republic of Moldova (Negru et al., 2002); Red Book of Romania (Oltean et al., 1994); Red Book of Ukraina,

2009; European Red List (Bilz et al., 2011); Habitats Directive, 1992, the Annexes of Conventions from Bern, 1979 and Washington, 1979.

The abundance of rare species was determined according to Braun-Blanquet, 1964.

Results and discussions

Twenty-two Protected Areas and more representative ecosystems were included in the study. Among representativ ecosystems was highlighted the forest areas: Pererâta, Rediul de Jos, Şişcani and Lupăria. The objects of study are located in the Danube River basin (the Republic of Moldova), on the following relief units: Moldova's Plateau, Northern Moldova's Plain, Central Moldova's Plateau as well as the Tigheci Hills (Fig. 1).



Nr.	Name NFR	Surface, ha
1.	Rosoşeni	149,0
2.	Mestecăniş	44,0
3.	Ocniţa	103,0
4.	Pociumbeni	53,0
5.	Stânca	55,0
6.	Şaptebani	17,0
7.	Lucăceni	49,6
8.	Seliţte-Leu	315,0
9.	Zberoaia-Lunca	147,9
10.	Nemţeni	20,9
11.	Sărata Galbenă	220,0
12.	Dancu	131,0
13.	Pogăneşti	203,0
14.	Sărata-Răzeşi	27,0
15.	Vila Caracui	84,0
16.	Hârtopul Moisei	101,0
17.	Ostianova	211,2
18.	Ciobalaccia	13,4
19.	Liceul Bolgrad	54,0
20.	Baurci	93,1
21.	Flămânda	71,0
22.	Vadul Lui Isac	68,0

Fig. 1. The scheme of investigated protected areas location (original)

Both protected areas and representative ecosystems are located in the forest fund, which creates favorable conditions for the growth and development of rich plant species diversity. The emphasis was placed on the assessment of the ecological status of spreading areas for threatened species with different degree of rarity: Vulnerable, Endangered and Critically Endangered species.

The climate and relief have caused conditions of existence and formation a vegetation specific to the location of the studied objects. All these, together with the human factor, determine their ecological status.

The analysis of the results of the researches carried out over several years (Begu et al., 2012; Liogchii & Begu, 2010; Liogchii et al., 2011) in the mentioned objects allows us to find that at the research stage a better state of plant growth and development was registered in Natural Forest Reservations (NFRs) Rosoşeni, Şaptebani, Nemţeni, Zberoaia Lunca, Dancu, Sărata Răzeşi and Ciobalaccia. These reserves are characterized by a luxuriant growth both for tree species as well as for the grassy plants. Along with the common species, in the studied ecosystems were registered 35 rare plant species with national, regional and international protection status.

The richest in rare plant species are NFRs Rosoşeni, Selişte Leu and Şaptebani, where were registered 16, 13 and 12 rare species respectively, followed by NFR Zberoaia Lunca, Forest Rediul de Jos with 11 species and NFRs Stânca and Hârtopul Moisei, Forest Pererâta with 10 rare species. The poorest in rare species is NFR Osteanova, with only 3 species. In the other reservations, the number of rare plant species varies from 4 to 10 (Fig. 2).

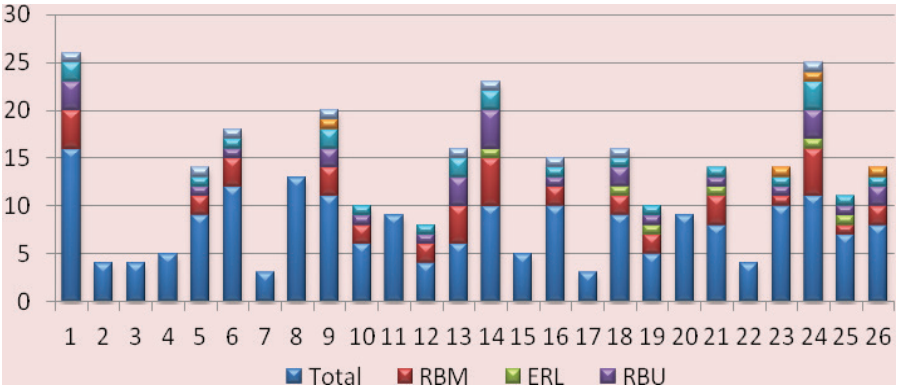


Fig. 2. The number of rare species with different protection status

Notes: 1 to 22 – the protected areas according to Fig. 1; 23 – Forest Pererâta; 24 – Forest Rediul de Jos; 25 – Forest Şişcani; 26 – Forest Lupăria.

As we can see, with the protected areas, the representative ecosystems Forests Rediul de Jos and Pererâta are important areas for certain species (Liogchii et al., 2016). The presence of rare species in an area is an indicator of its value. In

this respect, it is important to know the protection status of the rare species. As a result of the investigation in the areas included in the study there were registered species with a protection status at the national, regional and international levels.

Among the protected species at the national level the most valuable are the species listed in the Moldova's Red Book (MRB). Five species included in the MRB were registered in NFR Sărata Răzeşi and Forest Rediul de Jos and 4 species in NFRs Rosoşeni and Pogăneşti. In other reservations a fewer number of species included in the MRB were registered. Many of these species are also protected both at international and regional level being found on the European Red List and in the Annexes to the Environment Conventions as well as included in the Red Books of the neighboring countries – Romania and Ukraine.

The quantitative criterion does not always reflect the value of the protected object. For example, if we refer to Critically Endangered plant species identified in the investigated areas, an undeniable value has the NFR Hârtopul Moisei – which is the unique habitat of the species *Centaurea thirkei.* NFR Flamănda is protected by the Government as a growth place of the species *Centaurea angelescui.* This species, in a limited number of samples, has been reported only in two habitats of the country. The value of this species is even higher due to the fact that it is also found in the Red Book of Romania, while NFR Flamânda, being situated on the border with Romania, could serve as an ecological corridor for this species.

Single specimens of *Gladiolus imbricatus* were recorded in NFR Rosoşeni, while about 3% represent the abundance of *Paeonia peregrina* species in the Şişcani Forest where it was not mentioned previously.

NFR Dancu is the largest area in the country for the *Leucojum aestivum.* Here, on some sectors, the species has an abundance of 70–80%. Growing in isolation or in groups of 2–3 samples, this species has also been registered by us in NFRs Sărata-Răzeşi, Nemţeni and Pogăneşti. In the last two areas, the species has not been previously registered therefore NFRs Nemţeni and Pogăneşti can be considered as new areas for the *Leucojum aestivum* species.

Five endangered and seven vulnerable species were identified in the investigated areas. Among them are *Dictamnus gymnostylis, Vitis sylvestris, Cephalanthera damasonium* and *Schivereckia podolica* that were identified for the first time in the Forest Rediul de Jos. If the abundance of the first 3 species falls within 5–10%, then that of the species *Schivereckia podolica* is reduced to 1–2%.

The forests Rediul de Jos and Lupăria (Begu et al., 2007; Begu & Liogchii, 2008) are favorable ecosystems for the species *Scopolia carniolica*, which was also registered in NFR Rosoşeni. The first registration of the species in the protected area Rosoşeni could be explained by the extension of its area from Ukraine where it is indicated in several habitats located at the border with the Republic of Moldova. The abundance of this species does not exceed 10% in all mentioned areas.

One of the most wide-spread threatened species is the Vulnerable Endangered species *Fritillaria montana*, which has been identified in 10 investigated areas.

The Forest Lupăria impresses by the abundance of this species that reaches about 30% on some sectors. There is a lake in the forest that contributes to the maintaining of the ecosystem microclimate and creation of favorable conditions for the mezzo-hygrophilic species *Fritillaria montana*.

The diversity of flora species, together with other specific biotic and abiotic components, highlights the value of the investigated forest areas and serves as an argument for being taken under state protection. They fulfill the ecological function contributing to the preservation of biological diversity and the establishment of the National and European Ecological Network.

Table 1: List of threatened plant species

No.	Species Name	Protection status	Location
1.	*Centaurea angelescui* (Grinţ) (Asteraceae)	MRB(CR), RRB	NFR Flămânda
2.	*Centaurea thirkei* Sch. Bip. (Asteraceae)	MRB (CR)	NFR Hârtopul Moisei
3.	*Cephalanthera damasonium* (Miller) Druce (Orchidaceae)	MRB (VU), RRB, URB, CWash.	F. Rediul de Jos
4.	*Dictamnus gymnostylis* Stev. (Rutaceae)	MRB (EN), RRB	NFR Liceul Bolgrad, F. Rediul de Jos
5.	*Dryopteris filix-mas* (L.) Schott (Dryopteridaceae)	MRB (VU)	NFR Rosoşeni, NFR Stânca, NFR Şaptebani
6.	*Fritillaria montana* Hoppe (Liliaceae)	MRB (VU), ERL, RRB, URB, CBern	NFR Rosoşeni, NFR Stânca, NFR Şaptebani, NFR Zberoaia-Lunca, NFR Pogăneşti, NFR Sărata-Răzeşi, NFR Ciobalaccia NFR Hârtopul Moisei, F. Rediul de Jos, F. Lupăria
7.	*Galanthus nivalis* L. (Amaryllidaceae)	MRB (VU), RRB, URB, CWash., DH	NFR Zberoaia-Lunca, F. Pererâta
8.	*Gladiolus imbricatus* L. (Iridaceae)	MRB (CR), RRB, URB	NFR Rosoşeni
9.	*Hepatica nobilis* Mill. (Ranunculaceae)	MRB (VU)	NFR Şaptebani
10.	*Leucojum aestivum* L. (Amaryllidaceae)	MRB (CR), RRB, URB	NFR Nemţeni, NFR Dancu, NFR Pogăneşti, NFR Sărata-Răzeşi
11.	*Ornithogalum boucheanum* (Kunth) Aschers. (Hyacinthaceae)	MRB (EN), URB	NFR Pogăneşti
12.	*Ornithogalum oreoides* Zahăr. (Hyacinthaceae)	MRB (EN), URB, ERL	NFR Sărata-Răzeşi, NFR Ciobalaccia, NFR Liceul Bolgrad, NFR Flămânda

No.	Species Name	Protection status	Location
13.	*Paeonia peregrina* Mill. (Paeoniaceae)	MRB (CR), RRB	F. Şişcani
14.	*Polystichum aculeatum* (L.) Roth (Dryopteridaceae)	MRB (EN)	NFR Sărata-Răzeşi, NFR Flămânda
15.	*Schivereckia podolica* (Bess.) Andrz. ex DC. (Brassicaceae)	MRB (VU), URB, ERL, CBern	F. Rediul de Jos
16.	*Scopolia carniolica* Jacq. (Solanaceae)	MRB (VU), URB	NFR Rosoşeni, F. Rediul de Jos, F. Lupăria
17.	*Vitis sylvestris* CC. Gmel. (Vitaceae)	MRB (EN)	NFR Zberoaia-Lunca, NFR Nemţeni, NFR Dancu, NFR Sărata-Răzeşi, NFR Pogăneşti, F. Rediul de Jos

Explanatory note: MRB = Moldova's Red Book; RRB = Romania's Red Book; URB = Ukraine's Red Book; ERL= European Red List; CWash. = Washington Convention; CBern = Bern Convention; DH = Habitats Directive; CR = Critically Endangered; EN = Endangered, VU = Vulnerable Endangered; NFR = Natural Forest Reservations; F – forest.

Conclusions

1. The investigated ecosystems serve as important conservation areas for 17 threatened plant species. New growing areas have been registered for some of them.

2. In most cases, the abundance index of the threatened species is less than 10%, which requires the strengthening of the measures for their habitat protection.

3. In order to ensure the conservation of the threatened species in the representative ecosystems it is recommended to assign them the status of protected area in accordance with the specific elements that represent them.

4. The investigated areas can serve as connecting corridors with similar habitats in the neighboring countries and underpin the creation of inter-state protected areas.

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THE PROTECTED AREAS AND WETLANDS ALONG THE DANUBE IN MEHEDINȚI COUNTY

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THE PROTECTED AREAS AND WETLANDS ALONG THE DANUBE IN MEHEDINȚI COUNTY

Abstract: The study aims at integrating information on the preservation of the geological substrate and biodiversity in the protected areas, wetlands and Natura 2000 sites along the Danube in the Mehedinți County. A detailed analysis includes the flora, habitats and fauna of a community importance in the mentioned areas. The information is needed for drawing up measures for the protection and preservation of the protected areas, wetlands and Natura 2000 sites along the Danube in the Mehedinți County. This study was achieved within the project "Plumps for junk" (Project Code 15.2.1.054), implemented by Pro-Mehedinti Association (Romania) in partnership with Foundation "Phoenix – 21 Century" (Bulgaria) and Association "Regional partnerships for sustainable development – Vidin" (RPSD – Vidin, Bulgaria), project financed by Interreg V-A Romania – Bulgaria Programme.
Keywords: the protected areas, wetlands, Mehedinți.

Introduction

The issue of preserving the diversity of flora and fauna presents two different aspects: identifying endangered species and the immediate actions needed to save them and concretely applying such action within the endangered biocenotic systems. However, the protection of living bodies should not begin when they have reached the threshold of decline or even extinction. A realistic and efficient protection should be based on a "prophylactic" approach.

Many of the "classical" measures for the protection of endangered species, through the prohibition of their collection and trade, have proved to be not only limited, but also insufficient. However, such restrictive measures must be maintained in the following. As the relationship between the species that should be

protected and their own environment has been understood, the interest for protection has shifted from the idea of protection isolated species to the preservation of the ecosystems they live in. A genuine protection of rare and endangered species can only be assured by preserving ecosystems along with their characteristic biotopes. The only genuine possibility of protecting endangered species is the preservation of the biological communities and ecosystems they belong to. The purpose of a reservation, of a protected natural area is to maintain natural processes in a certain territory in an undisturbed state, preventing any human intervention that may deviate them. Many times, the preservation of biodiversity is equivalent to the preservation of unique and non-repeatable informational structures, whereby biological evolution has invested experience and sacrifices along millions of years. On extended territories subject to various agricultural arrangements, protected natural areas have frequently remained the last "oases" where natural (or even half-natural) ecosystems have maintained features of their original composition.

Practical experience has shown that not only financial resources are needed for preserving biodiversity; we also need the appreciation and respect that may be ensured through the ecological and civic education of local communities.

The study aims at integrating information on the preservation of the geological substrate and biodiversity in the protected areas, wetlands and Natura 2000 sites along the Danube in the Mehedinți County. A detailed analysis includes the flora, habitats and fauna of a community importance in the mentioned areas. The information is needed for drawing up measures for the protection and preservation of the protected areas, wetlands and Natura 2000 sites along the Danube in the Mehedinți County.

Physical, geographical, geological and environmental description of the protected areas and wetlands along the Danube in the Mehedinți County

ROSCI0206 Iron Gates (Fig. 1)

The Iron Gates Gorges is considered an open air geological museum. The complexity of the geological substrate, the remarkable biological diversity have established it as a unique European structure. 4 major structural units can be distinguished: the Danube units, the Severin sheet, the Getic sheet, the Supragetic sheet.

According to the management plan of the Iron Gates Natural Park (2013), the Iron Gates area stands out with is many points of geological and paleontological attraction renowned at a European and national level: the suspended fringe of Munteana – Dumbrăviţa, the exceptional outcrop in Munteana – Dumbrăviţa, the fossil points in Svinița and Bahna, the permian riolithic dome of Trescovăţ, the Danube Gorges, the calcar fringed formations in Grebenul Romanesc, gabbroes

and serpentinites, red permian, permian rioliths, Lower Jurassic fossil sandstones, urgonian calcars in the Cazane, the flysch of Sinaia layers. The complex structure of the Iron Gates Natural Park confers an outstanding touristic attractiveness. Four major land units (Locva Mountains, Almăj Mountains, Mehedinţi Mountains, the Mehedinţi Plateau), depressions (Moldova Nouă, Liubcova, Ogradena – Orşova, Severin), karst plateaus (Cărbunari, Sfânta Elena), calcar areas (Coronini – Liborajdea, Cozla, Sviniţa, Cazanele Dunării), superficial karst structures (limestone pavements, dolines, quays) and deep structures (Gaura cu Muscă Cave, Gaura Chindiei Cave, Ponicova Cave, Cuina Turcului Cave, Veterani Cave, Climente Cave), lithological land units (the riolithic dome of Trescovăţ, loess deposits, the suspended sinclinal of Munteana), river land units (Ostrovul Moldova Veche, Calinovăţ, the Nera "delta", Ostrovul Golu) are only some of the remarkable geo-morphological elements of this area.

Within the area of the Iron Gates Natural Park, zonal soils in the following categories are widely spread: alluvial clay podzoles, brown acid soils, lithomorphic intrazonal soils (V. Glăvan, M. Geanana, 1972), zonal soils (lowly levigated chernosems, podzolic brown reddish soils, brown and brown podsolic soils, brown acid soil), lithomorphic soils (rendzines, terra rosa, erubasems – described by N. Florea et al., 1970, 1971), lowly developed soils (alluvions, regosoils, lithosoils).

Orohydrographical. It has been shown that G. Vâlsan was the first geographer who showed that the Danube in the Cazane does not separate the Carpathians from the Balkans, but it is a transversal valley in the Carpathians, i.e. the Carpathians continue to the South of the Danube, up to the Valley of Timok and Morava.

The entire complex of mountains, to the West of the Timiş-Cerna corridor and the Timok, oriented from North to South and cut by the Danube in the middle, is a single geographical unit that G. Vâlsan has referred to as the "massive of the Porţile de Fier" (N. Popp, 1971).

The orographic conception and toponymic establishment envisaged by G. Vâlsan was also adopted by V. Mihăilescu (1963). The Danube, the only large artery of longitudinal circulation on water in Europe, connects the West and the East of the continent. The course of the Danube is divided into three secondary basins: the upper basin, the medium basin and the lower basin. The upper basin ranges from the Black Forest, the Jura-Alps to the Bohemian Massive, the medium basin ranges from Vienna to Baziaş, and the lower basin from Baziaş to the Black Sea. The Carpathian Gorges and the entire geo-morphological and hydrological complex in the neighbouring area are located in the upper side of the lower basin. The natural unit specific to the Danube basin includes the Carpathians of Porţile de Fier (A. C. Banu, 1967). The Carpathians of Porţile de Fier are included in a complex of calcar depressions and have the shape of an elongated massive, between the Timiş in the north and the Timok in the south. The waters of the Danube, in the Romanian sector of the Iron Gates Gorges, are supplied by a hydrographical network originating in the Locva, Almăj, Cerna and Mehedinţi Mountains.

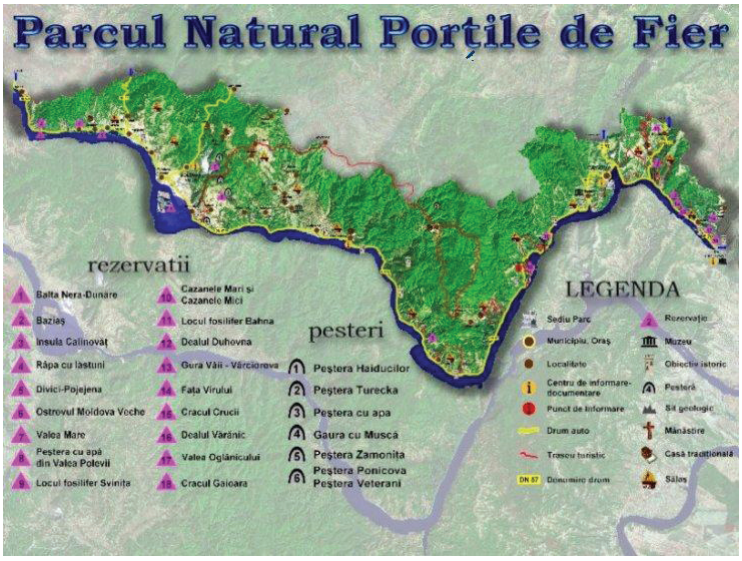

Fig. 1. Iron Gates Natural Park Map (inclusive ROSCI0206 Iron Gates) (according to http://www.pnportiledefier.ro/harta.html)

ROSPA0011 Blahniţa (including ROSCI0173 Stârmina Forest) and ROSCI0299 The Danube at Gârla Mare – Maglavit (Fig. 2, Fig. 3)

The sector from Drobeta Turnu Severin to Salcia is located to the Western side of the Wallachian platform, at the contact with the Carpathian orogene.

Compared to the Iron Gates Gorges, where a wide variety of magmatic, metamorphic and sedimentary rocks is found, sedimentary formations of different ages prevail to the downstream of Drobeta Turnu Severin, with fossil remains attesting life in the geological past and the environmental conditions of living bodies: Silurian-carbon deposits (Gârla Mare, Oprişor, Cetate), Mesosoic deposits (Cetate, Corlăţel), Sarmatian deposits (Salcia, Corlăţel, Cetate), Pontian deposits (between Hinova and Batoţi, Izvorul Frumos, Crivina, Viaşu, Pătulele, Gruia, Vrata, Cujmir, Obârşia de Câmp, Corlăţel), Pleistocene deposits (Corlăţel, Batoţi, Crivina, Gruia, Oprişor, Pătulele, Şimian, Izvorul Frumos, Cujmir, Devesel, Gruia, Gârla Mare, Rogova), Holocene deposits (Balta Verde, Izvoarele, Scăpău, Pătulele, Vrata) (F. Diaconu, 2008).

From a geo-morphological point of view, the area is included in the Romanian Plain, the West of the Oltenia Plain, in the contact area between the Blahnitei Plain, the Balacitei Piedmont and the Danube Lowlands. Land units are represented by the Jiana Plain, the Punghina Plain, the Salcia Lowlands, the Drobeta – Bala Corridor, the Bălăciţa Piedmont.

The territory of these protected natural areas is widely covered by mollisols (chernosems, Cambrian chernosems, alluvial clay chernosems), alluvial clay soils (brown-reddish soils, brown luvic soils, planosols), cambisols (brown

eu-mesobasic oils, brown luvic soils), psamosols (typical, mollic, glazed), hydromorphic soils, alluvial soils, alluvial protosols (Șchiopu R., Ionescu C., 2015).

The hydrographic network is dominated by the Danube and the Small Danube branch, along with the main water courses collecting and sending water directly or indirectly to the Motru or the Danube: Topolnița, Blahnița, Drincea, Husnița.

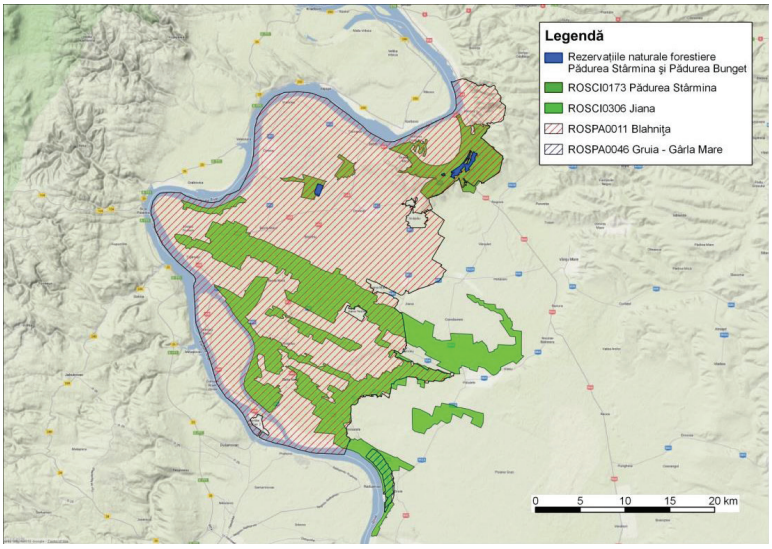

Fig 2. ROSPA0011 Blahnița and ROSCI0173 Stârmina Forest Sites map (according to R. Șchiopu, C. Ionescu (2015) – Integrated Management Plan)

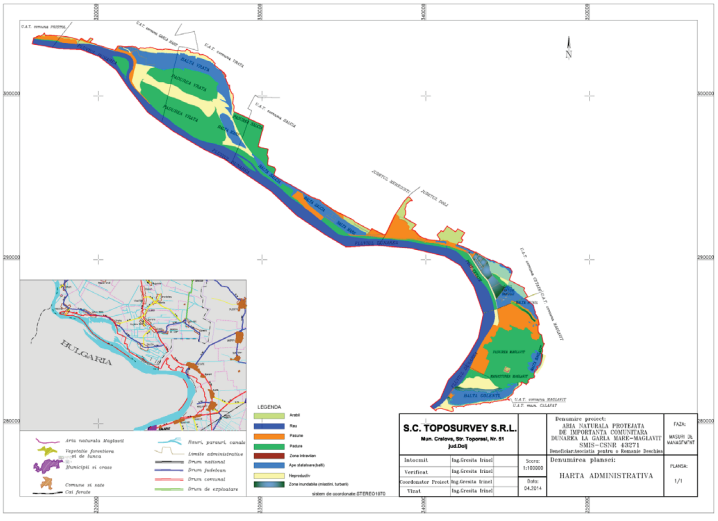

Fig. 3. ROSCI0299 The Danube at Gârla Mare-Maglavit Site map (according to http://apmmh.anpm.ro/-/harti-pentru-aria-naturala-protejata-dunarea-la-garla-mare-maglavit)

ROSCI0198 The Mehedinți Plateau (Fig. 4)

From a geo-morphological point of view, the Mehedinți Plateau is represented by two land units located between the peak of the Mehedinti Mountains to the West and the Getic Piedmont to the East, characterised by a very similar geological and geographical evolution (Meilescu et al., 2004).

The geological framework of the area was presented by Gh. M. Murgoci (1898) and subsequently detailed by Al. Codarcea (1940). The calcar dating back to the Jurassic-Cretacic belongs to the Danube autochthonous and is arranged in two main strips, parallel to one another. The Western strip belongs to the Mehedinți Mountains and is characterized by an extremely strong tectonic process. The Eastern strip appears in the central area of the Mehedinți Plateau, between Baia de Aramă and Cireșu. The calcar package is 200–300 m thick and includes 4–10 m thick layers, generally inclined from South to East. Even though they only take up 5% of the total area, calcar layers have generated many and diverse karst phenomena, that have made the Mehedinți Plateau famous.

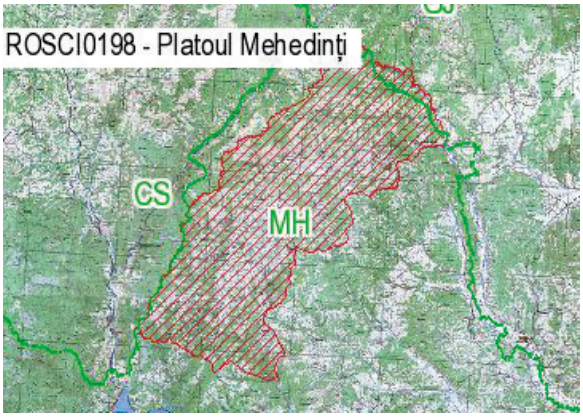

Fig. 4. ROSCI0198 The Mehedinți Plateau Site map (according to https://www.google.ro/search?q=harta+geoparc+platoul+mehedinti&espv=2&biw=1366&bih=599&source=lnms&tbm=isch&sa=X&ved=0ahUKEwit7aSOxZ_OAhUG7xQKHYR5DIgQ_AUIBygC&dpr=1#imgrc=ptrf1jqj5oGkLM%3A)

Almost all the rivers coming from the West, from waterproof formations, are caught in the underground, at the access to the calcar bar. To the downstream of the catchment point, the valleys remain dry, forming antithetical steps along the times, such as the rivers Topolnița, Ponorăț, Ponorel, etc. To the upstream of the catchment, lowlands are strongly alluviated, along hundreds of meters width; thus, closed depressions, with a plane bottom and the general aspect of a polje appear. The most typical phenomenon of the kind is the hydro-karst system next to the Ponoarele commune, generating the Zăton and Ponoarele depressions (M. Bleahu, A. Decu, V. Decu, 1963).

Except for depressions, other exo-karst forms are under-represented across the Mehedinți Plateau. However, one should not overlook the dolines to the West of Balta and Marga, and the limestone pavements and the Natural Bridge from Ponoarele (God's Bridge).

Groundwater has caved many caves, famous in terms of size and beauty, such as Topolnița, Epuran, Bulba, Gramei, Isverna, etc.

The geographical individuality of the Mehedinți Plateau was first outlined by L. Mrazec (1896), and its originality was underlined and recognized by Emm. De Martone (1904).

The significance of preservation, threats and trends, the economic potential of the protected areas and wetlands along the Danube in the Mehedinți County

The cultural identity of the world's peoples has been established in the environment where they have lived and is still dependent from its maintenance. The public interest for preserving heritage values has been recognized by Plinius cel Bătrân, who showed the necessity to adopt laws that would ensure the preservation of remarkable artistic or natural creations. There are natural and cultural values whose disappearance would be a hard loss for the entire humanity.

The Convention Concerning the Protection of the World Cultural and Natural Heritage, adopted by the UNESCO General Conference in 1972, is based on the deep and original idea that nature and culture are not opposite, but complementary realities, and the very cultural identity of the various peoples bears the prints of the natural environment it has been builded in (N. Toniuc, N. Boşcaiu, 1991). A historical monument whose original natural environment has been destroyed becomes incomplete, even mutilated.

The traditional philosophy of protecting nature has tried to save biotopes, assuming that the species populating them will be saved along. This philosophy of on-site preservation is opposed to off-site strategy, since a species taken out of its ecosystem can be considered to be already extinguished. The Romanian scholar Emil Racoviță (1934) underlined the interest of biocenological protection in original biotopes for idio-biological protection ("reservations are preferable to the protection of isolated specie").

The preservation of biological diversity in a protected area is best ensured when the closest treatment to the one before the establishment of protection is applied, so that any subsequent changes are as small as possible. The preservation of flora and fauna biodiversity is no longer possible without the preservation of a wide variety of natural habitats. The genuine protection of the flora and fauna fund is still conditioned by the protection of territories that stand out in terms of biological diversity (N. Toniuc, Ligia Purdelea, N. Boşcaiu, 1995).

According to M. Lockwood (2006), the values of a protected natural area are classified into: intrinsic value (biodiversity); local goods and services (plant products, animal products, recreation and tourism, historical sites and monuments, scientific research, education), general goods and services (life support for humans, life support for other living bodies, water quality and quantity, air quality, protection of fish resources, agricultural protection, protection of human settlements), values of communities (culture, identity, spirituality, heritage for

future generations), individual values (existential satisfaction, experimental satisfaction, physical health, mental health, spiritual welfare).

In their paper "Ariile protejate din România. Noţiuni introductive" (2009), E. Stanciu and F. Florescu consider that the suitable maintenance and use of the values of a protected natural area may result in obtaining gains, revenues or even advantages, which would decrease if the intrinsic values of such areas were not preserved properly. Economic benefits may result from the sustainable "exploitation" of intrinsic and extrinsic values of protected natural areas. However, the most important economic benefits result from the ecological services of protected natural areas: water depuration, air quality assurance, health assurance for human communities, and preservation of natural and cultural heritage.

ROSCI0206 Iron Gates

The first actions to protect nature in the Danube Gorges were taken at the beginning of the 20th century, when several reservations, such as the "Pasul Cazan din Banat", were proposed. In the report "Protecţiunea naturii în România", A. Borza (1924) also lists, among provisionally established botanical reservations, "the Danube Gorges, with the forest and rock vegetation, with a meridional flower colour, the classical place of *Tulipa hungarica* and *Campanula crassipes*", as well as "Porţile de Fier – the openings in Gura Văii, with an extremely rich flora in meridional species: Prangos carinata, Dianthus serbicus, etc.". In the First Congress of Romanian Naturalists of 1928, A. Borza refers to the Danube Gorges, which the "community of Caransebes has committed to protecting", as well as the "grass-covered slope in Gura Văii", as a future reservation.

The action for the protection of nature in the Iron Gates Gorges was pursued in the following decades, and the Ministry for Water, Forests and Environment Protection issued Order no. 84/30.01.1998, declaring *the Iron Gates Natural Park in the Iron Gates area of the Caraş-Severin and Mehedinţi counties, with a surface of 115655.85 hectares*, with the surrounding limits.

By Decree no. 41/02.03.2000, the President of Romania passed Law no. 5/06.03.2000 on the approval of the Plan for the Arrangement of National Territory – Section III Protected Areas, published in the Official Gazette no. 152/12.04.2000. The list of natural protected areas of a national interest includes the Iron Gates Natural Park, with an extension of 115655.85 hectares, as well as the reservations that exist on this territory: Balta Nera-Dunăre (10 ha), Baziaş (170 ha), The sand martin ravine of Divici Valley (5 ha), Valea Mare (1179 ha), The Fossiliferous Site of Sviniţa (95 ha), Cazanele Mari and Cazanele Mici (115 ha), The Fossiliferous Site of Bahna (10 ha), Duhovna Hill (190 ha), Gura Văii – Vârciorova (305 ha), Faţa Virului (1 ha), Cracul Crucii (2 ha), Oglănic Valley (150 ha), Cracul Găioara (5 ha), Vărănic Hill (100 ha).

The surface of the protected areas/reservations in the area of the Iron Gates Natural Park changed in the following period, so that, according to the Order of

the Minister for Agriculture, Forests, Water and Environment no. 552/2003 on the approval of the inner zoning of national parks and natural parks, in terms of the necessity to preserve biological diversity, Government Decision 251/2004 on the establishment of the protected natural area status for new areas and Government Emergency Ordinance no. 57/2007, as subsequently amended and supplemented, the situation of protected areas/reservations is as follows: Balta Nera-Dunăre (mixed, 10 ha), Baziaș (mixed, 170.9 ha), The Island of Calinovăț (birds, 24 ha), The sand martine ravine of Divici Valley (mixed, 5 ha), Divici – Pojejena (birds, 498 ha), Valea Mare (botany, 1179 ha), The Water Cave of Valea Polevii (mixed, 3.2 ha), Ostrovul Moldova Veche (birds, 1627 ha), The Fossiliferous Site of Sviniţa (paleontological, 95 ha), Cazanele Mari and Cazanele Mici (mixed, 215 ha), The Fossiliferous Site of Bahna (paleontological, 10 ha), Duhovna Hill (forest, 50 ha), Gura Văii – Vârciorova (mixed, 305 ha), Fața Virului (botany, 6 ha), Cracul Crucii (botany, 2 ha), Vărănic Hill (mixed, 350 ha), Oglănic Valley (botany, 150 ha), Cracul Găioara (botany, 5 ha).

According to Government Decision no. 1284/24.10.2007 on the establishment of special bird protection areas, as an integral part of the Natura 2000 European ecological network in Romania, as subsequently amended, two areas for bird protection were declared within the area of the Iron Gates Natural Park: *ROSPA0026 The Danube's Course – Baziaș – Iron Gates* with a surface of 10124.4 ha (in Mehedinţi: Drobeta Turnu Severin – 10%, Orșova – 21%, Eșelnița – 3%, Dubova – 5%, Sviniţa – 11%; in Caraș – Severin: Berzasca – 3%, Moldova Nouă – 15%, Pojejena – 8%, Sfânta Elena – 27%, Sichevița – 4%, Socol – 6%); *ROSPA0080 The Almăjului – Locvei Mountains* with a surface of 118141.6 ha (in Mehedinţi: Brezniţa – Ocol – 22%, Drobeta Turnu Severin – 41%, Ilovița – 65%, Orșova – 78%, Eșelnița – 55%, Dubova – 89%, Sviniţa – 87%; in Caraș – Severin: Bănia – < 1%, Berzasca – 90%, Cărbunari – 36%, Gârnic – > 99%, Moldova Nouă – 85%, Naidăș – < 1%, Pojejena – 91%, Sfânta Elena – 72%, Sichevița – 81%, Socol – 13%, Șopotu Nou – 28%, Topleț – 9%.

According to the Order of the Minister for Environment and Sustainable Development no. 1964/13.12.2007 on the establishment of the status of protected natural area of sites with community importance, as an integral part of the Natura 2000 European ecological network in Romania, as subsequently amended, ROSCI0206 Iron Gates was declared as a site of community importance, with a surface of 124293 ha (in Mehedinţi: Brezniţa – Ocol – 22%, Drobeta Turnu Severin – 51%, Ilovița – 65%, Orșova – 82%, Eșelnița – 58%, Dubova – 93%, Sviniţa – 99%; in Caraș – Severin: Bănia – < 1%, Berzasca – 93%, Cărbunari – 36%, Gârnic – > 99%, Moldova Nouă – 88%, Naidăș – < 1%, Pojejena – 98%, Sfânta Elena – 98%, Sichevița – 84%, Socol – 19%, Șopotu Nou – 28%, Topleț – 9%).

As of January 18, 2011, the Iron Gates Natural Park was also declared a RAMSAR site, a wetland of international importance, and its limits overlapped those of the Iron Gates Natural Park, as described in Government Decision no. 230/04.03.2003

on the limits of biosphere reservations, national parks and natural parks and the establishment of their administrations.

Objectives (according to the Natura 2000 standard form):

– preservation of habitats: 6110* Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albi, 6190 Rupicolous pannonic grasslands (Stipo-Festucetalia pallentis), 8310 Caves not open to the public, 3130 Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea, 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels, 8220 Siliceous rocky slopes with chasmophytic vegetation, 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition – type vegetation, 8210 Calcareous rocky slopes with chasmophytic vegetation, 9150 Medio-European limestone beech forests of the Cephalanthero-Fagion, 40A0* Subcontinental peri-Pannonic shrubs, 6210* Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia), 9110 Luzulo-Fagetum beech forests, 9130 Asperulo-Fagetum beech forests, 9170 Galio-Carpinetum oak-hornbeam forests, 91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae), 91M0 Pannonian Balkanic Turkey oak – sessile oak forest, 91Y0 Dacian oak and hornbeam forests, 92A0 *Salix alba* and *Populus alba* galleries, 9530* (Sub-) Mediterranean pine forest swith endemic black pines, 8120 Calcareous and calc-shist screes of the montane to alpine levels (Thlaspietea rotundifolii), 3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation, 3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* sp., 91K0 Illyrian Fagus sylvatica forests (Aremonio-Fagion), 91AA Ponto-Sarmatian forest vegetation with pubescent oak, 9180* Tilio-Acerion forests of slopes, screes and ravines, 91L0 Illyrian oak hornbeam forests (Erythronio-Carpinion), 8230 Siliceous rock with pioneer vegetation of the Sedo-Scleranthion or of the Sedo albi-Veronicion dillenii, 6120* Xeric sand calcareous grasslands, 3270 Rivers with muddy banks with Chenopodion rubri and Bidention vegetation.

– the preservation of species listed in Annex II to Council Directive 92/43/EEC: mammals: 1304 *Rhinolophus ferrumequinum*, 1303 *Rhinolophus hipposideros*, 1324 *Myotis myotis*, 1307 *Myotis blythii*, 1323 *Myotis bechsteinii*, 1316 *Myotis capacinii*, 1310 *Miniopterus schreibersi*, 1352 *Canis lupus*, 1361 *Lynx lynx*, 1305 *Rhinolophus euryale*, 1308 *Barbastella barbastellus*, 1302 *Rhinolophus mehelyi*, 1355 *Lutra lutra*, 1318 *Myotis dasycneme*, 1321 *Myotis emarginatus*; amphibians: 1188 *Bombina bombina*, 1193 *Bombina variegata*; reptiles: 1220 *Emys orbicularis*, 1217 *Testudo hermanni*; fish: 1159 *Zingel zingel*, 1138 *Barbus meridionalis*, 1163 *Cottus gobio*, 1157 *Gymnocephalus schraetzer*, 1146 *Sabanejewia aurata*, 2522 *Pelecus cultratus*, 1124 *Gobio albipinnatus*, 2555 *Gymnocephalus baloni*, 2011 *Umbra krameri*, 1145 *Misgurnus fossilis*, 1130 *Aspius aspius*, 1134 *Rhodeus sericeus amarus*, 1160 *Zingel streber*; non-vertebrates: 1088 *Cerambyx cerdo*, 1083 *Lucanus cervus*, 1089 *Morimus funereus*, 4046 *Cordulegaster heros*, 4064 *Theodoxus transversalis*, 1093

Austropotamobius torrentium, 1087 *Rosalia alpina*, 4014 *Carabus variolosus*, 1032 *Unio crassus*, 1084 *Osmoderma eremita*, 4020 *Pilemia tigrina*, 1078 *Callimorpha quadripunctaria*, 1074 *Eriogaster catax*, 1052 *Euphydryas maturna*, 1060 *Lycaena dispar*, 1061 *Maculinea nausithous*, 1059 *Maculinea teleius*; plants: 2327 *Himantoglossum caprinum*, 2097 *Paeonia officinalis* ssp. *banatica*, 1939 *Agrimonia pilosa*, 1898 *Eleocharis carniolica*, 2285 *Colchicum arenarium*, 2300 *Tulipa hungarica*, 2318 *Stipa danubialis*, 2093 *Pulsatilla grandis*, 2120 *Thlaspi jankae*, 4066 *Asplenium adulterinum*, 1428 *Marsilea quadrifolia*, 4067 *Echium russicum*, 4096 *Gladiolus palustris*.

ROSCI0206 Iron Gates is connected to ROSPA0026 The Danube's Course – Baziaș – Iron Gates and ROSPA0080 The Almăj-Locva Mountains.

Threats and pressures

The opening of rock carriers, economic activity with a negative environmental impact, the construction of a large number of holiday houses on the Danube's shore, badly managed by the local authorities, the absence of utilities on water and sewerage supply networks, as well as the absence of waste disposal systems in constructions erected prior to the designation of the area as a protected one, tourism that is still chaotic (camping in non-arranged areas, sound pollution, off road on forest roads), poaching, industrial fishing, over-grazing, the low awareness of local communities are major threats for the preservation of biodiversity and habitats with a community importance in the ROSCI0206 Iron Gates protected natural area.

ROSCI0173 Stârmina Forest

The Starmina natural protected area was declared a combined natural reservation by Decision of the Mehedinți County Council no. 26/1994 and a forest reservation of a national interest by Law no. 5/06.03.2000 on the approval of the Plan for the Arrangement of National Territory – Section III Protected Areas, published in the Official Gazette no. 152/12.04.2000, with a surface of 100.3 hectares.

According to the Order of the Minister for Environment and Sustainable Development no. 1964/13.12.2007 on the establishment of the status of protected natural area of sites with community importance, as an integral part of the Natura 2000 European ecological network in Romania, as subsequently amended, ROSCI0173 The Stârmina Forest was declared as a site of community importance (in Mehedinți: Devesel – <1%, Hinova – 2%) with a surface of 2769 ha.

Objectives (according to the Natura 2000 Standard Form): preservation of habitats – 92A0 *Salix alba* and *Populus alba* galleries, 91M0 Pannonian Balkanic Turkey oak – sessile oak forest, 91F0 Riparian mixed forests of *Quercus robur*, *Ulmus laevis* and *Ulmus minor*, *Fraxinus excelsior* or *Fraxinus angustifolia*, along the great rivers (Ulmenion minoris); the preservation of speies included in annex

II of Council Directive 92/43/EEC – 1335 *Spermophilus citellus*, 1355 *Lutra lutra*, 1188 *Bombina bombina*, 1220 *Emys orbicularis*, 1217 *Testudo hermanni*, 1134 *Rhodeus sericeus amarus*, 1145 *Misgurnus fossilis*, 1089 *Morimus funereus*, 1088 *Cerambyx cerdo*.

ROSCI0173 The Stârmina Forest is connected to ROSPA0011 Blahniţa.

Threats and pressures

Goat grazing inside the Stârmina Forest results in the soil subsiding, as well as damages to sprouts and shrubs. DN56A fragments the Stârmina Forest, resulting in the spread of ruderal and invasive species, animal mortality due to collisions. The collection of butcher's broom (*Ruscus aculeatus*) is a threat to destabilize the phytocoenosis of the Quercetum farnetto-cerris association. Chaotically stored waste, in the absence of specific arrangements, negatively impacts the environment through continuous pollution, landscape degradation, spreading of ruderal species.

ROSPA0011 Blahniţa

Within the current natural protected area ROSPA0011 Blahniţa, the Hinova – Ostrovul Corbului was declared as a reservation protected at the county level by Decision of the Mehedinţi County Council no. 13/10.07.2000 on the addition of the Decision of the Mehedinţi County Council no. 26/1994 on the protection of reservations and natural monuments in the Mehedinţi county.

Subsequently, according to Government Decision no. 1284/24.10.2007 on the establishment of special bird and fauna protection areas, as an integral part of the Natura 2000 European ecological network in Romania, as subsequently amended, ROSPA0011 Blahniţa was declared a protected natural area, with a surface of 43711 ha (in Mehedinţi: Burila Mare – 98%, Devesel – 95%, Gogoşu – 99%, Gruia – 27%, Hinova – 56%, Jiana – 53%, Pătulele – 1%, Vânjuleţ – 4%).

As of February 2, 2013, the Blahniţa site is declared a Ramsar site. The designation as a Ramsar site is a recognition of the importance of this area as a resource with a high economic, scientific and recreational value at a national level, in order to maintain environmental quality, with a role in flood control, mitigating climate changes, water purification, maintenance of biodiversity.

Objectives (according to the Natura 2000 standard form): the preservation of bird species included in Annex I to Council Directive 2009/147/EC: A027 *Egretta alba*, A026 *Egretta garzetta*, A075 *Haliaeetus albicilla*, A131 *Himantopus himantopus*, A022 *Ixobrychus minutus*, A068 *Mergus albellus*, A023 *Nycticorax nycticorax*, A393 *Phalacrocorax pygmeus*, A120 *Porzana parva*, A193 *Sterna hirundo*, A034 *Platalea leucorodia*, A029 *Ardea purpurea*, A024 *Ardeola ralloides*, A060 *Aythya nyroca*, A021 *Botaurus stellaris*, A196 *Chlidonias hybridus*, A081 *Circus aeruginosus*, A231 *Coracias garrulus*; the preservation of bird species with regular migration that

are not mentioned in Annex I to Council Directive 2009/147/EC: A298 *Acrocephalus arundinaceus*, A296 *Acrocephalus palustris*, A297 *Acrocephalus scirpaceus*, A295 *Acrocephalus schoenobaenus*, A168 *Actitis hypoleucos*, A359 *Fringilla coelebs*, A360 *Fringilla montifringilla*, A125 *Fulica atra*, A153 *Gallinago gallinago*, A123 *Gallinago chloropus*, A251 *Hirundo rustica*, A233 *Jynx torquilla*, A459 *Larus cachinnans*, A182 *Larus canus*, A179 *Larus ridibundus*, A156 *Limosa limosa*, A291 *Locustella fluviatilis*, A292 *Locustella luscinioides*, A070 *Mergus merganser*, A069 *Mergus serrator*, A230 *Merops apiaster*, A262 *Motacilla alba*, A260 *Motacilla flava*, A319 *Muscicapa striata*, A160 *Numenius arquata*, A337 *Oriolus oriolus*, A214 *Otus scops*, A017 *Phalacrocorax carbo*, A273 *Phoenicurus ochruros*, A315 *Phylloscopus collybita*, A316 *Phylloscopus trochilus*, A005 *Podiceps cristatus*, A008 *Podiceps nigricollis*, A266 *Prunella modularis*, A372 *Pyrrhula pyrrhula*, A118 *Regulus ignicapillus*, A317 *Regulus regulus*, A336 *Remiz pendulinus*, A249 *Riparia riparia*, A275 *Saxicola rubetra*, A276 *Saxicola torquata*, A361 *Serinus serinus*, A351 *Sturnus vulgaris*, A311 *Sylvia atricapilla*, A004 *Tachybaptus ruficollis*, A247 *Alauda arvensis*, A054 *Anas acuta*, A056 *Anas clypeata*, A052 *Anas crecca*, A050 *Anas penelope*, A053 *Anas platyrhynchos*, A055 *Anas querquedula*, A051 *Anas strepera*, A257 *Anthus pratensis*, A256 *Anthus trivialis*, A028 *Ardea cinerea*, A059 *Aythya ferina*, A061 *Aythya fuligula*, A067 *Bucephala clangula*, A087 *Buteo buteo*, A088 *Buteo lagopus*, A366 *Carduelis cannabina*, A364 *Carduelis carduelis*, A363 *Carduelis chloris*, A365 *Carduelis spinus*, A136 *Charadrius dubius*, A198 *Chlidonias leucopterus*, A373 *Coccothraustes coccothraustes*, A207 *Columba oenas*, A208 *Columba palumbus*, A212 *Cuculus canorus*, A253 *Delichon urbica*, A269 *Erithacus rubecula*, A099 *Falco subbuteo*, A096 *Falco tinnunculus*, A322 *Ficedula hypoleuca*, A165 *Tringa ochropus*, A162 *Tringa totanus*, A283 *Turdus merula*, A285 *Turdus philomelos*, A284 *Turdus pilaris*, A232 *Upupa epops*, A142 *Vanellus vanellus*, A086 *Accipiter nisus*.

ROSPA0011 Blahnița is connected to ROSCI0173 Stârmina Forest and ROSCI0306 Jiana.

Threats and pressures

Intensive agriculture initiated in the communist period with a view to creating new arable lands has resulted in changes in landscape structures, which is still felt nowadays. Over-grazing and under-grazing are a major threat for the degradation of pastures. The repopulation of forest systems with species that are not characteristic to them (*Robinia pseudoacacia*, *Pinus sylvestris*, *Populus x canadensis*, *Gleditschia triacanthos*, *Acer negundo*, *Elaeagnus angustifolia*, *Ailanthus altissima*, *Catalpa bignonioides*) is a threat in terms of the composition of vegetal associations, which are the foundation of natural forest habitats of a community importance. Traffic on national roads DN56B (Hinova – Batoți) and DN56A (Maglavit – Șimian), as well as ground roads results in the enhanced mortality of certain groups of animals, due to the collision with motor vehicles

(non-vertebrates, amphibians, reptiles, birds, mammals). Likewise, DN56A fragments the Stârmina Forest, resulting in the spread of ruderal and invasive species. Another major threat refers to chaotically stored waste, in the absence of specific arrangements for them. The negative effects of waste consist of continuous pollution, landscape degradation, and spread of ruderal species. Fishing with meshes, gill nets and fishing rods represents a danger, especially for fish species with a preserving interest. Fish braconage has a non-favourable impact on fish species, referring to species with a high commercial value (marine sturgeons).

ROSCI0299 The Danube at Gârla Mare – Maglavit

Within the current natural protected area ROSCI0299 The Danube at Gârla Mare – Maglavit, the Gârla Mare – Salcia wetlands were declared as a reservation protected at the county level by Decision of the Mehedinţi County Council no. 13/10.07.2000 on the addition of the Decision of the Mehedinți County Council no. 26/1994 on the protection of reservations and natural monuments in the Mehedinți county.

The Danube at Gârla Mare – Maglavit has been declared as a community importance site based on the Order of the Minister for Environment and Forests no. 2387/29.09.2011 on the amendment of the Order of the Minister for Environment and Sustainable Development no. 1964/13.12.2007 on the establishment of the status of protected natural area of sites with community importance, as an integral part of the Natura 2000 European ecological network in Romania.

The site ROSCI0299 The Danube at Gârla Mare – Maglavit includes a surface of 9422 hectares, integrated in the continental region from a bio-geographical point of view. The settlements in Dolj occupying surfaces within the site are: Calafat (5%), Cetate (18%) and Maglavit (20%), while Pristol (2%), Gârla Mare (22%), Vrata (45%) and Salcia (25%) belong to the Mehedinţi County.

The site is characterized by the presence of several habitats, specific to both wetland and dry lands, which ensure the life of important species with a preserving interest, among mammals, amphibians, and fish. It is one of the sites designed for the preservation of species such as suslik, otter, European pond turtle or Danube crested newt.

Objectives (according to the Natura 2000 standard form):

– the preservation of the habitat 92A0 Zavoaie with Salix alba and Populus alba;

– the preservation of species listed in Annex II to Council Directive 92/43/EEC: mammals: 1355 *Lutra lutra*, 1335 *Spermophilus citellus*; amphibians: 1188 *Bombina bombina*, 1993 *Triturus dobrogicus*; reptiles: 1220 *Emys orbicularis*; fish: 1124 *Gobio albipinnatus*, 2511 *Gobio kessleri*, 1134 *Rhodeus sericeus amarus*.

Threats and pressures

The arson of reed, stubbles and riparian vegetation is a danger for the places where pond birds use to nest and feed themselves, those with a community importance included. Water pollution from agricultural sources results in the eutrophisation of water, wth non-favourable consequences on aquatic vegetation and aquatic non-vertebrates (molluscs, crustaceans, fish). Waste accumulated in certain parts of the natural area result in imbalances of aquatic and swamp ecosystems. Fishing, even sportive fishing, may become a threat for fish species with a community importance. Over-grazing and/or under-grazing result in the degradation of the flower composition of pastures.

ROSCI0198 The Mehedinţi Plateau

The protected natural area ROSCI0198 The Mehedinţi Plateau was designed on the surface of the Mehedinți Plateau Geopark, declared by Government Decision no. 2151 of 30.11.2004 on the establishment of the status of protected natural area for new areas, with a surface of 106500 hectares.

According to the Order of the Minister for Environment and Sustainable Development no. 1964/13.12.2007 on the establishment of the status of protected natural area of sites with community importance, as an integral part of the Natura 2000 European ecological network in Romania, as subsequently amended, ROSCI0198 The Mehedinți Plateau was declared a site with community importance, with a surface of 53594 hectares. The settlements covered by the site ROSCI0198 The Mehedinți Plateau: the Mehedinți County – Baia de Aramă (74%), Bala (3%), Balta (74%), Bâlvănești (< 1%), Cireşu (> 99%), Godeanu (71%), Iloviţa (35%), Isverna (77%), Izvorul Bârzii (12%), Obârșia Cloșani (44%), Podeni (98%), Ponoarele (65%); the Gorj County – Padeş (5%); the Caraş-Severin County – Băile Herculane (< 1%), Topleț (1%).

Objectives (according to the Natura 2000 Standard Form): preservation of habitats – 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels, 6520 Mountain hay meadows, 8310 Caves not open to the public, 40A0* Subcontinental Peri-Pannonic shrubs, 9150 Medio-European limestone beech forests of the Cephalanthero-Fagion, 9180* Tilio-Acerion forests of slopes, screes and ravines, 91K0 Illyrian *Fagus sylvatica* forests (Aremonio-Fagion), 91L0 Illyrian oak hornbeam forests (Erythronio-Carpinion), 6210* Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia), 9110 Luzulo-Fagetum beech forests; preservation of mammal species included in Annex II to Council Directive 92/43/EEC: 1303 *Rhinolophus hipposideros*, 1316 *Myotis capacinii*, 1323 *Myotis bechsteinii*, 1310 *Miniopterus schreibersii*, 1324 *Myotis myotis*, 1304 *Rhinolophus ferrumequinum*, 1306 *Rhinolophus blasii*, 1305 *Rhinolophus euryale*, 1308 *Barbastellus barbastellus*, 1307 *Myotis blythii*, 1352 *Canis lupus*; preservation of amphibian and reptile species included in Annex II

to Council Directive 92/43/EEC: 1217 *Testudo hermanni*, 1193 *Bombina variegata*, 1220 *Emys orbicularis*, 1166 *Triturus cristatus*; preservation of fish species included in Annex II to Council Directive 92/43/EEC: 1163 *Cottus gobio*, 1146 *Sabanejewia aurata*, 1138 *Barbus meridionalis*; preservation of non-vertebrate species included in Annex II to Council Directive 92/43/EEC: 1093 *Austropotamobius torrentium*, 1088 *Cerambyx cerdo*, 1083 *Lucanus cervus*, 1089 *Morimus funereus*.

ROSCI0198 The Mehedinţi Plateau is connected to ROSPA0080 The Almăj – Locva Mountains and ROSPA0035 Domogled – Cerna Valley.

Threats and pressures

The opening of rock carriers, economic activity with a negative environmental impact, the construction of holiday houses on the Danube's shore, badly managed by the local authorities, tourism that is still chaotic (camping in non-arranged areas, sound pollution, off road on forest roads), poaching, over-grazing, the low awareness of local communities are major threats for the preservation of biodiversity and habitats with a community importance in the ROSCI0198 The Mehedinţi Plateau protected natural area.

Characterization of the flora and fauna in the protected areas and wetlands along the Danube in the Mehedinţi County

Flora

The diversity of the flora in the Iron Gates Gorges is explained by the fact that many and varied migration waves, from various floro-genetic origins, whose vestiges have survived to our days, sheltered by steep rocks, interfere in ths place. Of the total of 1875 vascular taxones (1749 species, 120 sub-species differing from the typical species, 6 varieties allocated into 570 genera and 131 families), we only list the taxones included in the Red List – Flora published in the Management Plan of the Iron Gates Natural Park (2013).

Likewise, we mention the taxones identified in ROSCI0173 Stârmina Forest, ROSPA0011 Blahniţa and ROSCI0299 The Danube at Gârla Mare – Maglavit, listed in the Rest List of vascular plans that are extinct, endangered, vulnerable and rare in Romanian flora (Boşcaiu N., Coldea G., Horeanu C., 1994), corroborated with Annex II to Council Directive 92/43/EEC of May 21, 1992 on the conservation of natural habitats and of wild fauna and flora and on-site observations.

The presentation of each taxon was accompanied by the following data: the scientific name, synonym, the natural protected area where it was signaled, the coenotic category, the biological form (bioform), the flora element, the basic number and the somatic number of chromosomes, ecological index. This information is taken after the works drawn up by N. Boşcaiu (1971), Z. Bolkhovskikh,

V. Grif, T. Matvejeva, O. Zarharyeva (1969), V. Ciocârlan (2000), A. Cronquist, A. Takhtajan, W. Zimmermann (1966), A. Fedorov (1969), A. Löve, D. Löve (1961), H. Meusel, E. Jägger, E. Weinert (1965), E. Oberdorfer (1970), A. Popescu, V. Sanda (1998), I. Tarnavschi (1948).

The following abbreviations were used:

For bioforms: H – hemicryptophytes; HH – helohidatophytes; G – geophytes; Ch – chamaephytes; Th – annual therophytes; TH – bi-annual therophytes; MM – megaphanerophytes; M – mesophanerophytes; N – nanophanerophytes.

For flora elements: Anat – Anatolian; Atl – Atlantic; Balc – Balkanic; Carp – Carpathian; Cauc – Caucasian; Cont – Continental; Dac – Dacian; Eua – Eurasian; Euc – Central-European; Eur – European; Med – Mediterranean; Mont – Mountain; Pan – Pannonic; Pont – Pontic.

Ecological ratios: U – humidity; T – temperature; R – soil reaction.

Categories: Ex – extinct; E – endangered; V – vulnerable; V/R – vulnerable/rare; R – rare; nt – not threatened;

IUCN categories: En – endangered; Vu – vulnerable.

PNPF – Iron Gates Region Museum.

Polypodiales
Sinopteridaceae
Cheilanthes marantae (L. Domin) (*Notholaena marantae* (L.) Desv.) – ROSCI0206 Iron Gates; PNPF status: V; Seslerion rigidae; H; Med-Atl(Euc); x=29; 2n=58; U1T2,5R3.5.

Aspleniaceae
Asplenium adulterinum Milde – ROSCI0206 Iron Gates; IUCN status: Vu; Asplenion rutae-murariae; H; Euc(Mont); x=9; 2n=144; U3T0R4.
Asplenium cuneifolium (Viv.) (*Asplenium serpentini* Tausch) – ROSCI0206 Iron Gates; IUCN status: En; PNPF status: R; Androsacetalia vandelii; H; Eur; x=9; 2n=72; U3T3R4.5.

Marsileales
Marsileaceae
Marsilea quadrifolia L. – ROSCI0206 Iron Gates; ROSCI0299 The Danube at Gârla Mare – Maglavit; IUCN status: Vu; Hydrocharition, Nanocyperion; HH; Eua(Med); 2n=40; U6T3R0.

Salviniales
Salviniaceae
Salvinia natans (L.) All. (*Marsilea natans* (L.) – ROSCI0206 Iron Gates; ROSPA0011 Blahnița; Hydrocharition; HH; Eua; x=9; 2n=18; U6T3R3.

Pinales
Pinaceae
Pinus nigra Arnold ssp. *pallasiana* (Lamb.) Holmboe var. *banatica* (Georg. et Ion.) Boşcaiu – ROSCI0206 Iron Gates; National Red List, 1994: EN; PNPF status: R; Car. Syringo-Carpinion orientalis; MM; Carp; x=12; 2n=24; U1.5T4R4.5.

Taxales
Taxaceae
Taxus baccata L. – ROSCI0206 Iron Gates; National Red List, 1994: V/R; Symphyto-Fagion; Car. Querco-Fagetea; M; Med-Atl-Eur; x=12; 2n=24; U3T3,5R4.

Gnetales
Ephedraceae
Ephedra distachya L. – ROSCI0206 Iron Gates; National Red List, 1994: R; PNPF status: V; Scabiosion argenteae, Festucion vaginatae; N; Eua(Cont); x=7; 2n=28; U2T4.5R4.5.

Ranunculales
Ranunculaceae
Pulsatilla vulgaris Miller ssp. *grandis* (Wenderoth) Zamels (*Pulsatilla grandis* Wenderoth) – ROSCI0206 Iron Gates; IUCN status: Vu; National Red List, 1994: R; Festuco-Brometea, Festucetalia valesiacae; H; Eur; x=8; 2n=32; U2T4R4.
Ranunculus flabelifolius Heuffel – ROSCI0206 Iron Gates; National Red List, 1994: R; Quercetea pubescenti-petraeae; H; Dac; U3T4R3.

Caryophyllales
caryophyllaceae
Minuartia capillacea (All.) Graebner (*Alsine liniflora* L.) – ROSCI0206 Iron Gates; National Red List, 1994: R; Festucetalia valesiacae; Ch; Euc; x=13; 2n=26; U2T4R4.
Minuartia cataractarum Janka – ROSCI0206 Iron Gates; National Red List, 1994: E/R; Asplenio-Festucion pallentis; Ch; Dac; U2T3R4.
Cerastium banaticum (Rochel) Heuffel – ROSCI0206 Iron Gates; National Red List, 1994: R; Bromo-Festucion pallentis, Thymo jankae-Festucetum dalmaticae; Ch; Carp-Balc; x=9; U2T4.5R4.
Paronychia cephalotes (Bieb.) Besser – ROSCI0206 Iron Gates; National Red List, 1994: R; PNPF status: R; Festucetalia valesiacae, Bromo-Festucion pallentis; Ch; Pont-Pan-Balc; x=9; 2n=36; U2T0R4.5.
Saponaria glutinosa Bieb. – ROSCI0206 Iron Gates; National Red List, 1994: R; Orno-Cotinetalia; Th; Med; x=7; 2n=28; U2T4R4.
Petrorhagia illirica (L.) P. W. Ball et Heywood ssp. *haynaldiana* (Janka) P. W. Ball et Heywood (*Tunica illirica* (L.) Fischer et C. A. Meyer) – ROSCI0206 Iron Gates; National Red List, 1994: R; Alysso-Sedion; Ch; Balc; U1.5T4R4.5.

Dianthus banaticus (Heuffel) Borbás – ROSCI0206 Iron Gates; National Red List, 1994: R; Festuco-Brometea, Prunetalia; H; Dac; x=15; 2n=30; U3T3R4.5.
Dianthus kladovanus Degen – ROSCI0206 Iron Gates; National Red List, 1994: R; PNPF status: R; Festuco-Brometea; H; Balc; x=15; 2n=30; U2T4R4.
Dianthus pinifolius Sibth. et Sm. ssp. *serbicus* Wettst. – ROSCI0206 Iron Gates; National Red List, 1994: R; PNPF status: R; H; Balc; x=15; 2n=30; U2T4R4.5.

Chenopodiaceae
Beta trigyna Waldst. et Kit. – ROSCI0206 Iron Gates; National Red List, 1994: V/R; Sisymbrion; H; Pont-Med; x=9; 2n=54; U1.5T4.5R4.

Fagales
Fagaceae
Fagus orientalis Lipsky – ROSCI0206 Iron Gates; National Red List, 1994: E; PNPF status: E; Quercetea pubescenti-petraeae, Lathyro-Carpinion; MM; Balc-Anat-Cauc; U3T3.5R3.

Urticales
Urticaceae
Parietaria lusitanica L. (ssp. *serbica* (Pančič) P. W. Ball, *Parietaria serbica* Pančič) – ROSCI0206 Iron Gates; National Red List, 1994: V/R; PNPF status: R; Cystopteridion; Th; Pont-Balc; U1.5T4.5R4.

Rosales
Rosaceae
Agrimonia pilosa Ledeb. (*Agrimonia dahurica* Willd. ex Ser.) – ROSCI0206 Iron Gates; IUCN status: Vu; Trifolion medii; H; Eua; x=7; 2n=28,56; U3T2.5R4.

Fabales
Fabaceae
Chamaecytisus rochelii (Wierzb.) Rothm. (*Cytisus rochelii* Wierzb., *Cytisus leucanthus* ssp. *obscurus* (Rochel) Hayek – ROSCI0206 Iron Gates; National Red List, 1994: R; Festucetalia valesiacae; N; Carp-Balc; U2.5T3R4.
Colutea arborescens L. – ROSCI0206 Iron Gates; National Red List, 1994: R; PNPF status: R; Quercetea, Car. Quercetalia pubescentis; M; Euc-Med; subspontan; x=8; 2n=16; U2T4.5R4.5.
Medicago arabica (L.) Hudson – ROSCI0206 Iron Gates; ROSPA0011 Blahnița; National Red List, 1994: R; Onopordion; Th; Med-Atl; x=8; 2n=16; U2T4,5R5.
Lotus uliginosus Schkuhr (*Lotus pedunculatus* auct. ssp. *uliginosus* Briq., *Lotus corniculatus* L. ssp. *uliginosus* Briq.) – ROSCI0206 Iron Gates; National Red List, 1994: R; Molinietalia; H; Eua(Med); x=6; 2n=12,24; U4T3R3.
Coronilla emerus L. (*Emerus major* Mill., *Hippocrepis emerus* (L.) Lassen.)

– ROSCI0206 Iron Gates; IUCN status: Vu; National Red List, 1994: R; Orno-Cotinetalia; N; Med-Euc; x=7; 2n=14; U2T3.5R4.5.
Onobrychis alba (Waldst. et Kit.) Desv. (*Hedysarum album* Waldst. et Kit.) – ROSCI0206 Iron Gates; National Red List, 1994: R; PNPF status: R; Festucion rupicolae; H; Dac-Balc; U1.5T4.5R4.

Myrtales
Lythraceae
Ammania verticillata (Ard.) Lam. – ROSCI0206 Iron Gates; National Red List, 1994: V/R; Nanocyperion; Th; Eua; U4T3R4.

Trapaceae
Trapa natans L. – ROSCI0206 Iron Gates; ROSPA0011 Blahnița; IUCN status: En; National Red List, 1994: V; Car. Nanocyperion; HH; Eua(Med); 2n=36,48; U6T4R3.5.

Rutales
Rutaceae
Dictamnus albus L. (*Dictamnus fraxinella* Pers.) – ROSCI0206 Iron Gates; IUCN status: Vu; National Red List, 1994: V/R; Quercetea pubescenti-petraeae, Car. Geranion sanguinei; H; Eua(Med); x=9; 2n=36; U1.5T4.5R4.5.

Sapindales
Aceraceae
Acer monspessulanum L. – ROSCI0206 Iron Gates; National Red List, 1994: V; PNPF status: V; Syringo-Carpinion orientalis; MM; Med; U2T4.5R4.5.

Geraniales
Linaceae
Linum uninerve (Rochel) Jáv. – ROSCI0206 Iron Gates; National Red List, 1994: R; Seslerion rigidae; H; Carp; U1.5T4R4.5.

Euphorbiales
Euphorbiaceae
Euphorbia myrsinites L. (*Euphorbia curtifolia* Chaub.) – ROSCI0206 Iron Gates; National Red List, 1994: R; PNPF status: R; Pimpinello-Thymion zygoidi; H-Ch; Med; x=10; 2n=20; U1T5R4.5.

Thymeleales
Thymeleaceae
Daphne laureola L. – ROSCI0206 Iron Gates; IUCN status; Vu; National Red List, 1994: V; PNPF status: R; Fagetalia, Car. Quercion pubescentis; N; Med-Atl; x=9; 2n=18; U2.5T3.5R4.5.

Araliales
Apiaceae
Seseli rigidum Waldst. et Kit. – ROSCI0206 Iron Gates; National Red List, 1994: R; Seslerion rigidae; H; Dac-Balc; U1.5T4.5R4.5.
Cachrys ferulacea (L.) Calestani (*Prangos ferulacea* (L.) Lindley, *Prangos carinata* Griseb. ex Degen) – ROSCI0206 Iron Gates; National Red List, 1994: R; PNPF status: V; Festucion rupicolae; H; Med; U1T4R4.
Ferula heuffelii Griseb. – ROSCI0206 Iron Gates; National Red List, 1994: R; PNPF status: R; Arction, Seslerion rigidae; H; Balc; U1T4R4.
Peucedanum longifolium Waldst. et Kit. – ROSCI0206 Iron Gates; National Red List, 1994: R; Seslerion rigidae; H; Dac-Balc; U1.5T4R4.5.

Dilleniales
Paeoniaceae
Paeonia officinalis L. ssp. *banatica* (Rochel) Soó (*Paeonia banatica* Rochel) – ROSCI0206 Iron Gates; National Red List, 1994: R; Orno-Cotinetalia; H(G); Pont-Balc; U2T4,5R4.

Theales
Hypericaceae
Hypericum rochelii Griseb. et Schenk. – ROSCI0206 Iron Gates; National Red List, 1994: R; Orno-Cotinetalia; H; Balc; U1.5T4R4.

Capparales
Brassicaceae
Alyssum pichleri Velen. – ROSCI0206 Iron Gates; National Red List, 1995: R; Festucion rupicolae; Ch; Balc; U2T4R3.
Alyssum pulvinare Velen. (*Alyssum angustifolium* Degen) – ROSCI0206 Iron Gates; National Red List, 1994: R; Festucion rupicolae; Ch; Balc; U1T4R4.5.
Alyssum stribrnyi Velen. – ROSCI0206 Iron Gates; IUCN status: Ex; National Red List, 1994: Ex; Festucion rupicolae; H; Balc; U1T4R4.5.
Thlapsi jankae Kerner – ROSCI0206 Iron Gates; IUCN status: En; National Red List, 1994: R; Festucion rupicolae; TH(H); Balc-Pan; x=7; 2n=14; U2T3.5R4.

Dipsacales
Dipsacaceae
Cephalaria uralensis (Murray) Roemer et Schultes (*Cephalaria corniculata* Waldst. et Kit.) ssp. *multifida* (Roman) Roman et Beldie – ROSCI0206 Iron Gates; National Red List, 1994: R; Festucion rupicolae; H; Balc; U1.5TT4R4.5.
Scabiosa columbaria L. ssp. *pseudobanatica* Schur (*Scabiosa banatica* Waldst. et Kit.) – ROSCI0206 Iron Gates; National Red List, 1994: R; Seslerio-Festucion pallentis; H; Dac-Pan; x=8; 2n=16; U2.5T3R4.5.

Solanales
Convolvulaceae
Convolvulus althaeoides L. (*Convolvulus elegantissimus* Miller) – ROSCI0206 Iron Gates; National Red List, 1994: R; PNPF status: R; Festucetalia valesiacae, Festucion rupicolae; H; Med; U1T4.5R4.5.
Convolvulus cantabrica L. – ROSCI0206 Iron Gates; National Red List, 1994: R; PNPF status: R; Festucion rupicolae; Bromo-Festucion pallentis; H; Pont-Med; x=5; 2n=30; U1.5T3.5R4.

Scrophulariales
Acanthaceae
Acanthus balcanicus Heywood et I. B. K. Richardson (*Acanthus longifolius* Host non Poiret) – ROSCI0206 Iron Gates; National Red List: V/R; PNPF status: R; Orno-Cotinetalia; H; Med; x=7; 2n=56; U1.5T4.5R4.

Lamiales
Lamiaceae
Thymus comosus Heuffel (*Thymus chamaedrys* Fries ssp. *comosus* (Heuffel) Nyman) – ROSCI0206 Iron Gates; National Red List, 1994: nt; Seslerio-Festucion pallentis, Asplenietea rupestris, Teucrion montani; Ch; Carp; x=7; 2n=28; U2T3.5R4.5.
Salvia verbenacea L. – ROSCI0206 Iron Gates; National Red List, 1994: R; Danthonio-Brachypodion; H; Med; x=8; 2n=54,64; U2T4.5R4.

Campanulales
Campanulaceae
Campanula crassipes Heuffel – ROSCI0206 Iron Gates; National Red List, 1994: R; Moehringion muscosae; Car. Campanuletum crassipedis; H; Balc; x=17; 2n=34; U1.5T4R4.
Campanula glomerata L. – ROSCI0206 Iron Gates; Quercetea, Arrhenatherion, Origanetalia, Car. Festuco-Brometea; H; Eua; x=17; 2n=34,68; U2.5T3R4.
Campanula lingulata Waldst. et Kit. – ROSCI0206 Iron Gates; National Red List, 1994: R; Syringo-Carpinion; TH; Balc; x=17; 2n=34; U1.5T4R4.
Campanula patula L. – ROSCI0206 Iron Gates; Arrhenatheretea; TH; Eur; x=10; 2n=20; U3T2.5R3.

Asterales
Asteraceae
Echinops banaticus Rochel ex Schrader (*Echinops rochelianus* Griseb.) – ROSCI0206 Iron Gates; ROSCI0173 Stârmina Forest; ROSPA0011 Blahniţa; National Red List, 1994: R; Syringo-Carpinion orientalis; H; Balc; x=8; 2n=32; U1.5T4R4.
Centaurea atropurpurea Waldst. et Kit. – ROSCI0206 Iron Gates; National Red List, 1994: R; Seslerion rigidae; H; Dac-Balc; x=9; 2n=18; U2T3R5.

Centaurea tenuiflora DC. (*Centaurea fastigiata* Gugl.) – ROSCI0206 Iron Gates; National Red List, 1994: R; Festucetalia valesiacae, Onopordion; TH; Pont-Balc; U1.5T4R4.5.
Centaurea triniifolia Heuffel – ROSCI0206 Iron Gates; National Red List, 1994: R; Sedo-Scleranthetea, Seslerio-Festucion pallentis; H; Carp-Balc; U1.5T4R4.5.

Asparagales
Amaryllidaceae
Galanthus nivalis L. – ROSCI0206 Iron Gates; ROSPA0011 Blahnița; National Red List, 1994: nt; Fagetalia, Car. Querco-Fagetea; G; Eur(Med); x=12; 2n=24; U3.5T3R4.

Liliales
Colchicaceae
Colchicum arenarium Waldst. et Kit. – ROSCI0206 Iron Gates; IUCN status: En; National Red List, 1994: E/R; Festucion vaginatae; G; Pan; x=19; 2n=38; U1.5T4.5R5.

Liliaceae
Tulipa hungarica Borbás – ROSCI0206 Iron Gates; National Red List, 1994: EN; Melicetum flavescentis banaticum, Festucetum pallentis, Syringo-Carpinetum orientalis; G; Carp-Balc; U1.5T4R4.5.
Tulipa hungarica Borbás ssp. *undulatifolia* (Roman) Roman et Beldie – ROSCI0206 Iron Gates; National Red List, 1994: EN (critical); PNPF status: Critic; Festucion rupicolae; 2n=24.
Ruscus aculeatus L. – ROSCI0206 Iron Gates; ROSCI0173 Stârmina Forest; ROSPA0011 Blahnița; National Red List, 1994: V; PNPF status: V; Orno-Cotinetalia, Symphyto-Fagion, Querco-Fagetea, Quercion farnetto; G-Ch; Pont-Med; x=10; 2n=40; U2.5T4R3.
Ruscus hypoglossum L. – ROSCI0206 Iron Gates; National Red List, 1994: R; PNPF status: R; Querco-Fagetea, Symphyto-Fagion, Quercetea pubescenti-petraeae; Ch-G; Med; x=10; 2n=40; U3T4R3.

Iridaceae
Iris reichenbachii Heuffel – ROSCI0206 Iron Gates; National Red List, 1994: R; Festucion rupicolae; G; Dac-Balc; x=6; 2n=24,48; U1.5T4.5R4.
Crocus flavus Weston (*Crocus moesiacus* Ker.-Gawler, *Crocus aureus* Sibth. et Sm., Crocus sulphureus Ker.-Gawler) – ROSCI0206 Iron Gates; ROSCI0173 Stârmina Forest; ROSPA0011 Blahnița; IUCN status: Vu; National Red List, 1994: V; PNPF status: V; Festuco-Brometea, Seslerio-Festucion pallentis; G; Balc; x=4; 2n=8; U3T5R3.
Gladiolus illyricus Koch – ROSCI0206 Iron Gates; National Red List, 1994: R(Ex); PNPF status: R; Festuco-Brometea; G; Med; x=15; 2n=60,90; U1.5T5R4.5.
Gladiolus palustris Gaudin – ROSCI0206 Iron Gates; IUCN status: Vu; Molinietalia; G; Euc; x=15; 2n=60; U4T3R4.

Orchidales
Orchidaceae
Epipactis helleborine (L.) Cr. – ROSCI0206 Iron Gates; National Red List, 1994: R; Quercetalia petraeae-pubescentis, Vaccinio-Piceetea, Car. Fagetalia; G; Eua; x=10; 2n=40; U3T3R3.
Epipactis palustris (L.) Cr. – ROSCI0206 Iron Gates; National Red List, 1994: R; Caricetalia davallianae, Molinion, Molinietalia, Car. Eriophorion latifolii; G; Eua; x=10; 2n=40; U4.5T3R4.5.
Cephalanthera damasonium (Mill.) Druce – ROSCI0206 Iron Gates; National Red List, 1994: R; Quercetea pubescenti-petraea, Car. Cephalanthero-Fagion; G; Eur(Med); x=8; 2n=32; U2.5T3R4.
Cephalanthera longifolia (L.) Fritsch – ROSCI0206 Iron Gates; National Red List, 1994: R; Car. Querco-Fagetea; G; Eur; x=8; 2n=32; U2.5T3R4.
Cephalanthera rubra (L.) L. C. Richard – ROSCI0206 Iron Gates; National Red List, 1994: V/R; PNPF status: R; Cephalanthero-Fagion, Car. Querco-Fagetea; G; Eur; 2n=48; U2T3R5.
Limodorum abortivum (L.) Swartz – ROSCI0206 Iron Gates; IUCN status: En; National Red List, 1994: R; Orno-Cotinetalia, Car. Quercetalia pubescentis; G; Euc(Med); 2n=56,64; U2.5T4R4.
Neottia nidus-avis (L.) L. C. M. Richard – ROSCI0206 Iron Gates; National Red List, 1994: R; Car. Fagetalia; G; Eua(Med); x=9; 2n=36; U3.5T3R3.
Plantanthera bifolia (L.) L. C. M. Rich. – ROSCI0206 Iron Gates; National Red List, 1994: R; Molinietalia, Querco-Fagetea; G; Eua(Med); x=7; 2n=42; U3.5T0R3.
Platanthera chlorantha (Custer) Reichenb. – ROSCI0206 Iron Gates; National Red List, 1994: R; Symphyto-Fagion, Molinietalia; G; Eua(Med); x=7; 2n=42; U3.5T3R3.
Orchis coriophora L. – ROSCI0206 Iron Gates; National Red List, 1994: R; Arrhenatherion, Molinion; G; Euc(Med); x=19; 2n=38; U4T0R4.5.
Orchis laxiflora Lam. ssp. *elegans* (Heuffel) Soó – ROSCI0206 Iron Gates; National Red List, 1994: R; Molinietalia, Magnocaricion, Eriphorion latifolii, Calthion; G; Pont-Pan; x=21; 2n=42; U4T3R0.
Orchis mascula (L.) – ROSCI0206 Iron Gates; National Red List, 1994: R; Querco-Fagetea, Quercetalia, Arrhenatherion, Carpinion; G; Eur(Med); x=21; 2n=42; U3T3R4.
Orchis militaris L. – ROSCI0206 Iron Gates; National Red List, 1994: R; Molinietalia, Festucetalia valesiacae, Alno-Padion; G; Eua; x=21; 2n=42; U3T3R4.
Orchis morio L. ssp. *picta* (Lois.) Arc. – ROSCI0206 Iron Gates; National Red List, 1994: R; Festuco-Brometea, Arrhenatheretea, Brometalia, Mesobromion; Pont-Med; x=9; 2n=36.
Orchis pallens L. – ROSCI0206 Iron Gates; IUCN status: En; National Red List, 1994: R; Fagetalia, Symphyto-Fagion, Prunetalia; G; Euc(Med); x=10; 2n=40; U3T3R4.5.
Orchis papilionacea L. – ROSCI0206 Iron Gates; National Red List, 1994: R; Danthonio-Brachypodion; G; Pont-Med; 2n=32; U3T4R4.

Orchis purpurea Hudson – ROSCI0206 Iron Gates; National Red List, 1994: R; Orno-Cotinion, Quercetalia pubescentis, Quercion petraeae, Fagetalia; G; Euc; x=10; 2n=40; U2.5T4R4.5.
Orchis simia Lam. – ROSCI0206 Iron Gates; National Red List, 1994: R; Orno-Cotinetalia, Brometalia; G; Med-Atl; x=21; 2n=42; U2T4.5R4.5.
Orchis tridentata Scop. – ROSCI0206 Iron Gates; National Red List, 1994: R; Festucion rupicolae, Brometalia; G; Med; x=21; 2n=42; U2T3.5R4.
Orchis ustulata L. – ROSCI0206 Iron Gates; National Red List, 1994: R; Festuco-Brometea, Arrhenatheretea, Brometalia, Car. Mesobromion; G; Eur; x=21; 2n=42; U2.5T3R0.
Himantoglossum hircinum (L.) Sprengel – ROSCI0206 Iron Gates; IUCN status: En; National Red List, 1994: R; Quercion petraeae, Orno-Cotinetalia, Mosobromion, Car. Geranion sanguinei; G; Med-Atl; x=9; 2n=36; U2.5T3.5R4.
Anacamptis pyramidalis (L.) L. C. Richard – ROSCI0206 Iron Gates; IUCN status: En; National Red List, 1994: V/R; PNPF status: R; Festuco-Brometea, Car. Mesobromion; G; Euc(Med); x=9; 2n=36; U2T4R4.5.
Ophrys scolopax Cav. ssp. *cornuta* (Steven) Camus – ROSCI0206 Iron Gates; National Red List, 1994: R; Festucion rupicolae, Juncion gerardii; G; Med; U2.5T4R4.

Cyperales
Cyperaceae
Eleocharis carniolica Koch (*Scirpus carniolicus* Neilr.) – ROSCI0206 Iron Gates; IUCN status: Vu; Cyperetalia fusci, Nanocyperion; Th; Eur; x=5; 2n=20; U5T0R0.

Typhales
Typhaceae
Typha shuttleworthii Koch et Sonder – ROSCI0206 Iron Gates; National Red List, 1994: V/R; Car. Phragmition; G-HH; Euc; U6T3R0.

Poales
Poaceae
Sesleria filifolia Hoppe – ROSCI0206 Iron Gates; National Red List, 1994: R; PNPF status: R; Seslerion rigidae, Car. Seslerietum filifoliae; H; Balc; U2T3.5R4.5.
Stipa danubialis Dihoru et Roman – ROSCI0206 Iron Gates; IUCN status: Vu; National Red List, 1994: R; PNPF status: R; Festucetalia valesiacae; H; Dac; x=11; 2n=44; U1.5T4R4.

Natural habitats

Freshwater habitats
PAL.CLASS.: 22.13 x (22.41 or 22.421)
3130 Oligotrophic to mesotrophic standing waters with vegetation of the

Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea – ROSCI0206 Iron Gates (Natura 2000 standard form; Management Plan of the Iron Gates Natural Park, 2013)

3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara sp. – ROSCI0206 Iron Gates (Natura 2000 standard form; Management Plan of the Iron Gates Natural Park, 2013)

3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition – type vegetation – ROSCI0206 Iron Gates (Natura 2000 standard form; Management Plan of the Iron Gates Natural Park, 2013)

Lemnetea de Bolós et Masclans 1955

Hydrocharitetalia Rübel 1933

Hydrocharition Rübel 1933

Hydrocharitetum morsus-ranae van Langendonck 1935 – Calinovăţ Island, Gurile Nerei (Sorina Ştefania Matacă, 2003)

Ceratophylletum demersi Hild 1956 – Calinovăţ Island (Sorina Ştefania Matacă, 2003)

Salvinio-Spirodeletum Slavić 1956 – Gurile Nerei area, the Danube alongside Pojejena (Sorina Ştefania Matacă, 2003)

Potametea Tx. et Prgs. 1942

Potametalia W. Koch 1926

Potamion pectinati (Koch 1926) Görs 1977

Potamogetonetum nodosi (Soó 1960) Segal 1964 – alongside the ruins of Tricule, Ponicova Valley, Divici (Sorina Ştefania Matacă, 2003)

Nymphaeion Soó 1964

Poygono-Potametum natantis Soó 1927 – Pojejena, Ostrovul Moldova Veche (Sorina Ştefania Matacă, 2003)

Trapetum natantis Kárpati 1963 – Gurile Nerei area, Divici, Calinovăţ Island, Ostrovul Moldova Veche (Sorina Ştefania Matacă, 2003)

Magnopotamion (Vollmar 1947) Den Harto get Segal 1964 p. foed.

Myriophyllo-Potametum Soó 1934 – the deep ponds to the South of Ostrovul Moldova Veche (I. Morariu, M. Danciu, P. Ularu, 1973)

Grassland and shrub habitats

PAL.CLASS.: 34.11

6110* Rupicolous calcareous or basophilic grasslands of the Alysso-Sedion albi – ROSCI0206 Iron Gates (Natura 2000 standard form; Management Plan of the Iron Gates Natural Park, 2013)

Koelerio-Corynephoretea Klika in Klika et Novák 1941

Alysso-Sedetalia Moravec 1967

Alysso alyssoides-Sedion albi Oberd. et T. Müller in T. Müller 1961

Alysso petraei-Sedetum hispanici Schneider-Binder et al. 1971 – Plavişeviţa, Cazanele Mari, Dubova, Mraconia Valley (E. Schneider-Binder, N. Boşcaiu, Gh.

Coldea, V. Lupşa, I. Resmeriţă, 1971); – Cazanele Mari, Cazanele Mici, Cazanele Mari next to the Ponicova Cave, Cazanele Mari next to the Veterani Cave, Saraorschi Valley (Sorina Matacă, 2002)

Alysso-Sedetum Oberd. et Th. Müller 1961 subass. *banaticum* Boşcaiu et Resmeriţă 1069 – the Mraconiei meadow, Ogradena Valley, Ogaşul Căprăriţa, Sohodol Valley (N. Boşcaiu, I. Resmeriţă, 1969)

Saponario glutinosae-Convolvuletum cantabricae Matacă 2003 – Danube Valley-to the downstream of Iuţi, the confluence of the Danube with Valea Roşie, to the upstream of Schela Cladovei (Sorina Ştefania Matacă, 2003)

Convolvulo cantabricae-Dasypyretum villosae Matacă 2003 – Saraorschi Valley, Gura Văii (Sorina Ştefania Matacă, 2003)

6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates – ROSCI0206 Iron Gates (Natura 2000 standard form; Management Plan of the Iron Gates Natural Park, 2013); ROSCI0198 The Mehedinţi Plateau (Natura 2000 standard form)

Rocky habitats and caves

PAL.CLASS.: 61.2

8120 Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii) – ROSCI0206 Iron Gates (Natura 2000 standard form; Management Plan of the Iron Gates Natural Park, 2013)

Thlaspietea rotundifolii Br.-Bl. 1948

Galio-Parietarietalia officinalis Gergely et al. 1966

Stipion calamagrostis Jenny-Lips et al. 1952

Parietarietum officinalis Csűrös 1958 – Mraconia Valley (Gh. Dihoru, I. Cristurean, M. Andrei, 1973); – Cazanele Mari, Ponicova Valley, Mraconia Valley (Sorina Matacă, 2003)

Parietario-Geranietum lucidi Gergely et al. 1966 – Danube Valley, the entrance of the Ponicova Cave, rock above the aven in the Ponicova Valley (Sorina Matacă, 2003)

Lamio bithynici-Parietarietum officinalis Matacă 2003 – Cazanele Mari, Veterani Cave (Sorina Matacă, 2003)

Galietum erecti Pop et Hodişan 1964 – Cazanele Mici, Ponicova Valley, Cazanele Mari (Sorina Matacă, 2003)

Peltarion alliaceae H-ič (1956) 1958

Geranietum macrorrhizi Boşcaiu 1971 – the left slope of Eşelniţa Valley (Sorina Matacă, 2003)

8210 Calcareous rocky slopes with chasmophytic vegetation – ROSCI0206 Iron Gates (Natura 2000 standard form; Management Plan of the Iron Gates Natural Park, 2013)

PAL.CLASS.: 62.1

Asplenietea trichomanis (Br.-Bl. in Meier et br.-Bl. 19 34) Oberd. 1977

Potentilletalia caulescentis Br.-Bl. in Br.-Bl. et Jenny 1926
Potentillion caulescentis Br.-Bl. in Br.-Bl. et Jenny 1926
Drabo lasiocarpae-Ceterachetum officinarum Peia 1978 – Tricule-Cazanele Mari, Mraconia-Eşelniţa (E. Schneider-Binder, N. Boşcaiu, Gh. Coldea, V. Lupşa, E. Plămadă, I. Resmeriţă, L. Stoicovici, 1970); – Cazanele Mari, Valea Mare, Ponicova Valley, Tisoviţa Valley (Sorina Matacă, 2003)
Moehringion muscosae Horv. et H-ič in Horv. 1962
Campanuletum crassipedis Borza (1931) 1936 – Cazanele Mari (E. Schneider-Binder, N. Boşcaiu, Gh. Coldea, V. Lupşa, E. Plămadă, I. Resmeriţă, L. Stoicovici, 1970); (Sorina Matacă, 2003); – Cazanele Mici (Gh. Dihoru, I. Cristurean, M. Andrei, 1973)
Festuco-Brometea Br.-Bl. et R. Tx. ex Klika et Hadač 1944
Festucetalia valesiacae Br.-Bl. et R. Tx. ex Br.-Bl. 1949
Festucion valesiacae Klika 1931
Stachyo nitens-Cachrysetum ferulaceae Sanda et Popescu 1999 – South of the Mehedinţi Plateau-Târziu Valley, Oglănic Valley (N. Roman, 1974); – Virul Mic viaduct (Sorina Ştefania Matacă, 2004)
Stipo pulcherrimae-Festucetalia pallentis Pop 1968
Seslerio-Festucion pallentis Klika 1931
Melico-Phleetum montani Boşcaiu et al. 1966 – Tisoviţa (Ogaşul Mare Valley), slope between Tisoviţa and Plavişeviţa (E. Schneider-Binder, N. Boşcaiu, Gh. Coldea, V. Lupşa, E. Plămadă, I. Resmeriţă, L. Stoicovici, 1970); – Oglănic Valley, Tisoviţa (Cioaca Goală), Padina Crucii viaduct, Slătinicul Mic, Ungureanu viaduct-Padina Mică viaduct, Moşu viaduct, Bahna Valley, to the downstream of Moldova Nouă (Sorina Matacă, 2003)
Convolvulo cantabricae-Stipetum eriocaulis Matacă 2003 – Oglănic Valley, Tisoviţa (Ogaşul Mare Valley) (Sorina Matacă, 2003)
Brachypodio-Chrysopogonetalia (Horvatič 19 58) Boşcaiu 1972
Danthonio-Brachypodion Boşcaiu 1972
Danthonio-Chrysopogonetum grylli Boşcaiu (1970) 1972 – Moldova Veche-Măceşti, Măceşti-Pojejena (I. Todor, I. Gergely, C. Bârcă, 1971); – Cerna Valley (Şt. Csűrös, I. Pop, I. Hodişan, M. Csűrös, 1968); – Sviniţa-Tricule (A. Popescu, Tr. Ştefureac, 1976); – Plavişeviţa-Cazanele Mari (Gh. Şerbănescu, V. Sanda, 1970); – Dubova, Mraconia (Gh. Dihoru, I. Cristurean, M. Andrei, 1973); – to the downstream of Cazanele Mici, Saraorschi Valley, Eşelniţa Hill, Cerna Valley, to the downstream of Moldova Nouă, Tricule, Oglănic Valley, Tisoviţa (Ogaşul Mare Valley) (Sorina Ştefania Matacă, 2004)
Seslerietea albicantis Oberd. 19 7 8 corr. Oberd. 1990
Seslerietalia coeruleae Br.-Bl. in Br.-Bl. et Jenny 1926
Seslerion rigidae Zólyomi 1939
Campanulo crassipedis-Seslerietum filifoliae Domin 1932 – Cazanele Mari (Sorina Matacă, 2003)

Seslerietea albicantis Oberd. 1978 corr. Oberd. 1990
Seslerietalia coeruleae Br.-Bl. in Br.-Bl. et Jenny 1926
Seslerion rigidae Zólyomi 1939
Campanulo crassipedis-Seslerietum filifoliae Domin 1932 – Cazanele Mari (Sorina Matacă, 2003)
Jurineo glycacanthae-Cephalarietum laevigatae Matacă 2003 – Coronini (mile 1039), Cazanele Mici (Sorina Ştefania Matacă, 2003)

8230 Siliceous rock with pioneer vegetation of the Sedo-Scleranthion or of the Sedo albi-Veronicion dillenii – ROSCI0206 Iron Gates (Natura 2000 standard form; Management Plan of the Iron Gates Natural Park, 2013)

8240 Limestone pavements – ROSCI0206 Iron Gates (Management Plan of the Iron Gates Natural Park, 2013)

8310 Caves not open to the public – ROSCI0206 Iron Gates (Natura 2000 standard form; Management Plan of the Iron Gates Natural Park, 2013)

Forest habitats

9110 Luzulo-Fagetum beech forests – ROSCI0206 Iron Gates (Natura 2000 standard form; Management Plan of the Iron Gates Natural Park, 2013); ROSCI0198 The Mehedinţi Plateau (Natura 2000 standard form 2000)

9150 Medio-European limestone beech forests of the Cephalanthero-Fagion – ROSCI0206 Iron Gates (Natura 2000 standard form; Management Plan of the Iron Gates Natural Park, 2013); ROSCI0198 The Mehedinţi Plateau (Natura 2000 standard form)

PAL. CLASS.: 41.31
Querco-Fagetea Br.-Bl. et Vlieger in Vlieger 1937
Fagetalia sylvaticae Pawlowski in Pawlowski et al. 1928
Symphyto-Fagion Vida 1959
Lathyro hallersteinii-Carpinenion (Boşcaiu 1979) Boşcaiu et al. 1982
Carpino-Fagetum Pucă 1941 – Ponicova Valley, Slătinicul Mic Valley, Vodiţa Valley, Mraconia Valley (Sorina Ştefania Matacă, 2005)
Moehringio muscosae-Acerenion Boşcaiu et al. 1982
Phyllitidi-Fagetum Vida (1959) 1963 – Mraconia Valley, right slope (N. Boşcaiu, 1967), between Mraconia Monastery and the mouth of Mraconia Valley (N. Boşcaiu, 1967), Vodiţa Valley (Sorina Ştefania Matacă, 2005)

9160 Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli – ROSCI0206 Iron Gates (Management Plan of the Iron Gates Natural Park, 2013)

9180 Tilio-Acerion forests of slopes, screes and ravines – ROSCI0198 The Mehedinţi Plateau (Natura 2000 standard form)

91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) – ROSCI0206 Iron Gates (Natura 2000 standard form; Management Plan of the Iron Gates Natural Park, 2013)

PAL.CLASS.: 44.3, 44.2 and 44.13
Salicetea purpurea Moor 1958
Salicetalia purpureae Moor 1958
Salicion albae (Soó 19 30 n. n.) Müller et Görs 1958
Salicetum albae Issler 1924 s. l. – Moldova Veche (I. Todor, I. Gergely, C. Bârcă, 1971); – Ciucar Fountain, Greben (A. Popescu, Tr. Ştefureac, 1976); – Cazanele Mari-Plavişeviţa (Gh. Şerbănescu, V. Sanda, 1970); – the confluence of the Danube with Mraconia (Gh. Dihoru, I. Cristurean, M. Andrei, 1973); – the confluence of the Danube with Eşelniţa, the Danube lowlands between Eşelniţa and Orşova (Şt. Csűrös, I. Pop, I. Hodişan, M. Csűrös, 1968); – Bahna Valley (N. Roman, 1974)

91G0 Pannonic woods with Quercus petraea and Carpinus betulus -ROSCI0206 Porţile de Fier (Management Plan of the Iron Gates Natural Park)

91H0 Pannonian woods with Quercus pubescens – ROSCI0206 Iron Gates (Management Plan of the Iron Gates Natural Park)

PAL.CLASS.: 41.7373, 41.7374
Quercetea pubescenti-petraeae (Oberd. 19 4 8 , 19 5 7) Jakucs 1961
Orno-Cotinetalia Jakucs 1931
Syringo-Carpinetum orientalis Jakucs 1959
Acantho longifolii-Quercetum pubescentis Jakucs et Fekete 1958 – Slătinicul Mic viaduct, Ungureanu viaduct-Padina Mică viaduct, Oglănic Valley (Sorina Matacă, 2003)
Echinopo banatici-Quercetum pubescentis Boşcaiu et al. 1971 – Cazane, Iron Gates (Vârciorova-Gura Văii) (P. Jakucs, 1961); – Iron Gates (I. Horvat, V. Glavač, H. Ellenberg, 1974); – Tisoviţa (Ogaşul Valea Mare), Liubotina, Plavişeviţa (N. Boşcaiu, V. Lupşa, I. Resmeriţă, Gh. Coldea, E. Schneider, 1971); – Padina Mică viaduct, Baziaş (Sorina Matacă, 2003)
Ceraso mahaleb-Quercetum pubescentis Jakucs et Fekete 1957 in Zólyomi 1958; – Cazanele Mici (Sorina Ştefania Matacă, 2005)

91K0 Illyric woods of Fagus sylvatica (Aremonio-Fagion) – ROSCI0198 The Mehedinţi Plateau (Natura 2000 standard form)

91L0 Illyric woods of oak and beech (Erythronio-Carpinion) – ROSCI0198 The Mehedinţi Plateau (Natura 2000 standard form)

91M0 Pannonian Balkanic Turkey oak – sessile oak forest – ROSCI0173 The Stârmina Forest (Natura 2000 standard form; Integrated Management Plan, 2015)

92A0 Salix alba and Populus alba galleries – ROSCI0206 Iron Gates (Natura 2000 standard form; Management Plan of the Iron Gates Natural Park, 2013); ROSCI0173 The Stârmina Forest (Natura 2000 standard form; Integrated Management Plan, 2015); ROSCI0299 The Danube at Gârla Mare – Maglavit (Natura 2000 standard form)

9280 Quercus farnetto woods – ROSCI0206 Iron Gates (Management Plan of the Iron Gates Natural Park, 2013)

PAL.CLASS.: 41.1B
Quercetea pubescenti-petraeae (Oberd. 1948, 1957) Jakucs 1961
Orno-Cotinetalia Jakucs 1931
Quercion farnetto Horvat 1954
Quercetum farnetto-cerris Georgescu 1945, Rudski 1949 – Caraşovăţ Valley (Gh. Dihoru, I. Cristurean, M. Andrei, 1973); – Sviniţa-Tricule, Glaucina Hill, Vârtop (A. Popescu, Tr. Ştefureac, 1976); – Tisoviţa, Plavişeviţa, Mraconia Valley (N. Boşcaiu, V. Lupşa, I. Resmeriţă, Gh. Coldea, E. Schneider, 1971); – South of the Mehedinţi Plateau-Alion Mountain, Târziu Valley (N. Roman, 1974); – Eşelniţa Hill, Tricule, to the downstream of Moldova Nouă, Mraconia Valley, Tisoviţa (Cioaca Maslat), Cazanele Mari, Ciucarul Mare, Ciucarul Mare Plateau (Sorina Matacă, 2002)

9530* (Sub-) Mediterranean pine forests with endemic black pines – ROSCI0206 Iron Gates (Natura 2000 standard form; Management Plan of the Iron Gates Natural Park, 2013)
PAL.CLASS.: 42.61 – 42.66
Quercetea pubescenti-petraeae (Oberd. 1948, 1957) Jakucs 1961
Orno-Cotinetalia Jakucs 1931
Syringo-Carpinetum orientalis Jakucs 1959
Pinetum pallasianae auct. rom. – Tricule (Sorina Ştefania Matacă, 2005)

Fauna

In the presentation of fauna species of a community importance in the natural protected areas along the Danube in the Mehedinţi county, the information in the Natura 2000 standard forms of sites ROSCI0206 Iron Gates, ROSPA0011 Blahniţa, ROSCI0173 Stârmina Forest, ROSPA0080 The Almăj – Locva Mountains, ROSPA0026 The Danube's Course – Baziaş – Iron Gates, ROSCI0299 The Danube at Gârla Mare – Maglavit, ROSCI0198 The Mehedinţi Plateau, of the Management Plan of the Iron Gates Natural Park (2013), The Integrated Management Plan of the sites ROSPA0011 Blahniţa, ROSCI0306 Jiana, ROSCI0173 Stârmina Forest, 2.605 Bunget Forest, 2.612 the Stârmina Forest and ROSPA0046 Gruia-Gârla Mare (the body partially overlapping ROSCI0306 Jiana) (2015), corroborated with field observations.
The following abbreviations were used (birds): S – sedentary bird; OV – summer guest; OI – winter guest; P – passage species; MP – partial migrator; RI – rarely in winter

Class Insect
Order Coleoptera
Family Carabidae
Subfamily Carabinae
Carabus variolosus Fabricius, 1787 – beetle; Natura 2000 code: 4014; ROSCI0206 Iron Gates;
Family Cerambycidae
Subfamily Cerambycinae
Cerambyx cerdo Linnaeus, 1758 – great capricorn beetle; Natura 2000 code: 1088; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; ROSCI0206 Iron Gates; ROSPA0080 The Almăj – Locva Mountains; ROSCI0198 The Mehedinţi Plateau;
Rosalia alpina Linnaeus, 1758 – Rosalia longicorn; Natura 2000 code: 1087; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; ROSCI0206 Iron Gates;
Subfamily Lamiinae
Morimus funereus Mulsant, 1863 – Natura 2000 code: 1089; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinţi Plateau;
Phytoecia (Pilemia) tigrina (Mulsant, 1851) – Natura 2000 code: 4020; ROSCI0206 Iron Gates;
Family Lucanidae
Subfamily Lucaninae
Lucanus cervus (Linnaeus, 1758) – stag beetle; Natura 2000 code: 1083; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinţi Plateau;
Family Cetoniidae
Subfamily Trichiinae
Osmoderma eremita (Scopoli, 1763) – hermit beetle, Russian leather beetle; Natura 2000 code: 1084; ROSCI0206 Iron Gates;

Order Lepidoptera
Family Nymphalidae
Subfamily Apaturinae
Apatura metis Freyer, 1829 – Freyer's purple emperor; Natura 2000 code: 1066; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest;
Subfamily Limenitidinae
Neptis sappho Pallas, 1771 – Pallas' sailer; Natura 2000 code: -; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest;
Subfamily Satyrinae
Kirinia roxelana (Cramer, 1777) – lattice brown; Natura 2000 code: -; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest;

Subfamily Nymphalinae
Euphydryas maturna Linnaeus, 1758 – scarce fritillary; Natura 2000 code: 1052; ROSCI0206 Iron Gates;
Family Lycaenidae
Subfamily Lyceninae
Lycaena dispar (Haworth, 1803) – large copper; Natura 2000 code: 1060; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; ROSCI0206 Iron Gates;
Subfamily Polyommatinae
Cupido alcetas (Hoffmannsegg, 1804) – Provencal short-tailed blue; Natura 2000 code: -; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest;
Maculinea nausithous Bergsträsser, 1779 – dusky large blue; Natura 2000 code: 1061; ROSCI0206 Iron Gates;
Maculinea teleius Bergsträsser, 1779 – scarce large blue; Natura 2000 code: 1059; ROSCI0206 Iron Gates;
Family Lasiocampidae
Subfamily Lasiocampinae
Eriogaster catax Linnaeus, 1758 – eastern eggar; Natura 2000 code: 1074; ROSCI0206 Iron Gates;
Family Arctiidae
Subfamily Arctiinae
Euplagia quadripunctaria (Poda, 1761) (syn. *Callimorpha quadripunctaria*) – Jersey tiger; Natura 2000 code: 1078; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; ROSCI0206 Iron Gates;

Order Odonata
Family Cordulegastridae
Cordulegaster heros Theischinger, 1979 – dragon-fly; Natura 2000 code: 4046; ROSCI0206 Iron Gates;

Class Bivalvia
Order Unionoida
Family Unioidae
Unio crassus Philipsson, 1788 – thick shelled river mussel; Natura 2000 code: 1032; ROSCI0206 Iron Gates;

Clasa Gastropoda
Family Neritidae
Theodoxus transversalis (Pfeiffer, 1828) – striped nerite; Natura 2000 code: 4064; ROSCI0206 Iron Gates;

Class Malacostraca
Order Decapoda
Family Astacidae
Austropotamobius torrentium (Schrank, 1803) – stone crayfish; Natura 2000 code: 1093; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinţi Plateau;

Class Actinopterygii
Order Acipenseriformes
Family Acipenseridae
Acipenser ruthenus Linnaeus, 1758 – sterlet; Natura 2000 code: 2487; ROSPA0011 Blahniţa;
Huso huso Linnaeus, 1758 – European sturgeon (beluga); Natura 2000 code: 2489; ROSPA0011 Blahniţa;

Order Clupeiformes
Family Clupeidae
Alosa immaculata E. T. Bennett, 1835 – Pontic shad; Natura 2000 code: 4125; ROSPA0011 Blahniţa;

Order Cypriniformes
Family Cyprinidae
Aspius aspius (Linnaeus, 1758) – asp; Natura 2000 code: 1130; ROSCI0206 Iron Gates; ROSPA0011 Blahniţa;
Barbus barbus (Linnaeus, 1758) – common barbel; Natura 2000 code: 5085; ROSPA0011 Blahniţa;
Barbus meridionalis (Risso, 1826) – Romanian barbel; Natura 2000 code: 1138; ROSCI0206 Iron Gates; ROSPA0011 Blahniţa; ROSCI0198 The Mehedinţi Plateau;
Gobio (Romanogobio) albipinnatus (Lukasch, 1933) – white-finned gudgeon; Natura 2000 code: 1124; ROSCI0206 Iron Gates; ROSPA0011 Blahniţa; ROSCI0299 The Danube at Gârla Mare – Maglavit;
Gobio (Romanogobio) kessleri (Dybowski, 1862) – Kessler's gudgeon; Natura 2000 code: 2511; ROSCI0299 The Danube at Gârla Mare – Maglavit;
Pelecus cultratus (Linnaeus, 1758) – sichel, ziege, sabrefish; Natura 2000 code: 2522; ROSCI0206 Iron Gates; ROSPA0011 Blahniţa;
Family Cobitidae
Cobitis taenia Linnaeus, 1758 – spined loach; Natura 2000 code: 1149; ROSPA0011 Blahniţa;
Misgurnus fossilis Linnaeus, 1758 – European weatherfish, European weather loach; Natura 2000 code: 1145; ROSCI0206 Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest;
Rhodeus sericeus amarus (Bloch, 1782) – European bitterling; Natura 2000 code:

1134; ROSCI0206 Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; ROSCI0299 The Danube at Gârla Mare – Maglavit;
Sabanejewia aurata (De Filippi, 1863); Natura 2000 code: 1146; ROSCI0206 Iron Gates; ROSPA0011 Blahnița; ROSCI0198 The Mehedinți Plateau;

Order Scorpaeniformes
Family Cottidae
Cottus gobio Linnaeus, 1758 – European bullhead; Natura 2000 code: 1163; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinți Plateau;

Order Esociformes
Family Umbridae
Umbra krameri Walbaum, 1792 – European mudminnow; Natura 2000 code: 2011; ROSCI0206 Iron Gates;

Order Perciformes
Family Percidae
Gymnocephalus baloni Holčik & Hensel, 1974 – Danube ruffe; Natura 2000 code: 2555; ROSCI0206 Iron Gates; ROSPA0011 Blahnița;
Gymnocephalus schraetser (Linnaeus, 1758) – striped ruffe; Natura 2000 code: 1157; ROSCI0206 Iron Gates; ROSPA0011 Blahnița;
Zingel streber (Siebold, 1863) – streber; Natura 2000 code: 1160; ROSCI0206 Iron Gates; ROSPA0011 Blahnița;
Zingel zingel (Linnaeus, 1766) – common zingel; Natura 2000 code: 1159; ROSCI0206 Iron Gates; ROSPA0011 Blahnița;

Class Amphibia
Order Caudata
Family Salamandridae
Salamandra salamandra Linnaeus, 1758 – salamander; Natura 2000 code: 2351; ROSCI0206 Iron Gates;
Triturus cristatus (Laurenti, 1768) – northern crested newt; Natura 2000 code: 1166; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinți Plateau;
Triturus dobrogicus (Kiritzescu, 1903) – Danube crested newt; Natura 2000 code: 1993; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; ROSCI0299 The Danube at Gârla Mare – Maglavit;
Triturus vulgaris (Linnaeus, 1758) – smooth newt; Natura 2000 code: 2357; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest;

Order Anura
Family Bombinatoridae
Bombina bombina (Linnaeus, 1761) – European fire-bellied toad; Natura 2000 code:

1188; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSCI0206 Iron Gates; ROSCI0299 The Danube at Gârla Mare – Maglavit;
Bombina variegata (Linnaeus 1758) – yellow-bellied toad; Natura 2000 code: 1193; ROSPA0026 the Danube's course Baziaş-Porţile de Fier; ROSCI0206 Iron Gates; ROSCI0198 Platoul Mehedinţi;

Family Pelobatidae

Pelobates fuscus (Laurenti, 1768) – common spadefoot; Natura 2000 code: 1197; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; ROSCI0206 Iron Gates;

Family Bufonidae

Bufo bufo (Linnaeus, 1758) – common toad; Natura 2000 code: 2361; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSCI0206 Iron Gates;
Bufo viridis (Laurenti, 1768) – European green toad; Natura 2000 code: 1201; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinţi Plateau;

Family Hylidae

Hyla arborea (Linnaeus, 1758) – European tree frog; Natura 2000 code: 1203; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; ROSCI0206 Iron Gates;

Family Ranidae

Rana dalmatina Fitzinger, 1839 – agile frog; Natura 2000 code: 1209; ROSCI0206 Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest;
Pelophylax (Rana) lessonae (Camerano, 1882) – pool frog; Natura 2000 code: 1207; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest;
Pelophylax (Rana) ridibunda (Pallas, 1771) – marsh frog; Natura 2000 code: -; ROSCI0206 Iron Gates;
Pelophylax temporaria Linnaeus, 1758 – Natura 2000 code: -; ROSCI0206 Iron Gates;

Class Reptilia

Order Testudines

Family Emydidae

Subfamily Emydinae

Emys orbicularis (Linnaeus, 1758) – European pond turtle; Natura 2000 code: 1220; ROSCI0206 Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSCI0299 The Danube at Gârla Mare – Maglavit; ROSCI0198 The Mehedinţi Plateau;

Family Testudinidae

Testudo hermanni Gmelin, 1789 – Hermann's tortoise; Natura 2000 code: 1217; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinţi Plateau;

Order Squamata
Family Anguidae
Anguis fragilis Linnaeus, 1758 – slow worm; Natura 2000 code: 2432; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest;
Family Lacertidae
Lacerta viridis (Laurenti, 1768) – European green lizard; Natura 2000 code: 1263; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest;
Podarcis tauricus (Pallas, 1814) – Balkan wall lizard; Natura 2000 code: 1248; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest;
Family Scincidae
Ablepharus kitaibelii Bibron & Bory de Saint-Vincent, 1833 – European copper skink; Natura 2000 code: 1276; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest;
Family Colubridae
Dolichophis caspius Gmelin, 1789 (Syn. *Coluber caspius*) – Caspian whipsnake; Natura 2000 code: 1278; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest;
Zamenis longissimus (Laurenti, 1768) (syn. *Elaphe longissima*) – Aesculapian snake; Natura 2000 code: 1281; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest;

Class Aves
Order Galliformes
Family Phasianidae
Subfamily Perdicinae
Coturnix coturnix (Linnaeus, 1758) – common quail; Natura 2000 code: A 113; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; OV;
Perdix perdix (Linnaeus, 1758) – partridge; Natura 2000 code: A 112; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; S;
Subfamily Tetraoninae
Tetrastes bonasia (Linnaeus, 1758) – hazel grouse; Natura 2000 code: A 104; ROSPA0080 The Almăj – Locva Mountains; S;

Order Anseriformes
Family Anatidae
Subfamily Aythyinae
Aythya ferina (Linnaeus, 1758) – common pochard; Natura 2000 code: A 059; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; MP;
Aythya fuligula (Linnaeus, 1758) – tufted duck; Natura 2000 code: A 061; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OI, OV;
Aythya marila (Linnaeus, 1761) – greater scaup; Natura 2000 code: A 062; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; OI;
Aythya nyroca (Güldenstädt, 1770) – ferruginous duck; Natura 2000 code: A 060;

ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV, RI;
Netta rufina (Pallas, 1773) – red-crested pochard; Natura 2000 code: A 058; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; OV, RI;
Subfamily Merginae
Bucephala clangula (Linnaeus, 1758) – common goldeneye; Natura 2000 code: A 067; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OI;
Mergus albellus (Linnaeus, 1758) – smew; Natura 2000 code: A 197; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OI;
Mergus merganser Linnaeus, 1758 – common merganser; Natura 2000 code: A 070; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OI;
Mergus serrator Linnaeus, 1758 – red-breasted merganser; Natura 2000 code: A 069; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OI;
Subfamily of the Anatinae
Anas acuta Linnaeus, 1758 – northern pintail; Natura 2000 code: A 054; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; P, OI;
Anas clypeata Linnaeus, 1758 – northern shoveler; Natura 2000 code: A 056; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; P, OV;
Anas crecca Linnaeus, 1758 – common teal; Natura 2000 code: A 052; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; P, OI, OV;
Anas penelope Linnaeus, 1758 – Eurasian widgeon; Natura 2000 code: A 050; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; P, OI;
Anas platyrhynchos Linnaeus, 1758 – mallard, wild duck; Natura 2000 code: A 053; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; MP, OI;
Anas querquedula Linnaeus, 1758 – garganey; Natura 2000 code: A 055; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV, P;
Anas strepera Linnaeus, 1758 – gadwall; Natura 2000 code: A 051; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Subfamily Tadorninae
Tadorna tadorna (Linnaeus, 1758) – common shelduck; Natura 2000 code: A 048; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; OV, RI;

Subfamily Anserinae
Anser albifrons (Scopoli, 1769) – greater white-fronted goose; Natura 2000 code: A 041; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; OI;
Anser anser (Linnaeus, 1758) – greylag goose; Natura 2000 code: A 043; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; MP;
Subfamily Cygninae
Cygnus olor (Gmelin, 1789) – mute swan; Natura 2000 code: A 036; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; MP;

Order Podicipediformes
Family Podicipedidae
Podiceps cristatus (Linnaeus, 1758) – great crested grebe; Natura 2000 code: A 005; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV, RI;
Podiceps nigricollis Brehm, 1831 – black-necked grebe; Natura 2000 code: A 008; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; MP;
Tachybaptus ruficollis (Pallas, 1764) (syn. *Podiceps ruficollis*) – little grebe; Natura 2000 code: A 004; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV, RI;

Order Columbiformes
Family Columbidae
Columba oenas Linnaeus, 1758 – stock dove; Natura 2000 code: A 207; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;

Order Caprimulgiformes
Family Caprimulgidae
Caprimulgus europaeus Linnaeus, 1758 – European nightjar; Natura 2000 code: A 224; ROSPA0080 The Almăj – Locva Mountains; OV;

Order Cuculiformes
Family Cuculidae
Cuculus canorus (Linnaeus, 1758) – cuckoo; Natura 2000 code: A 212; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;

Order Gruiformes
Family Rallidae
Fulica atra Linnaeus, 1758 – Eurasian coot; Natura 2000 code: A 125; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; MP;
Gallinula chloropus (Linnaeus, 1758) – common moorhen; Natura 2000 code: A

123; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Porzana parva (Scopoli, 1769) – little crake; Natura 2000 code: A 120; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Rallus aquaticus Linnaeus, 1758 – water rail; Natura 2000 code: A 118; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; MP;

Order Charadriiformes
Subord. Scolopaci
Family Scolopacidae
Actitis hypoleucos (Linnaeus, 1758) – common sandpiper; Natura 2000 code: A 168; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Gallinago gallinago (Linnaeus, 1758) – common snipe; Natura 2000 code: A 153; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; P,?OV;
Limosa limosa (Linnaeus, 1758) – black-tailed godwit; Natura 2000 code: A 156; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; P,?OV;
Numenius arquata (Linnaeus, 1758) – Eurasian curlew; Natura 2000 code: A 160; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Tringa nebularia (Gunnerus, 1767) – common greenshank; Natura 2000 code: A 164; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; P;
Tringa ochropus Linnaeus, 1758 – green sandpiper; Natura 2000 code: A 165; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; P;
Tringa totanus (Linnaeus, 1758) – common redshank; Natura 2000 code: A 162; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; P, OV;
Subord. Lari
Family Laridae
Larus cachinnans Pallas, 1811 – Caspian gull; Natura 2000 code: A 459; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; S;
Larus canus Linnaeus 1758 – common gull; Natura 2000 code: A 182; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OI;
Chroicocephalus ridibundus (Linnaeus, 1766) (syn. *Larus ridibundus*) – black-headed gull; Natura 2000 code: A 179; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; MP;
Family Sternidae
Chlidonias leucopterus (Temminck, 1815) – white-winged tern; Natura 2000 code: A 198; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Chlidonias niger (Linnaeus, 1758) – black tern; Natura 2000 code: A 197; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; OV;
Chlidonias hybrida (Pallas, 1811) – whiskered tern; Natura 2000 code: A 196;

ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Sterna hirundo Linnaeus, 1758 – common tern; Natura 2000 code: A 193; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;

Subord. Charadrii

Family Recurvirostridae

Himantopus himantopus (Linnaeus, 1758) – black-winged stilt; Natura 2000 code: A 131; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;

Family Charadriidae

Charadrius dubius Scopoli, 1786 – little ringed plover; Natura 2000 code: A 136; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Vanellus vanellus (Linnaeus, 1758) – northern lapwing; Natura 2000 code: A 142; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;

Order Gaviiformes

Family Gaviidae

Gavia arctica (Linnaeus, 1758) – black-throated loon; Natura 2000 code: A 002; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; OI;
Gavia stellata (Pontoppidan, 1763) – red-throated loon; Natura 2000 code: A 001; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; OI;

Order Ciconiiformes

Family Ciconiidae

Ciconia ciconia (Linnaeus, 1758) – white stork; Natura 2000 code: A 031; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0080 The Almăj – Locva Mountains; OV;
Ciconia nigra (Linnaeus, 1758) – black stork; Natura 2000 code: A 030; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;

Order Suliformes

Family Phalacrocoracidae

Microcarbo pygmeus (Pallas, 1773) (syn. *Phalacrocorax pygmeus*) – pygmy cormorant; Natura 2000 code: A 393; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV, RI;
Phalacrocorax carbo Linnaeus, 1758 – great cormorant; Natura 2000 code: A 017; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV, RI;

Order Pelecaniformes
Family Ardeidae
Ardea cinerea Linnaeus, 1758 – grey heron; Natura 2000 code: A 028; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV, RI;
Ardea purpurea (Linnaeus, 1766) – purple heron; Natura 2000 code: A 029; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Ardeola ralloides (Scopoli, 1769) – squacco heron; Natura 2000 code: A 024; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; ROSCI0299 The Danube at Gârla Mare – Maglavit; OV;
Botaurus stellaris (Linnaeus, 1758) – Eurasian bittern; Natura 2000 code: A 021; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV, RI;
Ardea alba (Linnaeus, 1758) (syn. *Egretta alba*) – great egret; Natura 2000 code: A 027; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV, RI;
Egretta garzetta (Linnaeus, 1766) – little egret; Natura 2000 code: A 026; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Ixobrychus minutus (Linnaeus, 1766) – little bittern; Natura 2000 code: A 022; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest;OV;
Nycticorax nycticorax (Linnaeus, 1758) – black-crowned night heron; Natura 2000 code: A 023; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Family Threskiornithidae
Platalea leucorodia Linnaeus, 1758 – Eurasian spoonbill; Natura 2000 code: A 034; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;

Order Accipitriformes
Family Accipitridae
Accipiter brevipes (Severtzov, 1850) – Levant sparrowhawk; Natura 2000 code: A 402; ROSPA0080 The Almăj – Locva Mountains; OV;
Accipiter nisus (Linnaeus, 1758) – Eurasian sparrowhawk; Natura 2000 code: A 086; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; S, OI;
Aquila chrysaetos (Linnaeus, 1758) – golden eagle; Natura 2000 code: A 091; ROSPA0080 The Almăj – Locva Mountains; S;
Circus aeruginosus (Linnaeus, 1758) – western marsh harrier; Natura 2000 code: A 081; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV, RI;

Circus cyaneus (Linnaeus, 1766) – hen harrier; Natura 2000 code: A 082; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; OI;
Haliaeetus albicilla (Linnaeus, 1758) – white-tailed eagle; Natura 2000 code: A 075; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0080 The Almăj – Locva Mountains; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; MP;
Hieraaetus pennatus (Gmelin, 1788) – booted eagle; Natura 2000 code: A 092; ROSPA0080 The Almăj – Locva Mountains; OV;
Milvus migrans (Boddaert, 1783) – black kite; Natura 2000 code: A 073; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; OV;
Pernis apivorus (Linnaeus, 1758) – European honey buzzard; Natura 2000 code: A 072; ROSPA0080 The Almăj – Locva Mountains; OV;

Subfamily Circaetinae

Circaetus gallicus (Gmelin, 1788) – short-toed snake eagle; Natura 2000 code: A 080; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0080 The Almăj – Locva Mountains; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;

Subfamily Buteoninae

Clanga pomarina Brehm, 1831 (syn. Aquilla pomarina) – lesser spotted eagle; Natura 2000 code: A 089; ROSPA0080 The Almăj – Locva Mountains; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Buteo buteo (Linnaeus, 1758) – common buzzard; Natura 2000 code: A 087; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; MP;
Buteo lagopus (Pontoppidan, 1763) – rough-legged buzzard; Natura 2000 code: A 088; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OI;
Buteo rufinus (Cretzschmar, 1829) – long-legged buzzard; Natura 2000 code: A 403; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; P, OV;

Family Pandionidae

Pandion haliaetus (Linnaeus, 1758) – osprey; Natura 2000 code: A 094; ROSPA0026 The Danube's Course – Baziaș – Iron Gates; P;

Order Strigiformes

Family Strigidae

Bubo bubo (Linnaeus, 1758) – owl; Natura 2000 code: A 215; ROSPA0080 The Almăj – Locva Mountains; S;
Otus scops (Linnaeus, 1758) – Eurasian scops owl; Natura 2000 code: A 214; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Strix uralensis Pallas, 1771 – Ural owl; Natura 2000 code: A 220; ROSPA0080 The Almăj – Locva Mountains; S;

Order Bucerotiformes
Family Upupidae
Upupa epops Linnaeus, 1758 – hoopoe; Natura 2000 code: A 232; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;

Order Coraciiformes
Family Meropidae
Merops apiaster Linnaeus, 1758 – European bee-eater; Natura 2000 code: A 230; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Family Coraciidae
Coracias garrulus Linnaeus, 1758 – European roller; Natura 2000 code: A 231; ROSPA0080 The Almăj – Locva Mountains; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Family Alcedinidae
Alcedo atthis (Linnaeus, 1758) – common kingfisher; Natura 2000 code: A 229; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; MP;

Order Piciformes
Family Picidae
Dendrocopos leucotos (Bechstein, 1802) – white-backed woodpecker; Natura 2000 code: A 239; ROSPA0080 The Almăj – Locva Mountains; S;
Dendrocopos medius (Linnaeus, 1758) – middle spotted woodpecker; Natura 2000 code: A 238; ROSPA0080 The Almăj – Locva Mountains; S;
Dryocopus martius (Linnaeus, 1758) – black woodpecker; Natura 2000 code: A 236; ROSPA0080 The Almăj – Locva Mountains; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; S;
Picus canus Gmelin, 1788 – grey-headed woodpecker; Natura 2000 code: A 234; ROSPA0080 The Almăj – Locva Mountains; S;
Subfamily Jynginae
Jynx torquilla (Linnaeus, 1758) – Eurasian wryneck; Natura 2000 code: A 233; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;

Order Falconiformes
Family Falconidae
Falco peregrinus Tunstall, 1771 – peregrine falcon; Natura 2000 code: A 103; ROSPA0080 The Almăj – Locva Mountains; S, OI;
Falco subbuteo Linnaeus, 1758 – Eurasian hobby; Natura 2000 code: A 099; ROSPA0026 The Danube's Course – Baziaş – Iron Gates; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Falco tinnunculus Linnaeus, 1758 – common kestrel; Natura 2000 code: A 096;

ROSPA0026 The Danube's Course – Baziaș – Iron Gates; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; MP;

Order Passeriformes
Family Oriolidae
Oriolus oriolus (Linnaeus, 1758) – Eurasian golden oriole; Natura 2000 code: A 337; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Family Laniidae
Lanius collurio Linnaeus, 1758 – red-backed shrike; Natura 2000 code: A 338; ROSPA0080 The Almăj – Locva Mountains; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Lanius minor Gmelin, 1788 – lesser grey shrike; Natura 2000 code: A 339; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Family Remizidae
Remiz pendulinus (Linnaeus, 1758) – Eurasian penduline tit; Natura 2000 code: A 336; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; MP;
Family Alaudidae
Alauda arvensis Linnaeus, 1758 – skylark; Natura 2000 code: A 247; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; MP;
Family Acrocephalidae
Acrocephalus arundinaceus (Linnaeus, 1758) – great reed warbler; Natura 2000 code: A 298; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Acrocephalus palustris (Bechstein, 1798) – marsh warbler; Natura 2000 code: A 296; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Acrocephalus scirpaceus (Hermann, 1804) – Eurasian reed warbler; Natura 2000 code: A 297; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Acrocephalus schoenobaenus (Linnaeus, 1758) – sedge warbler; Natura 2000 code: A 295; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Lullula arborea (Linnaeus, 1758) – woodlark; Natura 2000 code: A 246; ROSPA0080 The Almăj – Locva Mountains; OV;
Family Locustellidae
Locustella fluviatilis (Wolf, 1810) – river warbler; Natura 2000 code: A 291; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Locustella luscinioides (Savi, 1824) – Savi's warbler; Natura 2000 code: A 292; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Family Hirundinidae
Hirundo rustica (Linnaeus, 1758) – barn swallow; Natura 2000 code: A 251; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Riparia riparia (Linnaeus, 1758) – sand martin; Natura 2000 code: A 249; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Delichon urbicum (Linnaeus, 1758) – common house martin; Natura 2000 code: A 253; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;

Family Phylloscopidae
Phylloscopus collybita (Vieillot, 1817) – common chiffchaff; Natura 2000 code: A 315; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Phylloscopus trochilus (Linnaeus, 1758) – willow warbler; Natura 2000 code: A 316; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; P, OV;
Family Sylviidae
Sylvia atricapilla (Linnaeus, 1758) – Eurasian blackcap; Natura 2000 code: A 311; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Family Regulidae
Regulus ignicapilla (Temminck, 1820) – common firecrest; Natura 2000 code: A 318; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; MP;
Regulus regulus (Linnaeus, 1758) – goldcrest; Natura 2000 code: A 317; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; MP, OI;
Family Turdidae
Turdus merula Linnaeus, 1758 – blackbird; Natura 2000 code: A 283; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; MP;
Turdus philomelos Brehm, 1831 – song thrush; Natura 2000 code: A 285; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Turdus pilaris Linnaeus, 1758 – fieldfare; Natura 2000 code: A 284; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; MP, OI;
Family Muscicapidae
Erithacus rubecula (Linnaeus, 1758) – European robin; Natura 2000 code: A 269; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV, RI;
Ficedula hypoleuca (Pallas, 1764) – European pied flycatcher; Natura 2000 code: A 322; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; P, OV;
Muscicapa striata (Pallas, 1764) – spotted flycatcher; Natura 2000 code: A 319; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Phoenicurus ochruros (S. G. Gmelin, 1774) – black redstart; Natura 2000 code: A 273; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Saxicola rubetra (Linnaeus, 1758) – whinchat; Natura 2000 code: A 275; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Saxicola torquatus (Linnaeus, 1766) – European stonechat; Natura 2000 code: A 276; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV;
Family Sturnidae
Sturnus vulgaris Linnaeus, 1758 – common starling; Natura 2000 code: A 351; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; MP;
Family Prunellidae
Prunella modularis (Linnaeus, 1758) – dunnock; Natura 2000 code: A 266; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; OV, RI;
Family Motacillidae
Anthus pratensis (Linnaeus, 1758) – meadow pipit; Natura 2000 code: A 257; ROSPA0011 Blahniţa; ROSCI0173 Stârmina Forest; P, OV;

Anthus trivialis (Linnaeus, 1758) – tree pipit; Natura 2000 code: A 256; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Motacilla alba Linnaeus, 1758 – white wagtail; Natura 2000 code: A 262; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Motacilla flava Linnaeus, 1758 – western yellow wagtail; Natura 2000 code: A 260; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Family Fringillidae
Subfamily Carduelinae
Linaria cannabina (Linnaeus, 1758) (syn. *Carduelis cannabina*) – common linnet; Natura 2000 code: A 366; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; MP;
Chloris chloris (Linnaeus, 1758) (syn. *Carduelis chloris*) – European greenfinch; Natura 2000 code: A 363; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; S;
Coccothraustes coccothraustes (Linnaeus, 1758) – hawfinch; Natura 2000 code: A 373; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; S;
Subfamily Fringillinae
Fringilla coelebs Linnaeus, 1758 – common chaffinch; Natura 2000 code: A 359; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; MP;
Fringilla montifringilla Linnaeus, 1758 – brambling; Natura 2000 code: A 360; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OI;
Pyrrhula pyrrhula (Linnaeus, 1758) – Eurasian bullfinch; Natura 2000 code: A 372; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; S;
Serinus serinus (Linnaeus, 1766) – European serin; Natura 2000 code: A 361; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;
Spinus spinus (Linnaeus, 1758) (syn. *Carduelis spinus*) – Eurasian siskin; Natura 2000 code: A 365; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; MP, OI;
Family Emberizidae
Emberiza hortulana Linnaeus, 1758 – ortolan bunting; Natura 2000 code: A 379; ROSPA0080 The Almăj – Locva Mountains; ROSPA0011 Blahnița; ROSCI0173 Stârmina Forest; OV;

Class Mammalia
Order Rodentia
Family Sciuridae
Spermophilus citellus (Linnaeus, 1766) – suslik; Natura 2000 code: 1335; ROSCI0173 Stârmina Forest; ROSPA0011 Blahnița; ROSCI0299 The Danube at Gârla Mare – Maglavit;

Order Chiroptera
Family Rhinolophidae
Rhinolophus euryale Blasius, 1853 – Mediterranean horseshoe bat; Natura 2000 code: 1305; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinți Plateau;
Rhinilophus ferrumequinum (Schreber, 1774) – greater horseshoe bat; Natura 2000 code: 1304; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinți Plateau;

Rhinolophus blasii Peters, 1866 – Blasius's horseshoe bat; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinţi Plateau;
Rhinolophus hipposideros (Bechstein, 1800) – lesser horsehoe bat; Natura 2000 code: 1303; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinţi Plateau;
Rhinolophus mehelyi Matschie, 1901 – Mehely's horseshoe bat; Natura 2000 code:1302; ROSCI0206 Iron Gates;

Family Miniopteridae

Miniopterus schreibersii (Kuhl, 1817) – common bent-wing bat; Natura 2000 code: 1310; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinţi Plateau;

Family Vespertilionidae

Barbastellus barbastellus (Schreber, 1774) – barbastelle; Natura 2000 code: 1308; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinţi Plateau;
Myotis bechsteinii Kuhl, 1817 – Bechstein's bat; Natura 2000 code: 1323; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinţi Plateau;
Myotis blythii Tomes, 1857 – lesser mouse-eared bat; Natura 2000 code: 1307; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinţi Plateau;
Myotis capacinii Bonaparte, 1837 – long-fingered bat; Natura 2000 code: 1316; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinţi Plateau;
Myotis dasycneme (Boie, 1825) – pond bat; Natura 2000 code: 1318; ROSCI0206 Iron Gates;
Myotis emarginatus Geoffroy, 1806 – Geoffroy's bat; Natura 2000 code: 1321; ROSCI0206 Iron Gates;
Myotis myotis Borkhausen, 1797 – greater mouse-eared bat; Natura 2000 code:1324; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinţi Plateau;
Vespertilio murinus Linnaeus, 1758 – ROSCI0206 Iron Gates;

Order Carnivora

Family Felidae

Lynx lynx (Linnaeus, 1758) – lynx; Natura 2000 code: 1361; ROSCI0206 Iron Gates;

Family Canidae

Canis aureus Linnaeus, 1758 – golden jackal; Natura 2000 code: 1353; ROSPA0011 Blahniţa;
Canis lupus Linnaeus, 1758 – wolf; Natura 2000 code: 1352; ROSCI0206 Iron Gates; ROSCI0198 The Mehedinţi Plateau;

Family Mustelidae

Lutra lutra (Linnaeus, 1758) – otter; Natura 2000 code: 1355; ROSCI0206 Iron Gates; ROSCI0173 Stârmina Forest; ROSCI0299 The Danube at Gârla Mare – Maglavit;
Mustela eversmanii (Lesson, 1827) – steppe polecat; Natura 2000 code: 2633; ROSPA0011 Blahniţa;
Meles meles (Linnaeus, 1758) – European badger; Natura 2000 code: 2631; ROSPA0011 Blahniţa.

Measures for the protection, maintenance and restoration of wetlands in the region along the Danube

The protected natural areas ROSCI0206 Iron Gates, ROSCI0173 Stârmina Forest and ROSPA0011 Blahnița are included in the Natura 2000 Network, with a view of maintaining a favourable preservation of a representative surface of the most important types of habitats (listed in Annex I to the Habitat Directive) and representative populations of European species (listed in Annex II to the Habitat Directive and Annex I to the Bird Directive). The management of such areas should consider the preservation of biodiversity, as it has been maintained so far, in harmony with the traditional economic activities of human communities, as well as their sustainable development, without endangering the preservation status of these natural areas.

ROSPA0026 The Danube's Course – Baziaș – Iron Gates, overlapping ROSI0206 Iron Gates, includes aquatic, swamp, as well as copppice areas with an extremely rich biodiversity; for this reason, it has been declared a RAMSAR site. The management measures for the protection, preservation, as well as restoration of species and habitats include (according to the Management Plan of the Iron Gates Natural Park, 2013): protection of habitats of species with a community importance; mapping, maintaining a favourable preservation state or restoring the preservation state of habitats; forbidding or limiting all kind of chemical, sound, household waste, man-made pollution; forbidding/limiting the use of motor vehicles (ATVs), offroad motorcycles on forest roads and outside public roads; forbidding/limiting the use of chemical fertilizers, herbicides or pesticides; forbidding/limiting intervention on wet habitats (drainage in natural habitats); water quality assessment; fighting poaching in species with a cynegetic interest; forbidding the collection of the various species of flora and fauna; forbidding the burn-down of fields, the use of fire in non-dedicated places; permanent awareness and education of local communities on the need to protect species of flora and fauna; using ecological means and practices in the perspective of sustainable development.

ROSPA0011 Blahnița, partially overlapping ROSCI0173 Stârmina Forest, includes the wetland of Hinova-Ostrovul Corbului, which was declared a natural reservation since 1994, as well as the Gruia area, belonging to the protected natural area of ROSPA0046 Gruia-Gârla Mare. The Gârla Mare – Salcia wetland, declared a reservation since 1994, represents the core of the protected natural area ROSCI0299 The Danube at Gârla Mare – Maglavit. The most important management measures regarding the protection, preservation, as well as restoration of water and swamp species and habitats (according to the Integrated Management Plan, 2015) are as follows: ensuring habitat preservation, i.e. maintaining a favourable preservation of habitats through the interconnectivity of areas with a high conservative value and achieving a protection status, integrating management proposals for priority forest habitats of a community interest

in forest setups; ensuring the preservation of species, i.e. maintaining a favourable preservation of species the site was designated for, by extensively using the wet pastures in the area of Gogoşu; keeping grass and wood vegetation along the gullies and springs inside forests, planting willow trees, white poplars in the area to the downstream of Balta Verde, maintaining the trunks and roots of trees in the minor bed of streams, preventing the use of the Blahnița and Oreviţa streams for irrigating farm and vegetable crops, preventing the spillage of chemical substances used in farming and vegetable growing into the water of streams, forbidding the wash of animals, motor vehicles or any installations and tools in the water of streams, preventing waste storage in the minor or major beds of streams, preventing the burn-down of reed and shore vegetation, preventing the extraction of mineral aggregates from the minor beds of streams, preventing the blocking or deviation of stream courses, preventing the introduction of new fish species, especially those with an invasive character.

Measures for the protection, maintenance and restoration of individual Natura 2000 protected areas

ROSCI0206 Iron Gates and ROSCI0198 The Mehedinţi Plateau include many fresh water habitats, pasture and shrub habitats, rock and cave habitats, wood habitats. Of the latter, galleries of Salix alba and Populus alba are also found on the sites ROSCI0173 Stârmina Forest and ROSCI0299 The Danube at Gârla Mare – Maglavit, while Balkan-Pannonic woods of Turkey oak and common oak are only found in ROSCI0173 Stârmina Forest. Each of these types of habitats needs special protection and preservation measures (published in the management plans of these areas), so as to be maintained in the state the concerned site was designated for.

Drainage, operation of sand and gravel dunes, chemical treatments used in agriculture is forbidden in the areas of fresh water habitats, which are vulnerable in the current climate conditions. Seasonal water courses should be monitored and grazing should be limited.

Pasture and shrub habitats have a vegetation that is both rich and sensitive to human activities, so they require measures regarding the limitation of grazing, the removal of touristic routes, which would negatively impact them, forbidding the burn-down of vegetation.

For rock and cave habitats, preservation measures refer to the prohibition of tourism, by directing visitors to marked routes that do not affect vulnerable habitats, limiting grazing, avoiding the mobilization of rocks, which might have a negative impact on the landscape and on rocky vegetation, forbidding the collection of plants and animals characteristic to these habitats.

The promotion of conservative management and natural regeneration is perhaps the most important measure to preserve forest habitats, along with

the regulation of grazing, of traditional collection of medicinal plants, berries, mushrooms, touristic activities on the surface of primarily conservative habitats. Forest exploitations, the construction of forest roads, chemical treatments, burn-down of vegetation, cutting when forest exploitations are required, and embankment works, except those that need to meet water requirements, water quality protection.

The establishment of these measures for the protection and preservation of habitats in the protected natural areas along the Danube in the area of the Mehedinti county have favourable effects on the preservation of species with a community importance (plants, insects, molluscs, crayfish, fish, amphibians, reptiles, birds, mammals) in these sites (ROSCI0206 Iron Gates, ROSCI0173 Stârmina Forest, ROSCI0299 The Danube at Gârla Mare – Maglavit).

In ROSPA0026 The Danube's Course – Baziaș – Iron Gates (overlapping ROSCI0206 Iron Gates), ROSPA0080 The Almăj – Locva Mountains, ROSPA0011 Blahnița, ROSCI0173 Stârmina Forest, ROSCI0299 The Danube at Gârla Mare – Maglavit, populations of 139 bird species with a community importance have been identified. The presence of a significant number of birds, of which many are protected at a European level, increased the significance of the area as a European ecological corridor, a bird migration corridor, but it is also required to increase awareness on the bird and fauna treasure that this area contains. Thus, measures for the protection and preservation of birds and fauna in the sites along the Danube in the Mehedinți county primarily regard the preservation of the habitats these species are found in (habitat preservation measures mentioned previously), along with specific measures to preserve bird species: preventing swamp vegetation burns (reed, mace reed), forbidding the burn-down of vegetation, forbidding interventions on wet habitats (drainage), keeping shrubs at the border of woods, maintaining old trees in their position, fighting poaching, training hunters with a view to identifying protected species, forbidding/limiting non-controlled tourism, forbidding the use of chemical treatments, maintaining or restoring tree and shrub alignments with a view to ensuring nesting and feeding conditions for Coracias garrulus, Lanius collurio, Upupa epops, Oriolus oriolus, limiting disturbance to nesting species in wood by means of forest practices, ensuring proper nesting conditions for Himatopus himantopus, maintaining proper nesting conditions for Chlidonias hirundus (preserving floating water vegetation), educating population in order to prevent the killing of birds because of superstitions, forbidding/limiting all kinds of pollution (chemical, sound, domestic waste, man-caused), as well as forbidding/limiting the use of motor vehicles (ATV, motorcycles) on forest roads and outside public roads.

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DIVERSITY OF COLEOPTERANS (COLEOPTERA: CARABIDAE, SILPHIDAE, SCARABAEIDAE, LUCANIDAE) FROM THE FOREST ECOSYSTEMS OF CENTRAL AREA OF THE REPUBLIC OF MOLDOVA

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DIVERSITY OF COLEOPTERANS (COLEOPTERA: CARABIDAE, SILPHIDAE, SCARABAEIDAE, LUCANIDAE) FROM THE FOREST ECOSYSTEMS OF CENTRAL AREA OF THE REPUBLIC OF MOLDOVA

Abstract: The paper contains the results of researches on the diversity of species of coleopterans in two research stations located in a strictly protected area of the "Codrii" Scientific Reserve. The investigated forest ecosystems are represented by 28 species of coleopteran belonging to 13 genera and 4 families were identified. The work includes the taxonomic species list, sample number and date of collection, zoogeographic distribution, trophic spectrum, as well as ecological analytical and synthetic indices.
Keywords: Coleopteran, species diversity, synecological analysis, trophic spectrum.

Introduction

The "Codrii" Scientific Reserve is almost entirely representative of the forests of Central and Western Europe. In this reserve favorable conditions for breeding and reproduction have been formed for representatives of fauna from the Carpathian and Balkan Mountains and from Asia (Postolache, 1995). The vegetation is represented by deciduous forests (oak and beech) of the type of central European forests. This is the only reservation in the Republic of Moldova, where the study of invertebrate fauna has been carried out regularly. A series of papers have been published, listing insect species, including coleoptera (Andreev et al., 2005; Baban, 2006, 2012; Ecological Diversity Conspectus, 2011; Derjanschi et al., 2016; Neculiseanu & Matalin, 2000).

Materials and method

The researches were carried out during the vegetation period of 2013 in two scientific stations located in the strictly protected area of the "Codrii" Reserve: the oak forest with ash and lime mixture (resort I) and the oak forest with a mixture of hornbeam (resort II). These biocenoses are characterized by a rich diversity of flora and fauna.

The investigated coleopterans were collected using a Barber soil trap. Four extractions of 10 samples were performed for each studied ecosystem. In total, 3291 edaphic coleopterans were analyzed, including 2113 from the resort I and 1178 from the resort II (Ghiliarov, 1963).

The determination of forest coleopterans was based on specialized determinants and bibliographic sources (Kryzhanovskij, 1965).

The sinecological analysis was based on the estimation of ecological parameters: abundance (A), dominance (D), constancy (C) and ecological significance index (W) (Simionescu, 1983; Stan, 1994).

Results and discussions

As a result of the researches carried out in the two resorts, 28 species of coleoptera attributed to 13 genres and 4 families were collected by the Barber method. The most numerous specific family was Carabidae with 13 species of 5 genres, followed by the Scarabaeidae family with 8 species from 4 genres; the Silphidae family was represented by 6 species of 3 genera, and the Lucanidae family with one species (Table 1).

In station I there was no sign of *Necrodes littoralis* species and only 27 species were registered, while in the second resort there were not recorded the species: *Carabus intricatus, Aphodius rufipes, Cetonia aurata, Geotrupes stercorarius* and *Onthophagus vacca*, therefore only 23 species were recorded.

It was established that only the species of *Carabus coriaceus* and *Nicrophorus vespilloides* were present in both types of forests in all four collections made; 3 species (*Carabus cancelatus, Nicrophorus vespillo* and *Silpha carinata*) were recorded in three collections of the four, made in both types of forests; 2 species (*Abax carinatus* and *Nicrophorus humator*) were recorded in 2 collections of those made in both types of forests, and the species *Harpalus rufipes, Pterostichus melas, Onthophagus fracticornis* and *O. taurus*, present in both types of forests, were recorded in one of the collections.

At the same time, three species of rare and endangered coleopterans were found in the investigated resorts: *Carabus intricatus, C. ullrichi*, *Lucanus cervus*, these being included in the Red Book of the Republic of Moldova (3rd edition) (Cartea Roşie a R. Moldova, 2015).

Table 1. Fauna list of Coleopterans identified in the oak forest mixed with ash and lime

(the strictly protected area I) and in the oak forest with a mixture of hornbeam (strictly protected area II) from the "Codrii" Scientific Reserve and some ecological data (2013).

No.	Taxon	Oak forest mixed with ash and lime (strictly protected area I)	Ash forest mixed with hornbeam (strictly protected area II)	Trophic and area
The CARABIDAE family				
1.	*Abax carinatus* (Duft., 1812)	2 sp., 10.06–24.06.2013 C; (1) 3 sp., 24.06–17.07.2013 C; (2)	6 sp., 24.06–17.07.2013 C; (3) 1 sp., 17.07–15.08.2013 C; (1)	Z, E
2.	*A. parallelopipedus* Pil & Mit.,1783)	8 sp., 10.06–24.06.2013 C; (1) 5 sp., 24.06–17.07.2013 C; (2)	5 sp., 10.06–24.06.2013 C; (1) 21 sp., 24.06–17.07.2013 C; (5) 6 sp., 17.07–15.08.2013 C; (3)	Z, E
3.	*A. parallelus* (Duft., 1812)	7 sp., 24.06–17.07.2013 C; (4)	4 sp., 24.06–17.07.2013 C; (1) 36 sp., 24.06–17.07.2013 C; (6) 5 sp., 17.07–15.08.2013 C; (3)	Z, E
4.	*Carabus cancelatus* Illig., 1758	176 sp., 10.06–24.06.2013 C; (9) 214 sp., 24.06–17.07.2013 C; (8) 58 sp., 17.07–15.08.2013 C; (7)	107 sp. 10.06–24.06.2013 C; (8) 101 sp. 24.06–17.07.2013 C; (8) 4 sp., 17.07–15.08.2013 C; (2)	Z, Esb
5.	*C. convexus* Fabr., 1775	40 sp., 10.06–24.06.2013 C; (9) 4 sp., 24.06–17.07.2013 C; (3) 35 sp., 17.07.–15.08.2013 C; (9)	68 sp., 10.06–24.06.2013 C; (9) 27 sp., 24.06–17.07.2013 C; (6) 28 sp., 17.07.–15.08.2013 C; (6) 1 sp., 15.08 – 10.09.2013 C; (1)	Z, Esb
6.	*C. coriaceus* (L., 1758)	30 sp., 10.06–24.06.2013 C; (7) 7 sp., 24.06–17.07.2013 C; (4) 24 sp., 17.07–15.08.2013 C; (6) 12 sp.,15.08 – 10.09.2013 C; (6)	10 sp., 10.06–24.06.2013 C; (4) 6 sp., 24.06–17.07.2013 C; (5) 19 sp., 17.07–15.08.2013 C; (5) 4 sp., 15.08 – 10.09.2013 C; (3)	Z, E

No.	Taxon	Oak forest mixed with ash and lime (strictly protected area I)	Ash forest mixed with hornbeam (strictly protected area II)	Trophic and area
7.	*C. excellens F.*, 1798	601 sp. 10.06–24.06.2013 C; (9) 20 sp. 24.06–17.07.2013 C; (6) 383 sp.17.07.–15.08.2013 C; (9)	204 sp. 10.06–24.06.2013 C; (9) 60 sp., 24.06–17.07.2013 C; (8) 178 sp. 17.07.–15.08.2013C; (8) 2 sp., 15.08 – 10.09.2013 C; (1)	Z, E
8.	*C. intricatus* L., 1761	1 sp., 10.06–24.06.2013 C; (1) 1 sp., 17.07.–15.08.2013 C; (1)		Z, E
9.	*C. ullrichi* Germ., 1824	45 sp., 10.06–24.06.2013 C; (8) 14 sp., 24.06–17.07.2013 C; (5) 6 sp., 17.07.–15.08.2013 C; (5)	9 sp., 10.06–24.06.2013 C; (3) 11 sp., 24.06–17.07.2013 C; (5) 1 sp., 17.07.–15.08.2013 C; (1) 1 sp., 15.08 – 10.09.2013 C; (1)	Z, E
10.	*Cychrus caraboides* (L., 1758)	1 sp., 17.07.–15.08.2013 C; (1)	2 sp., 10.06–24.06.2013 C; (2) 1 sp., 17.07.–15.08.2013 C; (1) 5 sp., 15.08 – 10.09.2013 C; (3)	Z, E
11.	*Harpalus rufipes* (De Geer, 1774)	1 sp., 10.06–24.06.2013 C; (1)	2 sp., 17.07.–15.08.2013 C; (1)	F, Tp
12.	*Pterostichus melas* (Crtz., 1799)	1 sp., 10.06–24.06.2013 C; (1)	7 sp., 24.06–17.07.2013 C; (4)	Z, EMd
13.	*Pt. melanarius* (Illig., 1798)	5 sp., 10.06–24.06.2013 C; (1) 4 sp., 24.06–17.07.2013 C; (5)	5 sp., 10.06–24.06.2013 C; (1) 1 sp., 24.06–17.07.2013 C; (1) 2 sp., 17.07.–15.08.2013 C; (1)	Z,Esb
The SCARABAEIDAE family				
14.	*Aphodius rufipes* (L., 1758)	6 sp., 17.07.–15.08.2013 C; (3)		C, Tp
15.	*Cetonia aurata* (L., 1761)	1 sp., 10.06–24.06.2013 C; (1)		F, Tp

No.	Taxon	Oak forest mixed with ash and lime (strictly protected area I)	Ash forest mixed with hornbeam (strictly protected area II)	Trophic and area
16.	*Geotrupes stercorosus* Scriba, 1791	35 sp., 10.06–24.06.2013 C; (7) 10 sp., 24.06–17.07.2013 C; (4) 98 sp. 17.07.–15.08.2013 C; (8) 5 sp., 15.08 – 10.09.2013 C; (2)	26 sp. 10.06–24.06.2013 C; (7) 7 sp., 24.06–17.07.2013 C; (2) 40 sp. 17.07.–15.08.2013 C; (7)	C, ESb
17.	*G. stercorarius* (L., 1758)	1 sp., 24.06–17.07.2013 C; (1)		C, ESb
18.	*Onthophagus coenobita* (*Hbst*, *1783*)	7 sp., 10.06–24.06.2013 C; (1) 31 sp. 17.07.–15.08.2013 C; (3)	1 sp., 17.07.–15.08.2013 C; (1)	C, Tp
19.	*O. fracticornis* (Preys, 1790)	7 sp., 17.07.–15.08.2013 C; (4)	7 sp., 10.06–24.06.2013 C; (1)	C, Tp
20.	*O. taurus* (Schr., 1759)	19 sp. 17.07.–15.08.2013 C; (3)	2 sp., 10.06–24.06.2013 C; (1)	C, Tp
21.	*O. vacca* (L., 1767)	1 sp., 10.06–24.06.2013 C; (1) 3 sp., 17.07–15.08.2013 C; (3)		C, Tp
The SILPHIDAE family				
22.	*Nicrophorus humator* Olivier, 1790	5 sp., 10.06–24.06.2013 C; (3) 7 sp., 17.07–15.08.2013 C; (3)	1 sp., 10.06–24.06.2013 C; (1) 2 sp., 24.06–17.07.2013 C; (1)	N, EC
23.	*N. investigator* (Zett., 1824)	4 sp., 10.06–24.06.2013 C; (2) 4 sp., 24.06–17.07.2013 C; (1) 5 sp., 17.07.–15.08.2013 C; (2)	4 sp., 10.06–24.06.2013 C; (2) 11 sp. 24.06–17.07.2013 C; (3) 5 sp., 17.07.–15.08.2013 C; (2) 1 sp. 15.08 –10.09.2013 C; (1)	N, E
24.	*N. vespillo* (L., 1758)	6 sp., 10.06–24.06.2013 C; (2) 3 sp., 24.06–17.07.2013 C; (2) 13 sp. 17.07.–15.08.2013 C; (6)	3 sp., 10.06–24.06.2013 C; (2) 13 sp. 24.06–17.07.2013 C; (4) 14 sp. 17.07.–15.08.2013 C;(3)	N, H

No.	Taxon	Oak forest mixed with ash and lime (strictly protected area I)	Ash forest mixed with hornbeam (strictly protected area II)	Trophic and area
25.	*N. vespilloides* Herbst, 1784	23 sp., 10.06–24.06.2013 C; (7) 16 sp., 24.06–17.07.2013 C; (3) 49 sp. 17.07.–15.08.2013 C; (9) 1 sp., 15.08 – 10.09.2013 C; (3)	19 sp. 10.06–24.06.2013 C; (4) 25 sp. 24.06–17.07.2013 C; (4) 27 sp. 17.07.–15.08.2013 C;(4) 5 sp. 15.08 – 10.09.2013 C;(3)	N, Tp
26.	*Necrodes littoralis* (L., 1758)		1 sp. 15.08 – 10.09.2013 C; (1)	N, EA
27.	*Silpha carinata* Hbst, 1783	11 sp., 10.06–24.06.2013 C; (7) 3 sp., 24.06–17.07.2013 C; (2) 24 sp. 17.07.–15.08.2013 C; (5)	2 sp., 10.06–24.06.2013 C; (2) 6 sp., 24.06–17.07.2013 C; (3) 4 sp., 17.07.–15.08.2013 C; (3)	N, H
The LUCANIDAE family				
28.	*Lucanus cervus* L., 1758	5 sp., 10.06–24.06.2013 C; (1) 2 sp., 24.06–17.07.2013 C; (1)	2 sp., 24.06–17.07.2013 C; (2)	S, ECauc

Note: The figure – in brackets shows the number of samples in which the species was present.

In the oak forest mixed with ash and lime (resort I), the coleopteran fauna consists of 27 species belonging to 13 genres and 4 families. The most representative were Carabidae (13 species and 5 genera) and Scarabaeidae (8 species and 4 genera) families, followed by the Silphidae (5 species and 3 genera) and Lucanidae (1 species and 1 gene) families.

As a result of the analysis of the ecological parameters of coleopteran species collected in resort I, the following values were found: the highest values for abundance (A) and dominance (D) were recorded in the species *Carabus excellens* (1004 specimens), 52%) and *Carabus cancellatus* (448) (21.20%) – both eudominant species (D5) and in the dominant species *Geotrupes stercorosus* (148) (7.0%). In the forest of this type, there were also recorded 4 subdominant species (D3), 2 recessive species (D2) and 18 subrecessive species (D1) with values ranging from 4.21 to 0.05%. Constance (C) revealed 5 constant species (C3): *Carabus excellens* and *Carabus cancelatus* with values of 60, *Geotrupes stercorosus*, *Carabus convexus* and *Carabus coriaceus* – with values of 52,5; 3 accessory species (C2): *Nicrophorus vespilloides* (50), *Carabus ullrichi* (4,5) and *Silpha carinata* (40). The other 19 species are accidental, with values ranging from 25% to 2.5%. The

Ecological Significance Index (W) recorded the highest values for *Carabus excellens* (28,51) and *Carabus cancelatus* (12,72), these being typical forest species. There were also 8 accessory species with W2-W3 indices, another 17 species are accidental and have a minimum value of the ecological significance index (W1) (Table 2).

Table 2. Sinecological analysis of coleopteran species collected in the oak forest mixed with ash and lime (resort I) and in the oak forest with hornbeam mixture (resort II) from the "Codrii" Reserve (2013).

Species name	**Station I**		**Station I**		**Stat. I**	**Stat. 2**	**Stat. 1**	**Stat. 2**
	A (specimens)	**D (%)**	**A (sp.)**	**D (%)**	**C (%)**	**C (%)**	**W (%)**	**W (%)**
Carabus excellens	1004	47,52	444	37,69	60	65	28,51	24,50
Carabus cancelatus	448	21,20	212	18,00	60	45	12,72	8,10
Geotrupes stercorosus	148	7,00	73	6,20	52,5	40	3,68	2,48
Nicrophorus vespilloides	89	4,21	76	6,45	50	37,5	2,11	2,42
Carabus convexus	79	3,74	124	10,53	52,5	55	1,96	5,79
Carabus coriaceus	73	3,45	39	3,31	57,5	42,5	1,99	1,41
Carabus ullrichi	65	3,08	22	1,87	45	25	1,38	0,47
Onthophagus coenobita	38	1,80	1	0,08	10	2,5	0,18	0,002
Silpha carinata	38	1,80	12	1,02	35	20	0,63	0,20
Nicrophorus vespillo	22	1,04	30	2,55	25	22,5	0,26	0,57
Onthophagus taurus	19	0,90	2	0,17	7,5	0,17	0,07	0,004
Nicrophorus investigator	13	0,62	21	1,78	12,5	20	0,08	0,36
Abax parallelopipedus	13	0,62	32	2,72	7,5	22,5	0,05	0,61
Nicrophorus humator	12	0,57	3	0,25	15	5	0,09	0,01
Pterostichus melanarius	9	0,43	8	0,68	15	7,5	0,06	0,05
Abax parallelus	7	0,33	45	3,82	10	25	0,03	0,96
Lucanus cervus	7	0,33	2	0,17	5	5	0,02	0,01
Onthophagus fracticornis	7	0,33	7	0,59	2,5	2,5	0,01	0,01
Aphodius rufipes	6	0,28	0	0	2,5	0	0,01	0
Abax carinatus	5	0,24	7	0,59	7,5	10	0,02	0,06
Onthophagus vacca	4	0,19	0	0	5	0	0,01	0
Carabus intricatus	2	0,09	0	0	5	0	0,005	0
Necrodes littoralis	0	0	1	0,08	0	2,5	0	0,002
Cychrus caraboides	1	0,05	8	0,68	2,5	15	0,001	0,10
Harpalus rufipes	1	0,05	2	0,17	2,5	2,5	0,001	0,004
Pterostichus melas	1	0,05	7	0,59	2,5	10	0,001	0,06
Cetonia aurata	1	0,05	0	0	2,5	0	0,001	0
Geotrupes stercorarius	1	0,05	0	0	2,5	0	0,001	0

* The species in the table are listed in descending order of abundance.

In the hornbeam forest with a mixture of hornbeam (resort II), the coleopteran fauna consists of 23 species belonging to 11 genres and 4 families. The most representative were the families Carabidae (12 species and 5 genera) and Silphidae (6 species and 3 genera), followed by the families Scarabaeidae (4 species and 2 genera) and Lucanidae (1 species and 1 genus).

Based on the analyzed ecological parameters of coleopteran species collected in resort II, the abundance (A) and dominance (D) have the highest values for the species: *Carabus excellens* (444 specimens) (37.69%), *Carabus cancelatus* (212 sp.) (18.00%) and *Carabus convexus* (124 sp.) (10.53%), all of them being eudominant species (D5), as well as for *Nicrophorus vespilloides* (76), 45%) and *Geotrupes stercorosus* (73 ex.) (6.2%) species, both of which are dominant species, and for 4 subdomain species (D3), 2 recessive species (D2) and 12 subrecessive species (D1), with values ranging from 3.82 to 0.08%. The Constance (C) revealed 2 constant species (C3): *Carabus excellens* and *Carabus convexus* with the values 65 and 55, and *Carabus convexus* with 55; 4 complementary species (C2): *Carabus cancelatus* (45), *Nicrophorus vespilloides* (37,5), *Carabus coriaceus* (42,5), and *Geotrupes stercorosus* (40), the other 17 species being accidental with values from 25 to 2,5 %. The ecological significance index (W) has the highest values for the species *Carabus excellens* (24.50), *C. cancelatus* (8.10) and *C. convexus* (5.79), these species being characteristic of the studied ecosystem. There were also 10 accessory species (2.48 – 0.10) with W2-W3 indices, 10 other species being accidental and having the value of the ecological significance index less than 0.06 (W1) (Table 2).

According to the preferential trophic regime, we can mention that the coleopteran fauna of the studied forest ecosystems was composed of 4 trophic groups: zoophages – 12 species (43%), followed by coprophages – 7 (25%) species, necrophages – 6 species (21%), phytophages – 2 species (7%) and saprophages with one species (4%) (Figure 1).

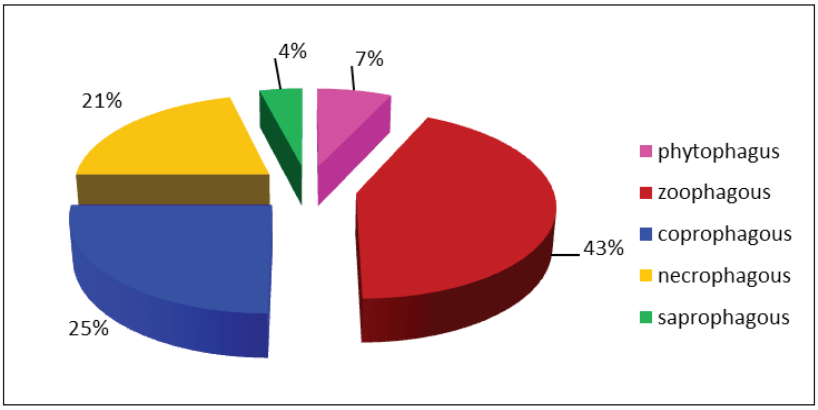

Fig. 1. The coleopteran trophic spectrum revealed in the studied stations

Depending on the area of distribution (Drugescu, 1990), there have been highlighted European species with 9 species (32%), transpaleartic species with 8 species (29%), followed by the Euro-Siberian species with 5 species (17%) and Eurocaucasian and holarctic species each with 2 species (7%), and the Euro-Asian and Euro-Mediterranean groups each with one species (4%).

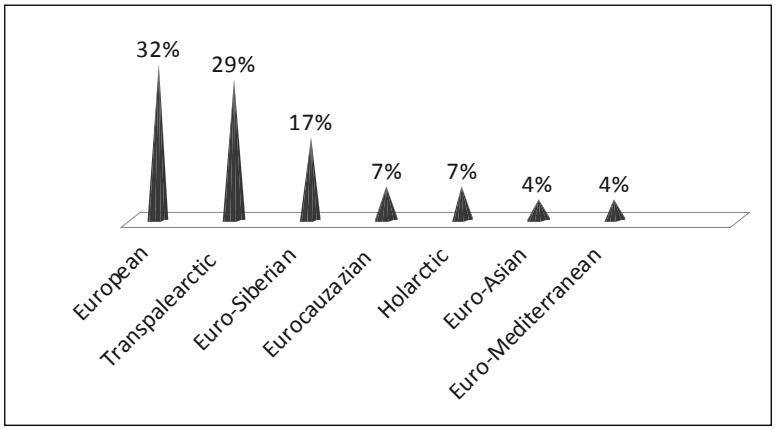

Fig. 2. The geographic distribution of the detected coleopterans in the forest ecosystems studied.

Conclusions

The Coleoptera Fauna (Insecta, Coleoptera), identified in 2 resorts of the strictly protected area of the "Codrii" Scientific Reserve, includes 28 species, with a total of 3291 specimens belonging to 13 genera and 4 families (Carabidae, Scarabaeidae, Silphidae and Lucanidae). Of the species identified, 3 have been found to be rare and threatened with extinction: *Carabus intricatus, C. ullrichi* and *Lucanus cervus*, these being included in the Red Book of the Republic of Moldova (3rd edition).

The analysis performed according to the type of nutrition of the species reported showed the dominance of the zoophage species, followed by the coprophages and necrophages, the least numerous being the phytophages and saprophages species.

According to the spreading area, the European, transpaleartic and Euro-Siberian species are dominant, and a small number of species belongs to the Eurocaucasian, Holarctic, Eurasian and Euro-Mediterranean groups. In the first type of forest, 27 species were recorded, and in the second type of forest – 25 species. Common to both areas were 22 species.

Based on the analysis of the influence of the ecological parameters on the coleopterans collected in the strictly protected area I, there have been identified 2 adundent eudominant species (*Carabus excellens* and *C. cancelatus*),

characteristic of the studied ecosystem, and 3 adundent eudominant species (*Carabus excellens, C. cancelatus* and *C. convexus*), characteristic of the strictly protected area II.

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CONTRIBUTIONS TO THE KNOWLEDGE OF DIVERSITY OF SUPERFAMILY PAPILIONOIDEA (INSECTA, LEPIDOPTERA) FROM THE PROTECTED AREA JIU-DANUBE CONFLUENCE (ROSPA0023)

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CONTRIBUTIONS TO THE KNOWLEDGE OF DIVERSITY OF SUPERFAMILY PAPILIONOIDEA (INSECTA, LEPIDOPTERA) FROM THE PROTECTED AREA JIU-DANUBE CONFLUENCE (ROSPA0023)

Abstract: The paper is a synthesis of the species of Papillionoidea superfamily, signaled during 1954–2017 in this area of Romania. The data comes both from previously published papers and from the observations made by the author. There were identified 48 species and subspecies, included in 33 genera, 20 tribes, 15 sufamilies, 5 families. Four species are now reported for the first time in the analyzed area: *Ochlodes sylvanus* (Esper 1777), *Papilio machaon* Linnaeus, 1758, *Gonepteryx rhamni* (Linnaeus 1758) and *Aporia crataegi* (Linnaeus 1758).) In terms of threat degree (IUCN), the identified species belong to the following categories: three endangered taxa (EN), eight vulnerable taxa (VU), five near threatened taxa (NT), thirty one least concern taxa(LC).

Keywords: diversity, lepidoptera, SPA, Jiu-Danube confluence.

Introduction

The protected area of the Jiu-Danube confluence (ROSPA0023) is part of the list of SPAs (Special Areas of Avifaunal Protection) according to the Government Decision no.1284/2007 regarding the declaration of special avifaunal protection areas as an integral part of the Natura 2000 European ecological network in Romania.

The area has 19,800 ha and is located on both sides of the Lower Jiu, downstream of Craiova, to the confluence of Jiu and the Danube, about 50 km long.

The area hosts not only important flocks of protected bird species but also a very rich and diverse entomofauna.

The diversity of the Lepidoptera Fauna from The Jiu-Danube Confluence Protected Areas has not been studied so far. The first data on the presence of the species of this superfamily in this area is found in papers published during 1954.

The purpose of this paper is to synthesise and centralize data on the presence of Papilionoidea family species in the Jiu-Danube Confluence Protected Area, adding also data obtained by the author in order to better know the diversity of papillionoids in this area of Romania.

Since the work is the first of its kind, it could be a reference point for further research on this superfamily.

Material and method

The paper is elaborated both based on data from specialized papers published during 1954–2015 (Alesinschi & Peiu, 1954, Bobîrnac, 1973, Bobîrnac & Sanda, 1964, Bobîrnac et al., 1968, 1971, Bobîrnac & Matei, 1983, Chimişliu, 1989, 2006, 2008, 2009, 2010, 2011, 2011a, 2012b, 2015; Chimişliu & Goga, 2005) and on personal observations made by the author in various sites in the Jiu-Danube Confluence Area.

The author added data was obtained from observations made during the years 2007–2017.

As method for identifying the species, we used direct observation accompanied by periodical photographing of the specimens from cultivated and spontaneous plants in the private garden in Secui, located in the Jiu meadow.

For the determination of the species we used the works: Lampert (1923), Stănoiu et al. (1979) and Szekely (2008).

For each species we mentioned: the previous entries in the literature (in the chronological order of the publication of the papers), the author obtained data and the protection status according to IUCN. The collection sites are presented in alphabetical order, and the collection dates in the chronological order of the years and months of collection.

Species are presented in phylogenetic order, according to Fauna Europaea (http // www.faunaeur.org).

Abbreviations

IUCN threat categories: EN = Endangered; VU = Vulnerable (vulnerable); NT = Near threatened; LC = Least concern.

Results

The analyzed material was collected from 15 collecting sites: Bratovoeşti, Dăbuleni, Drănic, Gura Văii, Livezi, Mârşani, Cobia Forest, Roaba Forest, Podari, Preajba, Prunet, Rojişte, Segarcea, Secui, Tâmbuşti.

After processing the material, we identified 48 species, included in 33 genera, 20 tribes, 15 subfamilies, 5 families. The distribution of species in the five families is shown in Table 1.

Table 1. The taxonomic spectrum of the species

No	Family	Subfamily	Tribe	No. of genera	No. of species and subspecies
	Hesperidae	Hesperinae		1	1
1	Lycaenidae	Lycaeninae	Lycaenini	1	2
		Polyommatinae	Polyommatini	2	2
		Theclinae	Eumaeini	1	2
2	Nymphalidae	Heliconiinae	Argynnini	3	8
		Libytheinae		1	1
		Limenitidinae	Limenitidini	1	1
		Melitaeinae	Melitaeini	1	3
		Nymphalinae	Nymphalini	5	7
		Satyrinae	Coenonymphini Elymniini Maniolini Melanargiini Satyrini	1 2 2 1 1	2 2 2 1 1
3	Papilionidae	Papilioninae	Graphiini	1	1
			Papilionini	1	1
		Parnassiinae	Luehdorfiini	1	1
4	Pieridae	Coliadinae	Coliadini	1	2
			Gonepterygini	1	1
		Dismorphiinae	Leptideini	1	1
		Pierinae	Anthocharini Pierini	1 3	1 5
5	5	15	16	33	48

Superfamily PAPILIONOIDEA
Family Hesperiidae Latreille, 1809
Subfamily Hesperiinae
Genus *Ochlodes* Scudder, 1872
Ochlodes sylvanus (Esper, 1777)
Personal data: Bratovoeşti 23.06.2015; 08.07.2015; Secui 11.05.2010; 25.05.2013; 23.06.2016; 22.05.2017; 08.06.2017.

Protection status: LC (Szekely, 2008).

Family LYCAENIDAE (Leach, 1815)
Subfamily LYCAENINAE (Leach, 1815)
Tribe Lycaenini
Genus *Lycaena* Fabricius, 1807
Lycaena dispar rutila (Werneburg, 1864))
Previous reports: Tâmbureşti (Bobîrnac, 1973), Secui (Chimişliu, 2006, Chimişliu, 2015).
Protection status: VU (Szekely, 2008.

Lycaena phlaeas (Linnaeus, 1761)
Previous reports: pădurea Roaba (Alexinschi & Peiu, 1954), Segarcea (Chimişliu & Goga, 2005).
Personal data: Secui 10.10.2010; 25.04.2016; 23.06.2016; 18.05.2017; Bratovoeşti 23.06.2015; 01.05.2015; 14.04.2017.
Protection status: LC (Szekely, 2008).

Subfamily POLYOMMATINAE (Swainson, 1827)
Tribe Polyommatini Swainson, 1827
Genus *Celastrina* Tutt, 1906
Celastrina argiolus (Linnaeus, 1758)
Previous reports: pădurea Roaba (Alexinschi & Peiu, 1954); Segarcea (Chimişliu, 2015).
Protection status: LC (Szekely, 2008).

Genus *Polyommatus* Latreille, 1804
Subgenus *Polyommatus* Latreille, 1804
Polyommatus (Polyommatus) icarus (Rottemburg, 1775)
Previous reports: Mârşani (Bobîrnac, 1972); Prunet (Chimişliu, 2006); Segarcea (Chimişliu & Goga, 2005); Livezi, Secui (Chimişliu, 2015).
Personal data: Bratovoeşti 23.06.2015; Secui 20.07.2014; 01.05.2015; 09.04.2016; 23.06.2016; 14.04.2017.
Protection status: LC (Szekely, 2008).

Subfamily THECLINAE (Butler, 1869)
Tribe Eumaeini Doubleday, 1847
Genus *Satyrium* Scudder, 1876.
Satyrium acaciae (Fabricius, 1787)
Previous reports: Segarcea (Chimişliu & Goga, 2005; Chimişliu, 2015).
Protection status: VU (Szekely, 2008).

Satyrium ilicis (Esper, 1779]
Previous reports: Segarcea (Chimişliu & Goga, 2005).
Protection status: VU (Szekely, 2008).

Family NYMPHALIDAE Swainson, 1827
Subfamily HELICONIINAE Swainson, 1827
Tribe Argynnini Duponchel [1835]
Genus *Argynnis* Fabricius, 1807
Subgenus *Argynnis* Fabricius, 1808
Argynnis (Argynnis) paphia (Linnaeus, 1758)
Previous reports: Branişte, Segarcea (Chimişliu, 2011a); Secui (Chimişliu, 2011b).
Personal data: Secui 12.10.2011; 15.09.2013.
Protection status: NT (Rákosy et al., 2003).

Subgenus *Fabriciana* Reuss, 1920
Argynnis (Fabriciana) adippe (Denis and Schiffermüller, 1775)
Previous reports: Segarcea (Chimişliu & Goga, 2005; Chimişliu, 2011a).
Protection status: NT (Rákosy et al., 2003).

Argynnis (Fabriciana) niobe (Linnaeus, 1758)
Previous reports: Podari (Chimişliu, 2011a).
Protection status: NT (Rákosy et al., 2003).

Subgenus *Pandoriana* Warren, 1942
Argynnis (Pandoriana) pandora (Denis and Schiffermuller, 1775)
Previous reports: Tâmbureşti (Bobîrnac et al., 1968), Bratovoeşti (Chimişliu, 2011b).
Personal data: Bratovoeşti 23.06.2015; Secui 25.05.2013; 05.06.2013; 17.04.2015; 17.06.2015 17.05.2016; 08.06.2016; 23.06.2016; 15.05.2017; 22.05.2017; 10.16.2017.
Protection status: VU (Székely, 2008).

Genus *Boloria* Moore, 1900
Subgenus *Clossiana* Reuss, 1920
Boloria (Clossiana) dia (Linnaeus, 1767)
Previous reports: Podari (Chimişliu, 2011a); Secui (Chimişliu, 2011b).
Protection status: LC (Székely, 2008).

Boloria (Clossiana) euphrosyne (Linnaeus, 1758)
Previous reports: Segarcea (Chimişliu & Goga, 2005).
Protection status: VU (Rákosy et al., 2003).

Boloria (Clossiana) selene (Denis & Schiffermüller, 1775)
Personal data: Secui 25.06.2007.
Previous reports: Secui (Chimişliu, 2011b).
Protection status: LC (Székely, 2008).

Genus *Issoria* Hübner**,** 1819
Subgenus ***Issoria*** Hübner, 1819
Issoria (Issoria) lathonia (Linnaeus, 1758)
Previous reports: Roaba Forest (Alexinschi and Peiu, 1954); Tâmbureşti (Bobîrnac et al., 1968) Segarcea (Chimişliu, 2011a); Secui (Chimişliu, 2011b).
Personal data: Bratovoeşti 23.06.2015; Secui 25.09.2009; 24.06.2012; 26.09.2016.
Protection status: LC (Székely, 2008).

Subfamily LIBYTHEINAE Swainson, 1827
Genus ***Libythea*** Fabricius, 1807
Libythea celtis (Laicharting, 1782)
Previous reports: Gura Văii (Chimişliu & Goga, 2005).
Protection status: EN (Rákosy et al., 2003).

Subfamily LIMENITIDINAE Behr, 1864
Tribe Limenitidini Behr**,** 1864
Genus *Neptis* Fabricius, 1807
Neptis sappho (Pallas, 1771) = *aceris* Esper, 1783
Previous reports: Tâmbureşti (Bobîrnac et al., 1971).
Personal data: Bratovoeşti 23.06.2015; Secui 26.09.2010; Malu Mare 20.09.2010.
Protection status: VU (Székely, 2008).

Subfamily MELITAEINAE
Tribe Melitaeini Newman, 1870
Genus *Melitaea* Fabricius, 1807
Melitaea athalia (Rottemburg, 1775)
Previous reports: Segarcea (Chimişliu & Goga, 2005); Bratovoeşti (Lac Victoria) (Chimişliu, 2011a); Secui (Chimişliu, 2011b).
Personal data: Secui 24.05.2013.
Protection status: LC (Székely, 2008).

Melitaea cinxia (Linnaeus, 1758)
Previous reports: Segarcea (Chimişliu & Goga, 2005).
Protection status: LC (Székely, 2008).

Melitaea phoebe (Denis and Schiffermüller,1775)
Previous reports: Mârşani and Tâmbureşti (Bobîrnac & Sanda, 1964), Secui (Chimişliu, 2011b).
Protection status: LC (Székely, 2008).

Subfamily NYMPHALINAE Swainson, 1827
Tribe Nymphalini Swainson, 1827
Genus *Aglais* Dalman, 1816
Aglais io (Linnaeus, 1758)
Previous reports: Bobîrnac & Matei, 1983 – Tâmbureşti; Chimişliu, 2011a – Branişte;Bratovoeşti, Dăbuleni, Secui (Chimişliu, 2011b).
Personal data: Bratovoeşti 23.06.2015; Dăbuleni 30.04.2010; Secui 15.04.2010; 10.10.2010; 31.11.2011; 15.04.2012; 17.04.2015; 21.04.2012; 23.04.2015; 10.05.2015; 17.06.2015 23.06.2016; 30.03.2017; 27.04.2017.
Protection status: LC (Székely, 2008).

Aglais urticae (Linnaeus, 1758)
Previous reports: Secui (Chimişliu, 2011b).
Personal data: Bratovoeşti 23.06.2015; Secui 10.05.2013; 20.05.2015; 23.05.2017; 08.06.2017.
Protection status: LC (Székely, 2008).

Genul *Araschnia* Hübner, 1819
Araschnia levana (Linnaeus, 1758)
Previous reports: Secui (Chimişliu, 2011b).
Personal data: Teasc 09.08.2013; Secui 10.04.2011; 23.04.2011; 24.04.2011; 15.04.2012; 21.04.2012; 17.04.2013; 26.04.2015; 01.05.2015; 07.06.2015; 10.05.2015; 17.04.2015; 21.04.2016; 23.06.2016; 20.04.2017; 05.05.2017.
Protection status: LC (Székely, 2008).

Genus *Nymphalis* Kluk, 1780
Nymphalis polychloros (Linnaeus, 1758)
Previous reports: Roaba Forest (Alesinschi & Peiu, 1954).
Protection status: VU (Székely, 2008).

Genus *Polygonia* Hübner, 1819
Polygonia c-album (Linnaeus, 1758)
Previous reports: Roaba Forest (Alesinschi & Peiu, 1954), Secui (Chimişliu, 2011b).
Personal data: Bratovoeşti 23.06.2015; Secui 17.06.2007; 12.07.2009; 10.10.2010; 31.11.2011; 17.04.2013; 20.07.2014; 02.03.2017; 08.06.2017.
Protection status: LC (Székely, 2008).

Genus *Vanessa* Fabricius, 1807
Vanessa atalanta (Linnaeus, 1758)
Previous reports: Tâmbureşti (Bobîrnac & Sanda, 1964), Bratovoeşti, Secui (Chimişliu, 2011b).
Personal data: Bratovoeşti 23.06.2015; Preajba 25.06.2009; Secui 26.09.2010; 10.10.2010; 10.04.2011; 23.06.2016; 20.05.2017.
Protection status: LC (Székely, 2008).

Vanessa cardui (Linnaeus, 1758)
Previous reports: Tâmbureşti (Bobîrnac & Sanda, 1964); Bratovoeşti (Chimişliu, 2011a).
Personal data: Bratovoeşti 23.06.2015; 08.07.2015; Secui 12.07.2009; 25.09.2009; 26.09.2010; 10.10.2010; 17.04.2015; 17.06.2015; 25.04.2016; 20.05.2017.
Protection status: LC (Székely, 2008).

Subfamily SATYRINAE
Tribe Coenonymphini
Genus *Coenonympha* Hubner, 1819
Coenonympha arcania (Linnaeus, 1761)
Previous reports: Cobia forest (Stănoiu et al., 1978).
Protection status: LC (Székely, 2008).

Coenonympha pamphilus (Linnaeus, 1758)
Previous reports: Roaba Forest (Alexinschi & Peiu, 1954); Tâmbureşti (Bobîrnac & Matei, 1983); Secui (Chimişliu, 2011c).
Personal data: Bratovoeşti 23.05.2015; Secui 11.05.2012.
Protection status: LC (Székely, 2008).

Tribe Elymniini
Genus *Lasiommata* Westwood, 1841
Lasiommata megera (Linnaeus, 1767)
Previous reports: Roaba Forest (Alesinschi & Peiu, 1954); Bratovoeşti (Chimişliu, 2011c).
Personal data: Secui 30.08.2009; 10.10.2010; 08.09.2017.
Protection status: LC (Székely, 2008).

Genus *Pararge* Hubner, 1819
Pararge aegeria Linnaeus, 1758
Previous reports: Roaba Forest (Alesinschi & Peiu, 1954).
Protection status: LC (Székely, 2008).

Tribe Maniolini
Genus *Aphantopus* Wallengren, 1853
Aphantopus hyperantus (Linnaeus, 1758)
Previous reports: Rojişte (Chimişliu, 2011c).
Statut protector: LC. (Székely, 2008).

Genus *Maniola* Schrank, 1801
Maniola jurtina jurtina (Linnaeus, 1758)
Previous reports: Roaba Forest (Alexinschi & Peiu, 1954); Tâmbureşti and Dăbuleni (Bobîrnac & Sanda, 1964); Branişte, Rojişte, Secui, Segarcea (Chimişliu, 2011c).
Personal data: 16.08.2009; 17.06.2014; 08.06.2016; 04.06.2017.
Protection status: LC (Székely, 2008).

Tribe Melanargiini
Genus *Melanargia* Meigen, 1828
M. galathea (Linnaeus, 1758)
Previous reports: Roaba Forest (Alexinschi & Peiu, 1954); Tâmbureşti (Bobîrnac & Matei, 1983); Segarcea (Chimişliu, 2011c).
Protection status: LC (Székely, 2008).

Tribe Satyrini
Genus *Brintesia* Fruhstorfer 1911
B. circe panonica (Fruhstorfer, 1911)
Previous reports: Cobia Forest (Chimişliu & Goga, 2005).
Protection status: NT (Székely, 2008).

Family PAPILIONIDAE LATREILLE, 1802
Subfamily PAPILIONINAE
Tribe Graphiini
Genus ***Iphiclides*** Hübner, 1819
Iphiclides podalirius (Linnaeus, 1758)
Previous reports: Tâmbureşti and Ogrin (Bobîrnac & Sanda, 1964), Pădurea Cobia-Segarcea (Chimişliu & Goga, 2005); Secui (Chimişliu, 2008).
Personal data: Bratovoeşti 23.06.2015; Dăbuleni 30.04.2010; Teasc 09.08.2013; Secui 26.09.2010; 15.04.2010; 30.04.2010; 24.06.2010; 21.04.2012; 17.04.2013; 01.05.2014; 15.08.2014; 26.04.2015; 01.05.2015; 10.05.2015; 05.07.2015; 20.04.2016; 23.06.2016; 02.03.2017; 14.03.2017.
Protection status: VU (Székely, 2008).

Tribe Papilionini
Genus *Papilio* Linnaeus, 1758
Papilio machaon Linnaeus, 1758 (Fig. 1)
Personal data: Bratovoeşti 23.06.2015; Secui 26.09.2010; 15.04.2012; 01.05.2014; 18.05.2015; 23.06.2016; 09.08.2016 (larva, Fig. 2); 08.06.2017.
Protection status: EN (Székely, 2008).

Subfamily PARNASSIINAE
Tribe Luehdorfiini
Genus *Zerynthia* Ochsenheimer, 1816
Subgenus *Zerynthia* Allancastria Bryk, 1934
Zerynthia (Zerynthia) polyxena (Denis & Schiffermüller, 1775) (Fig. 3)
Previous reports: Secui (Chimişliu, 2008).
Personal data: Dăbuleni 30.04.2010; Secui 19.04.2009; 30.04.2010; 11.05.2010; 01.05.2014; 06.05.2015; 07.05.2015 (larva, fig. 4); 10.05.2015; 06.05.2017.
Protection status: EN (Székely, 2008).

Family PIERIDAE Swainson 1820
Subfamily COLIADINAE
Tribe Coliadini
Genus *Colias* Fabricius, 1807
Colias croceus (Fourcroy, 1785)
Previous reports: Segarcea (Chimişliu & Goga, 2005), Dăbuleni, Livezi (Chimişliu, 2009).
Personal data: Bratovoeşti 20.07.2007; Secui 24.06.2010; 10.10.2010; 20.07.2014.
Protection status: LC (Székely, 2008).

Colias hyale (Linnaeus, 1758)
Previous reports: Dăbuleni (Chimişliu, 2009).
Personal data: Secui 24.09.2010.
Protection status: LC (Székely, 2008).

Trib Gonepterygini
Genus *Gonepteryx* Leach, 18 15
Gonepteryx rhamni (Linnaeus, 1758)
Personal data: Bratovoeşti 08.06.2014; 23.06.2015; Secui 22.06.2014; 17.06.2015; 23.06.2016.
Protection status: LC (Székely, 2008).

Fig. 1. *Papilio machaon* – adult (original)

Fig. *2. P. machaon* – larva (original)

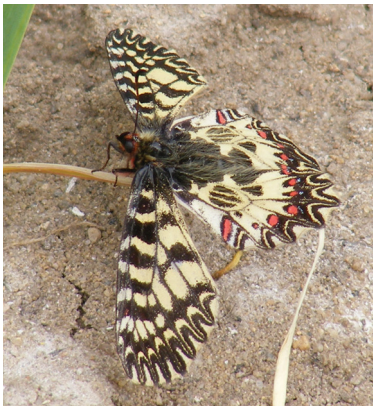

Fig. 3. *Zerynthia (Z.) polyxena* – adult (original)

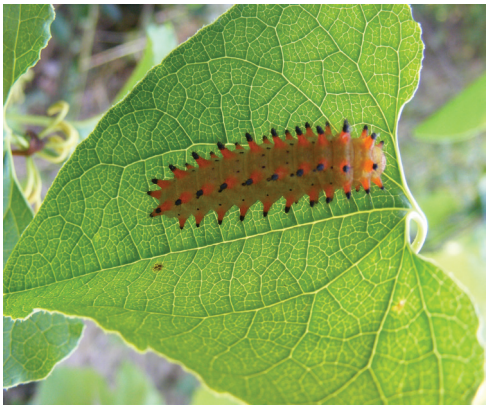

Fig. 4 *Zerynthia (Z.) polyxena* – larva (original)

Subfamily DISMORPHIINAE
Tribe Leptideini
Genus *Leptidea* Billberg, 1820
Leptidea sinapis (Linnaeus, 1758)
Previous reports: Secui (Chimişliu, 2009).
Personal data: Secui 09.04.2016; 14.04.2017; 08.06.2017.
Protection status: LC. (Székely, 2008).

Subfamily PIERINAE
Tribe Anthocharini
Genus *Anthocharis* Boisduval, Rambur, Duméril & Graslin, 1833
Anthocharis cardamines (Linnaeus, 1758)
Previous reports: Pădurea Cobia (Chimişliu & Goga, 2005); Bratovoesti (Chimişliu, 2009).

Personal data: Dăbuleni 30.04.2010; Secui 08.04.2012; 23.04.2015; 26.04.2015; 14.04.2017.
Protection status: LC (Székely, 2008).

Trib Pierini
Genus *Aporia* Hübner, 1819
Aporia crataegi (Linnaeus, 1758)
Personal data: Secui 24.05.2010.
Protection status: NT (Székely, 2008).

Genus *Pieris* Schrank, 1801
Pieris brassicae (Linnaeus, 1758)
Previous reports: Segarcea (Chimişliu & Goga, 2005), Secui (Chimişliu, 2009).
Personal data: Bratovoeşti 17.06.2008; 23.06.2015; 08.07.2015; Teasc 09.08.2013; Secui 24.06.2010; 04.07.2010; 10.10.2010; 17.04.2013; 20.07.2014; 26.04.2015; 05.07.2015; 17.06.2015; 23.06.2016; 25.05.2016.
Protection status: LC (Székely, 2008).

Pieris napi (Linnaeus, 1758)
Previous reports: Bratovoeşti, Branişte, Podari (Chimişliu, 2009).
Personal data: Bratovoeşti 23.06.2015; 08.07.2015; Dăbuleni 30.04.2010; Teasc 09.08.2013; Secui 24.06.2010; 04.07.2010; 10.10.2010; 10.04.2011; 17.04.2013; 20.07.2014; 23.04.2015; 05.07.2015; 20.04.2016; 25.05.2016; 23.06.2016; 08.06.2017.
Protection status: LC (Székely, 2008).

Pieris rapae (Linnaeus, 1758)
Previous reports: Prunet, Secui (Chimişliu, 2006), Bratovoeşti, Livezi (Chimişliu, 2009).
Personal data: Bratovoeşti 23.06.2015; 08.07.2015; Teasc 09.08.2013; Secui 15.04.2010; 24.06.2010; 04.07.2010; 10.10.2010; 10.04.2011; 17.04.2013; 20.07.2014; 17.06.2015; 09.04.2016; 21.04.2016; 25.04.2016; 20.04.2016; 25.05.2016; 23.06.2016; 30.03.2017; 14.04.2017; 08.06.2017.
Protection status: LC (Székely, 2008).
Genus ***Pontia*** Fabricius, 1807
Pontia dapidice (Linnaeus, 1758)
Previous reports: Bratovoeşti, Dăbuleni (Chimişliu, 2009).
Personal data: Bratovoeşti 23.05.2013; 08.05.2015; Secui 15.04.2010; 17.05.2012; 18.05.2015; 10.05.2017.
Protection status: LC (Székely, 2008).

Discussions

Within the 47 species identified in the analyzed material, four species are now reported for the first time in the area: *Ochlodes sylvanus, Papilio machaon, Gonepteryx rhamni, Aporia crataegi.* The absence of the previous mentions of these species attests to the fact that the area has not been researched, because the species are characteristic of the area's habitats.

In terms of degree of endangerment (IUCN), the identified species belong to the following categories of taxa:

– three endangered taxa (EN) – *Libythea celtis, Papilio machaon, Zerynthia (Zerynthia) polyxena*

– eight vulnerable taxa (VU) – *Lycaena dispar rutile; Satyrium acaciae; S. ilicis; Argynnis (Pandoriana) pandora; Boloria (Clossiana) euphrosyne; Neptis sappho, Nymphalis polychloros, Iphiclides podalirius.*

– five near threatened taxa (NT) – *Argynnis (Argynnis) paphia, Argynnis (Fabriciana) adippe, Argynnis (Fabriciana) niobe, Brintesia circe panonica, Aporia crataegi*

– 31 least concern taxa(LC).

Most of the identified species belong to the Nymphalidae family (28 species).

Conclusions

Although the data comes from sporadic mentions and observations, they are the first synthesis work on the Papilionoidea family in the Jiu-Danube Confluence (ROSPA0023).

Considering the physico-geographical characteristics of the area and the climate specificity, surely the diversity of this group of insects is much higher than mentioned in the present work.

Systematic studies are required in order to know the diversity of this group and to reconfirm or refute the presence of the species mentioned in the literature of specialty and unconfirmed by the observations of the author of this work.

The presence of species with different degrees of endangerment in the habitats of the area, together with other protected species, rare or threatened with extinction, increase the scientific value of Oltenia's lepidopteran fauna.

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THE STAPHYLININI (COLEOPTERA: STAPHYLINIDAE) OF JAMAICA BAY WILDLIFE REFUGE (NEW YORK, USA)

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THE STAPHYLININI (COLEOPTERA: STAPHYLINIDAE) OF JAMAICA BAY WILDLIFE REFUGE (NEW YORK, USA)

Abstract: The present paper presents the Staphilinini (Coleoptera: Staphylinidae) of Jamaica Bay Wildlife Refuge (JBWR) (Gateway National Recreation Area). From this refuge were recorded 14 species, belonging to genera *Creophilus* Leach (1 species), *Platydracus* Thomson (4 species), *Tasgius* Stephens (3 species), *Philonthus* Stephens (6 species), nine of which are native species, and 5 adventive species introduced from Europe [*Creophilus maxillosus* (Linnaeus), introduced in 1620; *Tasgius ater* (Gravenhorst), introduced in 1802; *Tasgius melanarius* (Heer), introduced 1935; *Tasgius winkleri* (Bernhauer); *Philonthus politus* (Linnaeus)]. Were obtained original data about the biology and reproduction of the species *Creophilus maxillosus villosus* (L.), *Platydracus zonatus (*Grav.*), Platydracus cinnamopterus (*Grav.*), Platydracus praetermissus* Newton*, Platydracus praelongus* (Mann.), *Philonthus brunneum* (Latr.), *Philonthus alumnus* Erich., *Philonthus poltus* (L.*).*
Keywords: Staphylinidae, Staphylinini, taxonomy, biology, ecology.

Introduction

Staphylinidae (rove beetles) is the largest family in order Coleoptera with 60.000 described living species, presently divided into 32 subfamilies (Solodovnikov et al., 2013) and placed in more than 3200 genera (Grebennikov & Newton, 2009). Most species of Palearctic and Nearctic's ecosystem remain difficult for non-specialists to identify. Body of rove beetles is slender, elytra short and truncate apically. Most species are beneficial coleopteres (predatory as adults and larvae), many are fungus feeders, some are pollen feeders

Tribe Staphylinini is very large tribe in family Staphylinidae, is divided into

eight subtribes, and including at present 200 genera worldwide, 31 occur in North America, six of them endemic. Two of the subtribes (Staphylinina, Philonthina) and 4 genera were found in JBWR.

The characteristics of species in this tribe (in the tribe Staphylini) are: antennal bases generally well separated and closer to eye than to each other, antennae seldom geniculate; neck usually concaveroad**,** seldom less than ½ as wide as head; anterior margin of prosternum usually straight, sometimes convex; elytral suture usually straight, elytal margins rarely overlapping; tarsi nearly always 5–5–5 (5–4–4 in *Atanygnathus*); abdominal intersegmental membranes with pattern of small irregular rounded sclerites; aedeagus with parameres fused at lest at base, usually fused into a single lobe which often bears black tubercles on side facing median lobe, paramere sometimes greatly reduced or absent (Arnett & Thomas, 2000).

In the JBWR the staphylinid has been poorly investigated till now, so, generally there is little information and literature on arthropods of this area, about all insects, rove beetles (Staphylinidae) inclusive. In JBWR were collected 30 staphylinid species, 46.7% of wich (of the total catch) constituted species of the tribe Staphylinini (Neculiseanu, 2011, 2013a, 2013b, 2013c, 2016).

From 14 species of this tribe recorded in JBWR, 9 are native species, and 5 adventive species introduced from Europe. In this work we were presented the Staphylinini fauna and describe in detail the biology of some species: oviposition periods, fecundity, the development period from eggs to adults, adult longevity, duration of each immature stage (egg-, larval, pupal- stages) etc. Behaviour observation and ecological data as feeding, cannibalism, predation were also describe for some species

Material and methods

The studies were carried out in the Jamaica Bay Wildlife Refuge (JBWR) which is located in Queens, within the limits of New York City (Fig. 1).

JBWR is one of the most important urban wildlife refuge in the United States, and is the largest bird sanctuary in the northeastern United States. Considered nationally and internationally area this refuge also is renowned as a prime birding spot where thousands of water, land and shorebirds stop during migration.

The research was effectuated in variety types of habitats and in their microhabitats in the vegetative season of 2008–2009. During field work were used pitfall traps, consists of plastic jars (08 cm diameter by 10 cm deep**)** and some pitfall traps constructed by author, which were buried in the ground even with the soil surface and filled with a solution of white vinegar (100 ml. in each trap). These traps were installed in the spring, summer and autumn in wet and dry habitats and along the border of standing water. Beetles also were collected by sifter and by hand from a variety of habitats. Some adults and larvae come to bait, other

were hand captured from mushrooms, margins of ponds, in leaf-litter, under stones and logs, under back, on and in the soil and sandy. Immature stages of some species were collected from the field, while their eggs were obtained in the laboratory from field collected adults. Some species taken at light. In order to study their behavior, life cycle and type of reproduction many species, were grown in the laboratory (pair beetles).

The adults and immature stages (larvae, pupae) collected in the field has been maintained in the containers and glasses with different diameter and deep with the soil from their habitats. The reproduction and life cycle for many species were studied at temperature 25±3°C under laboratory condition. Classification of the beetles are made after Newton & Thayer (1992), Lawrence and Newton (1995) and American Beetles (Arnett Jr. & Thomas (2000). The scientific works of Downie & Arnett Jr.(1996), Nomina Insecta Nearctica (1996) Bousquet, (2010), Brunke et. al. (2011) was used as the primary key to identify the majority of species.

Fig. 1. The Jamaica Bay Wildlife Refuge (JBWR) (Gateway National Recreation Area).

The following abbreviations are used in the text of this work: JBWR (Jamaica Bay Wildlife Refuge), LI (first instar), L2 (second instar), L3(third instar). The Microscope MBS–10 (LOMO) was used for identification of species and separation by sex. All the photos (pictures) of the work were made by the author.

Results and discussions

In this study we identified the diversity and natural history of the beetles Staphylinini (Coleoptera, Staphylinidae) of the Jamaica Bay Wildlife Refuge. In the research periods in JBWR were collected 14 species of the tribe Staphylinini, which belong to 4 genera: *Creophilus*, *Platydracus*, *Tasgius*, *Philonthus*. Captured beetles of the genus *Philonthus* were the most abundant, with a total of 6 species*: Philonthus alumnus* Erichson, *Philonthus brunneum* (Latreille), *Philonthus cognatus* (Stephens), *Philonthus fusiformis* Melsheimer, *Philonthus lomatus* Erichson, Philonthus politus (Linnaeus). The genus Platydracus include 4 species: *Platydracus cinnamopterus* (Gravenhorst), *Platydracus praelongus* (Mannerheim), *Platydracus praetermissus* Newton, *Platydracus zonatus* (Gravenhorst). The genus *Tasgius* is represented by the species *Tasgius ater* (Gravenhorst), *Tasgius melanarius* (Heer), *Tasgius winkleri* (Bernhauer)and the genus *Creophilus* by species *Creophilus maxillosus* (Linnaeus).

Were obtained original data about the natural history of Staphylinini and were describe the biology of some species: mating, oviposition periods, fecundity of female, the development period from eggs to adults, adult longevity, duration of each immature stage (egg-, larval-, pupal- stages), duration of the entire life cycle, voltinism etc. aspects of feeding and behavior of the adults and of instars larvae L1-L3.

Tribe Staphylinini

Genus ***Creophilus*** includes a dozen species in all worldwide. Species of this genus have disc of pronotum and most of disc of neck virtually impunctate and asetose, middle coxae widely separated by broadly rounded apical margin of mesosternum, pronotal hypomeron with superior line becoming obsolete near anterior angles of pronotum and not joining the inferior line (Fig. 2.1). The ***Creophilus maxillosus villosus*** (**Hairy Rove Beetle**) (12–23 mm), is common species, very videly distributed in the Palearctic region, also in Central America, Mexico and in West Indies. This species were found throughout the eastern U.S. in all vegetation seasons (fall and spring, sometimes in the summe). In the JBWR we found them in the spring and fall, in dung and in carrion. The species characterized by shiny black color, large eyes, mandibles close across each other in the front, golden setae on posterior angles of the head and slightly on the anterior angle of pronotum, elytra and abdomen with densely white setae, finely punctate. On April 17, 2009, one specimen of this species was found on carrion of raccon (***Procyon lotor***); on May

10, 2009 from the same carrion were collected four adults (sex undetermined) and were placed in a separate glass jar (Fig. 2.2). In this day at 8.00 MP observed mating (5 min). The eggs are oval, white colored, size 2 to 3 mm, and their stage lasted 3–4 ds (Fig. 2.3). The first instar (L1) obtained on 05.13.09; head and thorax brownish-rufous, abdomen light testaceous (Fig. 2.4). L3 are long, cylindrical and stout, head brown-black, thorax dark brownish – rufous. Abdomen with heavy chitinous plates; plates brown in color; areas between plates very flexible and much lighter in color; length 20–21 mm. The larval stage lasted 14–16 ds (Fig. 2.5). Pupa emerged in the pupal chamber; The pupal stage lasted 7–9 ds. (Fig. 2.6). This photo shows adults emergence from pupa. The newly adults pulled itself from the exuvia and then freed itself when the exuvia became caught on the soil.

Fig. 2.1.

Fig. 2.2.

Fig. 2.3.

Fig. 2.4.

Fig. 2.5.

Fig. 2.6.

Creophilus maxillosus villosus (continued) (Figs. 3.1 and 3.2). New adult black shining, posterior angles of head and anterior angles of pronotum with white setae. They are very active and flight on light if opened the glass jar where they were emerged (Figs. 3.3 and 3.4). Some adults were obtain in laboratory from larvae collected on carrion where they feed on maggots. The body of these new adults had

yellow gray setae and perhaps their belonging to ***Creophilus maxillosus europeana*.** The estimation of the total development from egg to adult lasted 24–29 days**.** The new reared adults were not again maited to observing the life cycle. Genus ***Tasgius*** includes large(15–20 mm) black species, with mandibles rather slender, with one tooth or without tooth on inner edge. Last segment of labial palpi dilated and terminally truncate. Three species of the genus were collected (Fig. 3.5). One of this is ***Tasgius ater*** (20–23 mm) with distinguishing characters: head and pronotun shiny, with punctures of two sizes, left mandible without tooth on inner edge. Taken under stones and wood in the mid of July. The second species (Fig. 3.6) ***T. melanarius*** (13–20 mm) found under cover in woods, in the leaf-litter in autumn and in pitfall traps in early of July. Beetle has head and pronotum less shiny, with dense, uniform punctures; pronotum with sides widest just before anterior angle, sides strongly converging, basal half of antennomere 2 bicoloured.

Fig. 3.1.

Fig. 3.2.

Fig. 3.3.

Fig. 3.4.

Fig. 3.5.

Fig. 3.6.

(Fig. 4.1). This is species ***T. winkleri*** (19.0–19.5 mm) and can be distinguishing from ***T. melanarius*** by the shape of pronotum and color of basal half of antennomere 2; widest pronotum at the anterior one third, and solid red of basal half of antennomere 2. Genus ***Platydracus*** includes species which have postocular macrosetal punctures nearer to base of head than to eye and middle of inner edge of each mandible with at least 2 teeth, usually with 3 teeth (on left mandible 2 dorsal and 1 ventral; on right mandible 1 dorsal and 2 ventral). There are approximately 38 species of this genus in America. They prefer dung (cow, horse), carrion, lives on fungi, in leaf-litter, but some usually are found under bark of damp, decaying logs, under cover near water (Fig. 4.2). The species ***P. zonatus*** (12–14 mm) has the following sign characteristics: dorsal surface usually medium to dark reddish, with distinctly bicolored pronotum (darkest at anterior angles and sides and sometimes along median line), black scutellum, antennomere 9 slightly transverse, abdomen with only sparse gold setae and paired areas of black velvet saetae. Found in early July under bark. ***zonatus*** (Fig. 4.3). In laboratory eggs of this species were laid by female in the soil, separately. The eggs are oval to slightly shaped with surface granular to faintly striate and color creamy yellow to white; length of the eggs was 1.9mm and width –1.6 mm; the egg stage lasted 5–7ds. (Fig. 4.4). Larvae L1 usually develop on carrion, but this larva was reared in laboratory condition without this food. This larva has slender body, head brown and thorax light brownish. The length of first instar on 2–3 ds is 10–11 mm and width of head capsule 1.1–1.2 mm. (Fig. 4.5). This photo shows the second instar L2 on 9–10 ds. The length of this instar is 13.0–13.5mm; width of head capsule 1.3–1.4 mm. (Fig. 4.6). The length of third instar L3 on 14–15 ds is 14.0–14.5 mm; width of head capsule – 1.5–1.6 mm.

Fig. 4.1.

Fig. 4.2.

Fig. 4.3.

Fig. 4.4.

Fig. 4.5.

Fig. 4.6.

Platydracus cinnamopterus (continued) (Fig. 5.1). Emerge adults in the first few ds have head and thorax dark brown, elytra and abdopmens segments light brown. New adults are very active. The species is widely distributed in Eastern North America (Fig. 5.2). This second species ***P. cinnamopterus*** (12–15 mm) of genus ***Platydracus*** can be distinguished from other species by narrow impunctate median line of pronotum (2 or fewer punctures could fit across its narrowest point), pronotum usually evenly coloured, light to dark red; antennomere 9 distinctly transverse, its apical width greater than its length. This is spring-summer breeders species, overwintering as adults, began to emerge from hibernation in early April (Fig. 5.3). Mating beetles observed during the day in the field on 05.17.09 between 6.00 and 7.00 PM. and in laboratory at night on 04.25.09 and on 05.12.09 between 10.55 – 11.00 and 11.00 – 11.10 PM respectively (Fig. 5.4) The eggs are laid in the soil, separately. One female is in capacity to laid about 30 eggs in the period from the Mid May to the Mid June. The eggs when freshly deposited (laid) are elongate – oval and have length 2.0–2.1 mm and width 1.3–1.7 mm. but later they assume a more spherical form with diameter of 1.72. mm. They are creamy yellow to white color. The egg stage duration is 4–6 ds. (Fig. 5.5). The first instar L1 observed in the early of May, has in length 7.1–7.5 mm and width of head capsule 1.0–1.1 mm. this instar lasted 5–6 ds. The larvae are voracious and consume many eggs and small larvae. Cannibalism was observed for this instar. (Fig. 5.6). This photo shows the L2 on 7–8 ds. The body is cylindrical, head brown, thorax light brownish, abdominal tergites white and with long urogomphi. In this time second instar has length 11.5–13.0 mm and width of head capsule 1.2–1.3 mm; Some larvae of this instar make a galleries in the soil.

Fig. 5.1.

Fig. 5.2.

Fig. 5.3.

Fig. 5.4.

Fig. 5.5.

Fig. 5.6.

Platydracus cinnamopterus (continued) (Fig. 6.1). L3 on 18–19 ds is stout, head of older larva is dark brown, abdomen with heavy chitinous plates; plates light brown in color; areas between plates very flexible and much lighter in color; Length larva before pupation is 17.0–18.0 mm; width of head capsule – 1.8 mm; no cannibalism occurred for the L3; some larvae also made a galleries in soil. Larvae of this instar feed on small arthropod and insects. (Fig. 6.2)..L3 before pupation larva building the pupal chamber and rolls up in a ring spiral and thus remains until pupation**.** The total larval stage lasted 23 to 26 ds . (Fig. 6.3). This photograph show the hatched pupa from larval exuvia L3. (Fig. 6.4).Color of pupa on 1–2 ds is white to yellowish and has length 8.7 to 9.0 mm and width 3.2–3.5 mm. The pupal stage lasted 7–8 ds. (Fig. 6.5). Pupa on 3–4 ds is brown- redish. Development from egg to adult stage generally takes 34 to 40 ds. (Fig. 6.6). Pupa before emergence adult (on 7–8 ds) is dark redish-black;

Fig. 6.1.

Fig. 6.2.

Fig. 6.3.

Fig. 6.4.

Fig. 6.5.

Fig. 6.6.

Platydracus cinnamopterus (continued) (Fig. 7.1). This photo shows the pupal exuvia after emerge adult, which usually is dark brown-redish color (Fig. 7.2). Newly emerged adults, which beginning to emerged from late June to late July, feeding, mating, but in laboratory no laided eggs. This species is spring-summer breeders, overwintering as adult. Development from the egg to the adult stage takes 36–41 ds. The larvae and adults with hight voracity consume different type (kind) of food, but prefer arthropods, especially insects and their immature stages. Overwintered old adults died toward the end of August (Fig. 7.3). This is **rufous form** of the same species ***Platydracus cinnamopterus*** which may be distinguished by ***C. cinnamopterus*** by the bright red color of dorsal surface (head, pronotum and elytra). Only one specimen was obtained from larva collected on the Mid of May. (Fig. 7.4). Larva L2 on 7–8 ds has length 11.0–12.0 mm and width of head capsule 1.1–1.2 mm. This instar of rufous form is darker than the same instar of this species (Fig. 7.5). L3 before pupation (22–23 ds) have the head capsule, thorax and abdomen more darker than larvae of ***P. cinnamopterus***; the length of L3 is 16.0–17.0 mm; width of head capsule – 1.6–1.7 mm (Fig. 7.6). Pupa on 4–5 ds is dark brown-reddish, the length is 7.9–8.1 mm, the width is 3.0–3.2 mm. The pupal stage lasted 7–8 ds. The species is widely distributed in the forested area of eastern North America. The adults collected in leaf-litter.

Fig. 7.1.

Fig. 7.2.

Fig. 7.3.

Fig. 7.4.

Fig. 7.5.

Fig. 7.6.

(Fig. 8.1). Name of this species ***Platydracus praetermissus*** (11–14 mm), from the latin adjective *praetermissus* meaning "neglected" or "overlooked" Species is widely distributed in the forested areas of eastern United States and can be distinguished by following characters: head, pronotum and elytra usually dark reddish, pronotum not bicolored, the complete impunctate median line of pronotum about 3–4 puncture diameters wide and narrowest, black scutellum, antennomere 9 subquadrate, its apical width nearly equal or equal to its length (Fig. 8.2) This larva of the ***P. praetermissus*** was collected on 07.31.2009 in leaf litter and reared to adult in the laboratory ***praetermissus*** (Fig. 8.3). Like the adult the L3 of this species was very actively and voracious, consume different type (kind) of food, but prefer small insects and their larvae. Before pupation head and thorax of mature larva are red brown with darkened abdominal segments (Fig. 8.4). The pupa of this

species was exposed in it pupal chamber in the soil on Mid of August. In the first few ds, it color was redish- yellow, but before emergence adult dark redish. The pupal stage lasted 8 ds This species is widely distributed in the forests of eastern United States, from New York to Florida (Fig. 8.5). This is ***Platydracus praelongus*** (15–17 mm) which may immediately be easily known from the other species of this genus by its pronotum with an uneven punctuation and wide impunctate line and with head and pronotum dull-metallic; each abdominal terga with distinct pair of velvety black spots. The species occurs along the eastern coast of United States and Mexico. Few specimens were found toward the end of June (Fig. 8.6). Only one larva of this species was collected under decaying reed near water on Early of July. This larva was voracious and consumed different arthropods, especially insects and their larvae. Body surface of larva generally dark, color of head capsule and thorax black and more sclerotized than abdominal segments. Larva reared in laboratory ten ds and on Mid of July was exposed pupa.

Fig. 8.1.

Fig. 8.2.

Fig. 8.3.

Fig. 8.4.

Fig. 8.5.

Fig. 8.6.

Pupa (Fig. 9.1) red yellow color, with eyes and last abdominal segments darker. The pupal stage duration – 9 ds. Adult emergence was observed in the laboratory in the second half of July. The large worldwide genus ***Philonthus*** includes species which lives in a wide variety of habitats. In most species the pronotum bears a double row of discal punctures and the number of punctures in these rows, including the anterior marginal punctures, is using in identification of species. The males of some species have the front tarsi dilated and pubescent beneath and always emarginated the last abdominal tergit, so it is very important to have males for identification of species. In North America 112 species have been described. Six species were found in JBWR (Fig. 9.2).

Adults of ***Philonthus brunneum*** (5.0–7.0 mm) were found on carrion of raccon (***Procyon lotor***) Sign characteristics of beetles: head quadrate, not narrowed behind eyes; elytra brown; legs and antennomeres 1–3 yellow. This spring-summer breeding species overwinter as adult. (Fig. 9.3). The eggs are white and when freshly laid are elongate-oval is shape; length of the egg was 0.8-0.9 mm; width 0.4-0.5 mm.

The egg stage lasted 4–6 ds. (Fig. 9.4). The L1 are white with head brownish and thorax white to yellowish more heavily chitinized than abdomen. The length of first instar L1 (on 2–3 ds) is 3.3–3.5 mm; width of head capsule is 0.3-0.4 mm; Larval stages lasted 12–15 ds. (Fig. 9.5). The L2 have the head brown, thorax light brownish and abdomen yellowish. The length of second instar(L2 on 6–7 ds) is 5.9–6.2 mm; width of head capsule is 0.5-0.6 mm (Fig. 9.6). Color of L3 before pupation: head brown, thorax brownish-red, abdomen with heavy chitinous brownish plates. On 12–13 ds the length of third instar is 6.5–6.8 mm; wdth of head capsule – 0.6-0.7 mm.

Fig. 9.1.

Fig. 9.2.

Fig. 9.3.

Fig. 9.4.

Fig. 9.5.

Fig. 9.6.

Philonthus brunneum (continued) (Fig. 10.1). This photo shows the larva before pupation and the galleries made it in the soil. On 14 –15 the larva rolls up like a semi-lune in a special chamber. Larval stages lasted 13–15 ds. but if L3 is not sufficiently fed, larval stage lasts as long as in other species (Fig. 10.2). The first pupa was obtained in laboratory in Mid of June, the last pupa were observed in early Octomber.The pupae were exposed in its pupal chamber. Color of body generally yellow-brownish. The length of pupa is 3.4–3.5 mm, width 1.4–1.6 mm; (Fig. 10.3). This photo shows the pupa on 4 ds; in this time color is brown-redish with black head. (Fig. 10.4). Before emergence new adults pupa is brown black. Usually the pupal stage lasted 5–7 ds. (Fig. 10.5). New adults emerged from the pupae and begin feeding and mating. The old adults usually disappeared in second half of September (Fig. 10.6). This species is ***P. fusiformis*** (5.0–5.5 mm). Character recognition: head and pronotum black, shining; pronotum distinctly narrowed in front; elytra red; antennomeres 5–10 longer than wide (habitus dorsal view). From one larva collected in leaf-litter in Early September, was obtained pupa. New adult emergence on Mid September. Pupal stage lasted 4–5 ds. Adults inhabiting the same habitats as their larvae .Was faund on carrion of raccon (***Procyon lotor***).

Fig. 10.1.

Fig. 10.2.

Fig. 10.3.

Fig. 10.4.

Fig. 10.5.

Fig. 10.6.

Philonthus alumnus (continued) (Fig. 11.1). Few specimens of ***Ph. alumnus*** (5.0–6.5 mm) were collected at light in spring and summer and were maintained in laboratory cultures. These beetles have head and pronotum black, shining, dark brown to red elytra and yellowish legs. Usually males have 2 last sterna notched apically (Fig. 11.2). Female lay white, oval shaped eggs, usually deposited on or in the soil on deep 0.5–1.0 cm and separately. Length of the eggs was 0.9–1.0 mm, width 0.5-0.6 mm. The egg stage lasted 4–5 ds. (Fig. 11.3). This photo shows the first instar on 1–2 ds. Body subcylindrical, widest anteriorly and in the middle and narrowed posteriorly. Head capsule light brown; thoracic, abdominal tergites and urogomphus are white. The length of first instar is 3.4–3.5 mm; width of head capsule 0.3-0.4 mm. Like the adults, the larvae are mainly predators. Their are nocturnal and hunt immature stages for small insects on or in soil (Fig. 11.4). This photo shows the habitus L3 (lateral view) before pupation (14–15 ds). Body cylindrical, head capsule dark brown, thorax more heavily chitinized than abdomen, color brwn; the length of third instar is 7.2–7.5 mm, width of head capsule 0.6-0.7 mm (Fig. 11.5). Pupate in a specially constructed pupal chamber in the soil. The length of pupa is 4.2–4.5 mm; width 1.5–1.6 mm. On first day pupa is white, anterior margin of prothorax bears seven-eight spines, lateral margins of abdominal segments each bearing a rather short spine; terminal segment bearing two spines (Fig. 11.6). Before emergence adult, pupa is red-brown with head and prothorax brown dark. The pupal stage lasted 4–5 ds.

Fig. 11.1.

Fig. 11.2.

Fig. 11.3.

Fig. 11.4.

Fig. 11.5.

Fig. 11.6.

Philonthus alumnus (continued) (Fig. 12.1). The adult beetle is soft and pale when emerging from the pupal stage. Color of emergence adult varies: head brown-black, pronotum brownish, elytra white yellow, legs and abdomen pale yellow (Fig. 12.2). Color of new beetles on 2–3 ds also varies: head become black, pronotum dark-brown, elytra red-yellowish, legs and abdomen red. In this period the beetles kept in special plastic cotainers make a first unsuccessful attempt to fly, but fall quikly down. They keep their wings spread, looking for food and dark places under leaves, bush-twings, soil clods, soil crevices avoiding all the obstacles in their way (Fig. 12.3). Adult on 7th day; at last it succeeds to fly out of the glass, that is to the hight of 8 to 9 cm and flew a few seconds touching down different objects in the laboratory. This species is one of the most abundant species of genus in North America (Fig. 12.4). The ***Philonthus politus*** (9.5–15.0 mm) belong to the group of species of the genus ***Philonthus*** hwo have 4 punctures in dorsal

rows of pronotum and dilated front tarsi. Body is black, shinning, with bronze elytra and dark brown antennae and legs, last abdominal sternum has along apical margin V-shaped incision. Most specimens(adults and larvae) were collected during spring-summer on carrion of raccon (***Procyon lotor***). This is spring-summer breeders, overwinter as adult. Adults emerge from hibernation in April. Some mating pairs was photographed on July-August between6 and 7 PM and also between 10 and 11 PM. The ovipositional period was 45–50 ds. The total fecundity ranged between 95 and 110 (Fig. 12.5). Eggs were laid in the soil, separately, or sometimes in pairs among soil clods, being well-hidden. Length of the eggs was 2.2–2.3 mm; width 1.5–1.6 mm; The eggs stage lasted 4–5 ds. (Fig. 12.6). Body of first instar L1 is fusiform, head capsule broader than long with sides round; anterior margin of head (nasale, mandible) and tarsus of the legs are yellow-redish; antenna longer than mandible; abdominal tergites are white; urogomphi longer than last two abdominal segment. The length of first instar is 5.9–6.2 mm; width of head capsule 0.8-0.9 mm. Cannibalism occured for this instar.

Fig. 12.1.

Fig. 12.2.

Fig. 12.3.

Fig. 12.4.

Fig. 12.5.

Fig. 12.6.

Philonthus politus (continued) (Fig. 13.1). L1 on 5 ds has head and thorax more heavily chitinized than abdomen; color head is brown-redish; abdominal tergal sclerites are pale orange (Fig. 13.2). On 8 ds L2 have approximately the same color as on 5 ds, but on abdomen observed more darker chitinous tergal tergites. Length of second instar is 9.2–9.5 mm; width of head capsule 1.1–1.2 mm (Fig. 13.3). L3 (on 14 ds) has body ength 17–19 mm; width of head capsule 1.5–1.7 mm (Fig. 13.4). Pupation usually occur in pupal chamber, which has the length 2.0–2.5 cm and it is building to deep 3–4 cm from surface of soil (in sol la adincimea de 3–4 cm). The pupal chamber is black blue (Fig. 13.5). The third instar L3 go into the pupa on 17 ds. This photograph show the emerges pupa from larval exuvia L3 (Fig. 13.6). On second ds obtained pupa in laboratory (lateral view) is yellow brownish with brown light eyes and has the length 7.5–8.5 mm and width is 3.0–3.7 mm. Anterior margin of prothorax bears from seven to nine pairs of hair-like spines; lateral margins of eighth and ninth abdominal segments each bearing a rather short recurved spine; terminal segment bearing no spines.

Fig. 13.1.

Fig. 13.2.

Fig. 13.3.

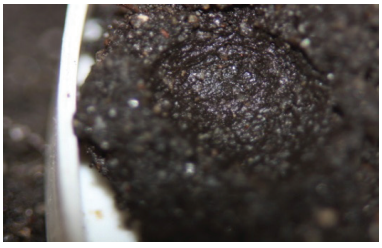

Fig. 13.4.

Fig. 13.5.

Fig. 13.6.

Philonthus politus (continued) (Fig. 14.1). Pupa on 4 and 5 ds are dark brown color and it's very difficult to observe them on the soil (Fig. 14.2). Body of pupa on 6 ds (two hours before emerge adult) is entire black. Pupae occurred from Mid June to Early August. The pupal stage lasted 6–7 ds. Before emergence new adult, mature pupa, with darkened wings, abdomen and other sclerotized parts actively swam around the enclosure using legs (Fig. 14.3). In this picture you can see adults emergence on the 1–2 ds. Their usually began emerge from the pupae from late June to late August, feeding to November and overwintered. The old female died in early August, the old male in early October. Development from egg to adult stage generally takes 26–29 ds. This species is introduced into North America, mostly from Europe (Fig. 14.4). The native species ***Philonthus lomatus*** (6.5–8.0 mm) belong to the species of genus ***Philonthus*** that have 6 pairs of punctures on the pronotal disc. The adults can be found in damp situations, in leaf litter, under stones, under reed and other decomposing plants**.** Some specimens were collected on carrion of raccon (***Procyon lotor***) on month August. Sign characteristics of beetle: head black oval, narrowed behind eyes, with antennomere 1 pale; pronotum oval, longer than wide, narrowed in front; legs, basal and apical antennomeres dull yellow; abdomen finely punctuate. This is spring-summer breeders and overwinter as adult. In laboratory the eggs (Fig. 14.5). Were usually deposited by female in the soil and separatelly. Eggs of this species are oval shaped, white with length 1.1–1.2 mm and width 0.5-0.6 mm. The egg stage duration is 4–5 ds. (Fig. 14.6). L1 has body shape cylindrical, slender with head and thorax more heavily chitinized than abdomen. Head capsule subquadrate, a little broader than long (width of head capsule 0.4-0.5 mm) with yellow-brownish color, antenna distinctly longer than mandible; thorax ground color, abdomen tergal segments and legs paler. The length L1 on 2nd ds are 3.4–3.6 mm; The larva has hight voracity, but no cannibalism occurred for this instar.

Fig. 14.1. (original)

Fig. 14.2. (original)

Fig. 14.3.

Fig. 14.4.

Fig. 14.5.

Fig. 14.6.

Philonthus politus (continued) (Fig. 15.1). The second instar can be readily distinguished from the first instar by longer body size (4.5–4.7 mm), width head capsule (0.5-0.6 mm) and by a few more specific characters. Cannibalism frequently occurred under poorer nutritional conditions or greater larval rearing density. The larvae are very active during the night. (Fig. 15.2. and Fig. 15.3). These photos shows the third instar L3 before pupation. Usually these larvae curl up like a half ring and remain still until pupae emerge. Length of L3 is 9.3–9.7 mm; width of head capsule 0.8-0.9 mm. The larval stage lasted 10–12 ds. (Fig. 15.4. and Fig. 15.5). These two pupae (on 2nd and on 4th ds respectively) were photographed in the night on differed sites where were observed. On the second ds. colour of pupa is light yellow, but on 4 ds. pupa has more darker yellow color. The length of pupa is 5.0–5.3 width 2.0–2.2 mm.

Fig. 15.1.

Fig. 15.2.

Fig. 15.3.

Fig. 15.4.

Fig. 15.5.

Conclusions

1. The results of research detected 14 staphylinid species of the tribe Staphylinini, belonging to genera *Creophilus* Leach (1 species), *Platydracus* Thomson (4 species), *Tasgius* Stephens (3 species), *Philonthus* Stephens (6 species), nine of which are native species, and 5 adventive species introduced from Europe [*Creophilus maxillosus* (Linnaeus), introduced in 1620; *Tasgius ater* (Gravenhorst), introduced in 1802; *Tasgius melanarius* (Heer), introduced 1935; *Tasgius winkleri* (Bernhauer); *Philonthus politus* (Linnaeus)].

2. Were obtained original data about the biology and reproduction period of the *Creophilus maxillosus villosus* (L.), *Platydracus zonatus* (Grav.), *Platydracus cinnamopterus* (Grav.*), Platydracus praetermissus* Newton*, Platydracus praelongus (*Mann.*), Philonthus brunneum (*Latr.*), Philonthus alumnus* Erich., *Philonthus poltus (*L.*)*. The species *Platydracus cinnamopterus, Philonthus brunneum, Philonthus alumnus, Philonthus politus* are monovoltine, spring-summer breeders species, overwintered as adults. Adults and larvae of these species are active predators. Cannibalism (important factor in the regulation of the population size of species) was observed for the first instar of species *Platydracus cinnamopterus* and *Philonthus politus* and frequently occurred for second instar of *Philonthus lomatus.*

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TWO SPECIES OF WASPS FROM TENTHREDINIDAE FAMILY WITH SIGNIFICANT POPULATIONS ON ROSA SPP. FROM THE REPUBLIC OF MOLDOVA

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TWO SPECIES OF WASPS FROM TENTHREDINIDAE FAMILY WITH SIGNIFICANT POPULATIONS ON ROSA SPP. FROM THE REPUBLIC OF MOLDOVA

Abstract: In this work, we present the insect fauna of *Rosa* spp., in conditions of the Republic of Moldova due to specialty literature and our investigations carried out during 2007–2017. The fifty three species of insects recorded on the *Rosa* spp., were structured in four groups: migratory, nectarivore and pollinators, herbivores and casual. From these 53 insect species, the *Blennocampa phyllocolpa* and the *Endelomyia aethiops* phytophagous wasps we studded more detailed. Thereby, we have investigated and recorded their morphology and bio-ecological development aspects, and proposed some measures for to regulate their population density in industrial plantations.

Keywords: *Rosa, Blennocampa phyllocolpa, Endelomyia aethiops, Republic of Moldova.*

Introduction

In the Republic of Moldova the most widespread species from the *Rosa* genus are: *R. canina* L. 1753 – dog rose; *R. majalis* Herrm. 1804 – cinnamon rose; *R. pendulina* L. 1753 – alpine rose.

On some spontaneous and cultivated *Rosa* spp., is recorded a significant entomofauna, namely: on flower – nectarivore and pollinators insects, on wood, leaves and fruit – insect pests that cause damage in case if they exceed the number of individuals per organ.

Some of the insects that developed on the rose are also harmful to the cultivated

rose. In the 50's of the 20th century, were mentioned five insect species as major pests on cultivated roses for industrial purposes – *Macrosiphum rosae, Tmetocera ocellana, Arge rosae, Blennocampa pusilla* and *Argilus chrysoderes*. For these pests were recommended to combat them with several chemical insecticides like: anabasine sulphate, hexachloran, Paris green, calcium arsenate, dichlorodiphenyltrichloroethane (DDT) were (Puteatin & Sharonova, 1959; Blank & Taeger, 2017a, 2017b).

In the 70's of the 20th century, a new pest of rose the fall webworm – *Hyphantria cunea* (Drury, 1773) for which were tested some biopreparations, for example: entobacterin Enterobacter and Dendroballin. These biopreparations also were been tested against the *Arge rosae* species which is a pestsof cultivated rose (Sharonova, 1973).

In this context, was studied the entomofauna of the erect shrubs, climbing cultivated rose and in various biotopes as a decorative plant (public parks, private gardens and nurseries) from neighbouring countries (Romania and Ukraine).

In the specialty literatures of these countries are mentioned following insect species: *Alantus cinctus*, *Ardis bipunctata* (Perju & Irimie, 2001; Tudose & Dobrin, 2005); *Arge ochropus* (sin.: *Hylotoma rosae*) (Vasiliev et al., 1975 a; Perju & Irimie, 2001; Tudose & Dobrin, 2005; Roman, 2002, 2004, 2009; Anonimous, 2013, 2014; Timuş & Baban, 2017); *Aulacaspis rosae* (Vasiliev et al., 1975 a); *Blenocampa pusilla* (Arion, 1952 quoted by Ghizdavu and Perju, 2001; Vasiliev et al., 1975 a; Oltean, 2005; Timuş & Baban, 2017); *Chaetosiphon tetrarhodus* (Vasiliev et al., 1975 a); *Cladardis elongatula* (Vasiliev et al., 1975 a), *C. pectinicornis* (Vasiliev et al., 1975 a); *Cladius spectinicornis* (Anonimous, 2013); *Clinodiplosis rosiperda* (Vasiliev et al., 1975 a); *Diplolesis eglanteriae, D.mayri, D.rosae, D.rosarum, D.spinosissimae, Edwardsiana rosae* (Vasiliev et al., 1975 a); *Emphytus basalis* (Vasiliev et al., 1975 a); *Endelomyia aethiops* (Vasiliev et al., 1975 a; Timuş & Baban, 2017); *Lampronia pubicornis* (Vasiliev et al., 1975 a); *Longicaudus trirhodus* (Vasiliev et al., 1975 a); *Macrosiphum rosae* (Marinescu, 2002; Dulămea & Dinu, 2003; Tudose & Dobrin, 2005; Roman, 2006; Anonimous, 2013; Alexandrescu, 2013); *Maculolachnus submacula* (*rosae*) (Vasiliev et al., 1975 a); *Megachile centuncularis*; *Monardis plana* (Vasiliev et al., 1975 a); *Myzaphis rosae* (Vasiliev et al., 1975 a); *Pareoptera plana* (Perju & Irimie, 2001; Tudose & Dobrin, 2005; Neacşu, 2006); *Platyptilia rhododactyla* (Vasiliev et al., 1975 a); *Rhodites rosae*; *Stigmella anomalella* (Tudose & Dobrin, 2005; Ecobici, 2005 Roşca, 2015), *S. centifoliella* (Vasiliev et al., 1975 a); *Thrips fuscipennis* (Vasiliev et al., 1975 a; Anonimous, 2013); *Tischeria angusticolella* (Vasiliev et al., 1975 a); *Typhlocyba rosae* (Marinescu, 2002; Anonimous, 2013); *Wachtliella rosarum* (Vasiliev et al., 1975 a; Neacşu, 2006). These species, by natural flight, can complete the entomofauna of the *Rosa* genus from the Republic of Moldova. Thus, the knowledge of their membership have an importance in the local monitoring and scientific establishment of the taxonomic units.

In the 2007–2017 years on *Rosa* spp., on the territory of the Republic of Moldova were recorded 53 insect species belonging to ten orders: (Timuş & Baban,

2017). These are part of 9 orders of insects (Orthoptera, Homoptera, Hemiptera, Thysanoptera, Coleoptera, Neuroptera, Lepidoptera, Hymenoptera, Diptera) and 1 mite (Trombidiformes).

We have structured these species into four groups at family level, depending on their lifestyle and development:

1) Migratory species. The adults of these species can be seen on *Rosa* spp., for to find a rest without consuming floral organs or to cause other damages: Odonata (Lestidae, Aeschnidae), Mantodea (Mantidae), Orthoptera (Tettigoniidae), Hemiptera (Pentatomiidae), Neuroptera (Chrysopidae); Mecoptera (Panorpidae), Coleoptera (Cantharidae, Chrysomelidae, Coccinelidae), Lepidoptera (Papilionidae, Pieridae, Nimphalidae), Hymenoptera (Formicidae, Scoliidae), Diptera (Muscidae, Calliphiridae, Syrphidae, Bombyliidae, Culicidae);

2) Nectarivore and pollinators insect species in the adult stage: Lepidoptera (Pieridae, Papilionidae, Nymphalidae, Lycaenidae) and Hymenoptera (Apidae, Vespidae);

3) Herbivores insects species or those which cause damage due to the total or partial consumption of some organs of the rose: (i) sucking the leaf lamina – Homoptera (Cicadellidae, Aphididae, Pseudococcidae) and Thysanoptera (Thripidae); (ii) feeds on the juices of plant stems – Homoptera (Pseudococcidae); (iii) insects which eat generative organs of plant – Coleoptera (Curculionidae, Scarabaeidae); (iv) defoliators – Lepidoptera (Tortricidae), Hymenoptera (Argidae, Tenthredinidae); (v) miniere – Lepidoptera (Neptuculidae); (vi) gall midges– Diptera (Cecidomyidae); (vii) gallflies – Hymenoptera (Cynipidae); (viii) carpophagous – Lepidoptera (Tortricidae);

4) Casual species – or those that lay eggs on the rose leaves, but without consuming of plant organs by active stages of insect (imago and larva): Hemiptera (Pentatomiidae), Neuroptera (Chrysopidae), Coleoptera (Coccinelidae).

Of these, 17 species of insects have developed large populations and impact on the rose, 12 insect species developed annual faunistic populations, 12 solitary and rare individuals, 2 species one individual. At the same time, 5 species have been recorded recently: *Harmonia axiridis* (predators afidophagus), *Polygonia c-album* (nectar consumer and pollinator), *Dasineura rosae* (gallicol in the larval stage), *Blennocampa phyllocolpa* Viitassari et Vikberg, 1985 and *Endelomyia aethiops* Gmelin, 1790, (phytophagus in the larval stage). The last two species have been of particular interest in recent years, so we have investigated more and the results are further exposed.

Material and methods

These two species of insects *B. phyllocolpa* and *E. aethiops*, were studied in different localities from the center and north of the Republic of Moldova, namely: the landscape habitat of UASM (the State Agrarian University of Moldova), Străşeni

town, Bravicea and Meleşeni village from Călăraşi district and Bogzeşti village from Teleneşti district. The study was more than ten years of duration, namely 2007–2017 period.

The *B. phyllocolpa* and *E. aethiops* species are investigated according to the classical entomological method: visual observations in nature; manual harvesting of larval stage and damaged leaves; a good analysis at binocular under the laboratory conditions.

Results and discussions

From the entomofauna registered on the Rosa species in the Republic of Moldova, only 2 insect species will be investigated in the current paper: *Blennocampa phyllocolpa* and *Endelomyia aethiops*, both from Hymenoptera order and Tenthredinidae family. These defoliator wasps' species were selected for this work, because in recent years they have developed significant populations and their density is increasing on *Rosa canina* L., 1753 throughout the republic. Another important reason of this paper is the total lack of information in the native literature regarding their bio-ecological development aspects. Thus, due to this fact it will complete the national patrimony with information about above-named aspects of these defoliator wasps.

Blennocampa phyllocolpa Viitassari et Vikberg, 1985 –
Rose leaf-rolling sawfly

Spread. The species is spreading in 27 European countries (Austria, Belgium, Great Britain, Bulgaria, Croatia, Czech Republic, Denmark, Switzerland, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Luxembourg, Norway, Poland, Romania, Russia (center), Netherlands, Serbia, Slovakia, Spain, Sweden, Ukraine) (Fauna Europaea).

In the neighbouring countries with the Republic of Moldova – Romania and Ukraine – the species is indicated by the name *Blennocampa pusilla* Klug.

Host plants. In the Republic of Moldova, this species was recorded as a pest of cultivated rose for industrial purposes in 1959 (Table 1).

After this year, we did not find any scientific articles regarding this rose insect pest. It is possible that, in the event of the occurrence of this pest in public and private gardens, it was being controlled by chemical treatments without any entomological investigations.

We recorded the species in 2017 on the rose, but because it is a spontaneous plant, without any economic importance, until now the wasp was not part of the research projects of the entomofauna. In this context, we emphasize that *B. phyllocolpa*, on spontaneous rose was first observed in the landscape habitat of UASM (the State Agrarian University of Moldova) at the level of pest in May 29, 2013. The population was numerous, which has not been seen before, so observations

continued in other localities: Strășeni town (19 June), Bravicea village (15 June) and Meleşeni (17 June) from Călăraşi district and Bogzeşti village (July 16) from Teleneşti district.

Table 1. Registration of wasps from *Rosa* spp., in Europe, Republic of Moldova and neighbouring countries

Species name		**Author species**	**Registration year**			
Popular name	**Scientific / synonym**		**Europa**	**Republic of Moldova**	**Neighbour countries**	
					Romania	**Ukraine**
Rose leaf-rolling sawfly	***Blennocampa phyllocolpa***	Viitassari et Vikberg	1985	-	-	-
	sin.: *Blennocampa pusilla*	Klug	1816	1959	1958	1975
	sin.: *Tenthredo pusilla*	Klug	1816	-	2001	-
Rose slug sawfly	***Endelomyia aethiops***	Gmelin	1790	2013	-	1975
	sin.: *Caliroa aethiops*	Fabricius	Russian literature			

Thus, since 2013, the species has been permanently monitored. In 2017, the populations of this pest have impressed as density on Rosa spp., in the UASM biotope (Fig. 1). That why we have spread our observations to other localities in the republic: the Speia village (Anenii Noi district), Căpriana (Straseni district) and Curchi (Orhei rayon), where the rose was strongly attacked by wasps.

In conclusion for *B. phyllocolpa*, can be considered to be a widespread species in the republic which attacks the rose from spontaneous, urban and rural biotopes. For the cultivated rose, the source of infestation in a way is ensured further. The species bio-ecology is described in Romanian and Ukrainian literature, so we present other information from species history.

Endelomyia aethiops Gmelin, 1790 – Rose slug sawfly

The most accessible source regarding the of information is Ukrainian literature (Vasiliev et al., 1975 b), being introduced into the pests list of parks with the popular name “rozanyi slizistyi pililshchyk” and in Romanian we name it for the first time according to the model of other species of this genus “the black slug sawfly of the rose leaves”. Because the local literature does not contain the descriptive information about the morphology and bio-ecology of this species, we consider it important to draw up and to present it further.

Spread. In other European countries, information about the spread was obtained from the database of European Wildlife (Fauna Europaea), where it was recorded in 26 countries as: Albania, Austria, Belgium, Britain, Bulgaria, Croatia,

Czech Republic, Denmark, Switzerland, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Luxembourg, Macedonia, Poland, Romania, Russia and Slovakia. For the Republic of Moldova *E. aethiops*is indicated "absent", so we consider our investigations to be very useful.

Fig. 1. ***Blennocampa phyllocolpa*** species: way of insect damage on the *Rosa canina* (original, photo A.Timuş, 2017)

Morphology. The adult – the specimens can be observed in nature seldom because they are small – 7 to 10 mm in length, with the appearance of flying ants.

The body colour is black; the wings are black, and with whitish second pair of legs. The female has a robust abdomen with a sharp tip – ovipositor.

The egg – the dimensions are less than one millimetre and white. The eggs are laid on the bottom of the foliage. The prolificity – from 9 to 40 eggs.

Larva – the larva called "false caterpillar" because has 22 orange feet: 6 on the chest (or 3 pairs) and 16 on the abdomen (or eight pairs). The body of the larva is covered with a mucilaginous substance (hence the name in Russian – the "sawfly slug of rose"). At the beginning, it is about 4 mm and at full development, it reaches up to 12–15 mm long. The body colour is yellow-green, with a red head and a black spot. Last abdominal segment has warts with spines arranged in transverse rows.

Pupa – before the adult flight is 7–8 mm long and has light brown color.

Biology. Wasp develops one generation per year and overwinters in the larval stage enclosed in a cocoon. The cocoon is made from particles of ground and is located in the surface layer of soil. In late spring, from the first decade of May until the beginning of June, the females appear and fly for mating. This happens very rarely because male's number is limited. After mating or without this process (by parthenogenesis), the eggs are laid on the underside of the leaves and in a week the larvae hatch. The larvae feed on the leaves approximately 4 weeks and then migrates into the soil for pupation.

Host plants and attack mode. The *E. aethiops* preferred rose plants, but it can attack and oleaginous roses grown for the production of aromatic oils. The stage pest is the larvae that consume the leaf lamina, usually the bottom, partially or entirely (Fig. 2). The nerves of the attacked leaves obtained a grey colour. In the same time, the cell net can be observed through transparency. By the end of June the leaves are dried, crumbled and fall. Adults feed mainly on pollen, so they do not cause harm.

Measures to control populations. For to reduce population density of defoliating wasps is necessary to follow the next measures:

1) To dig deep and insistent of earth around rose plants in early autumn or early spring;

2) During the growing season if the number of plants in the gardensis small, it is recommended to harvest the larvae of *E. aethiops* by hand, and after that their destruction;

3) Compliance with phytosanitary hygiene measures in the plantations and in the parks where the species of rose are presented;

4) Chemical treatments with insecticides are recommended only in rose plantations;

5) Chemical treatment for hamster is not recommended.

Fig. 2. ***Endelomyia aethiops*** species: the larva and its attack mode (original, photo A. Timuş, 2017)

Conclusions

In the result of investigations, where established that on spontaneous and cultivated *Rosa* spp. from Europe and including Republic of Moldova develop a great diversity of entomofauna. Forty insect species that belong to 10 orders have a varying influence on plants. During 2007–2017 on the territory of the Republic of Moldova is registered over fifty three insect species that have tangent with *Rosa* spp. As the consequence of researches, these 53 species were structured in four groups: migratory, nectarivore and pollinators, herbivores and casual.

The study during these years shows that two species of phytophagous wasps produce significant damage on *Rosa* species that led to the study of their bio-ecology: *B. phyllocolpa* and *E. aethiops*in.

The *B. phyllocolpa* species is spreading in 27 countries and can be considered to be a widespread species in the republic which attacks the rose from spontaneous, urban and rural biotopes. For the cultivated rose, the source of infestation in a way is ensured further.

The *E. aethiops* in species is spreading in 26 countries; develop one generation per year and overwinter in the larval stage enclosed in a cocoon; preferred rose plants, inclusive oleaginous roses grown for the production of aromatic oils.

In the result of researches are suggested some measures to regulate population densities of *B. phyllocolpa* and *E. aethiops*in industrial plantations: soil mobilization; on solitary plants the gathering and manual destruction of larvae; compliance with phytosanitary hygiene measures in the plantations and in the parks where the species of rose are exist; chemical treatments with insecticides are recommended only in rose plantations.

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A HISTORY OF THE BIRDS RESEARCHES IN BUCEGI – LEAOTA – PIATRA CRAIULUI GROUP OF MOUNTAINS, UNTIL 2015

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A HISTORY OF THE BIRDS RESEARCHES IN BUCEGI – LEAOTA – PIATRA CRAIULUI GROUP OF MOUNTAINS, UNTIL 2015

Abstract: The group of mountains Bucegi – Leaota – Piatra Craiului was unequal studied from the ornithological point of view. The most researches were focused on the Bucegi Mountains, because of their momentousness. A lesser number of articles were published about the avifauna of Piatra Craiului Mountains and no dedicated works were done on the Leaota ornithofauna. Based on the known material, 61 writings on this theme were found. They mention almost 150 species of birds identified over time here. Among them, some are disappeared from the area (*Gyps fulvus*, *Gypaetus barbatus*, *Aegypius monachus*, *Lagopus mutus*, *Pyrrhocorax graculus*, *Loxia leucoptera*) and others are accidental species (*Milvus milvus*, *Sitta neumayer*, *Montifringilla nivalis*, *Petronia petronia*).
Keywords: history, avifauna, mountains, Bucegi, Leaota, Piatra Craiului.

The Group of Mountains Bucegi – Leaota – Piatra Craiului is placed in the extreme Eastern part of the Southern Carpathians. As its name suggests, it is formed by three distinct subunits: Bucegi Mountains, Leaota Mountains and Piatra Craiului Mountains that sum nearly 1600 km^2. The highest elevations are: Omu Peak – 2,505 m (from Bucegi Mountains), Leaota Peak – 2,133 m (from Leaota Mountains) and La Om Peak – 2,238 m (from the Piatra Craiului Mountains). Braşov Depression (North), Valea Dâmboviţei (West), Subcarpaţii Ialomiţei (South) and Valea Prahovei (East) are its limits. The Rucăr-Bran Corridor separates the Piatra Craiului Mountains from the Leaota Mountains and Valea Moeciului (with Valea Grohotişului) and Dudele, Brateiul and Valea Ialomiţei separate the Leaota Mountains from the Bucegi Mountains.

Ialomiţa River springs from the Bucegi Mountains while tributaries of the

Dâmboviţa, Prahova and Olt River, which are other great rivers of the area, spring from this group of mountains, too. They form often a diverse carst landscape (Peştera Dâmbovicioarei, Peştera Ialomiţei, Cheile Mari ale Dâmboviţei, Cheile Dâmbovicioarei, Valea Cheii, Cheile Crovului, Cheile Zănoagei, Cheile Tătarului etc.).

The relief varies from the rocky ridge of the Piatra Craiului to the waved and monotonous crests of the Leaota Mountains. It is determined by the geological composition: mainly crystalline shale for the Leaota Mountains, limestone for the Piatra Craiului Mountains, and conglomerate for the Bucegi Mountains. The glacier circuses are present mainly in the Bucegi Mountains.

The soils are of mountain type: acidic brown, brown podzolic, redzina, and brown of subalpine pastures.

The climate is mountain temperate-continental. The average annual temperature on the highest peaks is below 0°C; the average temperature of the coldest month (January) is between –8 and –10°C and the average temperature of the hottest month (July) is around 10°C. The average annual amount of precipitations is over 1400 mm on the crests; in January (the driest month) it is over 70 mm and in June (the rainiest month) it is over 160 mm (Barco & Nedelcu, 1974, Mâciu et al., 1982, Murătoreanu, 2009, http://muntii-bucegi.ro/).

The vegetation is formed by broadleaf or mixed forests of *Fagus sylvatica*, *Abies alba*, and *Picea abies*, below 1350 (1450) m, forests of *Picea abies*, between 1350 (1450) – 1750 (1850) m, shrubs of *Pinus mugo*, between 1750 (1850) – 2000 (2200) m and alpine meadows with *Carex curvula*, upper 2000 (2200) m (Beldie, 1967, Neblea, 2007).

The fauna is typical of the Southern Mountains, with numerous species of vertebrates and invertebrates protected by law: *Canis lupus*, *Ursus arctos*, *Lynx lynx*, *Pernis apivorus*, *Tetrao urogallus*, *Picoides tridactylus*, *Ficedula parva*, *Lacerta vivipara*, *Vipera berus*, *Triturus cristatus*, *Bufo bufo*, *Carabus obsoletus*, *Lucanus cervus*, *Rosalia alpina*, etc. (Botnariuc & Tatole, 2005, http://www.mmediu.ro/).

As a result of the natural and artificial condition, the avifauna is diverse. It was studied mainly in the Bucegi Mountains. The earliest observations from the area appeared in the XIX century and Dombrowsky (1912) is the one that gathered these disparate data and complete them with personal observations. The first work centred on the Bucegi ornithofauna issued in 1930. It discusses about the birds from the Sinaia-Predeal zone, where 44 species were found (Paşcovschi, 1930). After few years, other observations of 42 bird species (including *Milvus milvus*, *Aquila clanga* and *Gyps fulvus*) were published in a series of articles (Cătuneanu, 1933–1936). They were followed, a little later, by other pieces of information (Paşcovschi, 1938). Linţia (1944) refers to 13 species collected in Sinaia-Buşteni area and in the masterworks of the Romanian ornithology (Dombrowsky, 1946; Linţia, 1954, 1955), only 19 species of birds are clearly mentioned (*Corvus corax*, *Pyrrhocorax graculus*, *Carduelis carduelis*, *Serinus serinus*, *Loxia curvirostra*, *Loxia leucoptera*, *Montifringilla nivalis*, *Alauda arvensis*, *Tichodroma muraria*, *Parus major*, *Ficedula*

hypoleuca, *Turdus torquatus*, *Prunella collaris*, *Delichon urbica*, *Anthus spinoletta*, *Perdix perdix*, *Falco tinnunculus*, *Gypaetus barbatus*, *Gyps fulvus*), some information being taken from the works that appeared in the previous century (Bielz, 1888, Czynk, 1890, Grunack, 1897, Csató, 1886). New data issued in a succession of papers focused on the species of Mallophaga hosted by the wild birds (Negru & Elekes, 1957, Negru, 1958–1961, 1962–1965, 1963). 62 birds' species were observed in the area by Papadopol (1960) and 72 by Brehme (1962). In his stories, Pop (1965) evoked the dissapartition of *Gypaetus barbatus* from here and information about *Tetrao urogallus* from the Northern versant of the Bucegi appear in the same year (Dumitraş & Reit, 1965). Cătuneanu (1965) and Tălpeanu (1966, 1967) discussed the situation of the *Tichodroma muraria*, respectively Falconiformes and few references to the birds from the Bucegi Mountains can be extracted, also, from "Fauna Vertebratica Romaniae" (Vasiliu & Şova, 1968). Rochlitzer (1977) shows his observations from the area, where he mentions, particularly, the occurrence of *Eremophila alpestris* and *Petronia petronia*. Contributions to the knowledge of the avifauna of the area brought Paspaleva &Tălpeanu (1978), too, who noted here 105 species. In another paper (Tălpeanu & Paspaleva, 1979), the authors referred to the expansion of the distribution of *Turdus pilaris* and *Eremophila alpestris*. According to the two catalogues of the "Grigore Antipa" National Museum (Papadopol & Tălpeanu, 1986, 1987), 11 bird species collected from the area are in these ornithological collections. "Die Ornis Siebenbürgens" (Klemm & Kohl, 1988) offers, also, some valuable data. Ciochia (1992) attests the breeding in the area of 77 species, including *Eremophila alpestris*, which was the subject in other two particular articles (Kiss & Szabó, 2000, Munteanu & Szabó, 2001). In 1994, a provisional Atlas of the breeding species from Romania was published (Munteanu et al., 1994). It was followed by another work with maps of distribution (Munteanu, 1998) and by the "Atlas of the breeding species from Romania" (Munteanu et al., 2002), that increases the number of the breeding species in the area to 110. Another catalogue, the one of the ornithological collection of the Brukenthal National Museum (Stein – von Spiess et al., 2005), reveals the fact that *Prunella collaris* and *Motacilla alba* live on Omu Peak, while another one, the one of the nests collection of "Grigore Antipa" National Museum (Petrescu, 2005) shows that the Museum holds few nests of *Phoenicurus ochruros* and *Troglodytes troglodytes* from the area. 35 species were seen here in 2008 (Mestecăneanu, 2008) and also a situation of the *Charadrius morinellus* at the national level comes out in the same year (Pârvulescu & Molnár, 2008). 87 birds' species were mentioned in the Bucegi National Park, among which *Aegypius monachus* is considered extinct and *Gypaetus barbatus* perished (Iptana, 2006) but, based on this and also on the internal data from ROMSILVA (2008), 129 birds' species were considered to be present here. 73 birds' species were found by Janković & Andrića (2012) in the Lespezi Quarry and adjacent area and 27 common or rare species were identified in the same parcel from the limit of the Bucegi National Park, by Niculescu (2012).

Not finally, few remarks regarding *Charadrius morinellus*, *Apus melba*, *Eremophila alpestris*, *Prunella collaris*, *Monticola solitarius*, *Regulus regulus*, *Sitta neumayer*, *Petronia petronia* there are also into a book of reference dedicated to the breeding avifauna from Romania (Munteanu, 2012).

The Piatra Craiului Mountains caught the attention of the ornithologist relatively late. Kamner (1914) referred to *Parus montanus* and *Parus cristatus*, collected from Piatra Mică, and Cătuneanu (1965), to *Tichodroma muraria*: 2 individuals observed by Schenk (1917) and by Manolache respectively, in 1959. Mătieş (1974) mentioned the rarity of *Aquila chrysaetos* in the area and Petrescu (1995) published a situation about the distribution of the 76 species identified here. New contributions to the knowledge of the avifauna appear after 2000: Ionescu & Drăghici (2005) observed 43 species of birds and Feneru (Feneru et al., 2005), 79. Also, some nests from the collection of the «Grigore Antipa» National Museum of Natural History origin in the area (Petrescu, 2005). In 2006, other two articles issued; in the first, 92 species were mentioned in the area (Mestecăneanu & Conete, 2006) and, in the second, 98 species (Mestecăneanu, 2006). Like in the case of the Bucegi Mountains, an image of the breeding species from here can be extracted from the works of Atlas type (Ciochia, 1992, Munteanu et al., 1994, Munteanu, 1998, Munteanu et al., 2002). In the systematic compendium of the Romanian breeding avifauna (Munteanu, 2012) there are mentioned few species (*Glaucidium passerinum*, *Apus melba*, *Ptyonoprogne rupestris*), but the list is obviously longer, if other indications regarding distribution of the species into diverse mountain habitats are taken into discussion.

Located in the vicinity of the more attractive Bucegi and Piatra Craiului Mountains, there are no express issues on the birds from the Leaota Mountains in the scientific literature. However, according to the research-studies performed in the upper stated mountains and based on the atlases (Ciochia, 1992, Munteanu et al., 1994, Munteanu, 1998, Munteanu et al., 2002) or on more or less generalist works (Vasiliu & Şova, 1968, Radu, 1967, Munteanu, 2012), we can expect over 100 species of birds in the area.

The picture of the works on the birds from the entire group of mountains is completed by The Red Bock of the Romanian Vertebrates, whereas among the 20 species mentioned here, *Gyps fulvus*, *Gypaetus barbatus*, *Aegypius monachus* and *Lagopus mutus* long-time disappeared as breeding species in Romania (Munteanu, 2005). Other information about the birds from the ROSCI0013 Bucegi, ROSCI0102 Leaota and ROSCI0194 Piatra Craiului appear in a catalogue of the habitats, species and sites (Brânzan et al., 2013) and on the maps of distribution from the Atlas of the communitarian interest birds' species from Romania (Petrovici, 2015) over 100 species breed in the area.

In the end, it must be shown that some information about the distribution of the species in the considered area can be found in the integral or partial works of ornitho-folklore (Băcescu, 1961, Georgescu & Georgescu, 1996).

Of course, some writings on the theme have been omitted involuntarily in this history, which is why I regret.

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EUROBIRDWATCH 2015 ON THE ARGEŞ DAM LAKES (ROMANIA)

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EUROBIRDWATCH 2015 ON THE ARGEŞ DAM LAKES (ROMANIA)

Abstract: In this paper the results of the census performed on October 3, 2015, occasioned by the EuroBirdwatch program, on the basins between Vâlcele and Goleşti from the Argeş River, are showed. 53 species of birds and 6,251 individuals were counted at that time. The Goleşti Basin housed the biggest number of species (36) and individuals (3,420) and the Bascov Basin, the lowest (13 species, respectively 157 individuals). The majority of the species (27, 47.37%) were occasional species. Only *Phalacrocorax carbo*, *Fulica atra*, *Motacilla alba* and *Pica pica* were present every basin. By dominance, the most (46, 80.70%) were subrecedent and only 3 species (5.26%, *Anas platyrhynchos*, *Aythya ferina* and *Fulica atra*) were eudominant. Anseriformes was the overdominant order in the coenose and *Aythya ferina* and *Anas platyrhynchos* were the overdominant species inside it. 4 species (1.52%, *Phalacrocorax pygmeus*, *Egretta garzetta*, *Egretta alba*, *Alcedo atthis*) are in the Annex I of the Birds Directive.
Keywords: EuroBirdwatch 2015, ROSPA0062, Anseriformes, protection.

Introduction

The EuroBirdwatch is one of the most important events for the birders. It takes place every year in autumn and it is a great occasion for the birds' fanciers from European and Central Asian countries to observe the migration of these amazing animals and to inform about the dangers and measures to be taken to protect them and their habitats. The birdwatch history starts in 1993, when 17 countries participated. In 2015, the number reaches 41 partners. Then more than 32,000 adults and children were involved when they observed almost **five million** migratory **birds (**http://www.birdlife.org, http://www.eurobirdwatch.

eu/). From Romania, Romanian Ornithological Society was the partner of the event, as each year. In 2015, 46,830 birds from 189 species were numbered. *Sturnus vulgaris*, *Anas platyrhynchos* and *Fulica atra* were on the first places regarding the strengths (http://www.sor.ro/ro/noutati/Euro-BirdWatch–2015-Rezultate-oficiale.html), and on the European level: *Sturnus vulgaris*, *Fringilla coelebs*, and *Fulica atra* (http://www.birdlife.org/europe-and-central-asia/news/numbers-are-euro-birdwatch–2015).

In Argeş County, this activity was initiated in 2004 on the birds from Piteşti Dam Lake and the Râul Doamnei Valley. Subsequently, the observations were concentrated on the basins from the Argeş River, mainly on the Piteşti one. These were the subjects of many ornithological studies since they were built (Mătieş, 1969; Munteanu & Mătieş, 1983; Munteanu et al., 1989; Gava, 1997; Mestecăneanu et al., 2003; Gava et al., 2004; 2007; Conete, 2011; Conete et al., 2012; Mestecăneanu & Gava, 2016; etc.). A few papers were dedicated on the avifauna from the autumnal season (Mestecăneanu et al., 2004; Mestecăneanu & Gava, 2015), too.

Material and methods

The study was performed on October 3, 2015 on the Vâlcele, Budeasa, Bascov, Piteşti, and Goleşti dam reservoirs. Starting from 1965, these were built on the course of the Argeş River and currently they are part of the protected area ROSPA0062 Lacurile de acumulare de pe Argeş (The Reservoirs of the Argeş River), constituent of the Nature 2000 network (Fig. 1). Their surface is: 640 ha – Vâlcele, 643 ha – Budeasa, 140 ha – Bascov, 150 ha – Piteşti and 680 ha – Goleşti (cf. http://www.baraje.ro).

North of the dam reservoirs is the Argeş Platform, West is the Cotmeana Platform, East is the Cândeşti Platform, and South is the Piteşti High Plain. The springs of the Argeş River are in the Făgăraş and Iezer – Păpuşa Mountains.

The vegetation of the dam lakes is typical of wetland areas from the South of Romania and the climate is continental with hilly characteristics. The temperature of the water is 9 ^{0}C at Piteşti, the average annual temperature. In the winter a bridge of ice can be formed, mostly in January (Barco & Nedelcu, 1974).

As field method, the itinerary one was used. It was combined (on Vâlcele, Budeasa and Bascov) with the fixed point of observations method. The main objective was to count the water birds. We availed two binoculars, a spotting scope and a photo device.

The scientific nomenclature and classification of the birds are compatible with the Hamlin Guide (Bruun et al., 1999).

Results and discussions

53 species of birds and 6,251 individuals were counted. They belong to 11 orders: the most important as strength was Anseriformes (with 3,027 individuals)

and the best represented as number of species was Passeriformes (with 29 species) (Table 1).

Table 1 – The species of birds, the presence, absolute abundance, constancy, and dominance categories and the status of protection by the Birds Directive

No.	Orders/Species	Goleşti Basin	Piteşti Basin	Bascov Basin	Budeasa Basin	Vâlcele Basin	Absolute abundance	Constancy category	Dominance category	Birds Directive
I	*Podicipediformes*									
1	*Podiceps cristatus*	+		+	+	+	71	C4	D2	-
2	*Podiceps grisegena*				+		1	C1	D1	-
3	*Podiceps nigricollis*	+					4	C1	D1	-
4	*Tachybaptus ruficollis*		+		+		25	C2	D1	-
II	*Pelecaniformes*									
5	*Phalacrocorax carbo*	+	+	+	+	+	277	C4	D3	-
6	*Phalacrocorax pygmeus*	+	+				60	C2	D1	AI
III	*Ciconiiformes*									
7	*Egretta garzetta*	+					6	C1	D1	AI
8	*Egretta alba*	+				+	13	C2	D1	AI
9	*Ardea cinerea*	+					9	C1	D1	-
IV	*Anseriformes*									
10	*Cygnus olor*	+	+	+	+		216	C4	D3	AII/B
11	*Anas platyrhynchos*	+	+		+	+	881	C4	D5	AII/A, AIII/A
12	*Anas strepera*		+				3	C1	D1	AII/A
13	*Anas penelope*				+		4	C1	D1	AII/A, AIII/B
14	*Anas crecca*	+	+			+	225	C3	D3	AII/A, AIII/B
15	*Anas clypeata*		+		+		40	C2	D1	AII/A, AIII/B
16	*Aythya fuligula*	+				+	210	C2	D3	AII/A, AIII/B
17	*Aythya ferina*	+			+		1,448	C2	D5	AII/A, AIII/B
V	*Falconiformes*									
18	*Accipiter nisus*	+					2	C1	D1	-
19	*Falco tinnunculus*	+					2	C1	D1	-
VI	*Galliformes*									
20	*Phasianus colchicus*	+					1	C1	D1	AII/A, AIII/A
VII	*Gruiformes*									
21	*Gallinula chloropus*		+				1	C1	D1	AII/B
22	*Fulica atra*	+	+	+	+	+	1,422	C4	D5	AII/A, AIII/B
VIII	*Charadriiformes*									
23	*Gallinago gallinago*		+				12	C1	D1	AII/A, AIII/B

No.	Orders/Species	Goleşti Basin	Piteşti Basin	Bascov Basin	Budeasa Basin	Vâlcele Basin	Absolute abundance	Constancy category	Dominance category	Birds Directive
24	*Larus argentatus*	+	+	+		+	247	C4	D3	AII/B
25	*Larus ridibundus*	+	+		+	+	607	C4	D4	AII/B
IX	*Columbiformes*									
26	*Columba palumbus*					+	1	C1	D1	AII/A, AIII/A
27	*Streptopelia decaocto*		+				1	C1	D1	AII/B
X	*Coraciiformes*									
28	*Alcedo atthis*		+				1	C1	D1	AI
XI	*Passeriformes*									
29	*Galerida cristata*	+					8	C1	D1	-
30	*Anthus spinoletta*	+	+			+	13	C3	D1	-
31	*Anthus pratensis*	+					1	C1	D1	-
32	*Motacilla cinerea*	+					1	C1	D1	-
33	*Motacilla alba*	+	+	+	+	+	55	C4	D1	-
34	*Sturnus vulgaris*		+				36	C1	D1	AII/B
35	*Garrulus glandarius*			+			2	C1	D1	AII/B
36	*Pica pica*	+	+	+	+	+	30	C4	D1	AII/B
37	*Corvus monedula*	+	+				54	C2	D1	AII/B
38	*Corvus frugilegus*	+	+				42	C2	D1	AII/B
39	*Corvus corone cornix*	+		+			6	C2	D1	AII/B
40	*Prunella modularis*	+					2	C1	D1	-
41	*Phylloscopus collybita*	+	+			+	6	C3	D1	-
42	*Phylloscopus trochilus*	+				+	2	C2	D1	-
43	*Turdus merula*		+				1	C1	D1	AII/B
44	*Turdus philomelos*	+					1	C1	D1	AII/B
45	*Parus caeruleus*		+			+	4	C2	D1	-
46	*Parus major*		+			+	5	C2	D1	-
47	*Sitta europaea*			+		+	2	C2	D1	-
48	*Passer domesticus*	+		+	+		26	C3	D1	-
49	*Passer montanus*	+	+	+	+		35	C4	D1	-
50	*Fringilla coelebs*	+		+	+	+	18	C4	D1	-
51	*Coccothraustes coccothraustes*				+		73	C1	D2	-
52	*Serinus serinus*	+					2	C1	D1	-
53	*Carduelis chloris*		+				1	C1	D1	-
54	*Carduelis spinus*	+			+	+	25	C3	D1	-
55	*Carduelis carduelis*				+		4	C1	D1	-

No.	Orders/Species	Goleşti Basin	Piteşti Basin	Bascov Basin	Budeasa Basin	Vâlcele Basin	Absolute abundance	Constancy category	Dominance category	Birds Directive
56	*Carduelis cannabina*		+		+		3	C2	D1	-
57	*Emberiza citrinella*					+	3	C1	D1	-

Legend:
+ – presence; C1 – occasional species, C2 – accessory species, C3 – constant species, C4 – euconstant species; D1 – subrecedent species, D2 – recedent species, D3 – subdominant species, D4 – dominant species, D5 – eudominant species; AI – annex I, AII – annex II, AIII – annex III, A – part A, B – part B.

The Goleşti Basin has the biggest number of species and individuals (36, respectively 3,420). It was followed by the Piteşti Basin (by the number of species, 28) and Budeasa (by the number of individuals, 1,744). Bascov Basin was the last, in both aspects: 13 species, respectively 157 individuals (Fig. 2).

Regarding the constancy of the birds on the basins, the majority of the species (27, 47.37%) were occasional and only 11 (19.30%) were euconstant (Table 1, Fig. 3).

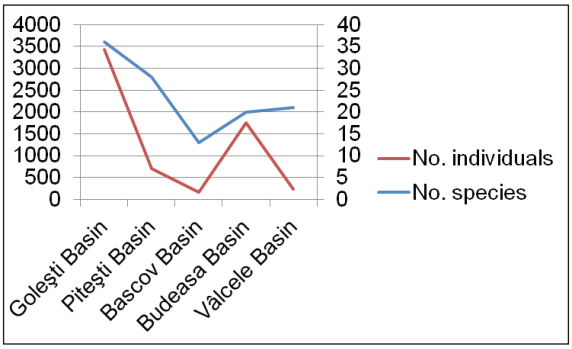

Fig. 2. The variation of the whole number of individuals and species

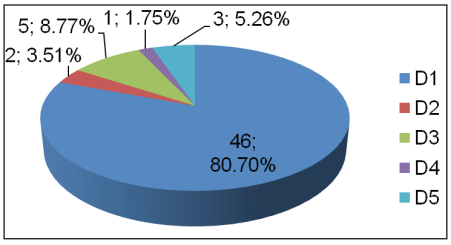

Fig. 3. The distribution of the species by the constancy categories
(C1 – occasional species, C2 – accessory species, C3 – constant species, C4 – euconstant species)

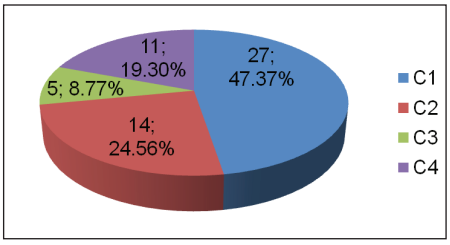

Fig. 4. The distribution of the species by the dominance categories
(D1 – subrecedent species, D2 – recedent species, D3 – subdominant species, D4 – dominant species, D5 – eudominant species)

Among the latter, only *Phalacrocorax carbo*, *Fulica atra*, *Motacilla alba* and *Pica pica* were present every location. *Phalacrocorax carbo* attained the biggest number on the Goleşti Basin (242 individuals), *Fulica atra*, on the Budeasa Basin (950 individuals), *Motacilla alba* and *Pica pica*, on the Goleşti Basin (35, respectively 19 individuals). Except *Pica pica*, resident species, the other species were mainly migratory.

By dominance, only 3 species (5.26%, *Anas platyrhynchos*, *Aythya ferina* and *Fulica atra*) were eudominant and 1 species (1.75%, *Larus ridibundus*) was dominant. Although they are certainly or probably breeding in the area, their most individuals were surely migratory. The majority of the species (46, 80.70%) were subrecedent, the recedent and subdominant ones summing 7 species, 12.28% (Table 1, Fig. 4).

Among the eudominant species, as mentioned earlier, only *Fulica atra* was observed on each basin, fact that proves its large ecological valences. Budeasa Basin hosted the most individuals (950). At the moment of the census, *Anas platyrhynchos* was the best represented on the Goleşti Basin (510 individuals). It was absent on the Bascov Basin, although it is often present here, and it had small strengths on the Piteşti and Budeasa Basins. *Aythya ferina* was also observed on the Goleşti (where it has the biggest figure between all species, 1,170 individuals) and on the Budeasa Basins – 278 individuals (Table 1, Fig. 5).

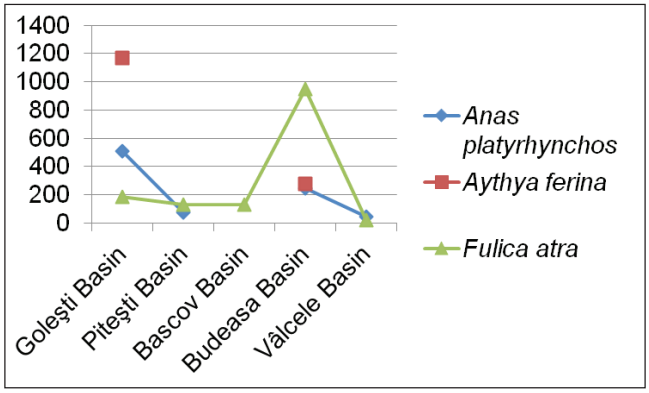

Fig. 5. The variation of strengths of the eudominant species

As a consequence, Anseriformes was the overdominant order in the coenose. The 8 species within the order totalised 3,027 specimens. It was followed by the Gruiformes order, with 2 species and 1,423 specimens (*Gallinula chloropus*, only 1 individual). Charadriiformes was the dominant order (3 species and 880 individuals, the most – *Larus ridibundus*, 607) and the other orders were separately complementary, and, here, two orders (Pelecaniformes, respectively Passeriformes) stand out (Table 1, Fig. 6).

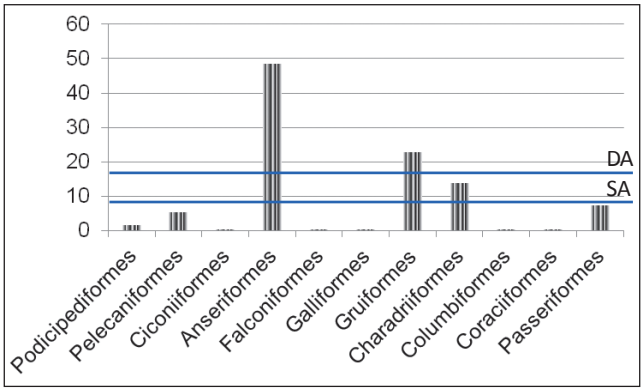

Fig. 6. The participation of the orders to the avicoenose formation, by the Index of relation (DA – dominance axis, SA – static axis)

Aythya ferina and *Anas platyrhynchos* were the overdominant species inside the Anseriformes order. They summed 2,329 individuals. No species was dominant while *Cygnus olor*, *Anas strepera*, *Anas penelope*, *Anas crecca*, *Anas clypeata* and *Aythya fuligula* were complementary (Fig. 7).

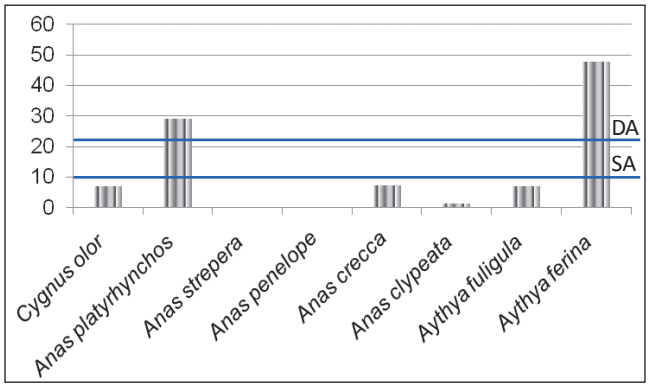

Fig. 7. Participation of the species to the formation of the Anseriformes coenose, by the Index of relation (DA – dominance axis, SA – static axis)

By the status of protection conferred by the Birds Directive (Table 1, Fig. 8), 4 species (1.52%, *Phalacrocorax pygmeus*, *Egretta garzetta*, *Egretta alba*, *Alcedo atthis*) are in the Annex I: they are the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution (http://ec.europa.eu/). *Phalacrocorax pygmeus* was observed on the Goleşti Basin – 57 individuals, and Piteşti Basin – 3 individuals. *Egretta garzetta* was observed only on the Goleşti Basin – 6 individuals. *Egretta alba* was registered also on the Goleşti Basin – 12 individuals, and on the Vâlcele Basin – 1

individual. *Alcedo atthis* was seen only on the Piteşti Basin – 1 individual. Except *Alcedo atthis*, that is resident, the others are migratory species: *Phalacrocorax pygmeus* and *Egretta alba* are mainly winter species and *Egretta garzetta* is summer species. The rest of the recorded species are present in the other annexes or they were not taken into consideration.

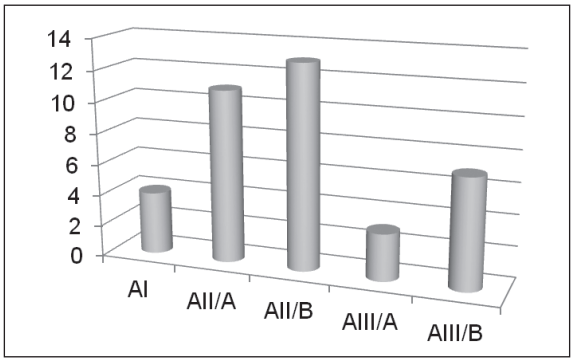

Fig. 8. The distribution of the species according to the annexes of the Birds Directive (AI – annex I, AII – annex II, AIII – annex III, A – part A, B – part B)

Conclusions

During the count of the birds performed on the basins between Vâlcele and Goleşti (from the Argeş River) on October 3, 2015, occasioned by the EurobirdWatch event, 53 species and 6,251 individuals were registered. The Anseriformes predominated as number of individuals and Passeriformes, as number of species. The most appealing of the basins was Goleşti and the least one was Bascov. Some factors, like the diversity of the habitats, the area of the basins, the human pressure, and the ecological valences of each species influence this state of facts. According to their phenology, the size of population, and the characteristic habitats, many species were rarely present on the basins, while other were frecvently seen on all the locations. Some were represended by a single individual (*Podiceps grisegena*, *Phasianus colchicus*, *Gallinula chloropus*, *Columba palumbus*, *Streptopelia decaocto*, *Alcedo atthis*, *Anthus pratensis*, *Motacilla cinerea*, *Turdus merula*, *Turdus philomelos*, *Carduelis chloris*), while *Anas platyrhynchos*, *Aythya ferina*, *Fulica atra* and *Larus ridibundus* were the most numerous, with hundreds of individuals, the majority – migratory individuals.

Among the protected species from the Annex I of the Birds Directive, only 4 species (*Phalacrocorax pygmeus*, *Egretta garzetta*, *Egretta alba*, *Alcedo atthis*) were observed.

The number of species and strengths can be bigger, if the anthropogenic pressure diminishes. When diverse leisure facilities develop in the proximity of

the site, it is essential to consider the importance of the place for the birds that led to its classification as Special Protected Area and site Natura 2000.

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ORIGIN AND EVOLUTION OF HUMAN. THE HOMINIDS COLLECTION OF THE IRON GATES REGION MUSEUM

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ORIGIN AND EVOLUTION OF HUMAN. THE HOMINIDS COLLECTION OF THE IRON GATES REGION MUSEUM

Astract: This article presents the hominids from the Iron Gates Region Museum collection: archeanthrops, paleanathropus, neanthropus, including local neanthropus. The pieces in this collection were included in the permanent exhibition of the Natural Sciences Department during 1980–2010. For the presentation of this collection was made a database with general information on the origin and evolution of human. This article gives full information on the thematic of the permanent exhibition.
Keywords: origin and evolution of human, collection, hominids.

Introduction

The hominids collection of the Iron Gates Region Museum was included in the permanent exhibition of the Natural Sciences Department during 1980–2010 (Fig. 1). For the presentation of this collection was made a database with general information on the origin and evolution of human.

This information is given below:

The pathways and general biological mechanisms of evolution of the living world went a different way with man.

An essential feature, characteristics and determination are detached from the world of animals, constituting a working process. The new mode of parabiology, an evolution, creates an adaptation to their environment or life.

The global process of adaptation continues daily, uninterrupted by the individual, group and population that expanded as a result of the combined forces of biology and socio-culture.

Fig. 1. Image in the permanent exhibition of the Natural Sciences Department (1980–2010)

Adaptation to culture and through culture is extremely rapid and often more direct, more efficient, and effective than genetic adaptation.

Fossil primates from the Oligocene and Miocene have been regarded as possible ancestors to humans, though we can not demonstrate this due to a lack of adjutant fossils. These primate fossils are Aegyptopithecus, Ramapithecus and Gigantopithecus.

Hominids included a number of forms in the early Miocene and early Pliocene, about which we have no material evidence (skeletal fragments or tools). On the boundary between Pliocene and Pleistocene, fossil fragments were found that prove that in that period, hominid beings were bipedal, erect in stature and with a modified skull, but with the ability of superior motor skills which could be used for vital activities. These forms were included in the evolutionary circle of progressive Australopithecines, which in all likelihood had branches that radiated into ecological niches situated around the Indian Ocean, North Africa and Europe.

Forms of transition to humans (Australopithecines)

Profound climatic change occurred in the second half of the Pliocene, resulting in a long process of adapting the habits of life to new living conditions. By para-biological means namely: formation of habits and skills using objects found in nature, intentional creation, wilful / conscious creation of necessary tools – demonstrated the easiest way of life discovered so far.

Pre-Paleolithic lifestyles

From 14 million years ago (Ramapithecus from Fort Ternan, Africa) to sometime around the Australopithecine period (between 5 – 1.6 million years, Africa, Europe and Asia). For Europe, the first known pre-Paleolithic discovery was from the Grăuceanu Valley from Bregiuleşti, in Vâlcea County, with an age of 1.8–2 million years through exploitation with paleo-magnetic methods.

Description of the collection of hominids

Paranthropus crassidens

The Australopithecus from Schwartz, Krans (Fig. 2)

The fossil mold comes from Schwartz Krans, South Africa, where he was found by Robert Broom and J. T. Robinson between the years 1948 and 1952. He was found in the layer with material from the lower Pleistocene and is a characteristic example for a robust of type of Australopithecus.

Scientific reconstitution by Dr. Cantemir Rişcuţia

No. inv.: 1

Fig. 2. *Paranthropus crassidens* (The Australopithecus from Schwartz, Krans). The fossil mold (plaster)

Archeanthrops, very widespread throughout the ancient world, appeared about 2 million years ago, had a very slow evolution, and existed until about 300,000 years ago, because they knew how to manufacture necessary tools. We calculate that they were justifiably in a position to begin humanity as we currently know it.

Homo erectus lantianensis
Sinanthropus from Lantian (Fig. 3)
The fossil was discovered in Lantian, Shensi Province of NW China in 1964 by Woo Ju Kong, who studied it. Absolute age is 2 million years.
Scientific reconstitution by Dr. Cantemir Rişcuţia
No. inv.: 5

Fig. 3. *Homo erectus lantianensis* (Sinanthropus from Lantian). The fossil mold (plaster)

Homo erectus modjokertensis
Hominid child from Modjokerto, 2–5 years old (Fig. 4, Fig. 5, Fig. 6)
The rest of the fossil was discovered in 1936 by J. Duyfjes and studied by G. H. R. von Koengswald. The fossil was discovered in the town of Modjokerto, Java, Indonesia in Djetis sediments. 2 million years old.
Scientific reconstitution by Dr. Cantemir Rişcuţia
No. inv.: 2 (the fossil mold – plaster); 3 (the fossil skull – plaster); 4 (vital reconstitution – plaster)

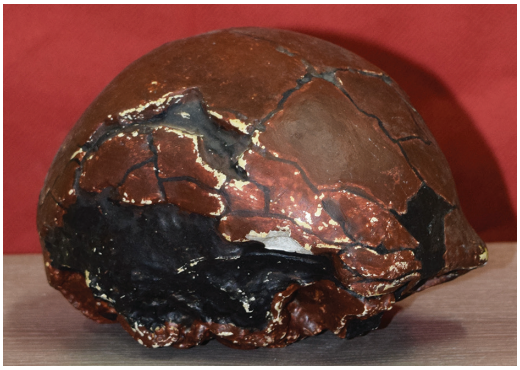

Fig. 4. *Homo erectus modjokertensis* (Hominid child from Modjokerto). The fossil mold (plaster)

Fig. 5. *Homo erectus modjokertensis* (Hominid child from Modjokerto). The fossil skull (plaster)

Fig. 6. *Homo erectus modjokertensis* (Hominid child from Modjokerto). Vital reconstitution (plaster)

Homo erectus pekinensis
Sinanthropus from Su Ku Tien (Fig. 7)
It was discovered in China by Dr. Pei in 1929 in the superior Pleistocene deposits.
Age: 1 million years
Scientific reconstitution by Dr. Cantemir Rişcuţia
No. inv.: 8

Fig. 7. *Homo erectus pekinensis* (Sinanthropus from Su Ku Tien). The fossil mold (plaster)

Homo erectus Trinil
Hominid from Trinil (Fig. 8)
Discovered in 1891 by Eugène Dubois in Trinil, Java, Indonesia, on the banks of the Solo River. 550 years old, dated by the potassium-argon method.
Scientific reconstitution by Dr. Cantemir Rişcuţia
No. inv.: 6

Fig. 8. *Homo erectus Trinil* (Hominid from Trinil). The fossil mold (plaster) Homo erectus erectus Sangiran

Hominid from Sangiran (Fig. 9, Fig. 10, Fig. 11)
The calvarium was discovered in 1937 by G. H. R. von Koengswald at Sangiran, Java, Indonesia, in sedimentary layers, sandstone conglomerates, and volcanic ash corresponding to those of Trinil. Age: 550,000 years.

Scientific reconstitution by Dr. Cantemir Rişcuţia
No. inv.: 9 (the fossil mold – plaster); 10 (skull reconstitution – plaster); 11 (vital reconstitution – plaster)

Fig. 9. *Homo erectus erectus Sangiran* (Hominid from Sangiran). The fossil mold (plaster)

Fig. 10. *Homo erectus erectus Sangiran* (Hominid from Sangiran). Skull reconstitution (plaster)

Fig. 11. *Homo erectus erectus Sangiran* (Hominid from Sangiran). Vital reconstitution (plaster)

Homo erectus heidelbergensis

Hominid from Mauer – Heidelberg (Fig. 12)

The discovery was made at Mauer near Heidelberg, in a pit of sand in the Elghenez River valley, a tributary of Nekar, at a depth of 24 m by Otto Schoetensack. Geological age corresponds to the interstadial 1–2 period (temporary retreat of ice), i.e. 350–400 thousand years ago.

Scientific reconstitution by Dr. Cantemir Rişcuţia

No. inv.: 7

Fig. 12. *Homo erectus heidelbergensis* (Hominid from Mauer – Heidelberg). The fossil mold (plaster)

Paleanathropus is represented by different forms of Neanderthal human well known today through the many discoveries made in almost all of the old world. They had a development of approximately 250,000 years and have participated in the genesis of humanity today.

Homo sapiens praesapiens steinheimensis
Hominid from Steinheim (Fig. 13, Fig. 14, Fig. 15)
The most ancient paleanthropus currently known. The skull fossil was discovered in 1933 by Karl Sigrist in ballast material in Steinheim on the Murr River near Stuttgart. The fossil was from Bergchemer, studied in detail by Huerta in 1936, and comes from the old Holsteinien layers of about 200 thousand years ago. The cranial capacity was 1070 cm^3.
Scientific reconstitution by Dr. Cantemir Rişcuţia
No. inv.: 12 (the fossil mold – plaster); 13 (skull reconstitution – plaster); 14 (vital reconstitution – plaster)

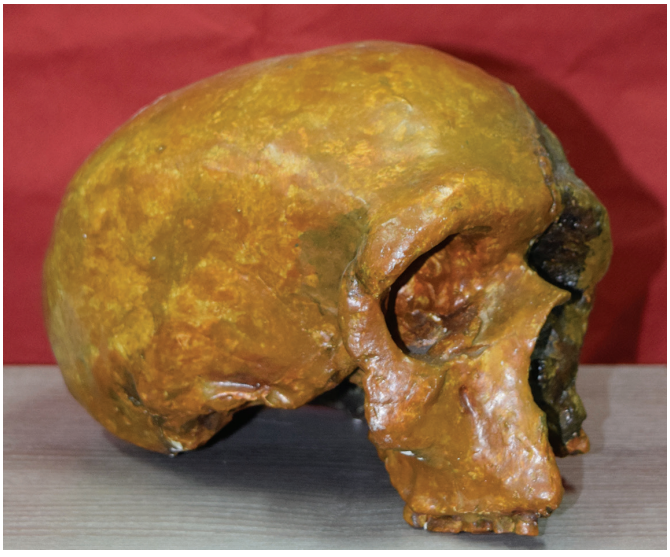

Fig. 13. *Homo sapiens praesapiens steinheimensis* (Hominid from Steinheim). The fossil mold (plaster)

Fig. 14. *Homo sapiens praesapiens steinheimensis* (Hominid from Steinheim). Skull reconstitution (plaster)

Fig. 15. *Homo sapiens praesapiens steinheimensis* (Hominid from Steinheim). Vital reconstitution (plaster)

Homo sapiens neanderthalensis

Hominid from Neanderthal (Fig. 16, Fig. 17, Fig. 18)

In 1856, in the Feldhoferd cave, in a valley called Neanderthal between Elberfeld and Düsseldorf, a skull cap was discovered which, together with the fossils discovered since 1864 in Europe, were grouped together with very primitive human forms. 50,000 years old.

Scientific reconstitution by Dr. Cantemir Rişcuţia
No. inv.: 15 (the fossil mold – plaster); 16 (vital reconstitution – man – plaster); 17 (vital reconstitution – woman – plaster)

Fig. 16. *Homo sapiens neanderthalensis* (Hominid from Neanderthal). The fossil mold (plaster)

Fig. 17. *Homo sapiens neanderthalensis* (Hominid from Neanderthal). Vital reconstitution – man (plaster)

Fig. 18. *Homo sapiens neanderthalensis* (Hominid from Neanderthal). Vital reconstitution – woman (plaster)

Neanthropus is represented by man as *Homo sapiens* L.
The first European forms of Neanthropus occurred approximately 35,000 years ago and they were *Homo sapiens fossilis*. After their emergence, the current human form reached its full development.

Homo sapiens sapiens Oberkässel
Cro-Magnon human from Oberkässel (Fig. 19, Fig. 20)
Discovered in 1914 in Oberkässel by Bonn in the late Würm layer from the superior Pleistocene age, this specimen is the result of a robust race typical of Upper Palaeolithic, Europe. 15,000 years old.
Scientific reconstitution by Dr. Cantemir Rişcuţia
No. inv.: 18 (the fossil mold – man – plaster); 19 (the fossil mold – woman – plaster)

Fig. 19. *Homo sapiens sapiens Oberkässel* (Cro-Magnon human from Oberkässel). The fossil mold – man (plaster)

Fig. 20. *Homo sapiens sapiens Oberkässel* (Cro-Magnon human from Oberkässel). The fossil mold – woman (plaster)

***Homo sapiens sapiens* Boian-Vărăşti**

Human from Boian-Vărăşti (Fig. 21)

Discovered in 1956 at Grădiştea Ulmilor, Boian-Vărăşti took part in Gumelniţa culture. It is later than Schela Cladovei, which gives evidence and intense gracilized to the girls.

Scientific reconstitution by Dr. Cantemir Rişcuţia
No. inv.: 27

Fig. 21. *Homo sapiens sapiens Boian-Vărăşti* (Human from Boian-Vărăşti). Vital reconstitution (plaster)

Homo sapiens sapiens Lautsch – Mladeč (Fig. 22)
Scientific reconstitution by Dr. Cantemir Rişcuţia
No. inv.: 20

Fig. 22. *Homo sapiens sapiens Lautsch – Mladeč*. The fossil mold (plaster)

Homo sapiens sapiens Kostenki (Fig. 23)
Scientific reconstitution by Dr. Cantemir Rişcuţia
No. inv.: 28

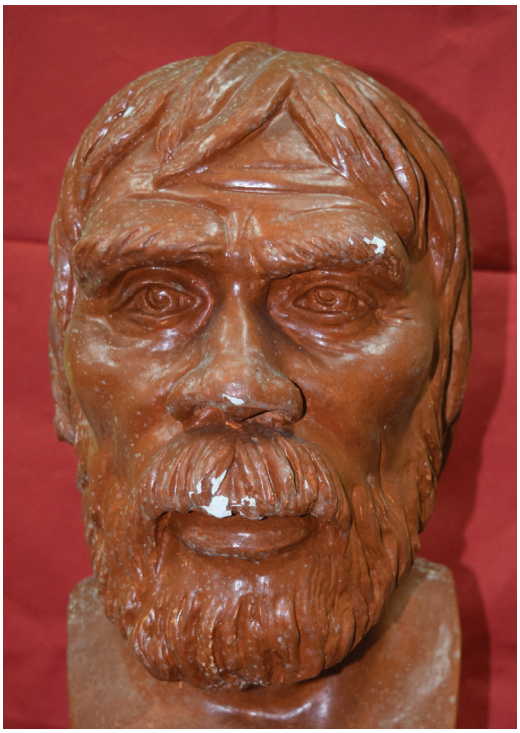

Fig. 23. *Homo sapiens sapiens Kostenki*.
Vital reconstitution (plaster)

Local Neanthropus from Schela Cladovei

Homo sapiens sapiens Schela Cladovei (Fig. 24, Fig. 25, Fig. 26)
A man's skull with obvious Cro-Magnon features was discovered in 1967 in the Epi-Paleolithic layer in Schela Cladovei near Drobeta Turnu Severin. Age: approximately 7000 years.
Scientific reconstitution by Dr. Cantemir Rişcuţia
No. inv.: 22 (the fossil mold – man – plaster); 21 (skull reconstitution – man – plaster); 23 (vital reconstitution – man – plaster)

Fig. 24. *Homo sapiens sapiens Schela Cladovei*.
The fossil mold – man (plaster)

Fig. 25. *Homo sapiens sapiens Schela Cladovei*.
Skull reconstitution – man (plaster)

Fig. 26. *Homo sapiens sapiens Schela Cladovei*.
Vital reconstitution – man (plaster)

Homo sapiens sapiens Schela Cladovei (Fig. 27, Fig. 28, Fig. 29)
Female skull, without diminished features, presented just after a blow, which later healed together the frontal bone and the occipital bone and invokes a special museum based interest. Age: approximately 7000 years.
Scientific reconstitution by Dr. Cantemir Rişcuţia
No. inv.: 25 (the fossil mold – woman – plaster); 24 (skull reconstitution – woman – plaster); 26 (vital reconstitution – woman – plaster)

Fig. 27. *Homo sapiens sapiens Schela Cladovei*.
The fossil mold – woman (plaster)

Fig. 28. *Homo sapiens sapiens Schela Cladovei*.
Skull reconstitution – woman (plaster)

Fig. 29. *Homo sapiens sapiens Schela Cladovei*.
Vital reconstitution – woman (plaster)

Homo sapiens sapiens Schela Cladovei (Fig. 30, Fig. 31)
Skull of an adult male, 30–35 years, with the tip of a bone arrow protruding from his the right jaw, large wing of the sphenoid, penetrating deep into the brain.
Scientific reconstitution by Dr. Cantemir Rişcuţia

Fig. 30. *Homo sapiens sapiens Schela Cladovei*.
Skull reconstitution – man (plaster)

Fig. 31. *Homo sapiens sapiens Schela Cladovei*.
Vital reconstitution – man (plaster)

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REFERENCES

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