COMPLEXUL MUZEAL DE ŞTIINŢELE NATURII
"ION BORCEA" BACĂU

STUDII ŞI COMUNICĂRI

2010

23

Editura "Ion Borcea"
Bacău

Complexul Muzeal de Ştiinţele Naturii „Ion Borcea” Bacău

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CUPRINS

PART I – VEGETAL BIOLOGY

PART II – ANIMAL BIOLOGY

COMPLEXUL MUZEAL DE ŞTIINȚELE NATURII „ION BORCEA” BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 7 – 13

PART I – VEGETAL BIOLOGY

QUALITATIVE AND QUANTITATIVE DETERMINATION OF ALGAL FLORA'S GALBENI LAKE, BACĂU COUNTY

ANCA TUDOR-ANDREI*

ABSTRACT

This paper presents the analysis results algal flora of the Galbeni Lake, Bacău County. The paper is part of a broader study which aimed to analyze of abiotic and biotic characteristics from areas bordering the Galbeni Lake.

Keywords: algal flora, Galbeni Lake

Introduction

The Galbeni Lake - Bird special protection area, situated at the confluence of rivers Bistrița and Siret, since May 2006 is in custody of the Regional Ecology Center Bacău. Perimeter area is approximately 6300 meters and widths between 800 and 1100 meters; surface areas is 1123 hectares.

Lake area were initially identified 168 bird species, including 74 species of shore habitats, 62 species characteristic of coastal habitats and 32 species on lake.

Material and method

I. Numbers and location of sampling stations

Sampling points were established by identifying potential sources of supply the algal flora, in terms of habitat restoration by filling the basin. Such were sampled from lenses ecosystems found in the lake basin area flooded (barrier basin) and the water courses wich will supply the lake (Siret river and Bistrița river - tributary Siret river).

To obtain exact information as algal flora of ponds future, I collected soil samples of soil profiles of future river banks.

Algae present in lenses ecosystems have been identified in these samples:

- Sample 1 – area near the dam
- Sample 2 – secondary process water dam area
- Sample 3 – middle area of the lake

Each sample sums of 6 samplings.

The soil profiles were made on these points:

- Sample 4 – left side of the lake, near dam
- Sample 5 – left side of the lake, in its middle area
- Sample 6 – holm Bistrița River (Ruși Ciutea village – Bacău county)
- Sample 7 – right side of the Siret River (Ruși Ciutea village – Bacău county)

Water samples were taken as:

- Sample 8 –Siret River – middle area of the lake
- Sample 9 –Bistrița River, upstrem lake (Ruși Ciutea village – Bacău county)
- Sample 10 – Siret River, upstrem lake (Ruși Ciutea village – Bacău county)

II. Processing the material collected

Each phytoplankton sample volume was 1950 ml. The samples were fixed with formalin solution concentration 4%. After settling were concentrated by siphoning and then analyzed using optical microscope combination: eyepieces 10X and objective 40X.

Phytoplankton volume of each sample was 1950 ml.

The samples were fixed with formalin solution concentration 4%. After settling were concentrated by siphoning and then analyzed using optical microscope combination: eyepieces 10X and

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objective 40X. Have made qualitative and quantitative determination of algal flora.

To determine the density of algae was used formula: (Phd. Ioan Cărăuş):

$$D = \frac{C \times N \times A}{0{,}50 \times 0{,}04 \times B \times n}$$

D - numerical density of phytoplankton (specimen/ml)
C - number of microscopic fields containing microscopic slide
N - number of algae found in the area examined microscopic slide
A - sample volum after siphoning (ml)
B - initial volume of sample collected (ml)
N - number of microscopic fields examined
0,5 - diameter of the microscopic field
0,04 - volume of concentrated suspension that was deposited on the slide for microscopic analysis

The soil samples were diluted in the ratio 1 g sample/100 ml distilled water, than were analyzed usig the method applied to samples of phytoplankton.

Results and discutions

After qualitative determinations have been identified algae species as belonging to the following sites phylum:

Cyanobacteria, Euglenophyta, Chromphyta (Xanthophyceae şi Bacillariophyceae classes), Chlorophyta, totalig 55 genus.

The quantitative determinations have show hight rate of species held in class Bacillariophyceae, compared with other species of algae observed.

Data on the density of algae in samples of work are presented in graphical form in appendices paper.

I. Determinations in water samples (Table 1)

In water samples were identified 31 genera of algae. The sample number 8 was collected from Siret river. Most specimens of algae were identified in this sample, the nunerical standpoit and systematically. The large number of species is correlated with a reduced number of individual representatives.

High density of planktonic algae present in river courses that will feed the lake that will form, is evidence that will containe a wide varriety of algae.

All samples have identified algae that indicate the α and β-mesosaprob character of water (grades III and II), characterized by great variety of organisms.

Organic substances in these ecosystems are going decomposition, mineralization process was almost completed and oxygen exist in large quantity.

Table 1

No.	Name	Sample 8	Sample 9	Sample 10
1.	Acanthosphaera sp.	+	-	+
2.	Actinastrum sp.	+	+	+
3.	Anabaena sp.	-	+	-
4.	Aphanocapsa sp.	+	+	+
5.	Bacillariophycee	+	+	+
6.	Carteria sp.	+	-	+
7.	Centritractus sp.	+	-	-
8.	Chlamydomonas sp.	-	+	+
9.	Chlorella sp.	+	+	-
10.	Chlorobotrys sp.	-	+	-
11.	Closteriopsis sp.	+	-	-
12.	Coelastrum sp.	-	-	+
13.	Coelosphaerium sp.	+	-	-
14.	Crucigenia sp.	+	+	+
15.	Dictyosphaerium sp.	+		+
16.	Euglena sp.	+	+	+
17.	Keratococcus sp.	+	-	-
18.	Koliella sp.	-	+	-
19.	Merismopedia sp.	+	-	-
20.	Micractinium sp.	+	+	+
21.	Monoraphidium sp.	+	-	+

22.	Oocystis sp.	+	+	
23.	Oscillatoria sp.	-	+	+
24.	Pediastrum sp.	+	-	-
25.	Polyedriopsis sp.	+	-	-
26.	Scenedesmus sp.	+	+	+
27.	Schroederia sp.	+	-	+
28.	Selenastrum sp.	-	-	+
29.	Sorastrum sp.	-	-	+
30.	Tetraedron sp.	+	-	-
31.	Volvox sp.	+	-	-
Specimens algae/ml		**9150.48**	**4724,35**	**1401,79**

II. Determinations made in the lenses ecosystems impoundment of the lake and soil profiles (Table 2)

The results indicate the presence of a great variety of flora algal species component of these ecosystems, wich will provide resources to develop a rich aquatic biocenosis after filling the basin through habitat restoration.

In the sediments analyzed (samples 4 and 5) have not identified but frustules, cell-free content live, from the bacillariophycee who inhabitated the lake before emptying.

Table 2

No.	**Name**	**Lenses ecosystems**			**Soil profiles**			
		Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7
1.	Bacillariophyceae	+	+	+	+	+	+	+
2.	Chlamydomonas sp.	+	+	-	-	-	-	-
3.	Chlorella sp.	+	+	+	-	-	-	-
4.	Chloridella sp.	+	-	-	-	-	-	-
5.	Chotadella sp.	+	-	-	-	-	-	-
6.	Closterium sp.	+	-	-	-	-	-	-
7.	Cosmarium sp.	+	-	-	-	-	-	-
8.	Crucigeniella sp.	+	-	--	--	-	-	-
9.	Euglena sp.	-	+	+	-	-	-	-
10.	Golenkinia sp.	+	-	-	-	-	-	-
11.	Merismopedia sp.	+	-	+	-	-	-	-
12.	Monoraphidium sp.	+	-	-	-	-	-	-
13.	Nostoc commune	-	-	+	-	-	-	-
14.	Oocystis sp.	+	-	+	-	-	-	+
15.	Oscillatoria sp.	+	+	+	-	-	+	+
16.	Oscillatoria tenuis	-	+	+	-	-	-	-
17.	Palmodictyon sp.	-	-	-	-	-	-	+
18.	Pediastrum sp.	+	-	-	-	-	-	-
19.	Pleurococcus sp.	+	+	-	-	-	-	-
20.	Scenedesmus sp.	+	-	+	-	-	-	-
21.	Synechocystis sp.	-	-	+	-	-	-	-
22.	Tetrallantos sp.	+	-	-	-	-	-	-
23.	Ulothrix sp.	+	+	-	-	-	-	-
24.	Volvox sp.	+	-	-	-	-	-	-
Specimens algae / ml		**6533,33**	**5850**	**15300**	**2300**	**250**	**350**	**700**

Opinion

By filling the basin will forme a biotope that will provide optomal conditions for the development of a heterogeneous structure biocenosis, algal flora identified from the current study.

New habitat that will result from filling the basin will be populated by species of algae found in the tributaries (Bistrița and Siret rivers) that feed the lake and that they will adapt with living lake. Species identified in the ecoszstems of lake impoundment biotope we have optomal conditions to positively influence the evolution of lake ecosystem.

Than algal flora composition will be changed due to the emergence of other popular ways of ecosystem: lenses ecosystems located on the slopes of the lake basin, aquatic birds, rainwater.

Rezumat

Lucrarea face parte dintr-un studiu mai amplu, care a avut ca obiectiv analiza caracteristicilor abiotice şi biotice ale râului Siret, afluent al lacului Galbeni, județul Bacău, ale zonelor limitrofe lacului şi ale cuvetei acestuia. La momentul realizării studiului, lacul Galbeni fusese complet desecat. Întrucât lacul Galbeni este parte integrantă a rețelei Natura 2000 fiind declarat APSA, studiul algoflorei s-a realizat în contextul identificării potențialului de refacere a ecosistemului după umplerea bazinului cu apă.

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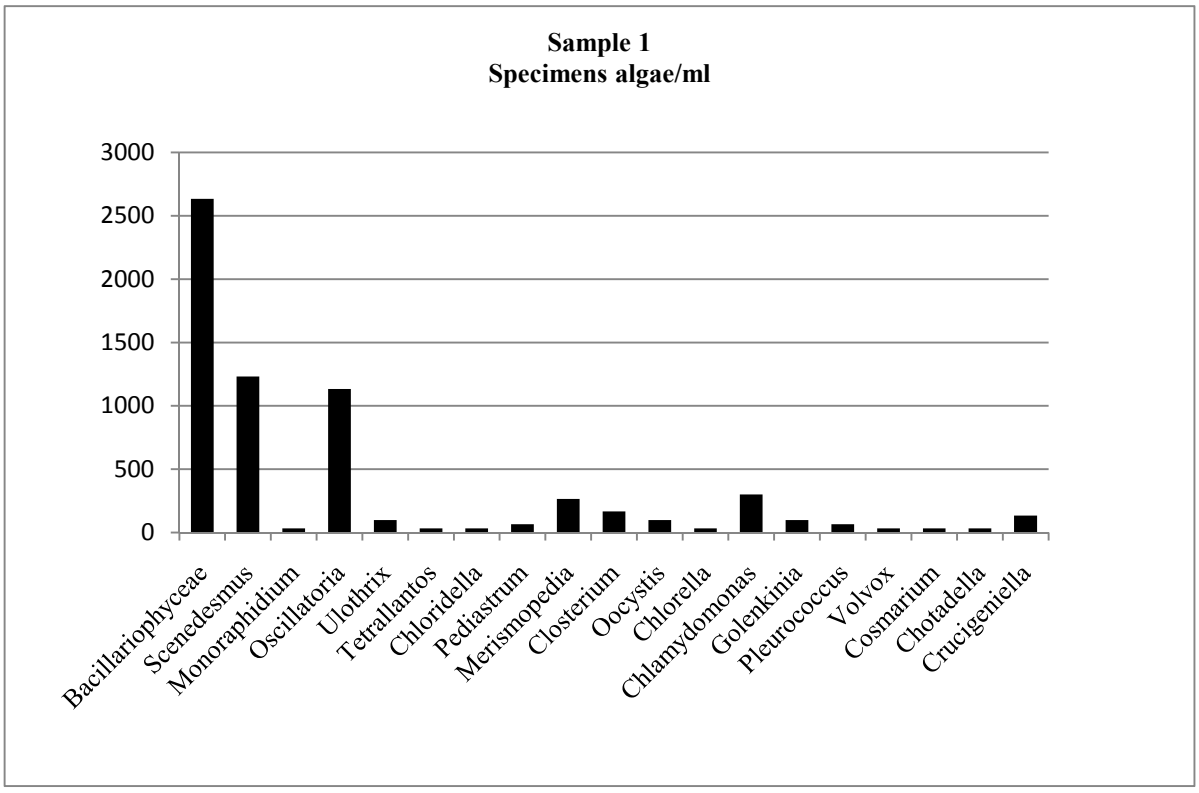

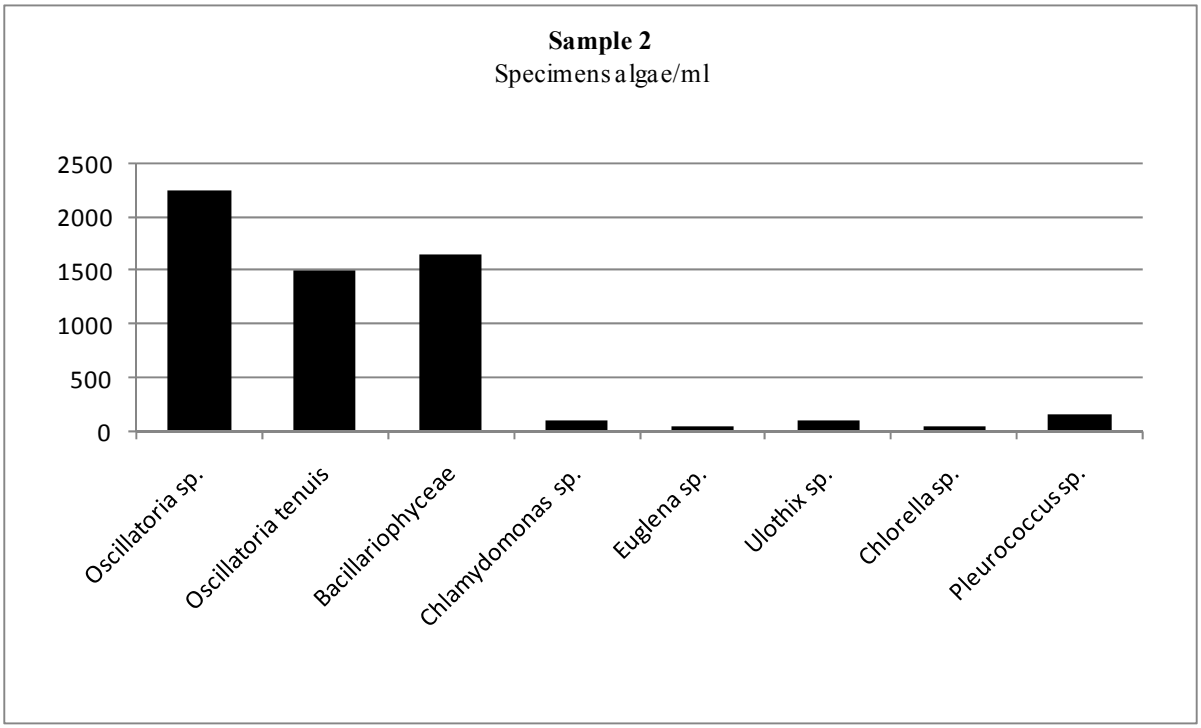

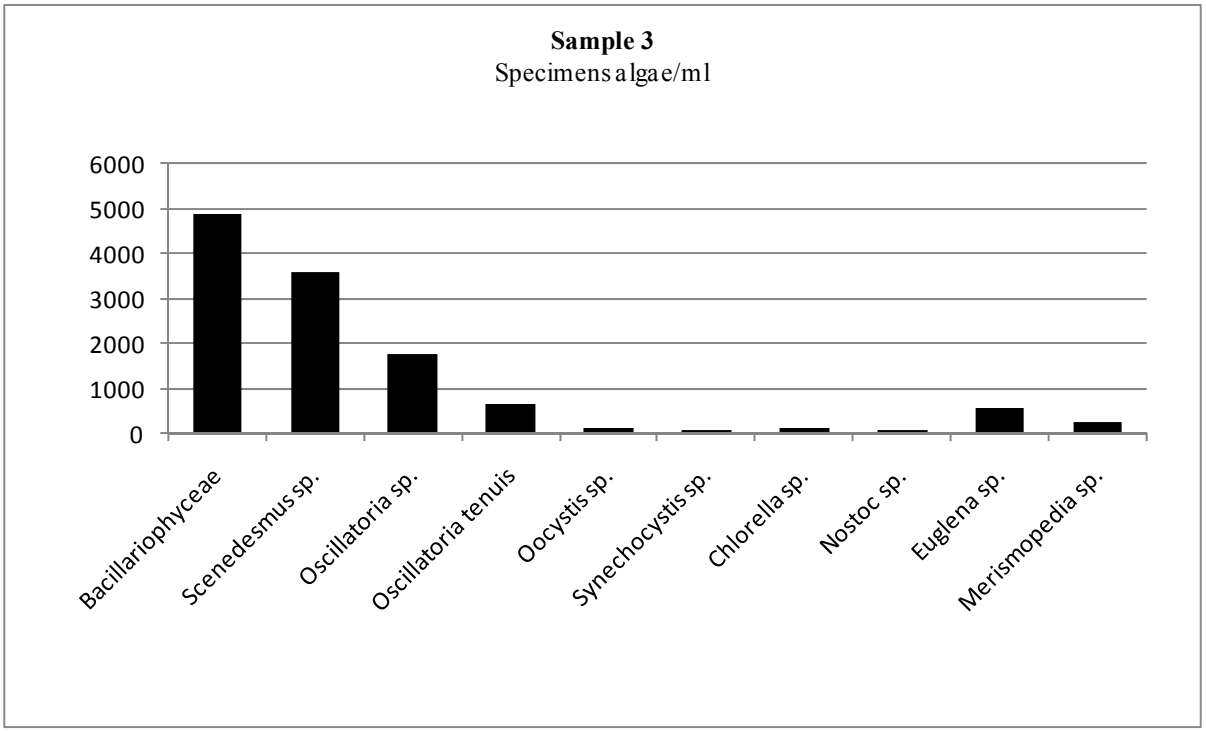

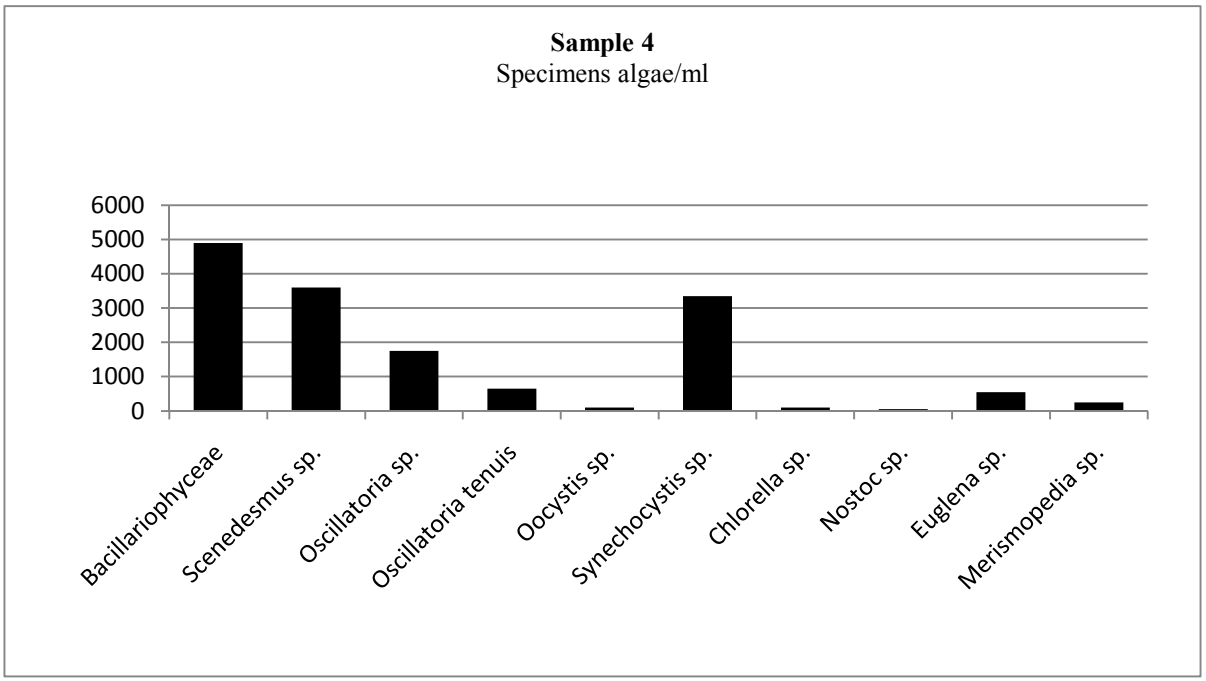

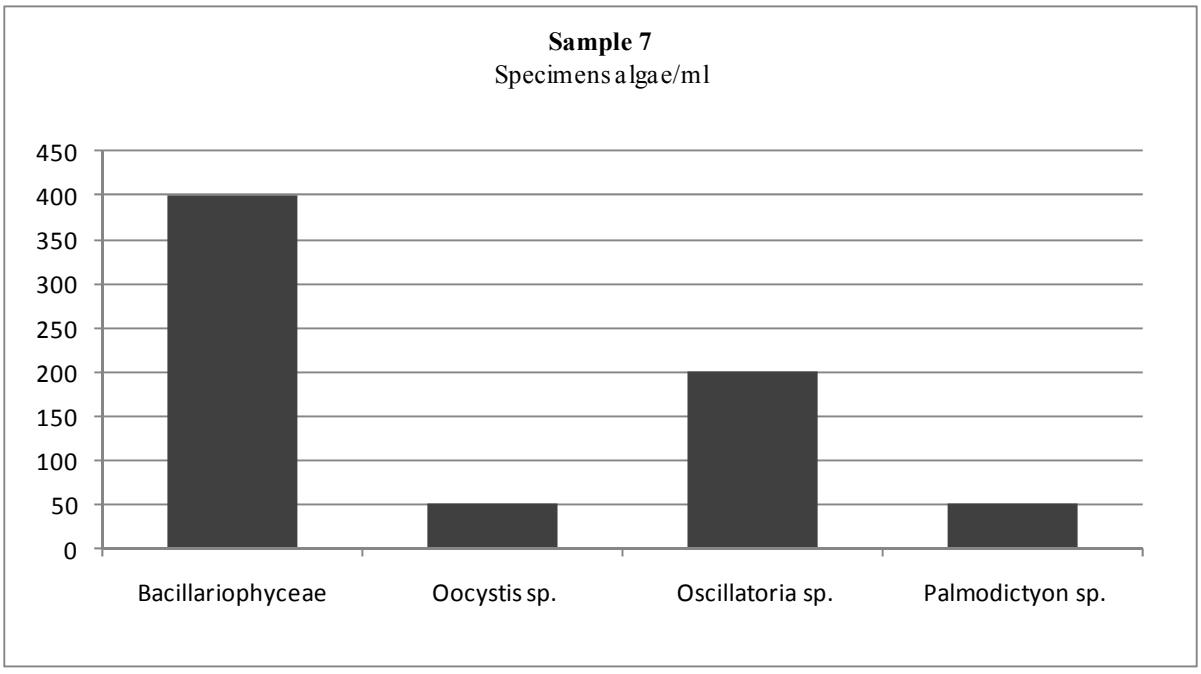

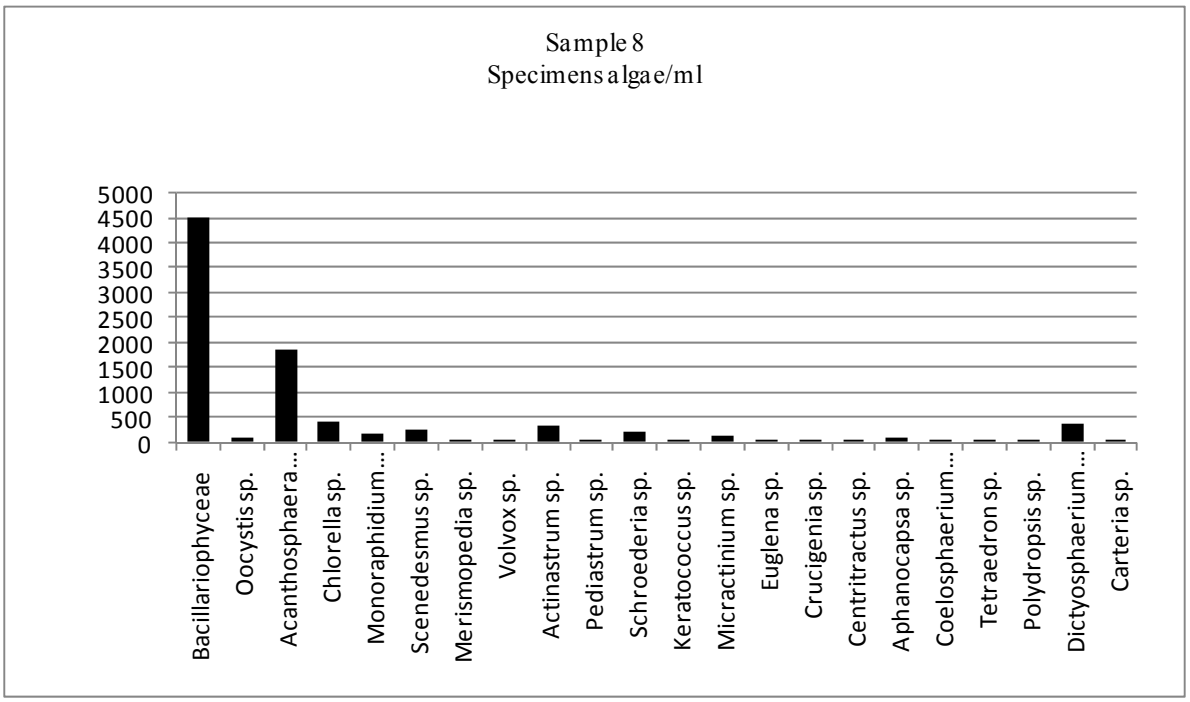

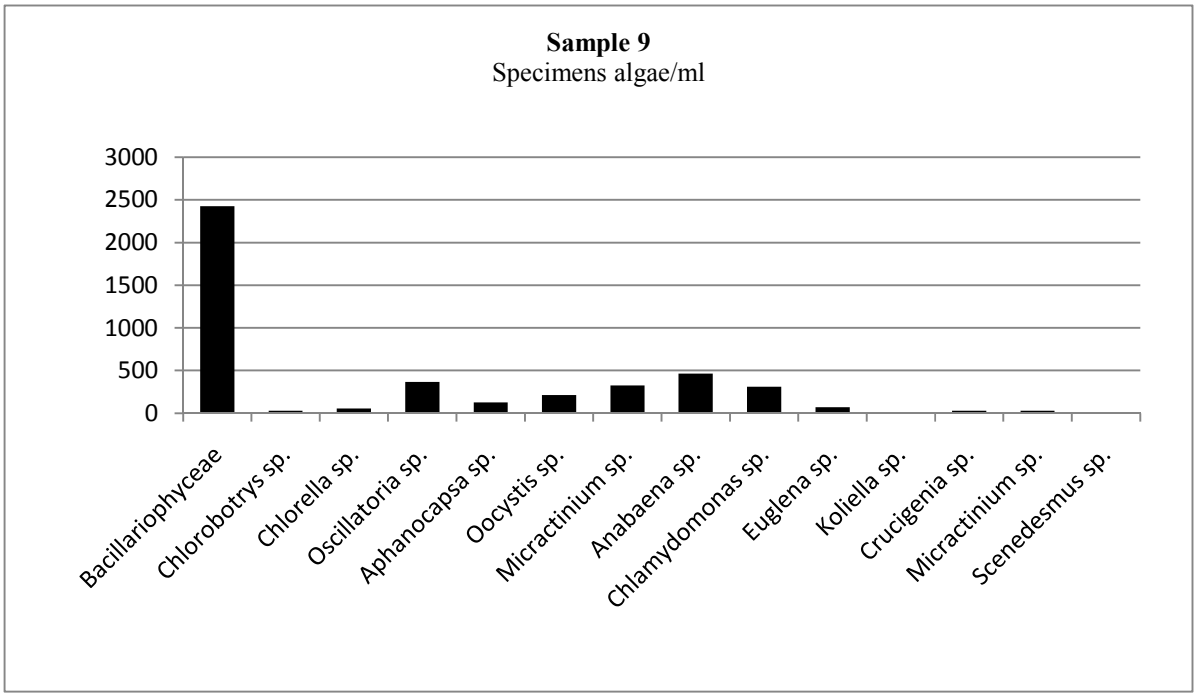

COMPLEXUL MUZEAL DE ŞTIINȚELE NATURII „ION BORCEA” BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 14 – 23

PRELIMINARY RESEARCH CONCERNING THE DIVERSITY OF MACROMYCETES IN PRALEA BROOK BASIN (BACĂU COUNTY)

OTILIA CARMEN PAVEL *

ABSTRACT

Mycological research conducted in the Pralea brook basin (Bacău County) showed the diversity of the macromycete species in the phytocenoses of the following associations: *Hieracio transsilvanico – Piceetum* Pawlowski et Br.-Bl. 1939, *Pulmonario rubrae - Fagetum* (Soó 1964) Täuber 1987, *Leucanthemo waldsteinii – Fagetum* (Soó 1964) Täuber 1987, *Symphyto cordati – Fagetum* Vida 1959.

There have been identified 205 taxa from Fungi kingdom out of which 20 species belong to the Ascomycota phylum and 185 species to the Basidiomycota phylum.

Key words: fungi, macromycetes, museum, Pralea, Căiuț, Bacău, Romania

Introduction

The Pralea brook is an important tributary to Trotuş river, with 22 km length and is situated on the territory of the Căiuți commune, Bacău County (fig. 1, 2). The hydrographical basin occupies a 65 km^2 surface and it stretches between 46°11' N and 26°46' E, at altitudes varying from 155 m (at emptying point in Trotuş river) to 771 m (at Coada Văii Baba summit).

From a geological point of view, the whole basin of Pralea brook is included in the Subcarpathian piedmont developed East to Ouşorul summit which is the northernmost sector of Vrancea Subcarpathians.

The annual average temperature varies according to altitude, in the high zones being 6 - 7°C, and in the lower areas 8 - 9°C. The atmospheric precipitations register values according to altitude, 550 - 600 mm in the lower zones and 700 mm in the higher regions.

Studies on the flora and vegetation have been carried out by D. Mititelu, N. Barabaş (12, 13, 14, 15, 16) and by M. Gurău (8, 9, 10).

Material and method

The mycological material was collected in phytocenoses of the associations: *Hieracio transilvanico-Piceetum Pawlowski* et Br.-Bt. 1939, *Pulmonario rubrae - Fagetum* (Soó 1964) Täuber 1987, *Leucanthemo waldsteinii – Fagetum* (Soó1964) Täuber 1987, *Symphyto cordati – Fagetum* Vida 1959.

The mycological research was conducted during 2009 – 2010 in 4 forests situated in the superior basin of Pralea brook: Ursoaia Mică forest (PUm), Coconaşi forest (PC), Bourului forest (PB), Pralea Ursoaia Mare forest (PUM) (tab. 1.).

The collected mushrooms specimens were identified using the mycological literature (1, 2, 3, 4, 5, 6, 7, 18, 19).

Taxa and their authors were given according to on amended Index Fungorum electronic version (Kirk and collab.) (18).

The classification of the macromycetes regarding the bioform (life form), their use and importance for people made after G. Sălăgeanu (17) and E. Boa (20).

The species picked were dried and conserved. The mycological material may be found in the Herbarium of the “Ion Borcea” Natural Science Museum Complex of Bacău.

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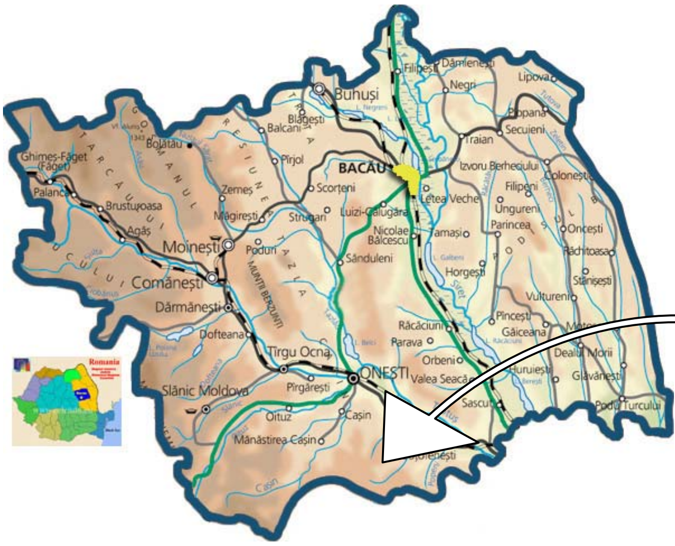

Fig. 1 – Map of Bacău County

Fig. 2 – Map of Căiuți commune

Results and discussions

There were identified 202 taxa belonging to 1 kingdom (Fungi), 2 phylums (Ascomycota – 20 species and Basidiomycota–185 species), 5 classes, 16 orders, 43 families, 101 genera (tab. 1, 2).

The genera with the most numerous species are *Russula* with 31 species and *Mycena* with 13 species.

The macromycete species belong to 8 biological forms and 6 ecological categories (tab. 1).

The bioform spectrum is dominated by mycetogeophyta mycorrhiza (Gm) with 63 species (tab. 1). The ecological spectrum is generally dominated by saprophytic species (116) and mycorrhizal species (63) (tab.1, fig. 3).

There were identified the high number of lignicolous (77-species), saprophytic and saproparasitic species on the wood of deciduous and coniferous species. Host and substrate are important biotic factors that contribute to diversity of fungi on wood.

Many species found belong to a wide ecological range, growing in deciduous or coniferous woods such as *Amanita rubescens* var. *rubescens* Pers., *Amanita muscaria* var. *muscaria* (L.) Lam., among the simbionts, or *Rhodocollybia butyracea* f. *butyracea* (Bull.) Lennox, and *Mycena pura* (Pers.) P. Kumm. among the saprotrophs.

Qualitative and quantitative analysis showed a maximum number of macromycete species in the association *Pulmonario rubrae - Fagetum* (Soó 1964) Täuber 1987, collected at Bourului forest (PB).

Among the dominant common species we mention: *Agaricus silvicola* (Vittad.) Peck, *Lycoperdon perlatum* Pers.; *Gymnopus peronatus* (Bolton) Antonín, Halling & Noordel., *Russula delica* Fr., *Russula cyanoxantha* (Schaeff.) Fr, *Mycena pura* (Pers.) P. Kumm., *Amanita rubescens* var. *rubescens* Pers.

Table 1 - **Macromycete species collected in the Pralea brook basin (2009-2010)**

	Species name	Biological forms	Ecological category	Categories of WUS	PB	PUm	PC	PUM
	Kingdom FUNGI							
	Phylum Ascomycota							
	Class Leotiomycetes							
	Order Helotiales							
	Family Dermateaceae							
1.	*Mollisia cinerea* f. *cinerea* (Batsch) P. Karst. 1871	EPx	Sl	inedible	+	-	-	-
	Family Helotiaceae							
2.	*Hymenoscyphus fructigenus* (Bull.) Gray 1821	Gs	Sf	inedible	+	-	+	-
3.	*Hymenoscyphus imberbis* (Bull.) Dennis 1964	EPx	Sl	inedible	+	-	-	-
4.	*Phaeohelotium epiphyllum* var. *epiphyllum* (Pers.) Hengstm. 2009	Gs	Sf	inedible	+	-	+	-
	Family Hyaloscyphaceae							
5.	*Lachnum corticale* (Pers.) Nannf. 1932	EPx	Sl	inedible	+	-	-	-

	Genera incertae sedis							
6.	*Chlorociboria aeruginosa* (Oeder) Seaver ex C.S. Ramamurthi, Korf & L.R. Batra 1958	EPx	Sl	inedible	+	-	+	+
	Class Pezizomycetes							
	Order Pezizales							
	Family Pezizaceae							
7.	*Pachyella violaceonigra* (Rehm) Pfister 1974	Gs	St	inedible	+	-	-	-
	Family Pyronemataceae							
8.	*Humaria hemisphaerica* (F.H. Wigg.) Fuckel 1870	Gs	St	inedible	+	-	+	+
9.	*Scutellinia scutellata* (L.) Lambotte 1887	EPx	Sl	inedible	+	-	-	-
	Class Sordariomycetes							
	Order Hypocreales							
	Family Nectriaceae							
10.	*Nectria cinnabarina* (Tode) Fr. 1849 f.c. *Tubercularia vulgaris* Tode 1790	Ex-EPx	SPl	inedible	+	-	+	+
	Order Xylariales							
	Family Xylariaceae							
11.	*Biscogniauxia nummularia* (Bull.) Kuntze 1891	EPx	Sl	inedible	+	-	-	-
12.	*Daldinia concentrica* (Bolton) Ces. & De Not. 1863	EPx	Sl	medicinal	+	-	-	-
13.	*Hypoxylon fuscum* (Pers.) Fr. 1849	EPx	Sl	inedible	+	+	+	+
14.	*Hypoxylon fragiforme* (Pers.) J. Kickx f. 1835	EPx	Sl	inedible	+	+	+	+
15.	*Hypoxylon howeanum* Peck 1872	EPx	Sl	inedible	+	-	-	-
16.	*Hypoxylon rutilum* Tul. & C. Tul. 1863	EPx	Sl	inedible	+	-	-	-
17.	*Kretzschmaria deusta* (Hoffm.) P.M.D. Martin 1970	EPx	Sl	inedible	+	+	+	+
18.	*Xylaria hypoxylon* (L.) Grev. 1824	EPx	Sl	inedible	+	-	-	-
19.	*Xylaria longipes* Nitschke 1867	EPx	Sl	inedible	+	-	+	+
20.	*Xylaria polymorpha* (Pers.) Grev. 1824	EPx	Sl	medicinal	+	-	+	+
	Phylum Basidiomycota							
	Class Agaricomycetes							
	Order Agaricales							
	Family Agaricaceae							
1.	*Agaricus augustus* Fr. 1838	Gs	St	food	-	-	-	+
2.	*Agaricus silvicola* (Vittad.) Peck 1872	Gs	St	food	+	-	+	+
3.	*Bovista nigrescens* Pers. 1794	Gs	St	edible WC, m.	+	-	-	+
4.	*Coprinus comatus* (O.F. Müll.) Pers. 1797	Th	St	food WC, m.	-	-	+	+
5.	*Chlorophyllum rhacodes* (Vittad.) Vellinga 2002	Gs	St	food WC	+	-	+	+
6.	*Crucibulum laeve* (Huds.) Kambly 1936	EPx	Sl	inedible	+	-	-	-
7.	*Cyathus striatus* (Huds.) Willd 1787	EPx-Gs	Sl	inedible, m.	+	+	+	-
8	*Lepiota aspera* (Pers.) Quél. 1886	Gs	St	poisonous	+	-	-	+
9.	*Lepiota castanea* Quél. 1881	Gs	St	poisonous	-	-	+	-
10.	*Lepiota cristata* (Bolton) P. Kumm. 1871	Gs	St	poisonous	+	-	-	+
11.	*Lepiota clypeolaria* (Bull.) P. Kumm. 1871	Gs	St	Poisonous	-	-	-	+
12.	*Lepiota pseudohelveola* Kühner 1936	Gs	St	poisonous	-	-	-	+
13.	*Leucoagaricus leucothites* (Vittad.) Wasser 1977	Gs	St	edible	+	-	-	-
14.	*Lycoperdon excipuliforme* (Scop.) Pers. (1801)	Gs	St	edible WC, m.	+	-	-	+
15.	*Lycoperdon molle* Pers. 1801	Gs	St	edible WC	+	-	-	+
16.	*Lycoperdon perlatum* Pers. 1796	Gs	St	edible WC, m.	+	-	+	+
17.	*Lycoperdon pyriforme* Schaeff. 1774	EPx	Sl	edible WC, m.	+	-	+	+
18.	*Macrolepiota procera* var. *procera* (Scop.) Singer 1948	Gs	St	Food	+	-	-	+
19.	*Phaeolepiota aurea* (Matt.) Maire 1928	Gs	St	poisonous	-	-	+	-
	Family Amanitaceae							
20.	*Amanita citrina* (Pers.) Pers. 1797	Gm	M	poisonous	+	-	-	-
21.	*Amanita excelsa* var. *spissa* (Fr.) Neville & Poumarat 2004	Gm	M	edible	+	-	-	-
22.	*Amanita fulva* Fr. 1815	Gm	M	edible WC	+	-	-	-
23.	*Amanita muscaria* var. *muscaria* (L.) Lam. 1783	Gm	M	poisonous, m.	+	-	-	+

24.	*Amanita phalloides* (Vaill. ex Fr.) Link 1833	Gm	M	poisonous D	+	-	-	-
25.	*Amanita rubescens* var. *rubescens* Pers. 1797	Gm	M	food WC	+	-	+	+
26.	*Amanita vaginata* (Bull.) Lam. 1783	Gm	M	edible NO	+	-	-	-
	Family Clavariaceae							
27.	*Clavaria fragilis* Holmsk. 1790	Gs	St	edible	+	-	-	-
	Family Cortinariaceae							
28.	*Cortinarius praestans* Cordier 1870	Gm	M	edible	-	-	+	-
	Family Inocybaceae							
29.	*Crepidotus variabilis* (Pers.) P. Kumm. 1871	EPx	Sl	inedible	+	-	-	-
30.	*Inocybe geophylla* (Fr.) P. Kumm. 1871	Gm	M	poisonous	+	-	-	+
31.	*Inocybe maculata* Boud. 1885	Gm	M	poisonous	+	-	-	-
32.	*Inocybe rimosa* (Bull.) P. Kumm. 1871	Gm	M	poisonous	+	-	-	-
33.	*Phaeomarasmius erinaceus* (Fr.) Scherff. ex Romagn. 1937	EPx	Sl	inedible	+	-	-	-
	Family Hydnangiaceae							
34.	*Laccaria amethystina* (Huds.) Cooke 1884	Gm	M	edible				
35.	*Laccaria laccata* (Scop.) Cooke 1884	Gm	M	edible	+	-	-	+
	Family Lyophyllaceae							
36.	*Ossicaulis lignatilis* (Pers.) Redhead & Ginns 1985	EPx	Sl	edible	+	-	-	-
37.	*Lyophyllum decastes* (Fr.) Singer 1951	Gs	St	food, m.	-	-	-	+
	Family Marasmiaceae							
38.	*Gymnopus confluens* (Pers.) Antonín, Halling & Noordel. 1871	Gs	St	edible	+	+	+	+
39.	*Gymnopus dryophilus* (Bull.) Murrill (1916)	Gs	Sf	edible	+	+	+	+
40.	*Gymnopus peronatus* (Bolton) Antonín, Halling & Noordel. 1997	Gs	Sf	inedible	+	+	+	+
41.	*Gymnopus putillus* (Fr.) Antonín, Halling & Noordel. 1997	Gs	St	inedible	+	-	-	-
42.	*Macrocystidia cucumis* (Pers.) Joss. 1934	Gs	St	inedible	-	-	+	-
43.	*Marasmius alliaceus* (Jacq.) Fr. 1838	Gs	Sf	edible	+	-	+	+
44.	*Marasmius cohaerens* (Alb. & Schwein.) Cooke & Quél. 1878	Gs-EPx	Sf-Sl	inedible	+	-	-	-
45.	*Marasmius prasiosmus* (Fr.) Fr. 1838	Gs	Sf	inedible	+	-	-	-
46.	*Marasmius rotula* (Scop.) Fr. 1838	EPx-Gs	St	inedible	+	-	-	+
47.	*Marasmius scorodonius* (Fr.) Fr. 1836	Gp	P	edible	+	-	-	-
48.	*Marasmius wynneae* Berk. & Broome 1860	Gs	Sf	inedible	+	-	-	+
49.	*Micromphale brassicolens* var. *brassicolens* (Romagn.) P.D. Orton 1960	Gs	Sf	inedible	-	-	+	-
50.	*Rhodocollybia butyracea* f. *butyracea* (Bull.) Lennox 1979	Gs	St	edible	+	-	-	+
	Family Mycenaceae							
51.	*Hemimycena lactea* (Pers.) Singer 1938	Gs	Sf	inedible	+	-	-	-
52.	*Mycena alcalina* (Fr.) P. Kumm. 1871	EPx	Sl	inedible	+	-	-	-
53.	*Mycena capillaris* (Schumach.) P. Kumm. 1871	Gs	Sf	inedible	+	-	-	-
54	*Mycena crocata* (Schrad.) P. Karst 1871	Gs	St	inedible	+	-	-	+
55.	*Mycena galericulata* (Scop.) Gray 1821	Ex-EPx	SPl	edible NO	+	-	-	+
56.	*Mycena hiemalis* (Osbeck) Quél. 1872	EPx	Sl	inedible	+	-	-	-
57.	*Mycena inclinata* (Fr.) Quél. 1872	Ex-EPx	SPl	inedible	+	-	-	-
58.	*Mycena laevigata* Gillet 1876	EPx	Sl	inedible	+	-	-	-
59.	*Mycena pelianthina* (Fr.) Quél. 1872	Gs	St	poisonous	+	-	-	+
60.	*Mycena polygramma* (Bull.) Gray 1821	Gs-EPx	St	inedible	-	-	+	-
61.	*Mycena pura* (Pers.) P. Kumm.1871	Gs	St	poisonous	+	-	+	+
62.	*Mycena rosea* (Schumach.) Gramberg 1912	Gs	St	poisonous	+	-	+	-
63.	*Mycena vitilis* (Fr.) Quél. 1872	Gs	St	inedible	+	-	+	+
64.	*Mycena zephirus* (Fr.) P. Kumm. 1871	Gs	St	inedible	+	-	-	-
65.	*Panellus stipticus* (Bull.) P. Karst. 1879	EPx-Ex	SPl	inedible, m.	+	-	-	-
	Family Physalacriaceae							
66.	*Armillaria mellea* (Vahl) P. Kumm. 1871	Ex-EPx	SPl	food WC, m.	+	-	+	+
67.	*Flammulina velutipes* var. *velutipes* (Curtis) Singer 1951	Ex-EPx	SPl	edible, m.	-	-	+	-
68.	*Oudemansiella mucida* (Schrad.) Höhn. 1910	Ex-EPx	SPl	edible	+	-	-	+

69.	*Xerula pudens* (Pers.) Singer 1951	Ex-EPx	SPl	inedible	+	-	+	+
70.	*Xerula radicata* (Relhan) Dörfelt (1975)	Gp	P	edible, m.	+	-	-	-
	Family Pluteaceae							
71.	*Pluteus aurantiorugosus* (Trog) Sacc. 1896	Epx	Sl	edible	-	-	+	-
72.	*Pluteus cervinus* var. *cervinus* P. Kumm. (1871)	EPx	Sl	edible	+	-	+	-
73.	*Pluteus semibulbosus* (Lasch) Quél. 1875	EPx	Sl	inedible	+	-	-	-
	Family Pleurotaceae							
74.	*Pleurotus ostreatus* (Jacq.) P. Kumm. 1871	Ex-EPx	SPl	food, (m)	+	-	+	-
	Family Psathyrellaceae							
75.	*Coprinopsis atramentaria* (Bull.) Redhead, Vilgalys & Moncalvo 2001	Th	Sh	poisonous, m.	+	-	+	-
76.	*Coprinellus disseminatus* (Pers.) J.E. Lange 1938	Th	Sh	edible NO	+	-	-	-
77.	*Coprinellus micaceus* (Bull.) Vilgalys, Hopple & Jacq. Johnson 2001	Th	Sh	edible NO	+	-	-	-
78.	*Psathyrella fatua* (Fr.) P. Kumm. 1949	Gs	St	inedible	+	-	+	-
	Family Schizophyllaceae							
79.	*Schizophyllum commune* Fr. 1815	Ex-EPx	SPl	inedible, m.	+	+	+	+
	Family Strophariaceae							
80.	*Hypholoma fasciculare* (Huds.) P. Kumm. 1871	EPx	Sl	poisonous	+	-	+	+
81.	*Hypholoma capnoides* (Fr.) P. Kumm. 1871	Epx	Sl	edible				
82.	*Hypholoma sublateritium* (Schaeff.) Quél.	EPx	Sl	poisonous				
83.	*Leratiomyces squamosu*s var. *squamosus* (Pers.) Bridge & Spooner 2008	EPx	Sl	inedible	+	-	-	-
84.	*Pholiota gummosa* (Lasch) Singer 1951	Ex-EPx	SPl	edible NO	-	-	+	-
85.	*Pholiota tuberculosa* (Schaeff.) P. Kumm. 1871	Ex-EPx	SPl	inedible	-	-	+	-
86.	*Stropharia aeruginosa* (Curtis) Quél. 1872	Gs	St	poisonous	-	-	-	+
	Family Tricholomataceae							
87.	*Clitocybe candicans* (Pers.) P. Kumm. 1871	Gs	Sf	poisonous D	+	-	+	+
88.	*Clitocybe gibba* (Pers.) P. Kumm. 1871	Gs	Sf	edible	+	-	-	+
89.	*Clitocybe nebularis* (Batsch) P. Kumm. 1871	Gs	St	edible WC	+	-	-	-
90.	*Clitocybe phyllophila* (Pers.) P. Kumm. 1871	Gs	Sf	poisonous D	+	-	-	-
91.	*Clitocybe vibecina* (Fr.) Quél. 1872	Gs	St	inedible	+	-	-	-
92.	*Lepista flaccida* (Sowerby) Pat. 1887	Gs	St	edible	+	-	-	+
93.	*Megacollybia platyphylla* (Pers.) Kotl. & Pouzar 1972	EPx	Sl	edible WC	+	-	-	+
94.	*Melanoleuca melaleuca* (Pers.) Murrill 1911	Gs	St	edible	+	-	-	-
95.	*Resupinatus applicatus* (Batsch) Gray 1821	EPx	Sl	inedible	+	-	-	+
96.	*Tricholoma myomyces* (Pers.) J.E. Lange (1933)	Gm	M	food	+	-	-	-
97.	*Tricholomopsis rutilans* (Schaeff.) Singer	EPx	Sl	edible WC	+	-	+	+
	Incertae sedis							
98.	*Panaeolus papilionaceus* var. *papilionaceus* (Bull.) Quél. 1873	Th	St	poisonous	+	-	-	-
	Order Auriculariales							
	Family Auriculariaceae							
99.	*Auricularia auricula-judae* (Bull.) Quél.	Ex-EPx	SPl	edible, m.	+	+	-	-
100.	*Pseudohydnum gelatinosum* (Scop.) P. Karst. 1868	EPx	Sl	edible	-	-	+	+
	Genera incertae sedis							
101.	*Guepinia helvelloides* (DC.) Fr 1828	Gs	St	edible	-	+	-	-
	Order Boletales							
	Family Boletaceae							
102.	*Boletus calopus* Pers. 1801	Gm	M	inedible	+	-	+	-
103.	*Boletus chrysenteron* Bull. 1791	Gm	M	edible	+	-	+	+
104.	*Boletus edulis* Bull. 1782	Gm	M	food	+	-	-	-
105.	*Boletus erythropus* f. *erythropus* Pers. 1796	Gm	M	edible WC	+	-	+	-
106.	*Boletus luridus* var. *luridus* Schaeff. 1774	Gm	M	edible WC	+	-	-	-
107.	*Boletus pulverulentus* Opat. 1836	Gm	M	edible NO	+	-	-	-

108.	*Chalciporus piperatus* (Bull.) Bataille 1908	Gm	M	edible NO	-	-	-	+
109.	*Strobilomyces strobilaceus* (Scop.) Berk. 1851	Gm	M	edible NO	+	-	-	-
	Family Paxillaceae							
110.	*Paxillus involutus* (Batsch) Fr. 1838	Gm	M	poisonous	+	-	+	-
	Order Cantharellales							
	Family Cantharellaceae							
111.	*Pseudocraterellus undulatus* (Pers.) Rauschert 1987	Gm	M	inedible	-	-	-	+
	Family Clavulinaceae							
112.	*Clavulina cinerea* (Bull.) J. Schröt. 1888	Gs	St	edible	+	-	-	-
113.	*Clavulina coralloides* (L.) J. Schröt.	Gs	St	edible	+	-	-	-
	Order Corticiales							
	Family Corticiaceae							
114.	*Corticium roseum* Pers. 1794	Ex-EPx	SPl	inedible	+	-	-	-
	Order Gomphales							
	Family Gomphaceae							
115.	*Ramaria palmata* (Pers.) Donk 1933	*Gs*	St	inedible	+	-	-	-
	Order Hymenochaetales							
	Family Hymenochaetaceae							
116.	*Hyphodontia sambuci* (Pers.) J. Erikss.	EPx	Sl	inedible	+	-	-	-
117.	*Phellinus hartigii* (Allesch. & Schnabl) Pat. 1903	Ex-EPx	SPl	medicinal	+	-	+	-
	Family Schizoporaceae							
118.	*Hyphodontia barba-jovis* (Bull.) J. Erikss. 1958	EPx	Sl	inedible	+	-	-	-
	Order Phallales							
	Family Phallaceae							
119.	*Mutinus caninus* (Huds.) Fr. 1849	Gs	St	inedible	-	-	-	+
120.	*Phallus impudicus* var. *impudicus* L. 1753	*Ex-Gs*	St	edible NO, m.	+	-	-	+
	Order Polyporales							
	Family Ganodermataceae							
121.	*Ganoderma applanatum* (Pers.) Pat. 1887	Ex-EPx	SPl	inedible, m.	+	-	+	+
122.	*Ganoderma adspersum* (Schulzer) Donk 1969	Ex-EPx	SPl	inedible	-	-	+	-
	Family Fomitopsidaceae							
123.	*Fibroporia vaillantii* (DC.) Parmasto 1968	EPx	Sl	inedible	+	-	-	-
124.	*Fomitopsis pinicola* (Sw.) P. Karst. 1881	Ex-EPx	SPl	inedible, m.	+	-	+	+
125.	*Fomitopsis rosea* (Alb. & Schwein.) P. Karst. 1881	Ex-EPx	SPl	inedible, m.	+	-	-	-
126.	*Postia caesia* (Schrad.) P. Karst. 1881	EPx	Sl	inedible	+	-	-	-
	Family Meruliaceae							
127.	*Steccherinum ochraceum* (Pers.) Gray 1821	EPx	Sl	inedible				
128.	*Bjerkandera adusta* (Willd.) P. Karst.	EPx	Sl	inedible, m.	+	-	-	-
	Family Phanerochaetaceae							
129.	*Climacodon pulcherrimus* (Berk. & M.A. Curtis) Nikol. 1961	EPx	Sl	inedible	+	-	-	-
	Family Polyporaceae							
130.	*Datronia mollis* (Sommerf.) Donk 1966	EPx	Sl	inedible	+	-	-	-
131.	*Fomes fomentarius* (L.) J. Kickx f. 1867	Ex-EPx	SPl	inedible, m.	+	-	+	-
132.	*Polyporus varius* (Pers.) Fr. 1821	Ex-EPx	SPl	nedible, m.	+	-	-	+
133.	*Tyromyces lacteus* (Fr.) Murrill 1907	EPx	Sl	inedible, m.	+	-	+	-
134	*Trametes gibbosa* (Pers.) Fr. 1838	EPx	Sl	nedible, m.	+	+	-	-
135.	*Trametes hirsuta* (Wulfen) Pilá 1924	EPx	Sl	inedible, m.	+	+	+	+
136.	*Trametes ochracea* (Pers.) Gilb. & Ryvarden 1987	EPx	Sl	inedible	+	-	-	-
137.	*Trametes versicolor* (L.) Lloyd 1921	EPx	Sl	inedible, m	+	+	+	+
138.	*Trametopsis cervina* (Schwein.) Tomšovský 2008	EPx	Sl	inedible	+	-	-	-
139.	*Trichaptum abietinum* (Dicks.) Ryvarden 1972	EPx	Sl	inedible, m.	+	-	-	+
140.	*Trichaptum biforme* (Fr.) Ryvarden 1972	Ex- EPx	SPl	inedible, m.	-	+	-	-
	Order Russulales							
	Family Bondarzewiaceae							
141.	*Heterobasidion annosum* (Fr.) Bref 1888	Ex-EPx	SPl	inedible, m.	+	-	+	+

	Family Peniophoraceae							
142.	*Peniophora quercina* (Pers.) Cooke (1879)	EPx	Sl	inedible	+	-	-	-
	Family Russulaceae							
143.	*Lactarius blennius* (Fr.) Fr. 1838	Gm	M	poisonous	+	+	-	+
144.	*Lactarius circellatus* Fr. 1838	Gm	M	inedible	+	+	-	-
145.	*Lactarius deliciosus* (L.) Gray 1821	Gm	M	food	+	-	-	-
146.	*Lactarius pallidus* Pers. 1797	Gm	M	edible NO	-	-	+	-
147.	*Lactarius piperatus* (L.) Pers. 1797	Gm	M	edible WC	+	-	+	-
148.	*Lactarius salmonicolor* R. Heim & Leclair 1953	Gm	M	edible	-	-	+	-
149.	*Lactarius subdulcis* (Pers.) Gray 1821	Gm	M	edible	-	-	-	+
150.	*Lactarius vellereus* (Fr.) Fr. 1838	Gm	M	edible NO	+	-	-	-
151.	*Russula aeruginea* Fr. 1863	Gm	M	edible WC	+	-	-	-
152.	*Russula alutacea* (Fr.) Fr. 1838	Gm	M	edible	+	-	+	-
153.	*Russula brunneoviolacea* Crawshay 1930	Gm	M	edible	-	-	+	-
154.	*Russula chloroides* (Krombh.) Bres.	Gm	M	edible	+	-	-	-
155.	*Russula cyanoxantha* (Schaeff.) Fr	Gm	M	food	+	-	+	-
156.	*Russula delica* Fr. 1838	Gm	M	food	+	-	+	-
157.	*Russula farinipes* Romell 1893	Gm	M	inedible	+	-	-	-
158.	*Russula fellea* (Fr.) Fr. 1838	Gm	M	inedible	+	-	-	-
159.	*Russula firmula* Jul. Schäff. 1940	Gm	M	inedible	+	-	-	-
160.	*Russula foetens* (Pers.) Pers.	Gm	M	inedible	+	-	+	-
161.	*Russula grisea* (Batsch) Fr. 1838	Gm	M	edible	+	-	-	-
162.	*Russula heterophylla* (Fr.) Fr. 1838	Gm	M	food	+	+	-	-
163.	*Russula integra* (L.) Fr. 1838	Gm	M	edible WC	+	-	-	-
164.	*Russula ochroleuca* (Pers.) Fr. 1838	Gm	M	edible	+	-	-	-
165.	*Russula olivacea* (Schaeff.) Fr. 1838	Gm	M	edible	+	-	+	-
166.	*Russula laurocerasi* var. *laurocerasi* Melzer 1920	Gm	M	inedible	+	-	+	-
167.	*Russula lutea* (Vent.) Sacc. 1887	Gm	M	edible	+		+	+
168.	*Russula nauseosa* (Pers.) Fr. 1838	Gm	M	inedible	+	-	-	-
169.	*Russula nigricans* (Bull.) Fr. 1838	Gm	M	inedible	-	-	+	-
170.	*Russula nitida* (Pers.) Fr. 1838	Gm	M	edible	+	-	-	-
171.	*Russula nobilis* Velen. 1920	Gm	M	poisonous	+	-	+	-
172.	*Russula pectinatoides* Peck 1907	Gm	M	inedible	+	-	-	-
173.	*Russula puellaris* Fr. 1838	Gm	M	edible	+	-	-	-
174.	*Russula risigallina* (Batsch) Sacc. 1915	Gm	M	edible	+	-	-	-
175.	*Russula turci* Bres. 1881	Gm	M	edible	+	-	-	-
176.	*Russula vesca* Fr. 1836	Gm	M	edible	+	-	-	-
177.	*Russula violeipes* Quél. 1898	Gm	M	edible	+	-	-	-
178	*Russula vinosa* Lindblad 1901	Gm	M	edible	+	-	-	-
179.	*Russula virescens* (Schaeff.) Fr. 1836	Gm	M	food, m.	+	-	-	-
180.	*Russula versicolor* Jul. Schäff. 1931	Gm	M	inedible	+	-	-	-
181.	*Russula xerampelina* (Schaeff.) Fr. 1838	Gm	M	edible	+	-	-	-
	Family Stereaceae							
182.	*Stereum hirsutum* (Willd.) Pers 1800	Ex-EPx	SPl	inedible, m.	+	+	+	+
183.	*Stereum ostrea* (Blume & T. Nees) Fr. 1838	EPx	Sl	inedible	+	-	-	-
	Order Thelephorales							
	Family Bankeraceae							
184.	*Phellodon tomentosus* (L.) Banker 1906	Gs	St	inedible	-	-	+	-
	Class Dacrymycetes							
	Order Dacrymycetales							
	Family Dacrymycetaceae							
185.	*Calocera viscosa* (Pers.) Fr. 1821	EPx	Sl	inedible, m.	+	-	-	-
Total numbers of species - 205					**172**	**19**	**73**	**68**

Legend:			
Biological forms	**Species number**	**Ecological category**	**Species number**
Gm – mycetogeophyta mycorrhiza	63	M – mycorrhizal fungi	63
Gs – mycetogeophyta saprophytica	54	Sf – saprophytic fungi on litter	14
Th – mycetotherophyta	5	St – saprophytic fungi on soil or humus	49
EPx – mycetoepixilophyta	52	Sl – saprophytic fungi on dead wood	53
Ex-EPx – mycetoedoxilophyta – mycetoepixilophyta	24	SPl – saproparasitic fungi on wood	24
EPx-Gs – mycetoepixilophyta – mycetogeophyta saprophytica	4	P – parasitic fungi	2
Ex-Gs – mycetoedoxilophyta- mycetogeophyta saprophytica	1		
Gp – mycetogeophyta parasitica	2		
Categories of wild useful fungi			
Food - eatable with great nutritional value	12	**Poisonous D** - deadly	3
food WC - food with caution or conditions; it might cause upsets in some, or it must be cooked first, or it should only be eaten when young.	3	**Poisonous** - do not eat; mushrooms which cause intoxications	21
edible - eatable	44	**Medicinal (m.)** - used as medicine or with medicinal properties	35
Edible WC- edible with caution or conditions; it might cause upsets in some, or it must be cooked first, or it should only be eaten when young.	14	**Inedible -** do not eat	92
		Edible NO - edible but not recommended; inedible	11
Foray locations and date of observations: **1. Bourului forest (PB):** 21.07.2009, 3.08.2009, 16.9.2009, 12.08.2010, 2.09.2010, 23.09.2010; **2. Coconaşi forest (PC):** 3.08.2009, 16.9.2009, 23.09.2010; **3. Ursoaia Mică forest (PUm):** 23.09.2010; **4. Pralea-Ursoaia Mare forest:** 21.07.2009, 3.08.2009, 16.9.2009, 12.08.2010, 2.09.2010, 23.09.2010.			

From the economic importance point of view the most numeros are the inedible species – 103 (44 %), followed by the edible species – 73 (31 %), medicinal mushrooms - 35 species (15 %) and poisonous species – 24 (10 %) (tab. 1, fig. 4).

From the edible mushrooms, 15 species have very high food value and 58 species have a medium food value or a low food value.

Interesting the finding of rare species such as *Strobilomyces strobilaceus* (Scop.) Berk., *Phaeolepiota aurea* (Matt.) Maire, *Pluteus aurantiorugosus* (Trog) Sacc. and *Mutinus caninus* (Huds.) Fr.

Table 2 – The numerical and percentages distribution of macromycetes

No.	Phylum /Order	Species number	%
	Ascomycota		
1.	Helotiales	6	3
2.	Hypocreales	1	0,5
3.	Pezizales	3	1,5
4.	Xylariales	10	5
	Basidiomycota		
1.	Agaricales	98	48
2.	Auriculariales	3	1,5
3.	Boletales	9	4
4.	Cantharellales	3	1,5
5.	Corticiales	1	0,5
6.	Dacrymycetales	1	0,5
7.	Gomphales	1	0,5
8.	Hymenochaetales	3	1,5
9.	Phallales	2	1
10.	Polyporales	20	10
11.	Russulales	43	21
12.	Thelephorales	1	0,5

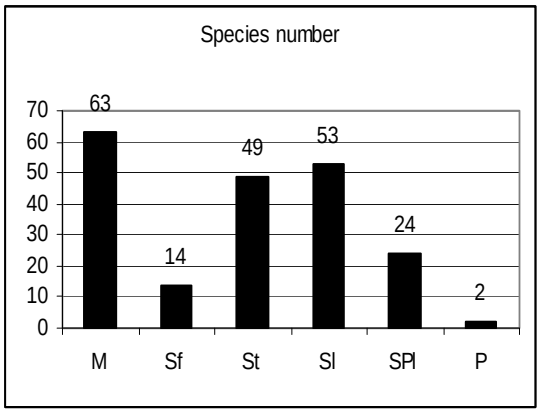

Fig. 3 - The spectrum of ecological category

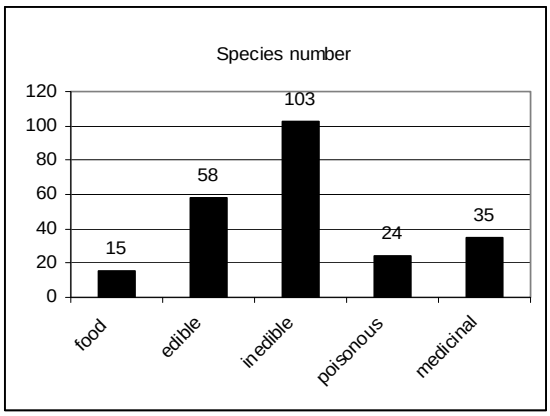

Fig. 4 - The spectrum of Categories of wild useful fungi

Conclusions

The mycological research was conducted in the superior basin of the Pralea brook during June 2009 – September 2010.

The paper includes the systematical conspect of macromycetes and it represents the first contribution to the knowledge of macromycetes diversity in this region.

A number of 205 mushroom species collected from the study area, 17 of them belonged to Ascomycota and 185 to Basidiomycota.

The macromycetes species belong to 8 biological forms and 6 ecological categories.

Rezumat

Studiul cuprinde rezultatele cercetărilor micologice desfăşurate în bazinul superior al pârâului Pralea, în perioada iunie 2009-septembrie 2010 şi reprezintă o prima contribuţie la cunoaşterea diversităţii macromicetelor din această regiune.

Conspectul sistematic al macromicetelor identificate cuprinde 205 de specii care aparţin la: 2 încrengături (Ascomycota – 20 specii, Basidiomycota - 185 specii), 5 clase, 16 ordine, 43 de familii şi 101 genuri.

Macromicetele aparţin la 8 forme biologice, iar spectrul este dominat de mycetogeophyta mycorrhiza (M) – 63 specii.

Din analiza categoriilor ecologice, se constată că speciile saprofite sunt cele mai numeroase, urmate de macromicetele micorizante.

Din punct de vedere al importanţei economice, ciupercile necomestibile sunt cele mai numeroase 103-specii (44%), urmate de cele comestibile -73 specii (31%), 35 specii medicinale (15 %) şi toxice – 24 specii (10 %).

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COMPLEXUL MUZEAL DE ŞTIINŢELE NATURII „ION BORCEA" BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 24 – 26

BIOMASS STUDY OF TWO EDIBLE MACROMYCETES SPECIES

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ABSTRACT

The researches presents aspects over the study of biomass for *Cantharellus cibarius* var. *cibarius* species and the *Boletus* genus, two species of edible macromycetes, study in 1999, 2000 and 2003. The appearence and the development of the sporifere bodies on *Cantharellus cibarius* species and *Boletus* genus are influenced of climatic elements, type of vegetation and relief.

Key words – biomass, macromycetes, *Cantharellus cibarius* var. *cibarius, Boletus*

Introduction

Biomass study for *Cantharellus* specie and the *Boletus* genus edible macromycetes was realized over three years, in the period when the sporifers body became mature. This study was performed in Nemira mountains, Bacau County, in different type of forests.

Material and method

The main methods used for in the study of biomass:

a) Gravimetric determination of specimen's biomass can be done directly, because the size of the macromycetes do not prevent their weighing and drying. The weighing has to be done immediately to determine the wet weight, or after drying it into the oven until the weight gets constant, to determine dry weight. The process of drying is made at temperatures up to 80 degrees Celcius, so as not to burn organic substance. If the wet weight and the dry weight are determined the water content of macromycetes species can be also determined by the equation:

Qa = Gum – Gus (Qa- water content, Gum – Wet weight, Gus – Dry weight)

b) Gravimetric determination of the population's biomass is achived by determing the mass of a sample containining sufficient specimens. If the whole number of population is known, multiply the average weight of one specimen by the total number of specimens, and the result will represent the total weight of the population

Average weight x Total number of specimens = The total weight of the population

Dry mass of the population in a area unit is calculated by multiplying the average weight of a specimen by the density index, meaning the number of specimens per unit of area.

Average weight x Total number of specimens = Weight of dry population/unit area

Results and discussions

Studies on the determination of biomass production were done in 1999, 2000 and 2003 on *Cantharellus cibarius* var. *cibarius* species and the *Boletus* genus.

On the field, there were chosen samples in a research area of 500 m², choosing compact areas where was posible to find enought number of species to determine the biomass production by applying the gravimetric method of determining population (in this case the Boletus Genus and the Cantharellus cibarius var. Cibarius species)

In 1999 there were studies on 5 samples which permit us to colected Cantharellus cibarius and Boletus species, resulting the following:

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Samples	1	2	3	4	5
Average weight Boletus	13,7g	12,5g	29,8g	24,8g	25,5g
Number of specimens	33	31	26	34	30

Dry weight of the Boletus genus species per unit area in 1999 is as follows:

Sample1 / 13,7 x 33 = 452,1g su/500m²
Sample2 / 12,5 x 31 = 387,5 g su/500m²
Sample3 / 28,8 x 26 = 748,8 g su/500m²
Sample4 / 24,8 x 34 = 843,2 g su/500m²
Sample5 / 25,5 x 30 = 765 g su/500m²

From the data obtained from field and from Dofteana Forestry and Targu Ocna Forestry results that in 1999 the productivity of Boletus genus species was 752 000 kg, taking into account ecological factors that can influence the biomass.

Of the 752 000 kg of Boletus wet weight after applying the processes prezented above have resulted 676 800 kg of dry mass.

The loss of water in the 752000 kg of Boletus was determined by the formula:

Qa = Gum – Gus
Qa = 75 200Kg Boletus

Dry weight of *Cantharellus cibarius* var. *cibarius* species per unit area is as follows:

Sample1 /5,5 x 25 = 137,5 g su/500m²
Sample2 /4,9 x 27= 132,3 g su/500m²
Sample3 /4,7 x 34=159,8 g su/500m²
Sample4 /6,6 x 31= 204,6 g su/500m²
Sample5 /6,8 x 37=251,6 g su/500m²

Samples	1	2	3	4	5
Average Weight Cantharellus	5,5	4,9	4,7	6,6	6,8
Number of specimens	25	27	34	31	37

Of the 326 000 kg of *Cantharellus cibarius* var. *cibarius* wet weight, after applying the processes presented above have resulted 250070 kg of dry mass.

The loss of water in the 326000 kg of *Cantharellus cibarius* was determined by the formula:

Qa = Gum – Gus
Qa = 75 930Kg

We made the calculation of dry mass for each sample in part because in most cases they are working with this values and under this form, so the mushrooms are conserved (canned) and that transported for trade.

In 2000 we choosed an area with 5 samples which permited us to collect species of Boletus genus and Cantharellus.

Samples	1	2	3	4	5
Average weight Boletus	17,5g	12,5g	24g	14,8g	16,2g
Number of specimens	39	43	26	32	35

Dry weight of the Boletus genus species per unit area is the following:

Sample1 / 17,5x 39 = 682,5g su/500m²
Sample2 / 12,5x 43= 537,5 g su/500m²
Sample3 / 21x 26= 546 g su/500m²
Sample4 / 14,8x 32= 473,6 g su/500m²
Sample5 / 16,2x 35= 567 g su/500m²

From the data obtained from field and from Dofteana Forestry and Targu Ocna Forestry results that in 2000 the productivity of Boletus genus species was 444 000 kg, taking into account ecological factors that can influence the biomass.

Of the 444 000 kg of Boletus wet weight after applying the processes prezented above have resulted 399 600 kg of dry mass.

The loss of water in the 444000 kg of Boletus was determined by the formula:

Qa = Gum – Gus
Qa = 444 800 Kg Boletus

Dry weight of *Cantharellus cibarius* var. *cibarius* species per unit area is as follows:

Sample 1 /3,5 x 29 = 101,5g su/500m²
Sample 2 /4,2 x 28 = 117,6 g su/500m²
Sample 3 /3,7 x 37 = 136,9 g su/500m²
Sample 4 /4,6 x 35 = 161 g su/500m²
Sample 5 /4,5 x 30 = 135 g su/500m²

Samples	1	2	3	4	5
Average weight Cantharellus	3,5	4,2	3,7	4,6	4,5
Number of specimens	29	28	37	35	30

Of the 156 000 kg of *Cantharellus cibarius* var. *cibarius* wet weight, after applying the processes presented above have resulted 120000 kg of dry mass.

The loss of water in the 156000 kg of *Cantharellus cibarius* was determined by the formula:

Qa = Gum – Gus

Qa = 36 000Kg

In 2003 there were studies made on 5 samples that revealed the following:

Samples	1	2	3	4	5
Average Weight Boletus	21,5g	13,9g	28g	12,8g	15,5g
Number of specimens	30	50	22	32	31

For the year 2003 the dry weight of the Boletus genus species per unit area was the following:

Sample1 / 21,5 x 30 = 645g su/500m²

Sample2 / 13,9 x 50 = 695 g su/500m²

Sample3 / 28 x 22 = 616 g su/500m²

Sample4 / 12,8 x 32 = 409,6 g su/500m²

Sample5 / 15,5 x 31 = 408,5 g su/500m²

Of the 468000 kg of Boletus wet weight after applying the processes presented above have resulted 421 200 kg of dry mass.

The loss of water in the 468 000 kg of Boletus was determined by the formula:

Qa = Gum – Gus

Qa = 468000 Kg Boletus

Dry weight of *Cantharellus cibarius* var. *cibarius* species per unit area is as follows:

Sample1 /3,7 x 33 = 122,1 g su/500m²

Sample2 /4,7 x 30 = 141 g su/500m²

Sample3 /6,2 x 30 = 186 g su/500m²

Sample4 / 3,5x 37 = 129,5 g su/500m²

Sample5 /4,8 x 32 = 153,6 g su/500m²

Samples	1	2	3	4	5
Average weight Cantharellus	3,7	4,7	6,2	3,5	4,8
Number of specimens	33	30	30	37	32

Of the 162 000 kg of *Cantharellus cibarius* var. *cibarius* wet weight, after applying the processes presented above have resulted 124 600 kg of dry mass.

The loss of water in the 162 000 kg of *Cantharellus cibarius* was determined by the formula:

Qa = Gum – Gus

Qa = 37 400 Kg

Conclusions

Based on the evaluation studies in the field, and on the production potential of macromycetes depending on the type of hábitat, it can be determined the amount of resorce available.

Estimated average productivity is correlate with potential hábitat areas of the administrative territorial units.

Rezumat

Cercetările prezintă aspecte privind studiul biomasei la specia *Cantharellus cibarius* şi genul *Boletus*, 2 specii de macromicete comestibile, studiu realizat în anii 1999, 2000 şi 2003. Apariţia şi dezvoltarea corpurilor sporifere la specia *Cantharellus cibarius* şi genul *Boletus* sunt influenţate de elementele climatice, tipul de vegetaţie şi relief.

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COMPLEXUL MUZEAL DE ŞTIINȚELE NATURII „ION BORCEA" BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 27 – 29

FLORISTIC DIVERSITY OF CORMOPHYTAE IN BERZUNȚI MOUNTAINS, BACĂU COUNTY

ARDEI IRINA-MĂDĂLINA*

ABSTRACT

This study presents the research done in the territory of Berzunți Mountains which are situated in the central area of Bacău County. The conspectus of cormoflora in the researched area during 2007-2010 comprises 825 taxa (618 species, 197 subspecies, 9 varieties and 1 form) which belong to 403 genera, 99 botanical families included in 58 orders, 6 classes and 2 fila. Besides, the paper presents: an analysis of bioforms, floristic elements and ecological indexes of Cormophytae and a short analysis of species included in the "Red List" of superior plants in Romania.

Keywords: Berzunți Mountains, diversity, cormoflora

Introduction

The Berzunți Mountains are completely situated in the territory of Bacău County, between 46º 28' 04'' şi 46º 16' 10'' northern latitude and 26º 27' 59'' şi 26º 38' 41'' eastern longitude. They have the following borders: Tarcău Mountains to the north, Dărmăneşti Depression to the west, Tazlău Subcarpathians to the east and south. The territory studied lies on a 140 km^2 surface of which 50% approximately is covered with forest vegetation, 20% with pastures and 5% with hayfields, the rest with agricultural fields, urban areas, access roads.

Material and methods

The determination of taxa collected between May 2007 and August 2010 in 31 collecting points was made by using several specialty books, such as: Săvulescu T., 1952-1976 - *Flora R.P.R.- R.S.R.* (vol. I-XIII) (9); Ciocârlan V., 2000 - *Flora ilustrată a României - Pteridophyta şi Spermatophyta* (2); Sârbu I., 2001 - *Flora ilustrată a plantelor vasculare din estul României* (8). For the conspectus of vascular flora we used the nomenclature in the above mentioned studies.The families in the flora conspectus are mentioned in a systematical order, the genera of each family are alphabetically mentioned, also the species included the genera.

Results and discussions

After reading the specialty literature (1, 4, 5, 7) and research in the field we made the conspectus of cormoflora in the area, which comprises 825 taxa (618 species, 197 subspecies, 9 varieties and 1 form) belonging to 403 genera, 99 botanical families included in 58 orders, 6 classes and 2 fila). Compared to the flora of the entire Bacău County which includes 1832 taxa, the vascular flora in Berzunți Mountains constitutes 45,03%.

The numerical distribution of cormoflora in fila, subfila and classes is dominated by Spermatophyta filum, Magnoliophytina subfilum with 806 taxa (96,96%) in which Magnoliopsida has 80,12% with 661 taxa, being followed by Liliopsida class with 16,84% (139 taxa). The Pteridophyta filum has only 2,30% of the identified taxa. Among the 99 families well represented (over 40 taxa) we mention the following families: Asteraceae, Poaceae, Fabaceae, Lamiaceae, Brassicaceae which have 292 taxa, representing 35,37% of the total taxa number.

The analysis of ecological bioforms

The spectrum of bioforms shows as dominant the **hemicryptophyte** (H) species with 44,28% representing almost half of the total identified taxa. Far from the first category are situated the **terophyte** species, either annual (Th) or biannual (TH) having 29,79% with 245 taxa. **Geophytes** (G) are represented by 91 taxa (11,07%). The participation of **phanerophytes** (M, M, N) to the spectrum of bioforms is quite low: 74 taxa (8,99%) (Fig.1)

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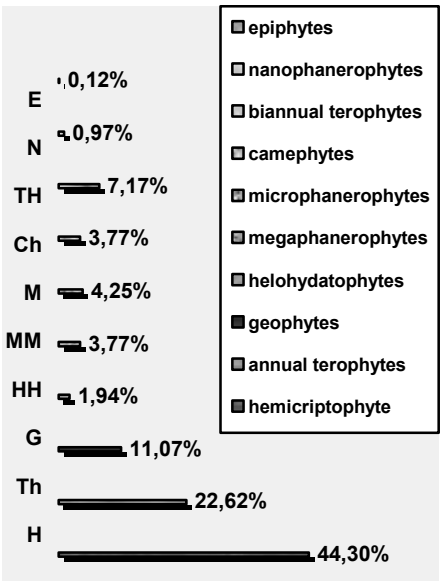

Figure 1 – Percent distribution of taxa in bioform categories

The analysis of floristic elements

Among geoelements a substantial weight belongs to the *Eurasian floristic element* (Eua) with 349 taxa (42,92%) followed by European elements (Eur) represented by 132 taxa (16,23%). Regarding floristic elements, the Berzunți Mountains area belongs to Eurasian domain, its flora having a European character, a fact proven by the numerical dominance of the mentioned elements (Fig. 2).

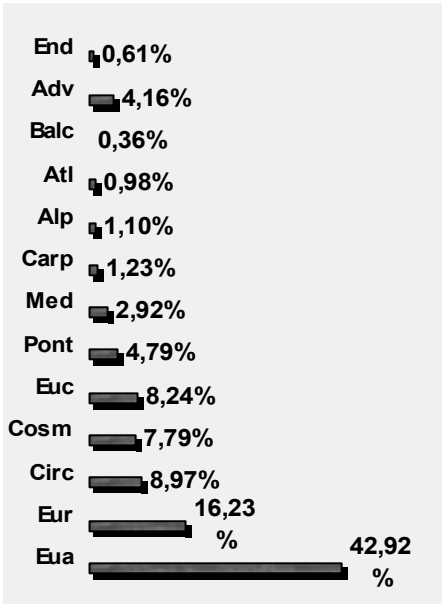

Figure 2 - Percent distribution of phytogeographical elements

The analysis of ecological indexes

Regarding the *ecological indexes* we notice the predominance of light biased plants with little tolerance for shade (L7 – 32,04%), amphitolerant (Tx – 26,72%) and of submontan temperate climate plants (T5) spread across the entire Central Europe (C3 – 30,06% and C4 – 18,99%), which prefer moderately wet soils (U5 – 21,73%), amphitolerant to the soil reaction (Rx – 29,48%) and unaffected by nitrogen concentration in soil (Nx – 17,50%) (Fig. 3)**.**

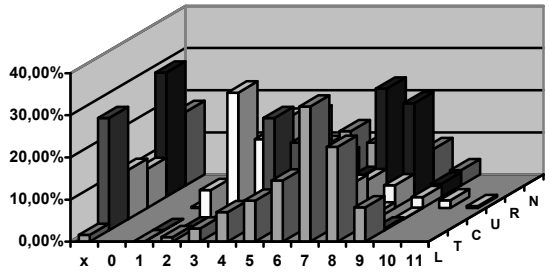

Figure 3 - Allocation of ecological category according to L,T,C,U,R and N indexes

The analysis of taxa in the „Red List"

After reading the books M. Oltean et al., 1994, *Lista Roşie a Plantelor Superioare din România* (6) şi Dihoru Gh., Dihoru Alexandrina, 1994, *Plante rare, periclitate şi endemice în flora României – Lista Roşie* (3), we noticed that of the 825 taxa in the conspectus either mentioned in the studied bibliography or seen in the field only 3,39 % are included in the Red List. The 28 taxa are distributed as follows (Table 1).

Conclusions

- The conspectus of cormoflora in the researched area comprises 825 taxa (618 species, 197 subspecies, 9 varieties and 1 form) which belong to 403 genera, 99 botanical families included in 58 orders, 6 classes and 2 fila).

- The numerical distribution of cormoflora in fila, subfila and classes is dominated by Spermatophyta filum, Magnoliophytina subfilum with 806 taxa (96,96%) in which Magnoliopsida class has a 80,12% weight with 661 taxa, being followed by Liliopsida class with 16,84% (139 taxa). The Pteridophyta filum has only 2,30% of the total identified taxa.

- Of the 99 best represented families (over 40 taxa) we mention the following families: Asteraceae, Poaceae, Fabaceae, Lamiaceae, Brassicaceae which have 292 taxa representing 35,37% of the total number of taxa;

- The bioform spectrum shows as dominant the hemicryptohyte species with 44,28%, representing almost half of the total identified taxa; this great number suggests an uniform presence of the vegetal cover;

- Of the geoelements a substantial weight belongs to the *Eurasian floristic element* (Eua) with 349 taxa (42,92%) followed by the *European elements* (Eur) represented by 132 taxa (16,32%). Regarding the floristic elements, Berzunți Mountains area belongs to the *Eurasian domain*, its flora having an *European character*, a fact proven by the numerical dominance of the mentioned elements;

- Regarding the *ecological indexes*, we notice the dominance of the light biased plants with little tolerance for shade (L7 – 32,04%), amphitolerant (Tx – 26,72%) or of submontan temperate climate plants (T5) spread in the entire Central Europe (C3 – 30,06% and C4 – 18,99%), which prefer moderately wet soils (U5 – 21,73%), amphitolerant to the soil reaction (Rx – 29,48%) and unaffected by nitrogen concentration in soil (Nx – 17,50%)**.**

- From the analysis of taxa included in „Red Lists" of superior plants we underlined a number of 28 taxa in different degrees of periclitation.

Rezumat

Lucrarea prezintă cercetările realizate in Munții Berzunți, munți situați în zona centrală a județului Bacău.

Conspectul cormoflorei din zona cercetată în perioada 2007-2010 cuprinde 825 taxoni (618 specii, 197 subspecii, 9 varietăți şi 1 forma) ce aparțin la 403 genuri, 99 familii botanice incluse în 58 ordine, 6 clase şi 2 increngături.

Lucrarea mai prezintă o analiză a bioformelor, elementelor floristice şi indicii ecologici la cormophytae şi o scurtă analiză a speciilor prezente în "Lista Roşie" a plantelor superioare din România.

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Table 1 – The analysis of special regime taxa in Berzunți Mountains area

Taxa unincluded in „Red List"	797	96,48%	Special regime species
Taxa included in „Red List"	28	3,51%	
R (rare)	17	2,06%	*1.Cephalanthera rubra* L. (L.C.M. Richard) *2.Galium pumilum* Murray, *3.Gymnadenia conopsea* (L.) R. Br.*, 4.Listera ovata* (L.) R. Br.*, 5. Neottia nidus –avis* L. (L. C. M.)*,6,. Orchis morio* L. ssp. *morio 7. Pinus syivestris* L.*, 8.Platanthera bifolia* L. (L. C. M.) Richard*, 9.Potamogeton trichoides* Cham. et Schlecht.,10. *Dactylorhiza maculata* (L.) Soó, 11. *Gladiolus imbricatus* L. 12.*Dianthus superbus* L., 13.*Galium rotundifolium* L., 14.*Monotropa hypopitys* L., 15.*Orchis coryophora* ssp. *coryophora* (Pollini) K. Richter, 16.*Orchis laxiflora* Lam. ssp. *elegans* (Heuffel) Soó; 17. *Epipactis helleborine* (L.) Crantz;
nt (unthreatened)	4	0,48%	*18. Cephalanthera damasonium* (Miller) Druce*, 19.Cephalanthera longifolia* (L.) Fritsch.*, 20.Galanthus nivalis* L., 21.*Hepatica transilvanica* Fuss
bR (rare subendemic)	3	0,36%	*22.Gentiana cruciata* L. ssp. *phlogifolia, 23.Melampyrum saxosum* Baumg
V/R (vulnerable / rare)	1	0,12%	*24.Taxus baccata* L.
K (insufficiently known status)	1	0,12%	*25.Galium sylvaticum* L.
BE (European areal almost extinct)	1	0,12%	*26.Abies alba* Miller
Ant (endemically unthreatened in Romania)	1	0,12%	*27.Hepatica transsilvanica* Foss
E (danger of extinction)	1	0,12%	*28.Symphytum cordatum* Waldst. et Kit

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COMPARATIVE STUDY OF THE GLUCOSE AMOUNT IN CONVENTIONAL AND *IN VITRO* CULTURES OF *STACHYS SIEBOLDII* MIQ.

MAFTEI DANIEL – IOAN[1], MIHAI COSMIN TEODOR [2], MAFTEI DIANA-ELENA[3]

ABSTRACT

One of our aims was to evince the influence of the medium of culture on the glucose content from the vitroplants of *Stachys sieboldii* Miq. compared to the mature plants grown in conventional cultures. For this purpose, we used 6 variants of nutritive medium supplemented with different amounts of growth regulators. These variants of nutritive medium served for the *in vitro* growth of the vitroplants. The MS hormone free medium was the control. We also tested the plants in conventional cultures in order to compare the results.

Key words: *Stachys sieboldii* Miq., glucosis content

Introduction

Stachys sieboldii Miq. sin. *S. affinis* Bunge (1833) is a species of the spontaneous flora from northern China known as the Chinese artichoke. This is a medicinal and also edible plant that is beneficial to humans due to its properties: antibacterial, antipyretic, antiseptic, antispastic, astringent, carminative, febrifuge, stomachical, hypotensive, tonic, vermifuge. [BRUNETON J., 1995]

Our research was aimed to reveal the influence of the culture medium on the glucose amount in several shoots of *Stachys sieboldii* Miq. provided *in vitro*, compared to the plants harvested from conventional cultures.

Material and method

The biological material used in our biochemical research is represented by vitroplants provided on varied culture media supplemented with certain amounts of growth regulators, grown in climatised chambers in the Laboratory of Genetics and Biotechnology of the University „Vasile Alecsandri" of Bacău. The mature plants from conventional cultures were harvested from an experimental plot situated in the Racova commune (Bacău county).

The medium variants used in our preliminary experiments of *in vitro* cultures' initiation at *Stachys sieboldii* Miq. were Murashige-Skoog (1962) (hormone free) [MURASHIGE T., 1974; 1977] and several variants of MS enriched with various combinations and concentrations of growth regulators.

Table 1 - Medium variants for *in vitro* cultures' initiation of *Stachys sieboldii* Miq.

Species	Medium variant	Basal medium	Amounts of growth regulators from the variants of culture medium (mg/l)						
			IAA	NAA	BAP	KIN	2.4-D	Zea	GA_3
Stachys sieboldii Miq.	MS	MS	-	-	-	-	-	-	
	BG_1	MS	-	-	1.0	-	-		0,5
	BA_1	MS	0.5	-	1.0	-	-	-	
	BN_1	MS	-	1,0	1.0	-	-	-	-
	A_2	MS	2,0	-	-	-	-	A_2	MS
	KN_1	MS	-	0.5	-	1.0	-	-	

IAA=indole-acetic acid; NAA=naftil-acetic acid; 2.4-D=2.4-dichlorophenoxyacetic acid; BAP=benzylaminopurine; KIN=kinetin; Zea=zeatin, GA3= gibberellic acid.

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Method

The hexoses combined with mineral acids at higher temperatures generate the hydroxymethylfurfurol, that interacts with the aromatic amines and provides intensely colored compounds. In the presence of ortho-toluidine and within an acetic acid medium, the glucose provides (at higher temperatures) a chemical compound colored in green, photometrable at 630 nm [ARTENIE &TĂNASE, 1981; ARTENIE et al., 2008].

Reagents:
Trichloroacetic acid 20%
Trichloroacetic acid 5%
Solution of ortho-toluidine
Standard solution of glucose.

Table 2-Research protocol

Research protocol:				
No.		Sample (ml)	Standard (ml)	Blank (ml)
1.	Extract	0.2	–	–
2.	Water	1.5	1.5	–
3.	Standard	–	0.2	–
4.	ATC 20%	0.5	0.5	–
All the substances are stirred, and 5 minutes afterwards are centrifuged at 3.000 rpm for 30 minutes.				
The following solutions are dropped inside several thermoresistant test tubes:				
Samples of supernatant liquid		0.5	–	–
Standard supernatant liquid		–	0.5	–
ATC 5%		–	–	1
Ortho-toluidine		2.5	2.5	2
The solutions are stirred and maintained on water vapors at boiling temperature for 8 minutes. They are cooled immediately in water stream. The sample (of 1 cm^3) are read at 630 nm.				
Calculations: E_P/E_S x 100				

Results and discussions

One of our aims was to evince the influence of the medium of culture on the glucose content from the vitroplants of *Stachys sieboldii* Miq. compared to the mature plants grown in conventional cultures. For this purpose, we used 6 variants of nutritive medium supplemented with different amounts of growth regulators. These variants of nutritive medium served for the *in vitro* growth of the vitroplants. The MS hormone free medium was the control. We also tested the plants in conventional cultures in order to compare the results.

The obtained values were displayed in the following table and graph.

Table 3 - The amount of glucose (mg/ 100 g of vegetal tissue) in the plants grown on various media of culture (the digit between the brackets in the second column shows the number of analysed samples):

Experimental variant	X (mg/100 g vegetal tissue)±SD	p	%
MS	545.59±12.3 (3)		100.00
Plants provided in conventional cultures	541.23±9.2 (3)	NS	99.20
BG1	510.09±11.,6 (3)	NS	93.49
BA1	523.00±15.6 (3)	NS	95.86
BN1	570.00±8.9 (3)	NS	104.47
KN1	559.00±13.0 (3)	NS	102.46
A2	560.36±21.3 (3)	NS	102.71

Compared to the glucose amount from the plants grown in conventional cultures or from the vitroplants provided on MS medium, we noticed a slight decrease in the plants obtained on BG1 and BA1 medium variants. The content of intracellular glucose in the vitroplants provided on BN1, KN1 and A2 medium variants is higher, but the differences are statistically insignificant (Table 3).

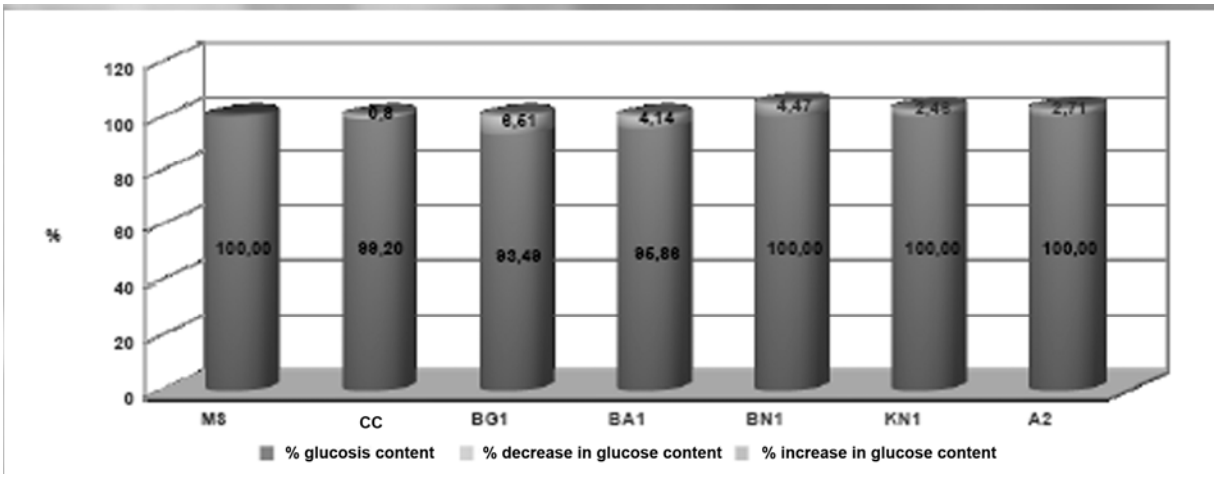

Fig. 1 - The percentage variations of the glucose amount from the plants grown in conventional cultures and from the vitroplants provided on BG1, BA1, BN1, KN1, and A2 medium variants, compared to the vitroplants obtained on MS medium

The decrease of the glucose amount within the plants harvested from conventional cultures is 0.8%, and for the vitroplants: BG1 de 6.51% (BG1 medium variant), 4.14% (BA1), compared to the value of glucose content in the plants provided on MS (that we referred to and considered it 100%). The vitroplants of *Stachys sieboldii* Miq. provided on BN1, KN1, and A2 respectively displayed a higher intracellular glucose amount (with 4.47%; 2.46%, and 2.71%, respectively) than that in the vitroplants provided on MS medium (Fig. 1).

Conclusions

From the analysis of our experimental values, we may conclude that there are no significant differences between the free glucose amount in the vitroplants provided on medium variants with various combinations and concentration of growth regulators, and the plants grown in conventional cultures.

Though our observations on the variation of some biochemical indices are still preliminary, we may state that there are no significant differences in the way the culture media influence the glucose metabolism in the plants of *Stachys sieboldii* Miq. (grown either *in vitro* or in conventional cultures).

Rezumat

Un aspect urmărit de noi a fost reprezentat de influența mediului de cultură asupra conținutului de glucoză al plantulelor de *Stachys sieboldii* Miq. În acest scop am folosit 6 medii de cultură cu compoziție diferită, pe care au fost crescute plantulele. Ca martor, am considerat mediul bazal MS.

Exprimată procentual, scăderea conținutului de glucoză a plantelor recoltate din culturile convenționale este de 0,8%, pe mediul BG1 de 6,51% şi pe mediul BA1 de 4,14%, comparativ cu valoarea înregistrată în cazul plantulelor cultivate pe mediul MS, luat de noi ca referință (100%). Plantulele de *Stachys sieboldii* Miq. cultivate pe mediile BN1, KN1 şi respectiv A2 prezintă un conținut intracelular de glucoză cu 4,47%, 2,46% şi respectiv 2,71% mai mare decât cel al plantulelor crescute pe mediul MS.

Analizând datele obținute, putem conchide că din punct de vedere al conținutului de glucoză liberă nu există diferențe semnificative între plantulele cultivate pe medii cu compoziție diferită şi plantele din culturile convenționale.

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PART II – ANIMAL BIOLOGY

INFLUENCE OF METABOLITES OF SOME STREPTOMYCETES ON THE GERMINATION OF TOMATO SEEDS AND NEMATODES OF GREENHOUSE

NADEJDA POIRAS[2], OLGA POSTOLAKI[1], CRISTINA BALTSAT[1], LARISA POIRAS[3], SVETLANA BURTSEVA[1]

ABSTRACT

Tomato is the most important vegetable cultured under glasshouses growing usually in monoculture or as part of a narrow crop rotation. An important aspect of this intensive cropping system is control of pest and diseases. Nematode *Meloidogyne* sp. is the main cause of yield losses in the glasshouse crops as their populations can build up very quickly under the ideal conditions of temperature and humidity. Many soil microorganisms including the actinomycetes have the capacity to produce the various biological active substances with antibacterial and antifungal activities which negatively influence on growth and development of some dangerous plant parasites including nematodes. The purpose of this research is to study the biological activity of some new strains of *Streptomyces* sp. isolated from the soils of R.Moldova. The metabolites of 27 strains of streptomycetes were studied on their phytostimulating and nematicidal activities. The influence of *Streptomyces* sp. metabolites on the germination of tomato seeds (grades Leana and Novelty of Dniester) has been studied. It has been revealed, that seeds of grade Leana possess higher germination. Such strains as *Streptomyces* sp. *11*, *Streptomyces* sp. *22*, *Streptomyces* sp. *182* increased the length of rootlets and their weight on 15 - 20 % in comparison with the control. In laboratory conditions the influence of metabolites of these strains on the plant parasite nematodes (order *Tylenchida*, phylum *Nematoda*) has been checked. The negative influence on second stage of juveniles of root-knot nematodes has rendered the metabolites of strains *Streptomyces sp. 11* and Streptomyces *sp. 182*, causing the wrinkle of nematode cuticle and the decrease of their activity.

Key words. Actinomycetes, exometabolites, phytostimulate and nematicide activities, tomato seeds, root-knot nematode.

Introduction

At the present time the investigations of novel bioactive natural compounds especially antibiotics are intensively carried out. The majority of them are metabolites of microorganisms. It is known that the most important source of new antibiotic substances is actinomycetes representing unique group of the microorganisms combining molecular, chemical and physiological features of bacteria and fungi (VALAGUROVA et al., 2003). They are found out in air and reservoirs, on the different vegetative and animal rests, but especially it is a lot of them in soil. They found in soils of the diversified biotopes, from subtropics to the extreme north – in a permafrost zone, on islands of Arctic Ocean. They are in soils of deserts and semi-deserts, in valleys and at mountain tops of Caucasus, Pamir and Altai etc. (KRASILNIKOV, 1970). The activities of actinomycetes in soil connect with synthesis and decomposition of humus, production of antibiotic substances and nitric balance of soil. The number of actinomycetes increases in the presence of decomposing organic matter. It is known, that many soil microorganisms including actinomycetes, participate in accumulation of biological active substances (antibiotics, industrial enzymes and other bioactive compounds) with phytostimulating and antibacterial action. It is proved that these substances influence positively on the growth and development of agricultural plants. They, especially *Streptomyces* species, account for more than 70% of the total antibiotic production. Genus *Streptomyces* is the most numerous between actinomycetes which synthesize the biological active substances of various classes of chemical compounds. Among them there are the substances possessing the phytostimulate, antibacterial, antineoplastic and antifungal actions, and also suppressing the development of activators of plant parasitic diseases (PREOBRAJENSKIY, 1990).

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Populations *Streptomyces* in agricultural soils form 10^5-10^7 colonies/grams of soil. *Streptomyces* isolates are important for the ecology of soils as they degrade recalcitrant substrates such as chitin and lignin and produce a variety of antibiotics. They selected from soils on the basis of their chitinolytic activities and antibiotic proprieties to suppress soil-born pathogenic fungi and nematodes (SMITHER-KOPPERL et al., 2001).

In the intensive cropping system is very important to control of pests and plant diseases. Among the main causes of yield losses in the glasshouse are root-knot nematodes from genus *Meloidogyne* especially *M. incognita*. Nematode populations can build up very quickly under the ideal conditions of temperature and humidity and to lead to the serious losses of the crop, especially susceptible host plants (tomato, cucumber etc.). The second-stage infective juveniles of root-knot nematodes are attracted to host roots causing the morphological and physiological changes "giant cells" where females continue feeding for the remainder of their life spans. Root-knot nematode damage results in poor growth, a decline in quality and quantity of the crop yield and reduction of the plant resistance to other stresses (e.g. drought, other diseases). The nematode-infested roots are colonized by the different soil pathogenic microbes and fungi. The majority of populations and generations (6 – 8) are found in an annual temperature range of 24-30^{0}C with humidity near 70% (DROPKIN, 1972; EISENBACK and TRIANTAPHYLLOU, 1991; NICKLE (ed.), 1991).

Nowadays some interests are increasing to the biological preparations based on the substances capable to stimulate the germination of seeds, to accelerate the development of cultural plants and the same time to depress the development of plant diseases and some organisms causing these diseases, thereby the increasing of plant productivity and quality of production (BABENCO et al., 1992). Even short-term action of biostimulators on seeds in their germination period causes the positively influence on the agricultural crops. These results from the fact that the biochemical processes proceeding in a phase of germination of seeds, are connected by chain reaction with the subsequent course of a metabolism in developing plants (DELIU et al., 1997; ONOFRASH et al., 2006; RASTIMESHINA et al., 1998).

Production of synthetic preparations for the growth of plants and vitamins still expensive today, therefore is offered the application of cultural liquids of the synthesizing of actinomycetes as a complex of various biologically active substances. Perspective method of application of microorganisms as the stimulators of plant growing is the presiding soaking of plant seeds in the dissolved cultural liquid (DELIU et al., 1997; ONOFRASH et al., 2006; RASTIMESHINA et al., 1998).

Modern requirements of cultivation of agricultural plants without using the chemical preparations promote the development of new biological approaches for increasing of biomass production in the greenhouses.

Our main objective was to study the biological activities of exometabolites of some new actinomycete strains (genus *Streptomyces*) isolated from the soils of R. Moldova, i.e. to define the phytostimulation ability of their exometabolites (EM) on some physiological processes of plants (germination of tomato seeds and rootlet-growing) and their nematicidal effect on second age juveniles of the root-knot nematodes from glasshouse.

Material and method

Twenty-seven strains of actinomycetes (genus *Streptomyces*) isolated from Moldavian soils, mostly chernoziom with the different humus content (2.4 – 6.8 %), were used in screening procedure.

Studied strains were stored in laboratory conditions at about +40 C (refrigerator) on agarized Czapek medium with glucose, starch-ammonia agar, oatmeal agar. Inoculum was obtained on medium Dulone during three days at 27^0 C in flasks 0,25l on agitator. Cultivation of streptomycetes was carried out on complex medium M-I (basic source of carbon was corn flour 20 g/l) in flasks Erlenmeyer on agitator within 5 days at 27^0 C. Biomass has been separated from cultural liquid (CL) on a centrifuge (7000 rev/min. during 20 min.). The received CL containing the complex of the exometabolites (EM) of the studied strains was diluted with distillated water 1:200. Tomato seeds of Leana and Novelty of Dniester were accounted and soaked into CL solutions of the studied actinomycete strains according to the standard method of VOZNJAKOVSKY (1989).

For every studied grade of tomato seeds three repetitions by 30 seeds were used. Covered Petri dishes with tomato seeds for studying their germination and root-growing were stored in the thermostat during 4 days. It was accounted, the quantity of sprouted seeds, their weight and length. Recalculation of the received data has done for 100 seeds (VOZNJAKOVSKY, 1989). The second age juveniles of the root-knot nematodes were extracted by modified Baermann method from glasshouse soils collected under infected tomato plants with galls on the roots (NICKLE et al., 1991).

Results and discussions

According to the laboratory results of IMB ASM and literature data accumulated for last years, it is showed that streptomycetes isolated from Moldavian soils possess ability to synthesize the phytohormones (auxins, gibberellins, cytokinins). The experiments with the seeds of tomato, cucumber, tobacco, peas and beans showed that the germination of their seeds, the length and weight of rootlets and stems were increased after processing with the dissolved metabolites of streptomycetes (BURTSEVA S., 2002; DELIU E., 1997; RASTIMESHINA I., 1998).

The influence of exometabolities (EM) of three strains *Streptomyces* sp.11, *Streptomyces* sp 22 and *Streptomyces* sp. 182 isolated from Moldavian soils on the germination of seeds and root formation of two tomato grades Leana and Novelty of Dniester have been studied. These chosen strains of *Streptomyces* have shown more effects of their EM on processes of germination and root formation in comparison with 27 surveyed strains.

Figure 1 shows the different effect EM on the germination of tomato seeds of the studied strains of streptomycetes. All received data had the better results for the tomato grade Leana. Such as the positive EM effects were noted for *Streptomyces* sp.182 and *Streptomyces* sp.11, the germination of tomato seeds grade Leana have increased to 118 % and 115 % accordingly.

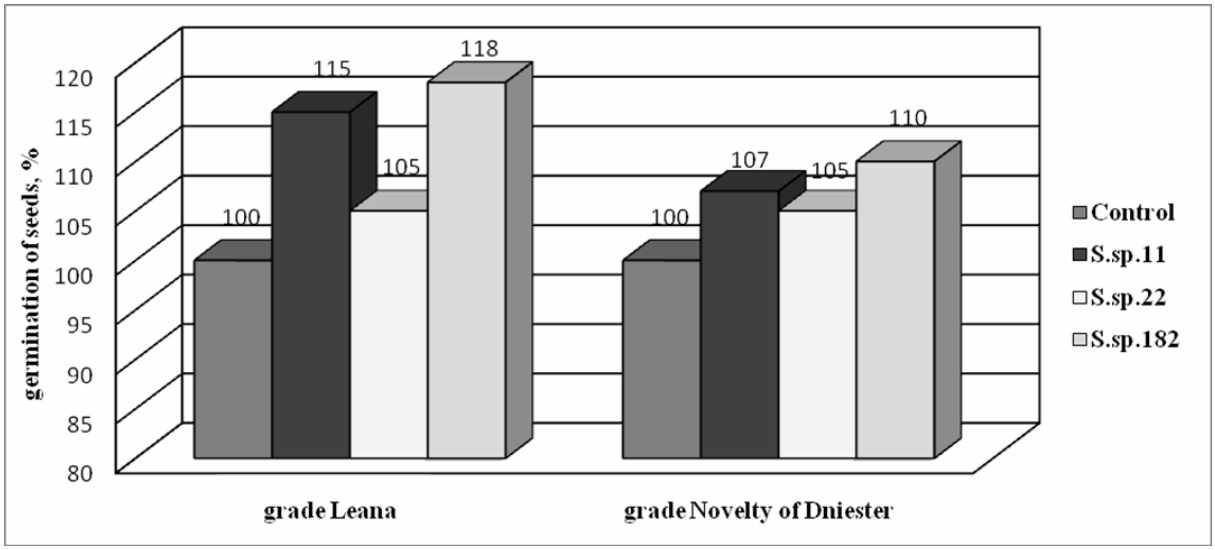


Fig. 1 - Influence of EM strains *Streptomyces* sp. 11, *Streptomyces* sp. 22 and *Streptomyces* sp. 182 on germination of seeds of two tomato grades Leana and Novelty of Dniester (%).

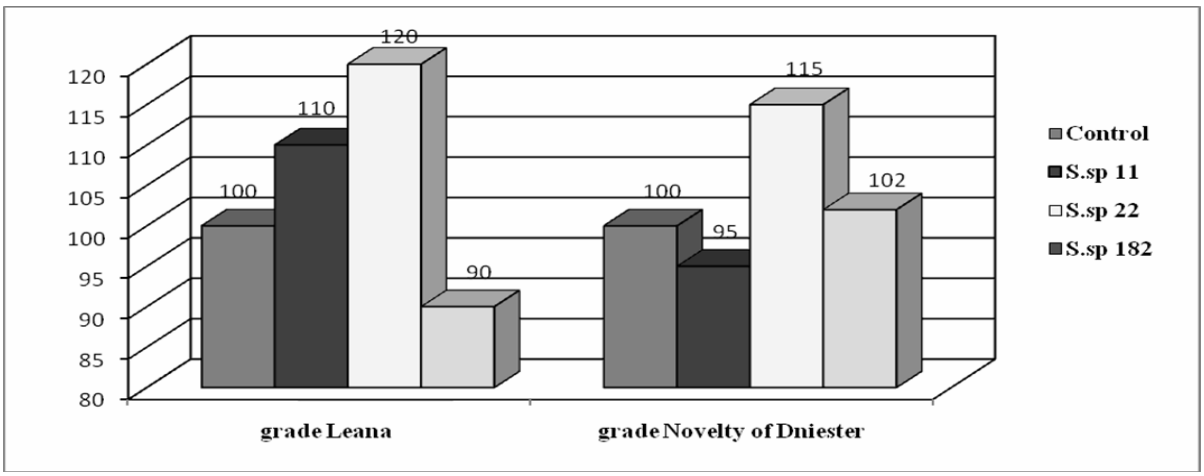
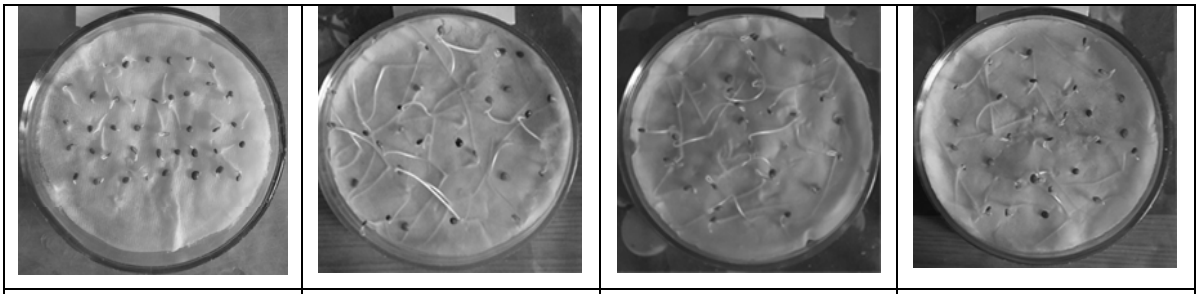


Fig. 2 - Influence of EM strains *Streptomyces* sp. 11, *Streptomyces* sp. 22 and *Streptomyces* sp. 182 on rootlet lengths of two tomato grades Leana and Novelty of Dniester (%).



Control	*Streptomyces* sp.22	*Streptomyces* sp.11	*Streptomyces* sp.182

Fig. 3. Changes of the length of rootlets of tomato seeds variety Leana processing of EM *Streptomyces* sp. 11, *Streptomyces* sp.22, *Streptomyces* sp. 182.

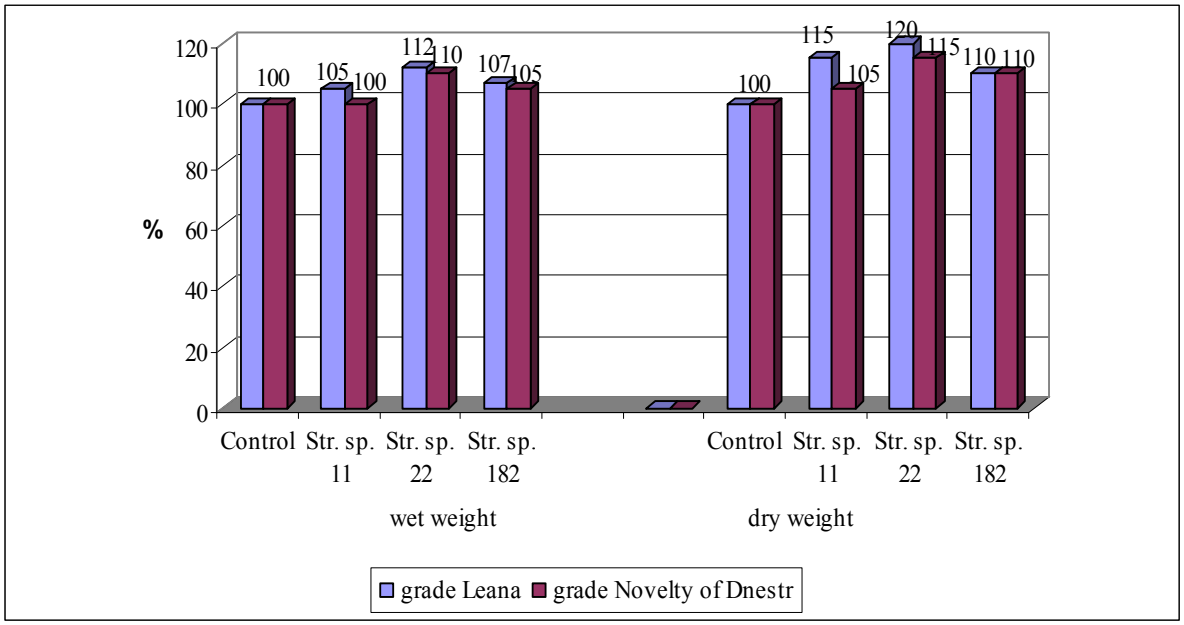


Fig. 4. Wet and dry seed weight of rootlets of two tomato grades Leana and Novelty of Dniester after influence EM strains *Streptomyces* sp. 11, *Streptomyces* sp. 22 and *Streptomyces* sp. 182 (%).

Definition of rootlet lengths of two tomato grades processed by solutions EM of the studied strains shows on **Fig. 2, 3**. It is visible that EM both strains to promote increasing the rootlets of Leana after processing EM *Streptomyces* sp.22.

The changes of weight (wet and dry) of rootlets of two tomato grades Leana and Novelty of Dniester after influence EM strains *Streptomyces* sp. 11, *Streptomyces* sp. 22 and *Streptomyces* sp. 182 are visible (Fig. 3, 4). So, for example, the wet weight of rootlets of both tomato grades exceeds their weight in control (seeds were presoaked in distilled water) on 5 - 15 %. The better results have been noticed in a variant of experiences with EM *Streptomyces* sp.22 such as the rootlet lengths of grades Leana and Novelty of Dniester were 115 % and 110 % respectively. The similar data were received for the dried rootlets especially after the influence of strain *Streptomyces* sp.22.

According to the received data, the phytostimulating activities of the studied strains were different. By the degree of influence EM on germination of seeds, the length and weight (wet and dry) of rootlets were chosen the strains *Streptomyces* sp.11, *Streptomyces* sp.22 and *Streptomyces* sp.182 between 27 surveyed strains isolated from Moldavian soils.

Last time the attention is paid to reveal and study the strains of *Streptomyces* possessing not only phytostimulating, antibacterial and antifungal activities but also the nematicidal activity, especially against the second stage juveniles of root-knot nematodes in glasshouse. Thus, it was revealed that *Streptomyces avermitilis* possessed also the

nematicidal activity (biological product "Avercom") in relation to juveniles *Meloidogyne incognita* (PETRUK et al., 2004). Therefore, the strains of streptomycetes possessing the good phytostimulating ability should also be checked for nematicidal activity especially against the dangerous plant parasitic nematodes of glasshouse. In our experiments, the influence EM on the activity of second age juveniles of root-knot nematodes from the glasshouse have been used the various dissolved solutions EM of strains *Streptomyces* sp.11, *Streptomyces* sp.22 and *Streptomyces* sp.182. In each variant of experiment with the different concentrations EM and time exposition (0.5 – 24 hours and more) was used on 50 juveniles of root-knot nematodes. It was observed, at the higher concentration EM, the number of active juveniles of nematodes decreased for rather short period of time. It was revealed that activity of juveniles of nematodes considerably decreased under the influence of EM *Streptomyces* sp.22 at high concentration 1:2 during 6 hours more than 50 % of juveniles have lost their activity. This study requires the further extension.

References

So, the carried out study has shown that the some strains of streptomycetes isolated from soils R.Moldova are capable to synthesize the biological active substances for the phytostimulating of germination and root formation of tomato seeds. As a result the exometabolities of strain *Streptomyces* sp.182 possesses more phytostimulating ability on germination of tomato seeds. However EM strain *Streptomyce*s sp.22 was better promoted the increasing of rootlets and their biomass and showed some nematicidal activity against the dangerous second stage juveniles of plant parasitic root-knot nematodes from glasshouse. The further selection of the strains of actinomycetes possessing the biological active compounds with phytostimulating and antipathogen abilities especially for glasshouse plants is continuing.

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COMPLEXUL MUZEAL DE ŞTIINȚELE NATURII „ION BORCEA” BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 38 – 43

FAUNISTIC DATA ON ORTHOPTERA INSECTS FROM THE SCIENTIFIC RESERVATION „LOWER PRUT” FROM THE REPUBLIC OF MOLDOVA

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ABSTRACT

The article presents the results of the researches on the Orthoptera fauna of scientific reservation „Lower Prut” from the Republic of Moldova, carried out between June-September 2008. In the geographical aspect, the scientific reservation „Lower Prut” belongs to Lower Prut Region, which has coordinates: 45°42'N 28°11'E. This site is situated between Cahul town and Giurguileshti village in the lower part of the Prut River valley, within the administrative region of Cahul district, in the south-western part of the Republic of Moldova.

In the paper shows a list of 48 species of Orthoptera (which consist 42.48 % from the whole fauna of the republic) including 30 ones of *Caelifera* and 18 ones of *Ensifera*, grouped in 13 Orthoptera subfamilies with, life and ecological forms, also their zoogeographical analysis. Seven life forms of long-horned grasshoppers and eight of short-horned grasshoppers ones are discerned. In total we have eleven life-forms of orthoptera insects from scientific reservation “Lower Prut”: chortobiont, gramineous chortobiont, sedge-grain chortobionts, facultative chortobionts, herbivore chortobiont, thamnobiont, openly-living geophilous, under-cover geophilous, fissure-living biont and geobiont.

Key words: Orthoptera, „Lower Prut” fauna, habitat.
Cuvinte cheie: Orthoptera, „Prutul de Jos”, fauna, habitat.

Introduction

In the Republic of Moldova are known 113 species of insects from Orthoptera order (13). From the orthopterological point of view the scientific reservation „Lower Prut” was not studded in the past. During 2008-2009 years in this scientific reservation was collected 48 species of insects from Orthoptera order. The recorded species consist 42.48 % from whole fauna of Orthoptera insects of our republic, including 30 ones of *Caelifera* suborder and 18 ones of *Ensifera*.

Material and method

The description of the studied area. The scientific reservation „Lower Prut” belongs to Lower Prut Region, which has coordinates: 45°42'N 28°11'E (Fig. 1). This site is situated between Cahul town and Giurguileshti village in the lower part of the Prut River valley, within the administrative region of Cahul district, in the south-western part of the Republic of Moldova.

The scientific reservation „Lower Prut River” („Prutul de Jos”) was created on 23 April 1991 for preserve the flora and fauna of the Lake Beleu and his surroundings territories and floodplains. The area of reserve is 1691 hectares and Lake Beleu constituted about ⅓ of the surface of the reservation (800 ha), the rest territory is presented by the of marsh vegetation (Fig. 2). The depth of the lake varies between 0.5 and 4 m (9).

The reserve is unique in its own way, not only for the Republic of Moldova but also for Europe. Being located approximately at latitude 45° north latitude, better said in halfway between the Equator and North Pole, these ponds represent an important passage for migratory birds. Also the reservation contains the largest natural reservoir in Republic of Moldova – Lake Beleu. This lake is unique ecosystem, described as the last natural floodplains in the lower Danube region. The site supports the globally vulnerable and endangered mammals, birds, reptiles, amphibians and fish species. From this reservation are knew: 39 mammals, 203 birds, 5 reptiles, 9 amphibians, 41 fish species (9) and a lot of insects species. Furthermore, Lake Beleu is a very valuable ecosystem, which keeps important aquatic plant genetic relics resource, many of which are rare species in our flora: *Nymphaea alba*, also known as the European White Water lily (11).

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The scientific reserve "Lower Prut" has a special value for the stability and balance natural in the inferior area of Prut River. This reservation was establishment for to maintain viability and improve the arid climate in the south of the republic. Nevertheless, because of stopping the annual floods, the lake is heavily clogged and decreasing in its size form year to other. It is absolutely necessary to restore or to make periodic flood dyking current gaps in order to supply natural flood area with water. At the same time, maintaining and restoring of the natural balance of typical ecosystems pools from river Prut is impossible because the territory of reserve is so limited. For that reason, it is timely to expand the area of this reserve, including all the neighbouring ponds of Lower Prut to Cahul.

This new reserve is required to be included in the Danube Delta Biosphere Reserve, thus, might preserve and maintain the natural beauty and richness of this unique formation.

Fig. 1 Lower Prut Region

Fig. 2. Scientific Reservation "Lower Prut"

Method of sampling and evaluation of Orthoptera species.

Orthoptera specimens were obtained by sweep-sampling and by hand direct on the grasses. The insects were collected from different location like land flooded, wet and meadows, also, from the steppes vegetation from the Shore of Prut River and Lake Beleu.

For collecting of the Orthoptera individuals we had used the sweep net. The samples were collected during calm, warm and sunny weather conditions June and in August 2008. During each visit we have performed 50 sweeps by 6 times in every studded habitat. At each step a sweep was made by traversing a horizontal arc of 180^0 with a standard canvas net, which had 38 cm in diameter (2, 10). Sample collection took place from 10 am to 6 pm with repose between 11.30 am till 15 pm o'clock. The individuals were identified immediately in the field or in the laboratory using identification keys (4, 5, 6, 7, 9, 15, 16, 17). Both system and nomenclature follow the work by Eades & Otte (1), and Grasshoppers, crickets and katydids *Orthoptera* (3).

The zoogeographic elements were established by work of G. Bei-Bienko (15, 16) and I. Iorgu (7). At processing of mathematical and statistical analysis of the entomological material we have applied the works of A. Andreyev (14).

The classification of life forms of long-horned and short-horned grasshoppers were carried out on the works of Bei-Bienko G., and Pravdin F (15, 16, 18).

Results and discussions

During our researches, on the scientific reservation „Lower Prut River" were collected 2605 individuals of insects from the order Orthoptera from 48 species which belong to 34 genera and to 15 subfamilies: *Conocephalinae* – 2 species, *Phaneropterinae* – 3, *Tettigoniinae* – 7, *Gryllinae* – 2, *Gryllomorphinae* – 1, *Nemobiinae* – 1, *Oecanthinae* – 1, *Gryllotalpinae* – 1, *Tridactylinae* – 1, *Tetriginae* – 2, *Acridinae* – 1, *Calliptaminae* – 1, *Catantopinae* – 1, *Gomphocerinae* – 17 and *Oedipodinae* 7; seven families: *Tettigoniidae*, *Gryllidae*, *Gryllotalpidae*, *Myrmecophilidae*, *Tridactylidae*, *Tetrigidae* and *Acrididae*; 5 superfamily: *Tettigonoiidae*, *Grylloidea*, *Tridactyloidea*, *Tetrigoidea* and *Acridoidea* (Tab. 1).

The majority of orthoptera species collected on the Shore of Prut River and Lake Beleu were revealed next species: *Gryllomorpha dalmatina*, *Gryllotalpa gryllotalpa, Xya variegata*, *Pteronemobius heydeni*, *Tetrix bipunctata*, *T. subulata*. The all these species have fissure-living biont and herpetobiont

life forms and are higrophilous and higro-mesophilous. In 12.08.2007, on the Shore of Prut River in Slobozia-Mare village was observed a female and a male of species *Gryllomorpha dalmatina*. This species are known for our republic just from this reservation (12).

In the surrounding vegetation of the Lake Beleu, hygrophilous meadows and floodplains the following species are predominant: *Conocephalus fuscus*, *Ruspolia nitidula*, *Metrioptera roeselii*, *Metrioptera bicolor*, *Paracinema tricolor bisignata*, *Mecostethus alliaceus*, *Omocestus viridulus* and *Chorthippus parallelus*. The collected species from same biotopes are chortobionts and herbivore chortobionts.

Table 1 - The sinecologycal indexes of insects from the order Orthoptera fauna from the scientific reservation „Lower Prut"

№	Species	N ♀/♂	Dominion		Feeding groups	Habitat		Zoogeo-graphy
			%	Class		Eco-form	Life-form	
1.	*Conocephalus fuscus*	18/21	1,50	D_2	Ph-cr.	1	A	HP
2.	*Ruspolia nitidula*	5/11	0,61	D_1	Ph-cr.	1	A	MA
3.	*Leptophyes albovittata*	22/16	1,46	D_2	Ph.	4	F	CAM
4.	*Leptophyes punctatissima*	11/7	0,69	D_1	Ph.	4	F	NE
5.	*Phaneroptera falcata*	18/14	1,23	D_2	Ph.	3	F	ES
6.	*Decticus albifrons*	11/15	1,00	D_1	Ph-cr.	5	H	CM
7.	*Metrioptera bicolor*	43/33	2,92	D_3	Ph-cr.	4	E	ES
8.	*Metrioptera brachyptera*	41/36	2,96	D_3	Ph-cr.	3	E	ES
9.	*Platycleis affinis*	9/12	0,81	D_1	Ph-cr.	5	A	CM
10.	*Platycleis tessellata*	7/6	0,50	D_1	Ph-cr.	5	A	CAP
11.	*Platycleis veyseli*	29/30	2,26	D_3	Ph-cr.	4	A	HP
12.	*Tettigonia viridissima*	13/15	1,07	D_1	Ph-cr.	3	F	HP
13.	*Gryllus campestris*	39/32	2,73	D_3	Ph-cr.	3	K	HP
14.	*Melanogryllus desertus*	51/38	3,42	D_3	Ph-cr.	3	K	CAM
15.	*Gryllomorpha dalmatina*	1/0	0,04	D_1	Ph-cr.	1	K	CM
16.	*Pteronemobius heydenii*	2/1	0,12	D_1	Ph-cr.	1	J	CM
17.	*Oecanthus pellucens*	63/58	4,64	D_3	Ph-cr.	5	F	CAM
18.	*Gryllotalpa gryllotalpa*	4/7	0,42	D_1	Ph-cr.	3	I	HP
19.	*Xya variegata*	21/14	1,34	D_2	Ph-cr.	1	J	CAM
20.	*Tetrix bipuncatata*	11/14	0,96	D_1	Ph.	1	J	ES
21.	*Tetrix subulata*	21/16	1,42	D_2	Ph.	2	J	HR
22.	*Acrida ungarica*	53/60	4,34	D_3	Ph.	5	C	MA
23.	*Calliptamus italicus*	29/32	2,34	D_3	Ph.	5	D	HP
24.	*Pezotettix giornae*	59/44	3,95	D_3	Ph.	4	F	CM
25.	*Chrysochraon dispar*	21/15	1,38	D_2	Ph.	1	A	ES
26.	*Euthystira bracyptera*	25/30	2,11	D_3	Ph.	1	A	CAP
27.	*Dociostaurus maroccanus*	28/43	2,73	D_3	Ph.	5	H	CAM
28.	*Chorthippus albomarginatus*	37/52	3,42	D_3	Ph.	3	B	CNE
29.	*Chorthippus biguttulus*	71/82	5,87	D_4	Ph.	4	B	CAM
30.	*Chorthippus brunneus*	69/64	5,11	D_4	Ph.	4	B	HP
31.	*Chorthippus dorsatus*	16/11	1,04	D_1	Ph.	3	B	ES
32.	*Chorthippus loratus*	11/10	0,84	D_1	Ph.	5	B	PM
33.	*Chorthippus parallelus*	31/24	2,11	D_2	Ph.	4	B	EP
34.	*Chorthippus vagans*	14/11	0,96	D_1	Ph.	4	B	P
35.	*Euchorthippus pulvinatus*	43/41	3,22	D_3	Ph.	5	B	CAM
36.	*Gomphocerippus rufus*	14/8	0,84	D_1	Ph.	4	B	ES
37.	*Omocestus haemorhoidalis*	59/58	4,49	D_3	Ph.	4	B	EP
38.	*Omocestus rufipes*	28/16	1,69	D_2	Ph.	5	B	HP
39.	*Omocestus viridulus*	44/43	3,34	D_3	Ph.	3	B	ES
40.	*Stauroderus scalaris*	9/5	0,54	D_1	Ph.	3	B	ES
41.	*Stenobothrus lineatus*	29/33	2,38	D_3	Ph.	4	B	ES

42.	***Acrotylus insubricus***	1/2	0,12	**D_1**	Ph.	5	G	CM
43.	***Aiolopus thalassinus***	65/46	4,26	**D_3**	Ph.	1	D	HP
44.	***Epacromius coerulipes***	1/1	0,08	**D_1**	Ph.	2	D	CAM
45.	***Epacromius tergestinus***	1/1	0,08	**D_1**	Ph.	2	D	EP
46.	***Mecostethus alliaceus***	31/42	2,80	**D_2**	Ph.	1	A	ES
47.	***Oedipoda caerulescens***	35/46	3,11	**D_3**	Ph.	5	G	PM
48.	***Paracinema bisignata***	53/71	4,76	**D_3**	Ph.	1	A	CM
TOTAL INDIVIDUALS		**2525**						
THE INDEX OF DIVERSITY		**35,238 with error – 0.022**						
THE SIMPSON INDEX		**0.028 with error – 0**						
THE SHENON INDEX		**1.529 with error – 0.058**						
THE EQUITABILITY		**0.371**						

Legend. **Feeding groups**: Ph. – phytophagous, Cr. – carnivorous, Ph-cr. – omnivorous; **Eco-forms**: 1 – higrophilous, 2 – higro-mesophilous, 3 – mesophilous, 4 – meso-xerophilous, 5 – xerophilous; **Life forms**: **A** – chortobiont, **B** – gramineous chortobiont, **C** – sedge-chortobionts, **D** – facultative chortobionts, **E** – herbivore chortobiont, **F** – thamnobiont; **G** – openly-living geophilous; H – under-cover geophilous, I – fissure-living biont J – herpetobionts, K – geobiont.

Zoogeography: PAL-Palaearctic: ES-Eurosiberian, HP-Holopalaearctic, EP-Euro-Asiatic-Palaearctic, HR-Holoarctice; MED-Mediterranean: CM Circummediterranean, MA-Mediterranean-African, PM-Ponto-Mediterranean, P-Pontic; Central Asian – CAM-Central Asian - Mediterranean, CAP Central Asian-Pontic; EU: European: CNE- Central-North-European NE-North-European.

In mesophilous and meso-hygrophilous biotopes with vegetation along with shrubs the fauna of grasshoppers is more numerous: *Leptophyes punctatissima*, *Phaneroptera falcata*, *Tettigonia viridisima*, *Pterolepis nitidula*, *Metrioptera bracyptera*, *Oecanthus pellucens*, *Gryllus campestris*, *Melanogryllus desertus*, *Tetrix bipuncatata*, *Pezotettix giornae*, *Calliptamus italicus*, *Stauroderus scalaris*, *Stenobothrus lineatus*, *Omocestus viridulus*, *Chorthippus albomarginatus*, *Ch. apicarius*, *Ch. loratus*, *Ch. dorsatus*, *Ch. parallelus*, *Ch. dichorus*, *Ch. biguttulus*, *Ch. brunneus*, *Ch. vagans*, etc.

Regarding life-forms of collected Orthoptera species in mesophilous and meso-hygrophilous biotopes of searched reservation we had observed that prevailed chortobionts type: gramineous chortobionts, sedge-grain chortobionts, facultative chortobionts and herbivore chortobionts, also, thamnobionts, fissure-living biont and geobiont.

The xerophilous grasslands of the reserves are located on the banks of the river Prut, at the height between 10 and 20 m about river level. The plants carpet has a small tall. The vegetation of these biotopes has a small number of species where prevailed those with a long period of semi-repose. In such biotopes were collected only 10 species of insects from the Orthoptera order – *Acrida ungarica*, *Dociostaurus maroccanus*, *Calliptamus italicus*, *Chorthippus biguttulus*, *Ch. brunneus*, *Euhorthippus pulvinatus*, *Omocestus haemorrhoidalis*, *O. minutus*, *Stenobothrus nigromaculatus* and *Oedipoda coerulescens.* The life-form appurtenance of these species is: Sedge-chortobionts, under-cover geophilous, facultative chortobionts and chortobiont openly-living geophilous.

The result of sinecologycal analysis of insects species of the Orthoptera order collected from the reserve "Lower Prut" were established, that species *Ruspolia nitidula*, *Leptophyes punctatissima*, *Decticus albifrons*, *Platycleis affinis*, *P. tessellata*, *Tettigonia viridissima*, *Gryllomorpha dalmatina*, *Pteronemobius heydenii*, *Gryllotalpa gryllotalpa*, *Tetrix bipuncatata*, *Chorthippus dorsatus*, *Ch. loratus*, *Ch. vagans*, *Gomphocerippus rufus*, *Stauroderus scalaris*, *Acrotylus insubricus*, *Epacromius coerulipes* and *E. tergestinus* are subrecedentes and constituent 10.71 % (279 individuals) from whole collected (2605).

Species *Conocephalus fuscus*, *Leptophyes albovittata*, *Phaneroptera falcata*, *Xya variegata*, *Tetrix subulata*, *Chrysochraon dispar*, *Chorthippus parallelus*, *Omocestus rufipes* and *Mecostethus alliaceus* are recedente and constituent 14,93% (389 individuals).

Species *Metrioptera bicolor*, *M. brachyptera*, *Platycleis veyseli*, *Gryllus campestris*, *Melanogryllus desertus*, *Oecanthus pellucens*, *Acrida ungarica*, *Calliptamus italicus*, *Pezotettix giornae*, *Euthystira bracyptera*, *Dociostaurus maroccanus*, *Chorthippus albomarginatus*, *Euchorthippus pulvinatus*, *Omocestus haemorhoidalis*, *O. viridulus*, *Stenobothrus lineatus*, *Aiolopus thalassinus*, *Oedipoda caerulescens* and *Paracinema tricolor bisignata* are subdominants, constituent 63.34 % (1650 individuals). In this reservation just 2 species are dominants – *Chorthippus biguttulus* şi *Chorthippus brunneus* and had constituent 10.98 % (286 individuals).

In the zoogeographical aspect 24 species have a Palaearctic distribution, by 10 –Mediterranean and Central-Asian and the last – European (Fig 3.).

From those Palaearctic the most has Eurosiberian distribution (12 species) and the fewest (1 species) – Holopalaearctic; from Mediterranean most have Circummediterranean (7) and the fewest (1) – Pontic zoogeographical distribution.

From those Central Asian 8 species have Central Asian-Mediterranean and 2 – Central Asian-Pontic. And the latest 2 species are European elements (Central-North-European and North-European) (Fig. 3).

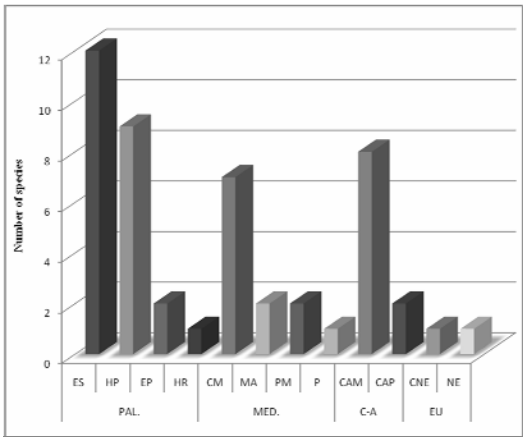

Fig. 1. The zoogeographical distribution of Orthoptera species from scientific reservation "Lower Prut".
Legend – at the table 1.

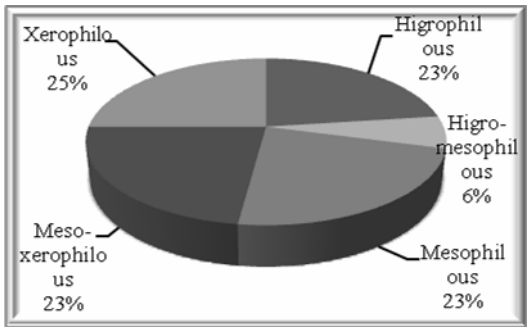

Fig. 2. The distribution to eco-form of Orthoptera species from scientific reservation "Lower Prut".
Legend – at the table 1.

According to ecological forms 12 species are xerophilous, by 11 species (23 %) are higrophilous, mesophilous and meso-xerophilous; and the next 3 are higro-mesophilous (Fig. 4).

The dominant in number of species concerning the life forms of orthoptera species on the investigated territory are gramineous chortobionts.

The index of diversity of orthoptera insects from scientific reservation "Lower Prut" has a value – 35.238 with error – 0.022 %; the Simpson index – 0.028 %; the Shenon index – 1.529 with error – 0.058 % and the latest one Equitability – 0.371 (Tab. 1).

Conclusion

1. During of our searching above fauna of insects from order Orthoptera in scientific reservation "Lower Prut" were collected 48 species which belong to 34 genera and 15 subfamilies.
2. Two species are dominants – *Chorthippus biguttulus* and *Chorthippus brunneus* from collected species.
3. In the zoogeographical aspect 24 have a Palaearctic distribution, by 10 Mediterranean and Central-Asian and the last 2 – European.
4. The *Gryllomorpha dalmatina* species are knew for our republic just from this reservation.
5. According to ecological forms of Orhoptera insects from "Lower Prut" 12 are xerophilous, by 11 (by 23 %) are higrophilous, mesophilous and meso-xerophilous; and 3 are higro-mesophilous.

Rezumat

În articol sunt expuse rezultatele cercetărilor a faunei insectelor din ordinul Orthoptera din rezervația științifică „Prutul de Jos" din Republica Moldova, efectuate în iunie-septembrie 2008. În aspect zoogeografic rezervația științifică „Prutul de Jos" are coordonatele cuprinse între: 45°42'N 28°11'E. Teritoriul dat este situat între orașul Cahul și Comuna Giurgiulești în partea su-vest a Republicii Moldova.

Lucrarea prezintă o listă a 48 specii de ortoptere (42.48% din fauna totala de ortoptere din Republica Moldova), dintre care 30 aparțin subordinului *Caelifera* și 18 *Ensifera*, grupate în 13 subfamilii cu date privind ecologia și zoogeografia acestora. Speciile colectate sunt divizate în mai multe forme ecologice: hortobionte, hortobionte graminee, hortobionte ciperacine, hortobionte facultative, hortobionte ierbivore, tamnobionte geofile deschise, geofile ascunse, geobionte și fisurobionte.

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COMPLEXUL MUZEAL DE ŞTIINȚELE NATURII „ION BORCEA" BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 44 – 50

POPULATION DYNAMICS OF THE NOCTURNAL LEPIDOPTEROFAUNA OF AN URBAN ECOSYSTEM –THE BOTANICAL GARDEN GALAȚI

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ABSTRACT

The present study had been developed in an urban ecosystem, The Botanical Garden of The Natural Sciences Museum Complex Galați. The research had been made during a period of 4 years (2004, 2005, 2008 and 2009). During the period of study, there were identified a number of 200 species (3014 individuals) from 9 families of nocturnal lepidopterans: Hepialidae, Cossidae, Sphingidae, Drepanidae, Geometridae, Notodontidae, Noctuidae, Lymantriidae, Arctiidae. Noctuidae family was the best represented of all the Lepidoptera families with 125 species.

Key words: nocturnal lepidoptera, dynamics, Botanical Garden Galați.

Introduction

The Botanical Garden of The Natural Sciences Museum Complex Galati is an urban ecosystem, situated near the the confluence of the River Siret with the Danube. It's climatic characteristics and geology were described in previous papers (Cristescu 2007-2008, Cristescu 2010).

The purpose of this paper is to analyze the fluctuations of the populations, the variations of the number of species and families every year during the period of study.

Material and method

In order to analyze the population fluctuations of the Lepidoptera, we chose three areas of the Botanical Garden – the Rose Garden, the Romanian Flora, and the Medicinal Flora. These areas have different types of vegetation: the Rose Garden (ornamental plants), the Romanian Flora (vegetation specific to the mountains, plains, sand dunes, and Dobrudja) and the Medicinal Flora (medicinal, economic plants and vegetables).

The nocturnal lepidotera were collected with three light traps, one installed in each mentioned area. The light traps were functional 3 days a week, from march untill November, from dusk till dawn.

The period of collecting was spread during four years: 2004, 2005, 2008 and 2009.

Results and discussions

During the 4 years period of study, there were identified a number of 200 species (3014 individuals) from 9 families of nocturnal lepidopterans: Hepialidae, Cossidae, Sphingidae, Drepanidae, Geometridae, Notodontidae, Noctuidae, Lymantriidae, Arctiidae (table 4).

The results obtained from each light trap were different in each area separately.

The Medicinal Flora is the area with the biggest nocturnal Lepidoptera diversity, followed by the Romanian Flora area.

The Medicinal Flora area the research have been made in 2004, 2005, 2008 and 2009. Every year, here were registered four families of nocturnal macrolepidoptera. The number of species from each family was fluctuating. (table 1). The best represented family in this area is Noctuidae family with 66 species in 2009.

Table 1. Frequency of the nocturnal macro-lepidoptera families in The Medicinal Flora area.

No.	Family	No. of species			
		2004	2005	2008	2009
1.	Hepialidae	0	1	0	0
2.	Cossidae	1	3	2	2
3.	Sphingidae	3	16	2	6
4.	Drepanidae	0	0	0	0
5.	Geometridae	8	12	9	16
6.	Notodontidae	0	2	3	0
7.	Noctuidae	23	43	44	66
8.	Lymantriidae	1	2	0	0
9.	Arctiidae	5	6	2	2
	TOTAL	**41**	**85**	**60**	**92**

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Over the years we noticed that the number of species increased. Thus if, in 2004 there were captured only 41 species of nocturnal lepidoptera, in 2009 in this area were registered 92 species. Noctuidae and Geometridae families were noted for a constant increase in the number of species.

The dynamics of the individuals shows that their number was also increasing during the years. Thus if
in 2004 there were 108 individuals captured at The Medicinal Flora, there number reached 700 in 2009 (fig.1).

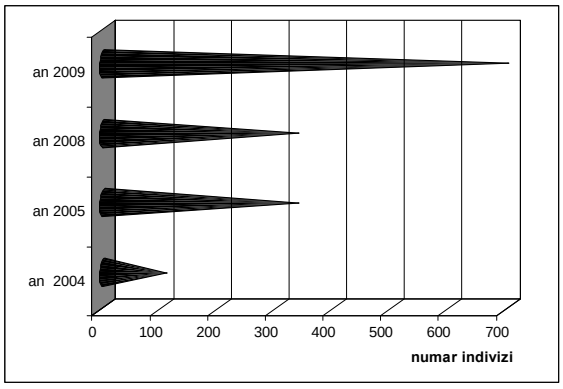


Fig.1. The dynamics of the number of individuals catched at The Medicinal Flora area.

In The Romanian Flora area the research have been
made during a three years period: 2005, 2008 and 2009. The greatest diversity of the moths families was registered in 2009 (six families). The number of the species was increasing every year in the Noctuidae and Geometidae families (table 2).

Table 2. Frequency of the nocturnal macrolepidoptera families in The Romanian Flora.

No.	Family	No. of species		
		2005	2008	2009
1.	Hepialidae	0	0	0
2.	Cossidae	0	0	2
3.	Sphingidae	2	5	3
4.	Drepanidae	1	1	1
5.	Geometridae	10	16	19
6.	Notodontidae	1	2	1
7.	Noctuidae	30	56	57
8.	Lymantriidae	0	1	1
9.	Arctiidae	3	3	2
	TOTAL	**47**	**84**	**86**

In this area the number of the nocturnal lepidoptera was bigger in 2008 (fig. 2).

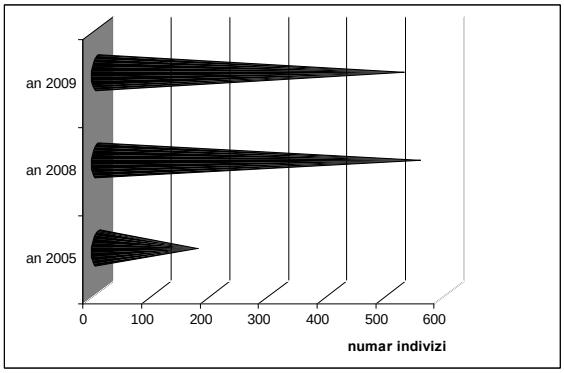


Fig. 2. The dynamics of the number of individuals catched at The Romanian Flora area.

The Rose Garden is the area were were registered the lowest diversity of the nocturnal lepidoptera.

There the research have been made in a period of three years: 2005, 2008 and 2009.

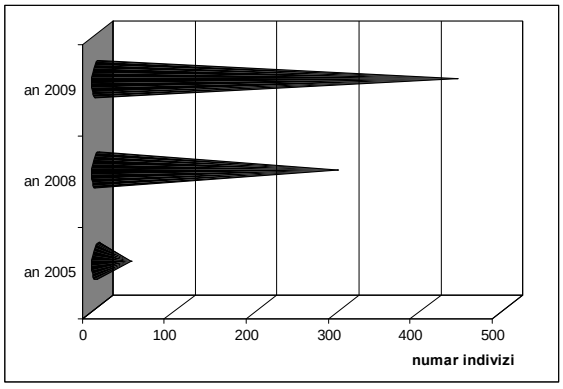
In this area appeared regularly only three familes of moths: Geometridae, Noctuidae and Arctiidae (table 3).

Table 3. Frequency of the nocturnal macrolepidoptera families in The Rose Garden area.

No.	Family	No. of species		
		2005	2008	2009
1.	Hepialidae	0	0	0
2.	Cossidae	0	0	1
3.	Sphingidae	0	0	4
4.	Drepanidae	0	0	0
5.	Geometridae	2	11	19
6.	Notodontidae	0	1	1
7.	Noctuidae	26	37	61
8.	Lymantriidae	0	0	1
9.	Arctiidae	1	1	1
	TOTAL	**29**	**50**	**88**

The families are represented through a small number a species. In 2009 there were catched the biggest number of individuals (fig. 3).

Fig. 3. The dynamics of the number of individuals catched at The Rose Garden area.



During these four years of study in The Botanical Garden Galați, were identified 200 species of nocturnal macrolepidoptera that belongs to 9 families.

Three of these families were encountered in each studied area: Geometridae, Noctuidae and Arctiidae family.

There were families poorly represented like Lymantriidae Family with only 2 species, and Drepanidae family with only 3 species. In other familiesc like Geometridae and Noctuidae, the number of species have increased every years almost in every collecting point. (fig.4).

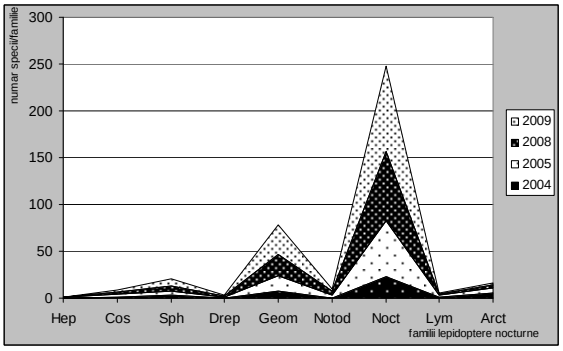


Fig.4. The dynamics of the nocturnal lepidopterofauna families during the research period in The Botanical Garden.

Conclusions

1. The best represented family in The Botanical Garden was Noctuidae Family with 125 species, followed by Geometridae Family with 41 species.
2.The increasing number of species and individuals can be correlated with the developing of the vegetation in The Botanical Garden.
3.In the Romanian Flora area and The Medicinal Flora area have been registered 6 families of nocturnal Lepidoptera every year, and in The Rose Garden only three families of moths.
4.The nocturnal lepidopterofauna came here from the surroundings areas like The Danube Meadow, The Siret Meadow, the gardens and parks from the city even from Dobrujda witch is very close to the studied area. The nocturnal Lepidoptera found here a suitable place for feeding and breeding, and some species had colonized this place like: *Tyta luctuosa, Emmelia trabealis, Hoplodrina ambigua* (Noctuidae). Other species catched only sporadically at the light traps could have been in a feeding flight in The Botanical Garden.

Rezumat

Studiul de față analizează fluctuațiile calitative şi cantitative ale faunei de lepidoptere nocturne pe parcursul instalării acestora pe teritoriul Grădinii Botanice Galați. Colectările s-au realizat pe parcursul a 4 ani (2004, 2005, 2008, 2009), rezultând un număr de 200 de specii ce fac parte din 9 familii. Familia Noctuidae este cea mai bine reprezentată cu 125 de specii. Am urmărit variația numărului de familii din fiecare an de colectare pe fiecare sector în parte, a numărului de specii din fiecare familie şi modificarea efectivelor populaționale.

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Table 4. The systematic list and the relative abundance of the nocturnal Lepidoptera from The Botanical Garden Galați

No.	Species	Relative abundance			
		2004	2005	2008	2009
	Fam. Hepialidae				
1	*Triodia sylvina* (LINNAEUS, 1761)	0	1	0	0
	Suprafamilia Cossoidea				
	Fam. Cossidae				
2	*Cossus cossus* (LINNAEUS, 1758)	0	1	0	1
3	*Zeuzera pyrina* (LINNAEUS, 1761)	0	1	2	1
4	*Phragmatecia castanea* (HÜBNER, 1790)	1	2	1	7
	Suprafamilia Bombycoidea				
	Fam.Sphingidae				
5	*Smerinthus ocelata* (LINNAEUS, 1758)	0	0	0	4
6	*Laothoe populi* (LINNAEUS, 1758)	0	0	1	4
7	*Agrius convolvuli* (LINNAEUS, 1758)	1	4	1	0
8	*Sphinx ligustri* (LINNAEUS, 1758)	0	1	0	0
9	*Macroglossum stellatum* (LINNAEUS, 1758)	0	1	3	1
10	*Hyles euphorbiae* (LINNAEUS, 1758)	0	0	1	4
11	*Hyles galii* (ROTTEMBURG, 1775)	5	4	0	2
12	*Hyles hyppophaes caucasica* (DENSO, 1913)	0	0	0	2
13	*Deilephila elpenor* (LINNAEUS, 1758)	0	0	0	1
14	*Deilephila porcellus* (LINNAEUS, 1758)	1	22	2	5
	Suprafamilia Drepanoidea				
	Fam. Drepanidae				
15	*Thyatira batis* (LINNAEUS, 1758)	0	0	1	0
16	*Habrosyne pyritoides* (HUFNAGEL, 1766)	0	0	0	2
17	*Tethea or* (DENIS&SCHIFFERMULLER, 1775)	0	1	0	0
	Suprafamilia Geometroidea				
	Fam. Geometridae				
18	*Ligdia adustata* (DENIS&SCHIFFERMÜLLER, 1775)	0	0	0	2
19	*Stegania dilectaria* (HÜBNER,1790)	1	0	3	1
20	*Heliomata glarearia* (DENIS&SCHIFFERMULLER, 1775)	1	2	0	0
21	*Macaria notata* (LINNAEUS, 1758)	0	1	4	0
22	*Semiothisa liturata* (CLERK, 1759)	0	0	3	2
23	*Chiasmia clathrata* (LINNAEUS, 1758)	0	22	1	0
24	*Godonella aestimaria sareptanaria* (STAUDINGER, 1871)	0	0	1	0
25	*Tephrina arenacearia* (DENIS&SCHIFFERMÜLLER, 1775)	0	18	36	21
26	*Eilicrinia cordiaria* (HÜBNER,1790)	0	0	1	1
27	*Colotois pennaria* (LINNAEUS, 1761)	0	0	1	0
28	*Biston betularia* (LINNAEUS, 1758)	0	1	0	0
29	*Peribatodes rhomboidaria* (DENIS&SCHIFFERMÜLLER, 1775)	0	4	17	47
30	*Ascotis selenaria* (DENIS&SCHIFFERMULLER, 1775)	1	8	0	2
31	*Ematurga atomaria* (LINNAEUS, 1758)	0	4	3	1
32	*Thetidia smaragdaria* (FABRICIUS,1787)	0	0	1	0
33	*Chlorissa viridata* (LINNAEUS, 1758)	1	5	0	2
34	*Phaiograma etruscaria* (ZELLER, 1849)	0	0	0	1
35	*Cyclophora suppuntaria* (ZELLER, 1847)	0	0	0	1
36	*Timandra comae* (SCHMIDT, 1931)	1	2	2	5
37	*Scopula corrivalaria* (KRETSCHMAR, 1862)	1	1	0	0
38	*Scopula marginepunctata* (GOEZE, 1781)	0	2	1	5
39	*Scopula flaccidaria* (ZELLER, 1852)	0	0	0	3
40	*Scopula subpuctaria* (HERRICH-SCHAFFER, 1847)	0	0	0	1
41	*Idaea ochrata* (SCOPOLI, 1763)	0	0	1	1
42	*Idaea rusticata* (DENIS&SCHIFFERMÜLLER1775)	0	0	1	34
43	*Idaea filicata* (HUBNER, 1799)	0	0	0	1
44	*Idaea dilutaria* (HÜBNER,1799)	0	0	6	0
45	*Idaea politaria* (HUBNER, 1799)	0	0	0	1
46	*Idaea dimidiata* (HUFNAGEL,1767)	0	0	1	6
47	*Idaea aversata* (LINNAEUS, 1758)	0	0	2	0
48	*Idaea degeneraria* (HÜBNER,1799)	0	0	4	4
49	*Idaea straminata* (BORKHAUSEN, 1794)	0	0	1	6
50	*Lythria purpuraria* (LINNAEUS, 1758)	1	1	2	2
51	*Lythria cruentaria* (HUFNAGEL, 1767)	0	0	0	2

52	*Xanthorhoe fluctuata* (LINNAEUS, 1758)	0	0	4	5
53	*Epirrhoe alternata* (MULLER, 1764)	0	0	0	1
54	*Costaconvexa polygrammata* (BORKHAUSEN, 1794)	0	1	2	8
55	*Eupithecia centaureata* (DENIS&SCHIFFERMÜLLER, 1775)	0	0	0	6
56	*Eupithecia innotata* (HUFNAGEL, 1767)	0	0	0	1
57	*Lithostege farinata* (HUFNAGEL, 1767)	0	1	0	4
58	*Lithostege griseata* (DENIS&SCHIFFERMULLER, 1775)	5	3	0	10
	Suprafamilia Noctuoidea				
	Fam.Notodontidae				
59	*Clostera curtula* (LINNAEUS, 1758)	0	1	1	1
60	*Clostera pigra* (HUFNAGEL, 1766)	0	1	3	0
61	*Clostera anastomosis* (LINNAEUS, 1758)	0	2	0	0
62	*Furcula furcula* (CLERK,1759)	0	0	1	0
63	*Notodonta zic zac* (LINNAEUS, 1758)	0	0	1	0
64	*Pterostoma palpina* (CLERK,1759)	0	0	2	1
	Suprafamilia Noctuoidea				
	Fam. Noctuidae				
65	*Acronicta megacephala* (DENIS&SCHIFFERMÜLLER, 1775)	0	0	1	2
66	*Acronicta rumicis* (LINNAEUS, 1758)	0	6	14	2
67	*Cryphia receptricula* (HUBNER, 1803)	0	0	0	1
68	*Paracolax tristalis* (FABRICIUS, 1794)	0	0	0	1
69	*Macrochilo cribrumalis* (HÜBNER,1793)	0	0	1	0
70	*Zanclongnatha lunalis* (SCOPOLI,1763)	0	0	1	0
71	*Catocala nupta* (LINNAEUS, 1767)	0	0	1	1
72	*Catocala elocata elocata* (ESPER, 1787)	1	1	0	3
73	*Dysgonia algira algira* (LINNAEUS, 1767)	0	1	7	13
74	*Prodotis stolida* (FABRICIUS,1775)	0	0	2	2
75	*Drasteria caucasica* (KOLENATI,1846)	0	0	2	15
76	*Lygephila craccae* (DENIS&SCHIFFERMÜLLER, 1775)	0	1	0	2
77	*Aedia leucomelas* (LINNAEUS, 1758)	0	1	6	7
78	*Tyta luctuosa* (DENIS&SCHIFFERMÜLLER, 1775)	6	39	94	205
79	*Scoliopteryx libatrix* (LINNAEUS, 1758)	0	1	1	0
80	*Colobochyla salicalis* (DENIS&SCHIFFERMÜLLER, 1775)	0	0	1	0
81	*Eutelia adulatrix* (HUBNER, 1813)	0	0	0	3
82	*Diachrysia chrysitis chrysitis* (LINNAEUS, 1758)	0	1	0	0
83	*Diachrysia tutti* (KOSTROWICKI, 1961)	0	2	0	0
84	*Macdunoughia confusa confusa* (STEPHENS,1850)	2	14	62	31
85	*Autographa gamma* (LINNAEUS, 1758)	2	14	36	51
86	*Abrostola triplasia* (LINNAEUS, 1758)	0	0	0	1
87	*Emmelia trabealis* (SCOPOLI, 1763)	22	22	53	171
88	*Acontia lucida* (HUFNAGEL,1766)	2	1	1	5
89	*Protodeltode pygarga* (HUFNAGEL, 1766)	0	1	0	0
90	*Eublema purpurina* (DENIS&SCHIFFERMÜLLER, 1775)	1	0	0	0
91	*Cucullia umbratica* (LINNAEUS, 1758)	0	2	0	0
92	*Calophasia lunula* (HUFNAGEL,1766)	0	0	1	1
93	*Calophasia opalina* (ESPER, 1793)	0	4	0	2
94	*Mycteroplus puniceago* (BOISDUVAL, 1840)	0	4	0	0
95	*Protoschinia scutosa* (DENIS&SCHIFFERMÜLLER, 1775)	0	4	2	3
96	*Heliothis viriplaca viriplaca* (HUFNAGEL, 1766)	1	3	0	0
97	*Heliothis peltigera* (DENIS&SCHIFFERMÜLLER, 1775)	0	0	0	11
98	*Helicoverpa armigera armigera* (HÜBNER,1808)	2	18	41	42
99	*Pyrrhia umbra* (HUFNAGEL, 1766)	0	1	0	1
100	*Elaphria venustula* (HÜBNER,1790)	0	1	0	0
101	*Caradrina morpheus* (HUFNAGEL, 1766)	0	0	5	2
102	*Platyperigea kadenii* (FREYER,1836)	1	1	24	10
103	*Paradrina clavipalpis* (SCOPOLI, 1763)	0	1	1	14
104	*Hoplodrina blanda* (DENIS&SCHIFFERMÜLLER, 1775)	0	0	3	2
105	*Hoplodrina ambigua* (DENIS&SCHIFFERMÜLLER, 1775)	5	38	210	65
106	*Charanyca trigrammica* (HUFNAGEL, 1766)	0	1	24	5
107	*Athetis gluteosa* (TREITSCHKE, 1835)	1	1	0	0
108	*Athetis furvula* (HÜBNER, 1808)	1	0	0	0
109	*Dypterigia scabriuscula* (LINNAEUS, 1758)	0	0	0	1
110	*Rusina ferruginea* (ESPER,1785)	0	0	1	0
111	*Talpophila matura* (HUFNAGEL, 1766)	0	0	0	1
112	*Trachea atriplicis* (LINNAEUS, 1758)	0	10	2	6
113	*Phlogophora meticulosa* (LINNAEUS, 1758)	0	0	0	5

114	*Ipimorpha retusa* (LINNAEUS, 1761)	0	0	2	0
115	*Enargia paleacea* (ESPER,1788)	0	0	1	0
116	*Enargia abluta* (HÜBNER,1808)	0	0	3	1
117	*Parastichtis suspecta* (HUBNER, 1817)	0	0	0	1
118	*Parastichtis ypsillon* (DENIS&SCHIFFERMÜLLER, 1775)	0	0	0	3
119	*Cosmia diffinis* (LINNAEUS, 1767)	0	0	0	2
120	*Cosmia pyralina* (DENIS&SCHIFFERMÜLLER, 1775)	0	0	1	3
121	*Cosmia trapezina* (LINNAEUS, 1758)	0	0	5	0
122	*Apamea anceps (*DENIS&SCHIFFERMÜLLER, 1775)	0	0	5	0
123	*Apamea scolopacina* (ESPER, 1788)	0	0	0	1
124	*Oligia strigilis* (LINNAEUS, 1758)	0	2	0	4
125	*Oligia versicolor* (BORKHAUSEN, 1792)	0	3	6	25
126	*Mesoligia furuncula* (DENIS&SCHIFFERMÜLLER, 1775)	0	0	2	3
127	*Mesoligia literosa* (HAWORTH,1809)	0	0	1	0
128	*Mesapamea secalis* (LINNAEUS, 1758)	0	1	1	1
129	*Photedes minima* (HAWORTH, 1809)	0	0	0	1
130	*Luperina testacea* (DENIS&SCHIFFERMÜLLER, 1775)	0	3	13	21
131	*Rhizedra lutosa* (HUBNER, 1803)	0	0	0	1
132	*Amphipoea fucosa* (FREYER, 1830)	0	0	27	0
133	*Nonagria typhae* (THUNBERG, 1784)	0	0	1	0
134	*Archanara neurica* (HÜBNER, 1790)	0	0	1	0
135	*Archanara dissoluta* (TREITSCHKE,1825)	0	0	20	0
136	*Archanara sparganii* (ESPER, 1790)	1	0	0	0
137	*Hadula trifolii* (HUFNAGEL,1766)	3	18	65	49
138	*Lacanobia w-latinum* (HUFNAGEL, 1766)	0	9	7	25
139	*Lacanobia suasa* (DENIS&SCHIFFERMÜLLER, 1775)	0	5	0	0
140	*Lacanobia oleracea* (LINNAEUS, 1758)	0	13	9	1
141	*Lacanobia blenna* (HÜBNER, 1824)	1	1	0	0
142	*Sideritis turbida* (ESPER, 1790)	0	0	0	1
143	*Mythimna turca* (LINNAEUS, 1761)	0	6	0	1
144	*Mythimna straminea* (TREITSCHKE, 1825)	0	0	2	1
145	*Mythimna vitellina* (HÜBNER,1808)	0	1	13	45
146	*Mythimna unipuncta* (HAWORTH, 1809)	0	0	0	2
147	*Mythimna albipuncta* (DENIS&SCHIFFERMÜLLER, 1775)	0	5	13	16
148	*Mythimna congrua* (HUBNER, 1717)	0	3	7	15
149	*Mythimna l-album* (LINNAEUS, 1767)	0	2	16	23
150	*Leucania comma* (LINNAEUS, 1761)	0	0	1	1
151	*Leucania obsoleta* (HÜBNER, 1803)	0	3	0	0
152	*Panolis flammea* (DENIS&SCHIFFERMÜLLER, 1775)	0	0	0	1
153	*Orthosia incerta* (HUFNAGEL,1766)	1	8	5	21
154	*Orthosia populeti* (FABRICIUS, 1781)	0	0	0	5
155	*Orthosia opima* (HUBNER, 1809)	0	0	0	2
156	*Orthosia gothica* (LINNAEUS, 1758)	0	0	0	16
157	*Anorthoa munda* (DENIS&SCHIFFERMÜLLER, 1775)	0	1	0	0
158	*Egira conspicillaris* (LINNAEUS, 1758)	0	3	5	24
159	*Athetmia centrago* (HAWORTH, 1809)	0	0	0	1
160	*Xanthia icterita* (HUFNAGEL, 1766)	0	0	1	4
161	*Xanthia gilvago* (DENIS&SCHIFFERMÜLLER, 1775)	1	0	3	0
162	*Xanthia ocellaris (*BORKHAUSEN, 1792)	0	0	1	9
163	*Agrochola litura* (LINNAEUS, 1761)	2	0	19	34
164	*Agrochola lota* (CLERK, 1759)	0	0	0	1
165	*Conistra rubiginosa* (SCOPOLI, 1763)	0	0	1	5
166	*Lithophane ornithopus ornithopus* (HUFNAGEL, 1766)	0	0	0	1
167	*Eupsilia transversa* (HUFNAGEL,1766)	0	1	2	13
168	*Dichonia convergens* (DENIS&SCHIFFERMÜLLER, 1775)	0	0	1	0
169	*Ulochlaena hirta* (HUBNER, 1813)	0	0	0	3
170	*Axylia putris* (LINNAEUS, 1761)	0	17	1	3
171	*Ochopleura plecta* (LINNAEUS, 1761)	0	6	0	3
172	*Noctua pronuba* (LINNAEUS, 1758)	0	0	23	23
173	*Noctua orbona* (HUFNAGEL,1766)	0	1	0	5
174	*Noctua interposita* (HÜBNER, 1790)	0	0	1	8
175	*Noctua fimbriata* (SCHREBER,1759)	0	0	10	14
176	*Noctua janthina* (DENIS&SCHIFFERMÜLLER, 1775)	0	1	2	4
177	*Xestia c-nigrum* (LINNAEUS, 1758)	0	21	54	39
178	*Xestia xantographa* (DENIS&SCHIFFERMÜLLER, 1775)	0	1	15	83
179	*Cerastis rubricosa* (DENIS&SCHIFFERMÜLLER, 1775)	0	5	0	21

180	*Cerastis leucographa* (DENIS&SCHIFFERMÜLLER, 1775)	0	1	0	0
181	*Euxoa aquilina* (DENIS&SCHIFFERMÜLLER, 1775)	1	0	0	0
182	*Euxoa hastifera pomazensis* (KOVACS,1952)	0	0	9	4
183	*Agrotis crassa* (HÜBNER,1803)	0	2	4	5
184	*Agrotis syricola* (BERIO, 1936)	0	0	0	3
185	*Agrotis ipsilon* (HUFNAGEL,1766)	3	2	0	4
186	*Agrotis exclamationis* (LINNAEUS, 1758)	0	12	31	101
187	*Agrotis segetum* (DENIS&SCHIFFERMÜLLER, 1775)	6	6	35	21
188	*Earias clorana* (LINNAEUS, 1761)	0	0	17	2
189	*Earias vernana* (FABRICIUS, 1787)	1	6	4	7
	Fam.Lymantriidae				
190	*Lymantria dispar* (LINNAEUS, 1758)	13	1	1	2
191	*Euproctis similis* (FUESSLY, 1775)	0	1	0	0
	Fam.Arctiidae				
192	*Atolmis rubricolis* (LINNAEUS, 1758)	2	1	0	0
193	*Eilema sororcula* (HUFNAGEL, 1766)	0	1	0	0
194	*Dysauxes ancilla* (LINNAEUS, 1767)	0	0	1	0
195	*Dysauxes punctata* (FABRICIUS, 1781)	0	0	2	0
196	*Phragmatobia fuliginosa* (LINNAEUS, 1758)	2	15	15	3
197	*Spilosoma lubricipeda* (LINNAEUS, 1758)	0	30	0	0
198	*Spilosoma urticae* (ESPER, 1789)	1	0	0	0
199	*Hyphantria cunea* (DRURY, 1773)	1	15	0	0
200	*Diaphora mendica* (CLERK, 1759)	2	4	0	8
	Total species/year	**41**	**97**	**113**	**141**
	Total individuals/year	**108**	**548**	**1179**	**1660**
	TOTAL SPECIES	**200**			
	TOTAL INDIVIDUALS	**3014**			

COMPLEXUL MUZEAL DE ŞTIINȚELE NATURII „ION BORCEA” BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 51 – 83

THE ELATERIDS COLLECTION CATALOGUE (COLEOPTERA: ELATERIDAE) FROM THE PATRIMONY OF „ION BORCEA” NATURAL SCIENCES MUSEUM COMPLEX OF BACĂU

LĂCRĂMIOARA GABRIELA ZAHARIA *

ABSTRACT

The Elateridae Collection Catalogue presents a number of 2897 specimen from 84 species, belonging to 32 genera from Elateridae family preserved in the patrimony of „Ion Borcea” Natural Sciences Museum Complex of Bacău.

Key words: Elateridae, collection, „Ion Borcea” Natural Science Museum Complex of Bacău

Introduction

Species of the Elateridae family (Coleoptera order) are distributed in almost all edaphic ecosystems, both natural (meadows, forests, dunes) and the anthropic (different crops and forestry). For fauna of Europe are cited so far 693 species (Fauna Europaea) and for the Central European area a number of 199 species from 61 genera. Out of the species quoted for Central Europe, in the fauna of our country have been identified 142 species belonging to the family Elateridae from 58 genera The first mention in Romania is a summary published by Carl Fuss in 1873 but species of this family have been sporadically studied in Romania most species cited are qouted in fauna inventory lists.

Material and method

The material studied is part of the entomological collections from the patrimony of Natural Sciences Complex Museum “Ion Borcea” from Bacău. There were analyzed 2897 specimens belonging to the family Elateridae, collected between the years 1956 – 2010 from 196 localities. Collection data are presented for each species separately in chronological order.

The specimens studied were collected directly from plants, mowing with the entomology net, on Barber traps, pheromone traps or light traps.

The paperwork presents tables with identified species, collecting sites and date, number of specimens, collectors’ name.

The abbreviation of colectors’ name

A.M. – Arinton Mihaela
A.P. – Apetrei P.
A.V./P.V. – Astanei/Pavel Valeria
C.C. – Chirilă Constantin
C.G./A.G. – Codreanu/Andrei Gabriela
C.L./Z.L. – Ciucă/Zaharia Lăcrămioara
C.M. – Ciubotaru Maria
D.I. – Dănilă Ioan
D.L. – Dospinescu Liliana
F.F. – Florin Feneru
G.A./D.A. – Goagă/Dima Aristița
G.D. – Guşă Delia
G.G. – Gurău Gabriela
H.D. – Herghelegiu D.
H.M. – Hongu Maria
J.O. – Jigău Ortansa
L.N. Lotrean Nicolae
M.A. – Marcu Aurelia
L.N. – Lotrean Neculai
P.C./M.C. – Pricopie/Marcoci Corina
P. E./M.E. – Păsălău/Mereuță Elena
P.O. – Pavel Otilia
R.D. – Rotaru D
R.G. – Răileanu G.
T.A. – Tăbăcaru A.
T.B. – Tomozii Bogdan
T.L. – Temelie L
V.M. – Voicu Maria

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1. Adâncata (SV)
2. Adjud (VN)
3. Agapia (NT)
4. Agigea (CT)
5. Almăj (NT)
6. Arama (SV)
7. Bacău (BC)
8. Balaur (NT)
9. Băbuşa (VS)
10. Bărboasa (BC)
11. Bălăneasa (BC)
12. Bălţăteşti (NT)
13. Bârnova (IS)
14. Bârsa Tamaşului PNPC* (BV)
15. Bârzuleşti (BC)
16. Bereşti-Tazlău (BC)
17. Berzunţi (BC)
18. Bibireşti (BC)
19. Bicaz Chei (NT)
20. Bicăjel (NT)
21. Bicăjel Depression (NT)
22. Bijghir (BC)
23. Brătila (BC)
24. Brodoc (VS)
25. Botoşani (BT)
26. Brusturoasa (BC)
27. Buda (AG)
28. Buhoci (BC)
29. Buhuşi (BC)
30. Burdujeni (SV)
31. Căiuţi (BC)
32. Călimani Mounts (SV)
33. Căşerie-Asău (BC)
34. Câmpul Lung Mold. (SV)
35. Ceacu (IL)
36. Ceahlău (NT)
37. Ceahlău - 7 Nov (NT)
38. Cheile Tişiţei (VN)
39. Cheile Turzii (CJ)
40. Chiril (SV)
41. Ciritei (NT)
42. Cluj (CJ)
43. Coman (BC)
44. Comorova (CT)
45. Copălău (BT)
46. Coşula (BT)
47. Coţofăneşti (BC)
48. Covasna (CV)
49. Cozia (NT)
50. Cozla (NT)
51. Curmătura PNPC (BV)
52. Dărmăneşti (BC)
53. Dărmăneşti (NT)
54. Deal Cârloman (NT)
55. Deal Cotmeanca (AG)
56. Dealul Mic PNPC (BV)
57. Dealul Vulpii (NT)
58. Doamna Stream (NT)
59. Dobrina (VS)
60. Dofteana (BC)
61. Dospineşti (BC)
62. Dumbrava (NT)
63. Drumul Găidarului (BC)
64. Drumul Runcului (Bc)
65. Durău (NT)
66. Făget-Cluj (CJ)
67. Fântânele-Durău (NT)
68. Filipeşti (BC)
69. Frumoasa (SV)
70. Găiceana (BC)
71. Gârboavele (GL)
72. Gherăieşti (BC)
73. Gioseni (BC)
74. Glodişoare (BC)
75. Grigoreni (BC)
76. Godovana (BC)
77. Gorovei (BT)
78. Gugeşti (VN)
79. Gura Tamaş PNPC* (BV)
80. Gura-Văii (BC)
81. Hanu Conachi (GL)
82. Hălăciu (IS)
83. Hăneşti (BT)
84. Heltiu (BC)
85. Hemeiuşi (BC)
86. Herculane (CS)
87. Holt (BC)
88. Horodiştea (BT)
89. Huşi (VS)
90. Iaşi (IS)
91. Iezer Păpuşa (SB)
92. Ilişeşti (SV)
93. Ion Creangă (NT)
94. Iteşti (BC)
95. Iţcani (SV)
96. Izvorul Alb (BC)
97. Izvorul Muntelui (NT)
98. Lala Stream (SV)
99. La Om Peak PNPC (BV)
100. Lespezi (BC)
101. Liteni (SV)
102. Livadă (BT)
103. Lozna (BT)
104. Luizi Călugăra (BC)
105. Luncani (BC)
106. Marele Grohotiş PNPC (BV)
107. Mangalia (CT)
108. Măgura (BC)
109. Mănăstirea Caşin (BC)
110. Mărăşti (BC)
111. Megheş (BC)
112. Mihai Eminescu (SV)
113. Moineşti (BC)
114. Mitocaş (SV)
115. Muchia Coţofenei PNPC (BV)
116. Nebunul Lake Danube Delta (TL)
117. Neptun (CT)
118. Nemira (BC)
119. Nicolae Bălcescu (BC)
120. Niculiţel (TL)
121. Padina Lăncii PNPC* (BV)
122. Ocloş (BC)
123. Oituz (BC)
124. Oneşti (BC)
125. Onişcani (BC)
126. Orşova (MH)
127. Perchiu (BC)
128. Piatra Craiului PNPC*(BV)
129. Piatra Mică PNPC* (BV)
130. Piatra Neamţ (NT)
131. Petreşti (VN)
132. Pietricica (NT)
133. Pietrosul Rodnei (SV)
134. Piteşti (AG)
135. Piscul Rai (AG)
136. Plopana (BC)
137. Poduri (BC)
138. Poiana Braşov (BV)
139. Poiana Sărată (BC)
140. Pomicola (BC)
141. Ponoare (SV)
142. Potoci (NT)
143. Prăjeşti (BC)
144. Pufu-Slănicel (BC)
145. Răcăciuni (BC)
146. Rădăuţi (SV)
147. Răchitoasa (BC)
148. Racova (BC)
149. Rediu (NT)
150. Rodnei Mounts (SV)
151. Roman (NT)
152. Ruginoasa (SV)
153. Ruginoasa (IS)
154. Runc (BC)
155. Salcia (SV)
156. Saturn (CT)
157. Sărărie (BC)
158. Schitu Goleşti (AG)
159. Sinaia (PH)
160. Simeria (HD)
161. Slănic Moldova (BC)
162. Slătioara (SV)
163. Sohodol (BC)
164. Strugari (BC)
165. Suceava (SV)
166. Şandru Mount (BC)
167. Şerbăneşti (BC)
168. Şpârlea (BV)
169. Ştefăneşti (NT)
170. Tazlău (NT)
171. Tescani (BC)

172. Timbacu Mare (BV)
173. Traian (BC)
174. Trebeş (BC)
175. Trivale (AG)
176. Tociloasa (BC)
177. Truşeşti (BT)
178. Tudora (SV)
179. Turnu Severin (MH)
180. Urecheşti (BC)
181. Valea Bârsei PNPC (BV)
182. Valea Budului (BC)
183. Valea Frumoasei (BC)
184. Valea Iaşului (AG)
185. Valea Seacă (BC)
186. Valea Tamaşului PNPC* (BV)
187. Valea Uzului (BC)
188. Vorona (BT)
189. Vărărie (NT)
190. Văratec (NT)
191. Vânători (NT)
192. Vultureni (BC)
193. Zău de Câmpie (MS)
194. Zănoaga PNPC* (BV)
195. Zboina Peak (VN)
196. Zeletin (BC)

* National Park Piatra Craiului

I. Subfamily Agrypninae
Tribe Agrypnini
Genus *Agrypnus*

1 *Agrypnus murinus* (Linnaeus, 1758)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Schitu Goleşti (AG)	14.05.1967	1	G.A.	G.A.	Z.L.
2	Frumoasa (SV)	04.05.1968	1	R.G.	R.G.	Z.L.
3	Ponoare (SV)	17.05.1968	1	R.G.	R.G.	Z.L.
4	Frumoasa (SV)	17.05.1968	1	R.G.	R.G.	Z.L.
5	Burdujeni (SV)	05.07.1968	1	R.G.	R.G.	Z.L.
6	Traian (BC)	22.05.1970	2	G.A.	G.A.	Z.L.
7	Ponoare (SV)	16.06.1970	1	R.G.	R.G.	Z.L.
8	V. Budului (BC)	17.07.1975	1	G.A.	G.A.	Z.L.
9	Racova (BC)	28.05.1978	1	G.A.	G.A.	Z.L.
10	Brusturoasa (BC)	17.05.1979	2	M.E.	M.E.	Z.L.
11	Tudora (SV)	25.06.1982	3	D.I.	D.I.	Z.L.
12	Tudora (SV)	11.07.1982	2	D.I.	D.I.	Z.L.
13	Tudora (SV)	21.07.1982	1	D.I.	D.I.	Z.L.
14	P. Neamţ (NT)	02.06.1984	1	D.A.	D.A.	Z.L.
15	P. Neamţ (NT)	03.06.1984	4	D.A.	D.A.	Z.L.
16	P. Neamţ (NT)	23.06.1984	1	D.A.	D.A.	Z.L.
17	Tudora (SV)	02.05.1985	1	D.I.	D.I.	Z.L.
18	P. Neamţ (NT)	11.05.1985	1	D.A.	D.A.	Z.L.
19	P. Neamţ (NT)	12.05.1985	1	D.A.	D.A.	Z.L.
20	V. Budului (BC)	13.05.1992	1	H.M.	H.M.	Z.L.
21	Gherăieşti (BC)	27.06.1993	1	H.M.	H.M.	Z.L.
22	V. Uzului (BC)	12.07.1993	1	D.A.	D.A.	Z.L.
23	Godovana (BC)	16.05.1994	12	D.A./C.M./ P.E./C.G	D.A./C.M./ P.E./C.G	Z.L.
24	M. Eminescu (SV)	29.05.1994	1	D.I.	D.I.	Z.L.
25	Hemeiuşi (BC)	03.06.1994	1	H.M.	H.M.	Z.L.
26	V. Uzului (BC)	08.07.1994	2	D.A.	D.A.	Z.L.
27	V. Uzului (BC)	09.07.1994	1	C.G.	C.G.	Z.L.
28	Hemeiuşi (BC)	04.08.1994	1	H.M.	H.M.	Z.L.
29	Niculiţel (TL)	12.09.1994	2	D.A.	D.A.	Z.L.
30	Pomicola (BC)	01.05.1995	2	P.E.	P.E.	Z.L.
31	Pomicola (BC)	18.05.1995	1	D.A.	D.A.	Z.L.
32	M. Eminescu (SV)	12.06.1995	1	D.I.	D.I.	Z.L.
33	V. Uzului (BC)	17.07.1995	1	H.M.	H.M.	Z.L.
34	V. Uzului (BC)	18.07.1995	1	C.M.	C.M.	Z.L.
35	Buhoci (BC)	22.05.1996	1	D.A.	D.A.	Z.L.
36	Buhoci (BC)	25.05.1996	1	P.E.	P.E.	Z.L.
37	V. Budului (BC)	28.05.1996	1	D.A.	D.A.	Z.L.
38	Luncani (BC)	03.06.1996	2	H.M.	H.M.	Z.L.
39	V. Uzului (BC)	06.07.1996	1	H.M.	H.M.	Z.L.

40	Slănic Mold. (BC)	25.05.1998	1	P.M.	P.M.	Z.L.
41	Făget-Cluj (CJ)	21.06.1998	1	H.M.	P.M.	Z.L.
42	Piteşti (AG)	29.05.1999	1	L.N.	L.N.	Z.L.
43	Potoci (NT)	28.06.1999	1	P.E.	P.M.	Z.L.
44	V. Budului (BC)	01.06.1999	1	J.O.	G.G.	Z.L.
45	Gherăieşti (BC	01.05.2000	1	C.L.	C.L.	Z.L.
46	Sărărie (BC)	26.06.2000	1	P.E.	P.M.	Z.L.
47	P. Craiului (BV)	06.06.2001	1	C.M.	C.L.	Z.L.
48	Vânători (NT)	07.06.2001	1	G.G.	G.O.	Z.L.
49	P. Craiului (BV)	08.06.2001	6	G.G.	C.L.	Z.L.
50	P. Craiului (BV)	08.06.2001	2	G.G.	P.M.	Z.L.
51	P. Craiului (BV)	08.06.2001	1	H.M.	P.M.	Z.L.
52	P. Craiului (BV)	08.06.2001	1	C.M.	C.L.	Z.L.
53	P. Sărată (BC)	25.07.2001	2	H.M.	G.O.	Z.L.
54	Zeletin (BC)	12.05.2002	1	C.L.	G.O.	Z.L.
55	Traian (BC)	20.05.2002	2	C.L.	C.L.	Z.L.
56	Zeletin (BC)	22.05.2002	8	C.L.	C.L.	Z.L.
57	Sărărie (BC)	03.06.2002	1	P.M.	P.M.	Z.L.
58	Huşi (VS)	13.05.2003	1	C.L.	C.L.	Z.L.
59	V. Bârsei (BV)	20.06.2003	1	P.O.	C.L.	Z.L.
60	Sărărie (BC)	23.06.2003	1	C.M.	C.M.	Z.L.
61	Sărărie (BC)	24.06.2003	1	G.G.	C.L.	Z.L.
62	Sărărie (BC)	26.06.2003	2	C.M.	Z.L.	Z.L.
63	Sărărie (BC)	26.06.2003	1	A.M.	Z.L.	Z.L.
64	P. Sărată (BC)	21.07.2003	1	G.G.	Z.L.	Z.L.
65	Căiuți (BC)	30.08.2003	1	Z.L.	G.O.	Z.L.
66	V. Budului (BC	11.05.2004	2	C.M.	G.O.	Z.L.
67	P. Craiului (BV)	21.05.2004	6	Z.L.	G.O.	Z.L.
68	P. Craiului (BV)	25.05.2004	1	Z.L.	G.O.	Z.L.
69	M. Eminescu (SV)	29.05.1994	1	D.I.	D.I.	Z.L.
70	P. Sărată (BC)	24.07.2004	2	C.M.	G.O.	Z.L.
71	Brodoc (VS)	25.07.2004	8	Z.L.	G.O.	Z.L.
72	Bacău (BC)	31.07.2004	1	A.G.	A.G.	Z.L.
73	Şpârlea (BV)	17.08.2004	1	G.D.	G.O.	Z.L.
74	Heltiu (BC)	15.04.2005	1	Z.L.	P.M.	Z.L.
75	Pietricica (NT)	10.05.2005	2	D.I.	D.I.	Z.L.
76	Cozia (NT)	19.05.2005	1	D.I.	D.I.	Z.L.
77	Căiuți (BC)	25.05.2005	2	Z.L.	P.M.	Z.L.
78	Ponoare (SV)	05.06.2006	1	D.I.	D.I.	Z.L.
79	Agigea (CT)	07.06.2008	2	Z.L.	G.O.	Z.L.
TOTAL			**135**			

Genus *Danosoma*
2 *Danosoma fasciata* (Linnaeus, 1758)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Tudora (SV)	07.07.1971	1	R.G.	R.G.	Z.L.
TOTAL			**1**			

Tribe Conoderini
Genus *Drasterius*
3 *Drasterius bimaculatus* (Rossi, 1790)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Holt (BC)	27.08.2005	1	A.M.	G.O.	Z.L.
TOTAL			1			

II. Subfamily Denticollinae
Tribe Denticollini
Genus *Hemicrepidius*
4 *Hemicrepidius hirtus* (Herbst, 1784)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name	Variety
1.	Suceava (SV)	21.07.1962	1	R.G.	R.G.	Z.L.	f.n.
2.	Burdujeni (SV)	5.07.1968	1	R.G.	R.G.	Z.L.	meles
3.	Perchiu (BC)	6.07.1970	1	G.A.	G.A.	Z.L.	f.n.
4.	Dofteana (BC)	26.07.1971	1	G.A.	G.A.	Z.L.	meles
5.	Tudora (SV)	27.07.1996	1	D.I.	D.I.	Z.L.	f.n.
6.	Racova (BC)	6.10.1983	1	P.E.	P.E.	Z.L.	meles
7.	Prăjeşti (BC)	11.06.1985	2	D.A.	D.A.	Z.L.	meles
8.	Dospineşti (BC)	15.06.1988	1	D.A.	D.A.	Z.L.	f.n.
9.	V. Uzului (BC)	16.07.1993	1	C.M.	C.M.	Z.L.	f.n.
10.	V. Uzului (BC)	7.04.1994	2	C.M.	C.M.	Z.L.	f.n.
11.	V. Uzului (BC)	8.07.1994	1	P.C.	P.C.	Z.L.	meles
12.	M. Eminescu (SV)	18.06.1995	1	D.I.	D.I.	Z.L.	f.n.
13.	Hemeiuşi (BC)	5.07.1995	1	C.M.	C.M.	Z.L.	meles
14.	Hemeiuşi (BC)	18.06.1996	1	H.M.	H.M.	Z.L.	meles
15.	Gherăieşti (BC)	23.06.1996	1	H.M.	H.M.	Z.L.	meles
16.	V. Uzului (BC)	06.07.1996	1	H.M.	H.M.	Z.L.	f.n.
17.	Tudora (SV)	27.07.1996	2	D.I.	D.I.	Z.L.	f.n.
18.	Hemeiuşi (BC)	25.06.1997	1	C.M.	C.M.	Z.L.	meles
19.	V. Uzului (BC)	4.07.1997	2	H.M.	H.M.	Z.L.	f.n.
20.	V. Uzului (BC)	6.07.1997	2	H.M./ P.E.	H.M./ P.E.	Z.L.	meles
21.	V. Uzului (BC)	7.07.1997	1	H.M.	H.M.	Z.L.	meles
22.	Bărboasa (BC)	20.06.1998	1	P.M.	P.M.	Z.L.	f.n.
23.	Făget (CJ)	21.06.1998	1	H.M.	C.L.	Z.L.	f.n.
24.	Sărărie (BC)	28.06.2000	2	C.L.	H.M./P.M.	Z.L.	f.n.
25.	Sărărie (BC)	15.07.2000	1	H.M.	C.L.	Z.L.	f.n.
26.	Roman (NT)	21.06.2002	1	C.L.	C.L.	Z.L.	f.n.
27.	P. Sărată (BC)	23.07.2002	1	C.M.	C.M.	Z.L.	f.n.
28.	Sărărie (BC)	26.06.2003	1	G.G.	C.L.	Z.L.	f.n.
29.	Sărărie (BC)	23.06.2003	2	J.O.	Z.L.	Z.L.	f.n.
30.	Sărărie (BC)	23.06.2003	2	G.G.	Z.L.	Z.L.	f.n.
31.	Sărărie (BC)	25.06.2003	5	J.O.	Z.L.	Z.L.	f.n.
32.	Sărărie (BC)	26.06.2003	5	G.G./A.M./C.M.	Z.L.	Z.L.	f.n.
33.	Vânători (NT)	23.06.2004	1	A.M.	G.O.	Z.L.	f.n.
34.	Chiril (SV)	10.06.2005	1	D.I.	D.I.	Z.L.	f.n.
35.	Agigea (CT)	07.06.2008	2	Z.L.	G.O.	Z.L.	f.n.
36.	N. Bălcescu (BC)	17.06.2008	1	P.E.	P.E.	Z.L.	f.n.
TOTAL			**53**				

5 *Hemicrepidius niger* (Linnaeus, 1758)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Adjud (VN)	06.03.1961	1	G.A.	G.A.	Z.L.
2	Sohodol (BC)	11.06.1961	1	G.A.	G.A.	Z.L.
3	Izvorul Alb (BC)	21.06.1963	4	R.G.	R.G.	Z.L.
4	Burdujeni (SV)	5.07.1968	3	G.A.	G.A.	Z.L.
5	Arama (SV)	05.08.1969	1	R.G.	R.G.	Z.L.
6	Slănic Mold. (BC)	08.05.1971	1	G.A.	G.A.	Z.L.
7	Slănic Mold. (BC)	09.06.1971	1	G.A.	G.A.	Z.L.

8	Slănic Mold. (BC)	11.06.1971	2	G.A.	G.A.	Z.L.
9	Slănic Mold. (BC)	02.07.1971	6	G.A.	G.A.	Z.L.
10	Slănic Mold. (BC)	20.07.1971	1	G.A.	G.A.	Z.L.
11	Tudora (BT)	07.07.1971	3	D.I.	D.I.	Z.L.
12	D. Runcului (Bc)	14.07.1971	1	G.A.	G.A.	Z.L.
13	Berzunți (BC)	25.05.1972	1	G.A.	G.A.	Z.L.
14	V-lea Frumoasei (BC)	15.07.1972	6	G.A.	G.A.	Z.L.
15	Racova (BC)	31.05.1973	1	G.A.	G.A.	Z.L.
16	Tazlău (NT)	08.08.1973	1	G.A.	G.A.	Z.L.
17	Grigoreni (BC)	04.06.1974	1	G.A.	G.A.	Z.L.
18	Hemeiuşi (BC)	29.07.1974	1	G.A.	G.A.	Z.L.
19	V. Budului (BC)	17.07.1975	1	G.A.	G.A.	Z.L.
20	Tr. Severin (MH)	30.07.1978	1	G.A.	G.A.	Z.L.
21	Prăjeşti (BC)	11.06.1985	1	D.A.	D.A.	Z.L.
22	P. Braşov (BV)	17.06.1990	1	P.E.	P.E.	Z.L.
23	P. Braşov (BV)	18.06.1990	6	P.E.	P.E.	Z.L.
24	V. Uzului (BC)	12.07.1993	2	D.A./ P.E.	D.A./ P.E.	Z.L.
25	Filipeşti (BC)	14.07.1993	1	D.A.	D.A.	Z.L.
26	Bacău (BC)	9.08.1993	1	H.M.	H.M.	Z.L.
27	Gherăieşti (BC)	30.04.1994	1	T.B.	P.M.	Z.L.
28	Vorona (BT)	21.05.1994	2	D.I.	D.I.	Z.L.
29	Găiceana (BC)	31.05.1994	1	D.L.	D.L.	Z.L.
30	Vorona (SV)	4.06.1994	7	D.I.	D.I.	Z.L.
31	V. Uzului (BC)	05.07.1994	7	P.V.	P.M.	Z.L.
32	Racova (BC)	05.06.1995	1	D.L.	D.L.	Z.L.
34	M. Eminescu (BT)	19.06.1995	1	D.I.	D.I.	Z.L.
35	V. Uzului (BC)	06.07.1994	1	H.M.	H.M.	Z.L.
36	V. Uzului (BC)	07.07.1994	3	P.E.	P.E.	Z.L.
37	V. Uzului (BC)	08.07.1994	7	C.G./D.A.	C.G./D.A.	Z.L.
38	Pomicola Bc (BC)	18.05.1995	1	D.A.	D.A.	Z.L.
39	Perchiu (BC)	13.07.1995	1	P.E.	P.E.	Z.L.
40	V. Uzului (BC)	16.07.1993	1	P.E.	P.E.	Z.L.
41	V. Uzului (BC)	17.07.1993	1	C.M.	C.M.	Z.L.
42	Zău de Câmpie (MS)	10.05.1996	1	C.M.	P.M.	Z.L.
43	Buhoci (BC)	25.05.1996	1	P.E.	P.E.	Z.L.
44	Buhoci (BC)	22.05.1996	5	P.E./G.A.	P.O./P.M.	Z.L.
45	V. Budului (BC)	28.05.1996	2	D.A./H.M.	P.M./H.M.	Z.L.
46	Luncani (BC)	3.06.1996	1	D.A.	P.M.	Z.L.
47	V. Uzului (BC)	4.06.1996	8	C.M.	C.M./M.C.	Z.L.
48	V. Uzului (BC)	7.06.1996	1	H.M.	H.M.	Z.L.
49	V. Uzului (BC)	8.06.1996	1	C.M.	C.M.	Z.L.
50	Hemeiuş (BC)	18.06.1996	1	H.M.	H.M.	Z.L.
51	V. Uzului (BC)	4.07.1996	4	C.M.	C.M.	Z.L.
52	V. Uzului (BC)	5.07.1996	5	C.M.	C.M./P.M.	Z.L.
53	V. Uzului (BC)	07.07.1996	1	C.M.	C.M.	Z.L.
54	Iteşti (BC)	5.05.1997	1	H.M.	P.M.	Z.L.
55	Bibireşti (BC)	1.06.1997	1	C.M.	C.G.	Z.L.
56	V. Budului (BC)	17.06.1997	10	P.O./C.M.	P.O./C.M.	Z.L.
57	V. Budului (BC)	23.06.1997	1	F.F.	P.M.	Z.L.
58	Hemeiuşi (BC)	25.06.1997	1	C.M.	C.M.	Z.L.
59	Ceahlău (NT)	02.07.1997	1	G.A.	P.O.	Z.L.
60	V. Uzului (BC)	04.07.1997	1	C.G.	P.M.	Z.L.
61	V. Uzului (BC)	05.07.1997	6	C.M.	P.M.	Z.L.

62	V. Uzului (BC)	06.07.1997	7	P.O./C.G./ P.E.	P.O./C.G./ P.M./P.E.	Z.L.
63	V. Budului (BC)	24.09.1997	1	C.M.	C.M.	Z.L.
64	Băbuşa (VS)	07.04.1998	1	C.C.	P.M.	Z.L.
65	Buda (AG)	4.06.1998	1	L.N.	L.N.	Z.L.
66	Făget (CJ)	21.06.1998	1	H.M.	P.M.	Z.L.
67	Iezer Păpuşa (SB)	27.06.1998	1	L.N.	L.N.	Z.L.
68	V. Uzului (BC)	06.07.1998	1	C.M.	P.M.	Z.L.
69	V. Uzului (BC)	07.07.1998	1	P.O.	P.O.	Z.L.
70	Trivale (AG)	8.07.1998	2	L.N.	L.N.	Z.L.
71	Vânători (NT)	1.06.2000	1	T.B.	P.M.	Z.L.
72	Sărărie (BC)	23.06.2000	2	P.E./P.M.	P.M.	Z.L.
73	Sărărie (BC)	24.06.2000	3	C.L./P.M.	C.L./P.M.	Z.L.
74	Sărărie (BC)	25.06.2000	1	P.M.	P.M.	Z.L.
75	Sărărie (BC)	26.06.2000	1	P.M.	P.M.	Z.L.
76	Sărărie (BC)	28.06.2000	21	C.L.	P.M.	Z.L.
77	Sărărie (BC)	29.06.2000	2	P.M./G.M.	P.M.	Z.L.
78	Sărărie (BC)	15.07.2000	6	C.L.	C.L.	Z.L.
79	V. Uzului (BC)	12.08.2000	1	P.E.	G.O.	Z.L.
80	V. Budului (BC)	15.05.2001	3	C.L.	P.M.	Z.L.
81	P. Craiului (BV)	06.06.2001	3	C.M.	C.L.	Z.L.
82	P. Craiului (BV)	07.06.2001	7	G.D.	Z.L.	Z.L.
83	P. Craiului (BV)	08.06.2001	34	G.G./G.D. C.M./H.M.	C.L./P.M.	Z.L.
84	Sărărie (BC)	21.06.2001	3	C.M.	Z.L.	Z.L.
85	Pufu-Slănicel (BC)	28.06.2001	14	A.M./C.M.	P.M./A.G.	Z.L.
86	Sărărie (BC)	28.06.2001	10	G.G.	P.M.	Z.L.
87	Pj.Zănoaga PC (BV)	28.06.2001	6	C.L.	C.L.	Z.L.
88	P. Craiului (BV)	08.06.2001	5	G.G.	P.M.	Z.L.
89	P. Sărată (BC)	23.07.2001	1	C.L.	C.L.	Z.L.
90	Pufu-Slănicel (BC)	28.07.2001	4	C.L.	C.L.	Z.L.
91	P. Sărată (BC)	28.07.2001	1	G.G.	C.L.	Z.L.
92	Sărărie (BC)	04.06.2002	1	P.M.	P.M.	Z.L.
93	V. Budului (BC)	10.06.2002	2	G.G.	Z.L.	Z.L.
94	Vânători (NT)	28.06.2002	1	T.B.	G.O.	Z.L.
95	Dofteana (BC)	03.07.2002	1	G.G.	Z.L.	Z.L.
96	Dealul Mic PC (BV)	09.07.2002	1	C.L.	C.L.	Z.L.
97	Sărărie (BC)	15.07.2002	1	P.M.	P.M.	Z.L.
98	P. Sărată (BC)	24.07.2002	1	P.M.	P.M.	Z.L.
99	V. Bârsei (BV)	20.06.2003	4	P.O.	C.L.	Z.L.
100	V. Budului (BC	10.06.2003	2	G.G.	Z.L.	Z.L.
101	Vânători (NT)	21.06.2003	1	T.B.	Z.L.	Z.L.
102	Sărărie (BC)	23.06.2003	11	J.O./G.G	Z.L.	Z.L.
103	Sărărie (BC)	23.06.2003	1	P.E.	P.M.	Z.L.
104	Sărărie (BC)	24.06.2003	18	G.G	Z.L.	Z.L.
105	Sărărie (BC)	25.06.2003	29	G.G./A.M./ J.O./C.M.	Z.L.	Z.L.
106	Sărărie (BC)	26.06.2003	11	G.G./A.M./ C.M.	Z.L.	Z.L.
107	Sărărie (BC)	29.06.2003	1	C.M.	Z.L.	Z.L.
108	P Craiului (BV)	9.07.2003	2	C.L.	C.L.	Z.L.
109	P. Sărată (BC)	21.07.2003	1	G.G.	P.M.	Z.L.
110	P. Sărată (BC)	22.07.2003	2	G.G.	Z.L.	Z.L.
111	V. Budului (BC)	03.06.2004	1	A.M.	P.M.	Z.L.

112	P. Sărată (BC)	21.06.2004	2	T.A.	G.O.	Z.L.
113	P. Sărată (BC)	23.06.2004	6	G.G.	G.O.	Z.L.
114	P. Sărată (BC)	24.06.2004	1	G.G.	G.O.	Z.L.
115	Vânători (NT)	23.06.2003	2	A.M.	G.O.	Z.L.
116	Călimani M. (SV)	24.07.2004	1	G.D.	G.O.	Z.L.
117	Bacău (BC)	31.07.2004	1	A.G.	A.G.	Z.L.
118	Suceava (SV)	12.06.2005	37	D.I.	D.I.	Z.L.
119	Ponoare (SV)	14.06.2005	4	D.I.	D.I.	Z.L.
120	Ruginoasa (SV)	24.06.2005	10	D.I.	D.I.	Z.L.
121	Agigea (CT)	07.06.2008	1	Z.L.	G.O.	Z.L.
TOTAL			**440**			

Genus *Crepidophorus*
6 *Crepidophorus mutilatus* (Rosenhauer, 1847)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Hemeiuşi (BC)	18.07.1974	1	G.A.	G.A.	Z.L.
2	V. Uzului (BC)	07.07.1994	1	P.E.	P.E.	Z.L.
3	V. Uzului (BC)	09.07.1994	1	C.G.	C.G.	Z.L.
4	V. Uzului (BC)	09.07.1996	1	C.M.	C.M.	Z.L.
5	V. Uzului (BC)	04.07.1997	1	C.G.	P.M.	Z.L.
6	V. Uzului (BC)	05.07.1997	1	C.M.	P.M.	Z.L.
7	V. Uzului (BC)	06.07.1997	1	C.M.	H.M.	Z.L.
8	Sărărie (BC)	27.06.2000	1	G.G.	P.M.	Z.L.
9	Sărărie (BC)	28.06.2000	1	C.L.	P.M.	Z.L.
10	Pufu - Slănicel (BC)	28.07.2001	3	C.L.	C.L.	Z.L.
11	Poiana Sărată (BC)	25.06.2003	1	J.O.	Z.L.	Z.L.
TOTAL			13			

Genus *Athous*
7 *Athous vittatus* (Fabricius, 1792)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name	Variety
1	Sinaia (PH)	30.05.1956	1	D.I.	D.I.	Z.L.	f.n.
2	Suceava (SV)	03.05.1965	1	R.G.	R.G.	Z.L.	f.n.
3	Mitocaş (SV)	03.06.1965	1	R.G.	R.G.	Z.L.	f.n.
4	Suceava (SV)	03.06.1965	1	R.G.	R.G.	Z.L.	f.n.
5	Gorovei (BT)	05.07.1968	1	G.A.	G.A.	Z.L.	f.n.
6	Bijghir (BC)	16.09.1972	1	G.A.	G.A.	Z.L.	angularis
7	Adâncata (SV)	16.09.1972	2	R.G.	R.G.	Z.L.	ocskayi
8	M. Eminescu (BT)	01.05.1995	2	D.I.	D.I.	Z.L.	f.n.
9	Heltiu (BC)	30.04.2002	1	C.L.	C.L.	Z.L.	f.n.
10	Dofteana (BC)	05.07.2002	1	C.G.	C.L.	Z.L.	f.n.
11	Valea Budului (BC)	11.05.2004	2	C.M.	G.O.	Z.L.	f.n.
12	Zeletin (BC)	12.05.2004	1	Z.L.	G.O.	Z.L.	f.n.
13	Poiana Sărată (BC)	24.06.2004	1	C.G.	P.M.	Z.L.	f.n.
14	Holt (BC)	21.05.2004	1	A.M.	G.O.	Z.L.	f.n.
15	Ruginoasa (IS)	24.06.2005	7	D.I.	D.I.	Z.L.	f.n.
TOTAL			**24**				

8 *Athous haemorrhoidalis* (Fabricius, 1801)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name	Variety
1	7 Nov-Ceahlău (NT)	05.08.1966	1	D.I.	D.I.	Z.L.	f.n.
2	C. Lung Mold (SV)	17.06.1968	1	R.G.	R.G.	Z.L.	f.n.
3	V. Seacă (BC)	08.07.1971	1	A.V.	A.V.	Z.L.	ruficaudis
4	Adâncata (SV)	16.09.1972	1	R.G.	R.G.	Z.L.	f.n.
5	Măgura (BC)	07.06.1978	1	A.V.	A.V.	Z.L.	f.n.
6	Tudora (BT)	01.05.1984	1	D.I.	D.I.	Z.L.	f.n.
7	Tudora (BT)	02.05.1985	7	D.I.	D.I.	Z.L.	f.n.
8	Botoşani (BT)	24.08.1985	1	D.I.	D.I.	Z.L.	f.n.
9	M. Eminescu (BT)	03.06.1994	4	D.I.	D.I.	Z.L.	f.n.
10	M. Eminescu (BT)	01.05.1995	2	D.I.	D.I.	Z.L.	f.n.
11	M. Eminescu (BT)	14.05.1995	3	D.I.	D.I.	Z.L.	f.n.
12	Pomicola (BC)	18.05.1995	1	P.E.	P.E.	Z.L.	deubeli
13	V. Uzului (BC)	17.07.1995	1	C.M.	C.M.	Z.L.	f.n.
14	Tociloasa (BC)	24.05.1996	1	C.C.	C.C.	Z.L.	f.n.
15	Simeria (HD)	13.05.1998	2	T.B.	T.B.	Z.L.	f.n.
16	Cheile Tişiţei (VN)	26.05.1998	1	D.I.	D.I.	Z.L.	f.n.
17	V. Budului (BC)	15.05.1999	1	D.A.	C.L.	Z.L.	f.n.
18	Trivale (AG)	29.05.1999	1	L.N.	L.N.	Z.L.	f.n.
19	Gherăieşti (BC)	01.05.2000	12	C.L.	C.L.	Z.L.	f.n.
20	V. Budului (BC)	15.05.2001	1	C.M.	C.L.	Z.L.	f.n.
21	P. Sărată (BC)	25.07.2001	1	H.M.	G.O.	Z.L.	f.n.
22	Zeletin (BC)	12.05.2002	1	Z.L.	G.O.	Z.L.	f.n.
23	Hemeiuşi (BC)	17.05.2002	1	Z.L.	Z.L.	Z.L.	f.n.
24	Zeletin (BC)	22.05.2002	1	Z.L.	Z.L.	Z.L.	f.n.
25	Heltiu (BC)	30.04.2003	1	Z.L.	Z.L.	Z.L.	f.n.
26	Luncani (BC)	12.05.2003	3	C.M.	C.M.	Z.L.	f.n.
27	Huşi-Dobrina (VS)	13.05.2003	1	Z.L.	Z.L.	Z.L.	f.n.
28	Zeletin (BC)	17.05.2003	1	Z.L.	Z.L.	Z.L.	f.n.
29	Căiuţi (BC)	29.05.2003	2	Z.L.	Z.L.	Z.L.	f.n.
30	Heltiu (BC)	30.04.2004	4	Z.L.	Z.L.	Z.L.	f.n.
31	V. Tamaşului (BV)	10.05.2004	2	G.D.	G.D.	Z.L.	f.n.
32	Gura Tamaş (BV)	22.04.2004	1	Z.L.	G.O.	Z.L.	f.n.
33	P. Craiului (BV)	22.05.2004	1	Z.L.	G.O.	Z.L.	f.n.
34	P. Sărată (BC)	24.07.2004	2	C.M.	G.O.	Z.L.	f.n.
35	V. Budului (BC)	11.05.2004	2	C.M.	G.O.	Z.L.	f.n.
36	Ilişeşti (BT)	16.05.2005	1	D.I.	D.I.	Z.L.	f.n.
37	Cozla (NT)	19.05.2005	3	D.I.	D.I.	Z.L.	f.n.
38	V. Budului (BC)	28.05.2008	1	P.E.	P.E.	Z.L.	f.n.
TOTAL			**73**				**f.n.**

9 *Athous sacheri* (Kiesenwetter, 1858)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Gorovei (BT)	05.07.1968	1	R.G.	R.G.	Z.L.
2	Gârboavele (GL)	22.06.1972	2	R.G.	R.G.	Z.L.
3	Gârboavele (GL)	06.07.1972	1	R.G.	R.G.	Z.L.
4	Gârboavele (GL)	07.07.1972	1	R.G.	R.G.	Z.L.
5	Bacău (BC)	24.07.1992	1	H.M.	H.M.	Z.L.
6	Hemeiuşi (BC)	25.06.1995	1	T.B.	H.M.	Z.L.
7	Gioseni (BC)	29.06.1996	1	C.M.	C.M.	Z.L.
8	Holt (BC)	05-10.05.2004	3	A.M.	G.O.	Z.L.
9	V. Budului (BC)	13.05.2004	1	P.M.	P.M.	Z.L.
10	Holt (BC)	07.05.2004	3	A.M.	G.O.	Z.L.
11	Holt (BC)	08.07.2004	7	A.M.	G.O.	Z.L.

12	Bacău (BC)	09.07.2004	1	P.M.	P.M.	Z.L.
13	Holt (BC)	10.07.2004	9	A.M.	G.O.	Z.L.
14	Bacău (BC)	12.07.2004	29	P.M.	G.O.	Z.L.
15	Bacău (BC)	13.07.2004	1	P.M.	P.M.	Z.L.
16	Bacău (BC)	14.07.2004	6	P.M.	G.O.	Z.L.
17	Holt (BC)	17-24.07.2004	1	A.M.	G.O.	Z.L.
18	Holt (BC)	24-31.07.2004	6	A.M.	G.O.	Z.L.
19	Bacău (BC)	25.07.2004	9	A.G.	A.G.	Z.L.
20	Bacău (BC)	25.07.2004	2	A.M.	P.M.	Z.L.
21	Bacău (BC)	25.07.2004	9	P.M.	P.M.	Z.L.
22	Bacău (BC)	28.07.2004	19	P.M.	G.O.	Z.L.
23	Bacău (BC)	31.07.2004	17	A.G.	A.G.	Z.L.
24	V. Budului (BC)	09.08.2004	1	P.M.	P.M.	Z.L.
25	Bacău (BC)	10.08.2004	4	P.M.	P.M.	Z.L.
26	Bacău (BC)	25.08.2004	17	P.M.	G.O.	Z.L.
27	Bacău (BC)	27.08.2004	1	P.M.	G.O.	Z.L.
28	Holt (BC)	23.07.2005	2	A.M.	G.O.	Z.L.
29	Bacău (BC)	18.07.2006	1	P.M.	P.M.	Z.L.
30	Bacău (BC)	26.07.2006	3	P.M.	P.M.	Z.L.
31	Bacău (BC)	29.07.2006	1	P.M.	P.M.	Z.L.
32	Bacău (BC)	03.08.2006	2	P.M.	P.M.	Z.L.
33	Bacău (BC)	07.08.2006	1	P.M.	P.M.	Z.L.
TOTAL			**164**			

10 *Athous subfuscus* (Müler, 1764)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Văratec (NT)	17.07.1962	1	G.A.	G.A.	Z.L.
2	Slătioara (SV)	18.07.1964	1	R.G.	R.G.	Z.L.
3	Sinaia (PH)	18.07.1965	3	R.G.	R.G.	Z.L.
4	Burdujeni (SV)	05.07.1968	1	R.G.	R.G.	Z.L.
5	Tudora (BT)	07.07.1971	4	D.I.	D.I.	Z.L.
6	Bălăneasa (BC)	08.09.1972	1	G.A.	G.A.	Z.L.
7	Bacău (BC)	09.07.1980	1	D.A.	D.A.	Z.L.
8	Tudora (BT)	10.06.1982	1	D.I.	D.I.	Z.L.
9	Tudora (BT)	11.07.1982	2	D.I.	D.I.	Z.L.
10	Tudora (BT)	01.05.1984	1	D.I.	D.I.	Z.L.
11	Tudora (BT)	15.05.1984	3	D.I.	D.I.	Z.L.
12	V. Uzului (BC)	07.07.1998	2	G.D	P.M.	Z.L.
13	Sărărie (BC)	24.06.2000	1	P.E.	P.M.	Z.L.
14	P. Craiului (BV)	06.06.2001	3	C.M.	C.L.	Z.L.
15	P. Craiului (BV)	07.06.2001	1	G.D.	G.D.	Z.L.
16	P. Craiului (BV)	08.06.2001	1	G.D.	C.L.	Z.L.
17	P. Craiului (BV)	28.06.2001	1	G.D.	P.M.	Z.L.
18	M. Coţofenei PNPC (BV)	24.07.2002	2	C.L.	C.L.	Z.L.
19	Vânători (NT)	21.06.2003	1	T.B.	Z.L.	Z.L.
20	Padina Lăncii PC (BV)	09.07.2003	5	C.L.	C.L.	Z.L.
22	V. Bârsei (BV)	20.04.2004	2	Z.L.	G.O.	Z.L.
23	Heltiu (BC)	30.04.2004	2	Z.L.	G.O.	Z.L.
24	M Călimani (SV)	24.07.2004	1	G.D.	G.O.	Z.L.
25	P. Craiului (BV)	22.05.2004	4	Z.L.	G.O.	Z.L.
26	D. Vulpii (NT)	15.07.2006	1	D.I.	D.I.	Z.L.
TOTAL			**47**			

11 *Athous zebei* (Bach, 1854)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Şandru M. (BC)	24.06.1998	1	G.A.	G.A.	Z.L.
2	Valea Frumoasei (BC)	15.07.1972	1	P.E.	P.M.	Z.L.
3	M. Eminescu (BT)	19.06.1995	1	D.I.	D.I.	Z.L.
4	Valea Uzului (BC)	06.07.1997	1	P.O.	P.O.	Z.L.
5	Dofteana (BC)	03.07.2003	1	G.G.	Z.L.	Z.L.
6	Dealul Mic PNPC (BV)	09.07.2002	1	H.M.	P.M.	Z.L.
7	Poiana Sărată (BC)	24.07.2002	1	P.M.	P.M.	Z.L.
8	Poiana Sărată (BC)	21.07.2003	1	G.G.	P.M.	Z.L.
9	Ilişeşti (SV)	16.05.2005	1	D.I.	D.I.	Z.L.
10	Ponoare (SV)	05.06.2005	2	D.I.	D.I.	Z.L.
11	Ponoare (SV)	14.06.2005	17	D.I.	D.I.	Z.L.
12	Ilişeşti (SV)	16.06.2005	22	D.I.	D.I.	Z.L.
13	Pietricica (NT)	22.06.2005	1	D.I.	D.I.	Z.L.
14	Ruginoasa (IS)	24.06.2005	3	D.I.	D.I.	Z.L.
TOTAL			54			

12 *Athous bicolor* (Goeze, 1777)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Valea Frumoasei (BC)	15.07.1972	1	P.E.	P.M.	Z.L.
2	Cheile Turzii (CJ)	24.06.1998	1	H.M.	P.M.	Z.L.
3	Hemeiuşi (BC)	17.06.2002	1	C.L.	C.L.	Z.L.
TOTAL			3			

13 *Athous austriacus* (Desbrochers, 1873)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Răcăciuni (BC)	25.06.1970	1	G.A.	G.A.	Z.L.
2	Slănic (BC)	02.07.1971	2	G.A.	G.A.	Z.L.
3	Slănic (BC)	12.07.1971	1	G.A.	G.A.	Z.L.
4	Grigoreni (BC)	04.06.1974	1	G.A.	G.A.	Z.L.
5	Perchiu (BC)	13.07.1995	1	P.E.	P.E.	Z.L.
6	Gherăieşti (BC)	07.08.1996	1	P.E.	P.E.	Z.L.
7	Făget (CJ)	21.06.1998	1	H.M.	C.L.	Z.L.
8	Cheile Turzii (CJ)	22.06.1998	2	P.E.	P.M.	Z.L.
9	Sărărie (BC)	26-27.06.2000	2	P.E.	P.M.	Z.L.
10	La Om Peak PNPC (BV)	10.07.2002	1	C.L	C.L.	Z.L.
11	Dealul Mic PC (BV)	09.07.2002	1	C.L	C.L.	Z.L.
12	P. Sărată (BC)	24.07.2004	1	C.M.	G.O.	Z.L.
13	Pietricica (NT)	22.06.2005	1	D.I.	D.I.	Z.L.
14	Ruginoasa (IS)	24.06.2005	5	D.I.	D.I.	Z.L.
TOTAL			21			

14 *Athous mollis* (Reitter, 1889)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Zboina Peak (VN)	27.06.1971	1	G.A.	G.A.	Z.L.
2	V. Frumoasei (BC)	15.07.1972	1	G.A.	G.A.	Z.L.
3	Izvorul Alb (BC)	21.07.1998	1	G.G.	G.O.	Z.L.
4	Hemeiuşi (BC)	17.05.2002	1	Z.L.	Z.L.	Z.L.
5	Moineşti (BC)	04.06.2003	1	Z.L.	Z.L.	Z.L.
6	Ruginoasa (IS)	24.06.2005	1	D.I.	D.I.	Z.L.
TOTAL			**6**			

15 *Athous jejunus* (Kiesenwetter, 1858)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors' name	preservers' name	identifier's name
1	Suceava (SV)	05.06.1963	1	R.G.	R.G.	Z.L.
TOTAL			1			

16 *Athous campyloides* (Newman, 1833)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors' name	preservers' name	identifier's name
1	Suceava (SV)	22.06.1961	1	R.G.	R.G.	Z.L.
2	Mitocaş (SV)	18.05.1964	1	R.G.	R.G.	Z.L.
3	Coţofăneşti (BC)	08.06.1970	3	G.A.	G.A.	Z.L.
4	Urecheşti (BC)	10.06.1970	2	G.A.	G.A.	Z.L.
5	Ponoare (SV)	16.06.1970	2	R.G.	R.G.	Z.L.
6	Răcăciuni (BC)	25.06.1970	1	G.A.	G.A.	Z.L.
7	Pietricica (NT)	27.04.1971	1	G.A.	G.A.	Z.L.
8	Tescani (BC)	11.06.1972	1	G.A.	G.A.	Z.L.
9	V. Frumoasei (BC)	15.08.1972	1	G.A.	G.A.	Z.L.
10	Brusturoasa (BC)	20.06.1974	1	G.A.	G.A.	Z.L.
11	Hemeiuşi (BC)	23.07.1974	1	G.A.	G.A.	Z.L.
12	Gherăieşti (BC)	07.06.1977	1	A.V.	A.V.	Z.L.
13	Racova (BC)	08.06.1977	1	G.A.	G.A.	Z.L.
14	Bacău (BC)	09.07.1980	1	G.A.	G.A.	Z.L.
TOTAL			**18**			

17 *Athous cavifrons* (Redtenbacher, 1858)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors' name	preservers' name	identifier's name
1	Agigea (CT)	08.06.2002	1	T.B.	T.B.	Z.L.
TOTAL			1			

Genus *Diacanthous*
18 *Diacanthous undulatus* (De Geer, 1774)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors' name	preservers' name	identifier's name
1	Suceava (SV)	27.07.1978	1	R.G.	R.G.	Z.L.
TOTAL			1			

Genus *Denticollis*
19 *Denticollis linearis* (Linnaeus, 1758)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors' name	preservers' name	identifier's name
1	Piatra Craiului (BV)	07.06.2001	1	G.D.	P.M.	Z.L.
2	Poiana Sărată (BC)	21.06.2004	1	T.A.	D.A.	Z.L.
TOTAL			**2**			

Genus *Dima*
20 *Dima elateroides* (Charpentier, 1825)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors' name	preservers' name	identifier's name
1	Piatra Craiului (BV)	20.06.2003	1	T.B.	P.M.	Z.L.
TOTAL			1			

Genus *Cidnopus*
21 *Cidnopus pilosus* (Leske, 1785)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Iţcani (SV)	14.05.1964	2	R.G.	R.G.	Z.L.
2	Suceava (SV)	31.05.1965	2	R.G.	R.G.	Z.L.
3	Suceava (SV)	18.06.1965	2	R.G.	R.G.	Z.L.
4	Cozla (NT)	17.05.1966	4	D.I.	D.I.	Z.L.
5	Doamna Stream (NT)	24.05.1966	1	V.M.	V.M.	Z.L.
6	Deal Cârloman (NT)	27.05.1966	1	V.M.	V.M.	Z.L.
7	Ştefăneşti (NT)	10.05.1967	1	V.M.	V.M.	Z.L.
8	Schitu Goleşti	14.05.1967	2	G.A.	G.A.	Z.L.
9	D. Cotmeanca (AG)	26.05.1967	1	G.A.	G.A.	Z.L.
10	Bicăjel Dep. (NT)	08.06.1967	3	G.A.	G.A.	Z.L.
11	Iţcani (SV)	02.05.1968	3	R.G.	R.G.	Z.L.
12	Dărmăneşti (NT)	17.06.1970	1	V.M.	V.M.	Z.L.
13	Dofteana (BC)	11.05.1971	1	G.A.	G.A.	Z.L.
14	Brusturoasa (BC)	20.06.1971	1	G.A.	G.A.	Z.L.
15	Hemeiuşi (BC)	30.06.1971	1	G.A.	G.A.	Z.L.
16	Slănic (BC)	02.07.1971	2	G.A.	G.A.	Z.L.
17	Coman (BC)	26.04.1972	1	G.A.	G.A.	Z.L.
18	Dărmăneşti (NT)	26.05.1972	3	V.M.	V.M.	Z.L.
19	D. Găidarului (BC)	23.05.1972	1	G.A.	G.A.	Z.L.
20	D. Pietricica (NT)	30.05.1972	2	V.M.	V.M.	Z.L.
21	Dărmăneşti (NT)	01.06.1972	1	V.M.	V.M.	Z.L.
22	Almăj (NT)	17.06.1972	1	V.M.	V.M.	Z.L.
23	V. Frumoasei (BC)	15.07.1972	2	G.A.	G.A.	Z.L.
24	Racova (BC)	31.05.1974	1	G.A.	G.A.	Z.L.
25	Grigoreni (BC)	04.06.1974	1	G.A.	G.A.	Z.L.
26	Măgura (BC)	06.06.1974	2	G.A.	G.A.	Z.L.
27	Brusturoasa (BC)	20.06.1974	4	G.A.	G.A.	Z.L.
28	Bicaz Chei (NT)	27.06.1974	1	V.M.	V.M.	Z.L.
29	Racova (BC)	11.06.1975	1	G.A.	G.A.	Z.L.
30	Gherăieşti (BC)	07.06.1977	1	A.V.	A.V.	Z.L.
31	Racova (BC)	08.06.1977	1	G.A.	G.A.	Z.L.
32	Herculane (CS)	01.06.1978	6	G.A.	G.A.	Z.L.
33	Herculane (CS)	02.06.1978	1	G.A.	G.A.	Z.L.
34	Herculane (CS)	05.06.1978	7	G.A.	G.A.	Z.L.
35	Herculane (CS)	07.06.1978	2	G.A.	G.A.	Z.L.
36	Brusturoasa (BC)	04.07.1978	6	G.A.	G.A.	Z.L.
37	Brusturoasa (BC)	17.05.1979	3	M.E.	M.E.	Z.L.
38	Bijghir (BC)	18.05.1979	3	G.A.	G.A.	Z.L.
39	Balaur (NT)	03.06.1980	1	V.M.	V.M.	Z.L.
40	Covasna (CV)	29.05.1982	5	D.A.	D.A.	Z.L.
41	Covasna (CV)	01.06.1982	2	D.A.	D.A.	Z.L.
42	Tudora (BT)	15.05.1984	1	D.I.	D.I.	Z.L.
43	Bereşti-Tazlău (BC)	12.06.1984	5	D.A.	D.A.	Z.L.
44	Tudora (BT)	02.05.1985	2	D.I.	D.I.	Z.L.
45	Bacău (BC)	15.06.1993	1	D.A.	D.A.	Z.L.
46	Găiceana (BC)	01.05.1994	1	D.A.	P.M.	Z.L.
47	Godovana (BC)	16.05.1994	19	D.A./P.E./D.L.	P.M./P.E./D.L.	Z.L.
48	Vorona (BT)	21.05.1994	3	D.I.	D.I.	Z.L.
49	Plopana (BC)	04.06.1994	1	D.A.	P.M.	Z.L.
50	M. Eminescu (BT)	14.05.1995	1	D.I.	D.I.	Z.L.
51	V. Uzului (BC)	17.07.1995	1	H.M.	H.M.	Z.L.
52	Zău de Câmpie (MS)	10.05.1996	1	C.L.	C.L.	Z.L.
53	Buhoci (BC)	22.05.1996	3	P.O./H.M./D.A.	P.O./H.M./P.M.	Z.L.

54	M. Eminescu (BT)	26.05.1996	1	D.I.	D.I.	Z.L.
55	Luncani (BC)	03.06.1996	1	H.M.	H.M.	Z.L.
56	P. Sărată (BC)	19.07.1996	1	D.A.	P.M.	Z.L.
57	V. Budului (BC)	24.09.1997	3	O.E.	P.M.	Z.L.
58	Bibireşti (BC)	22.05.1998	1	P.E.	P.M.	Z.L.
59	Hemeiuşi (BC)	13.06.1998	1	P.O.	P.O.	Z.L.
60	Trivale (AG)	29.05.1999	1	L.N.	L.N.	Z.L.
61	Izvorul Alb (BC)	25.06.1999	3	C.M.	G.O.	Z.L.
62	Gherăieşti (BC)	01.05.2000	11	C.L.	C.L./G.D.	Z.L.
63	Sărărie (BC)	26.06.2000	1	P.M.	P.M.	Z.L.
64	Poiana Sărată (BC)	28.07.2001	2	G.G.	C.L.	Z.L.
65	Izvorul Alb (BC)	15.05.2002	9	C.M.	G.O.	Z.L.
66	Traian (BC)	20.05.2002	7	C.L.	G.O.	Z.L.
67	Sărărie (BC)	25.06.2003	1	A.M.	Z.L.	Z.L.
68	Sărărie (BC)	29.06.2003	1	C.M.	Z.L.	Z.L.
69	V. Budului (BC)	11.05.2004	1	C.M.	G.O.	Z.L.
70	Zeletin (BC)	12.05.2002	1	Z.L.	G.O.	Z.L.
71	P. Craiului (BC)	21.05.2004	4	Z.L.	G.O.	Z.L.
72	P. Sărată (BC)	24.07.2004	1	C.M.	G.O.	Z.L.
73	Livadă (BT)	02.05.2005	2	D.I.	D.I.	Z.L.
74	Pietricica (NT)	10.05.2005	11	D.I.	D.I.	Z.L.
75	Pietricica (NT)	15.05.2005	1	D.I.	D.I.	Z.L.
76	Cozla (NT)	19.05.2005	1	D.I.	D.I.	Z.L.
77	Ponoare (SV)	05.06.2005	1	D.I.	D.I.	Z.L.
78	Ponoare (SV)	14.06.2005	1	D.I.	D.I.	Z.L.
79	Ilişeşti (SV)	16.06.2005	1	D.I.	D.I.	Z.L.
TOTAL			**195**			

Genus *Nothodes*
22 *Nothodes parvulus* (Panzer, 1799)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Izvorl Alb (BC)	21.06.1963	1	R.G.	R.G.	Z.L.
2	Ponoare (SV)	16.06.1970	1	R.G.	R.G.	Z.L.
3	Runc (BC)	10.06.1975	2	G.A.	G.A.	Z.L.
4	Tudora (BT)	02.05.1985	1	D.I.	D.I.	Z.L.
5	M. Eminescu (BT)	03.06.1994	1	D.I.	D.I.	Z.L.
6	Vorona (BT)	04.06.1994	1	D.I.	D.I.	Z.L.
7	Trivale (AG)	25.05.1999	2	L.N	L.N	Z.L.
8	Iaşi (IS)	15.05.2002	1	C.L.	C.L.	Z.L.
9	Zeletin (BC)	22.05.2002	2	C.L.	C.L.	Z.L.
10	Roman (NT)	21.06.2002	1	C.L.	C.L.	Z.L.
11	V. Budului (NT)	11.05.2004	2	C.M.	G.O.	Z.L.
12	Cozla (NT)	19.05.2005	1	D.I.	D.I.	Z.L.
13	Pietricica (NT)	03.07.2005	1	D.I.	D.I.	Z.L.
TOTAL			**17**			

Genus *Limonius*
23 *Limonius minutus* (Linnaeus, 1758)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Ponoare (NT)	21.06.1968	1	D.I.	D.I.	Z.L.
2	Adâncata (SV)	16.05.1972	1	R.G.	R.G.	Z.L.
3	Tudora (BT)	02.05.1985	1	D.I.	D.I.	Z.L.
4	Tudora (BT)	12.05.1985	2	D.I.	D.I.	Z.L.
5	Pufu Slănicel (BC)	28.06.2001	1	C.L.	C.L.	Z.L.

6	Horodiştea (BT)	12.07.2004	1	D.I.	D.I.	Z.L.
7	Pietricica (NT)	10.05.2005	2	D.I.	D.I.	Z.L.
8	Cozla (NT)	19.05.2005	3	D.I.	D.I.	Z.L.
TOTAL			**12**			

Tribe Prosternini
Genus *Ctenicera*
24 *Ctenicera virens* (Schrank, 1781)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors' name	preservers' name	identifier's name
1	Cheile Tişiţei (VN)	26.05.1998	1	D.I.	D.I.	Z.L.
2	P. Craiului (BV)	08.07.2001	2	C.M.	C.M.	Z.L.
3	P. Craiului (BV)	10.07.2003	1	C.L.	C.L.	Z.L.
4	Poiana Sărată (BC)	24.05.2004	1	Z.L.	G.O.	Z.L.
TOTAL			**5**			

25 *Ctenicera pectinicornis* (Linnaeus, 1758)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors' name	preservers' name	identifier's name
1	Valea Uzului (BC)	08.07.1994	1	C.M.	H.M.	Z.L.
2	Fântânele-Durău (PN)	09.06.1996	1	T.B.	C.M.	Z.L.
3	Poiana Sărată (BC)	23.07.2002	1	C.M.	C.M.	Z.L.
4	Sărărie (BC)	26.06.2003	1	C.M.	Z.L.	Z.L.
5	P. Craiului PNPC (BV)	21.05.2004	1	Z.L.	G.O.	Z.L.
6	Valea Bârsei (BV)	23.05.2004	1	Z.L.	G.O.	Z.L.
7	Bârsa Tamaşului PNPC (BV)	24.05.2004	1	Z.L.	G.O.	Z.L.
8	P. Craiului (BV)	26.05.2004	12	Z.L.	G.O.	Z.L.
TOTAL			**19**			

26 *Ctenicera heyeri* (Saxesen, 1838)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors' name	preservers' name	identifier's name
1	Fântânele-Durău (PN)	09.06.1996	1	T.B.	C.M.	Z.L.
2	Bârnova (IS)	28.06.1998	1	D.A.	D.A.	Z.L.
3	P. Craiului PNPC (BV)	08.06.2001	1	G.D.	Z.L.	Z.L.
4	Curmătura (BV)	28.06.2001	1	G.D.	Z.L.	Z.L.
5	Piatra Mică PNPC (BV)	02.07.2001	2	G.D.	Z.L.	Z.L.
6	Sărărie (BC)	25.06.2003	1	A.M.	Z.L.	Z.L
7	Valea Bârsei PNPC (BV)	23.05.2004	1	Z.L.	G.O.	Z.L.
8	P. Craiului PNPC (BV)	26.05.2004	1	Z.L.	G.O.	Z.L.
TOTAL			**9**			

27 *Ctenicera cuprea* (Fabricius, 1781)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors' name	preservers' name	identifier's name
1	Gherăieşti (BC)	08.07.1960	1	G.A.	G.A.	Z.L.
2	Izv. Muntelui (NT)	17.06.1966	1	V.M.	V.M.	Z.L.
3	Nemira (BC)	16.05.1970	1	G.A.	G.A.	Z.L.
4	Şandru Mount (BC)	16.07.1970	1	G.A.	G.A.	Z.L.
5	Pietricica Peak (NT)	14.05.1971	1	V.M.	V.M.	Z.L.
6	Nemira (BC)	14.07.1971	1	G.A.	G.A.	Z.L.
7	Nemira (BC)	01.06.1974	1	G.A.	G.A.	Z.L.
8	Agapia (NT)	28.05.1975	1	V.M.	V.M.	Z.L.
9	Valea Uzului (BC)	05.07.1997	1	P.E.	P.E.	Z.L.
10	P. Craiuluiu PNPC (BV)	08.06.2001	1	G.G.	C.L.	Z.L.
11	Curmătura PNPC (BV)	28.06.2001	2	C.L.	C.L.	Z.L.

12	Zănoaga PNPC (BV)	28.06.2001	1	C.L.	C.L.	Z.L.
13	Timbacu Mare (BV)	28.06.2001	1	G.D.	C.L.	Z.L.
14	Curmătura PNPC (BV)	18.05.2002	6	F.F.	C.L.	Z.L.
15	Curmătura PNPC (BV)	30.05.2002	5	F.F.	C.L.	Z.L.
16	Căşerie-Asău (BC)	05.06.2002	3	C.L.	C.L.	Z.L.
17	Lala Stream (SV)	15.06.2002	3	C.L.	C.L.	Z.L.
18	M-tii Rodnei (SV)	15.06.2002	1	C.L.	C.L.	Z.L.
19	M. Grohotiş PNPC (BV)	21.06.2003	1	P.O.	C.L.	Z.L.
20	Sărărie (BC)	24.06.2003	2	G.G.	C.L.	Z.L.
21	Sărărie (BC)	26.06.2003	1	C.M.	Z.L.	Z.L.
22	Piatra Mică PNPC (BV)	02.07.2003	1	G.D.	Z.L.	Z.L.
23	P. Craiului PNPC (BV)	21.05.2004	1	Z.L.	G.O.	Z.L.
24	P. Craiului PNPC (BV)	22.05.2004	1	Z.L.	G.O.	Z.L.
25	V. Bârsei PNPC (BV)	23.05.2004	1	Z.L.	G.O.	Z.L.
26	Bârsa Tamaş PNPC (BV)	24.05.2004	4	Z.L.	G.O.	Z.L.
27	P. Craiului PNPC (BV)	23.06.2004	4	G.D.	G.O.	Z.L.
28	P. Craiului PNPC (BV)	26.05.2004	98	Z.L.	G.O.	Z.L.
TOTAL			**146**			

Genus *Liotrichus*
28 *Liotrichus affinis* (Paykull, 1800)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Zănoaga PNPC (BV)	22.06.2001	1	C.L.	C.L.	Z.L.
2	P. Craiului PNPC (BV)	02.07.2001	1	G.D.	C.L.	Z.L.
3	V. Tamaş PNPC (BV)	10.05.2004	1	Z.L.	G.O.	Z.L.
TOTAL			**3**			

Genus *Actenicerus*
29 *Actenicerus sjaelandicus* (Müller, 1764)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Tudora (SV)	07.07.1971	1	D.I.	D.I.	Z.L.
2	Ponoare (SV)	14.05.1972	1	R.G.	R.G.	Z.L.
3	Tudora (SV)	15.07.1984	1	D.I.	D.I.	Z.L.
4	Slănic (BC)	15.06.2002	1	H.M.	H.M.	Z.L.
5	Cluj (CJ)	03.05.2003	1	Z.L.	Z.L.	Z.L.
6	Sărărie (BC)	23.06.2002	1	J.O.	Z.L.	Z.L.
7	Sărărie (BC)	24.06.2002	1	A.M.	Z.L.	Z.L.
8	Sărărie (BC)	26.06.2002	1	A.M.	Z.L.	Z.L.
9	Gura Tamaş PNPC (BV)	22.04.2004	1	Z.L.	G.O.	Z.L.
TOTAL			9			

Genus *Prosternon*
30 *Prosternon tessellatum* (Linnaeus, 1758)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Burdujeni (SV)	18.06.1963	1	R.G.	R.G.	Z.L.
2	Suceava (SV)	07.07.1964	1	R.G.	R.G.	Z.L.
3	Adâncata (SV)	09.05.1966	2	R.G.	R.G.	Z.L.
4	Lespezi (BC)	31.06.1967	1	G.A.	G.A.	Z.L.
5	Ponoare (SV)	21.06.1968	1	D.I.	D.I.	Z.L.
6	Slănic (BC)	20.07.1971	1	G.A.	G.A.	Z.L.
7	Vl. Frumosei (BC)	15.07.1972	1	G.A.	G.A.	Z.L.
8	Luizi Călugăra (BC)	03.08.1973	1	G.A.	G.A.	Z.L.
9	Hemeiuşi (BC)	07.06.1974	1	G.A.	G.A.	Z.L.
10	Mărăşti (BC)	13.06.1993	1	H.M.	H.M.	Z.L.

11	Gherăieşti (BC)	23.06.1993	1	D.A.	D.A.	Z.L.
12	Godovana (BC)	16.05.1994	4	P.E.	P.M.	Z.L.
13	Vorona (BT)	21.05.1994	2	D.I.	D.I.	Z.L.
14	M. Eminescu (BT)	29.05.1994	2	D.I.	D.I.	Z.L.
15	M. Eminescu (BT)	08.07.1994	1	D.I.	D.I.	Z.L.
16	Piscul Rai (AG)	12.07.1994	1	D.I.	D.I.	Z.L.
17	Niculiţel (TL)	12.09.1994	1	D.A.	D.A.	Z.L.
18	M. Eminescu (BT)	01.05.1995	1	D.I.	D.I.	Z.L.
19	Buhoci (BC)	22.05.1996	2	C.M./P.E.	C.M./P.M.	Z.L.
20	Bibireşti (BC)	24.05.1996	1	P.E.	P.M.	Z.L.
21	Tociloasa (BC)	24.05.1996	1	D.L.	D.L.	Z.L.
22	Valea Uzului (BC)	06.07.1997	1	C.M.	C.M.	Z.L.
23	Valea Uzului (BC)	07.07.1997	3	C.M.	C.M./C.G.	Z.L.
24	Valea Budului (BC)	13.05.1998	1	P.M	P.M	Z.L.
25	Bicăjel (NT)	18.07.2001	1	A.P.	A.P.	Z.L.
26	Poiana Sărată (BC)	25.07.2001	1	G.G.	Z.L.	Z.L.
27	Poiana Sărată (BC)	26.07.2001	1	C.M.	C.M.	Z.L.
28	La Om Peak PNPC (BV)	10.07.2002	2	C.L.	C.L.	Z.L.
29	Căiuţi (BC)	29.05.2003	1	Z.L.	Z.L.	Z.L.
30	V. Bârsei PNPC (BV)	20.04.2004	1	Z.L.	G.O.	Z.L.
31	Poiana Sărată (BC)	24.07.2004	1	Z.L.	G.O.	Z.L.
32	Brodoc (VS)	25.07.2004	2	Z.L.	G.O.	Z.L.
TOTAL			**43**			

31 *Prosternon chrysocomum* (Germar, 1843)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	M. Eminescu (BT)	01.05.1995	2	D.I.	D.I.	Z.L.
			2			

Genus *Anostirus*
32 *Anostirus purpureus* (Poda, 1761)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	S. Moldova (BC)	02.07.1971	1	G.A.	G.A.	Z.L.
2	Tudora (BT)	02.05.1985	1	D.I.	D.I.	Z.L.
3	Hemeiuşi (BC)	16.04.1994	1	T.B.	T.B.	Z.L.
4	M. Eminescu (BT)	08.05.1994	1	D.I.	D.I.	Z.L.
5	M. Caşin (BC)	03.05.1997	1	C.M.	C.M.	Z.L.
6	Sărărie (BC)	23.06.2003	2	G.G./A.M.	Z.L.	Z.L.
7	Gura Tamaş PNPC (BV)	22.04.2004	1	Z.L.	G.O.	Z.L.
TOTAL			8			

33 *Anostirus gracilicollis* (Stierlin, 1896)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Mănăstirea Caşin (BC)	23.05.2007	1	Z.L.	G.O.	Z.L.
TOTAL			**1**			

Genus *Metanomus*
34 *Metanomus infuscatus* (Eschscholtz, 1829)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	V-lea Tamaş PNPC (BV)	10.05.2004	2	Z.L.	G.O.	Z.L.
TOTAL			**2**			

Genus *Selatosomus*

35 *Selatosomus amplicollis* (Germar, 1843)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Tudora (BT)	15.05.1984	1	D.I.	D.I.	Z.L.
2	Valea Uzului (BC)	16.07.1993	1	H.M.	H.M.	Z.L.
3	V. Budului (BC)	11.05.1996	1	T.B.	T.B.	Z.L.
TOTAL			**3**			

36 *Selatosomus aeneus* (Linnaeus, 1758)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Tudora (BT)	15.05.1984	1	D.I.	D.I.	Z.L.
2	Valea Uzului (BC)	05.06.1994	1	H.M.	H.M.	Z.L.
3	Durău (NT)	18.06.1994	1	P.C.	P.C.	Z.L.
4	Valea Uzului (BC)	06.07.1996	1	C.C.	C.C.	Z.L.
5	Oneşti (BC)	19.08.1998	1	P.M.	P.M.	Z.L.
6	Poiana Sărată (BC)	27.07.2002	1	G.G.	G.O.	Z.L.
7	Pietrosul Rodnei (SV)	24.07.2004	2	G.D.	G.D.	Z.L.
TOTAL			**8**			

37 *Selatosomus latus* (Fabricius, 1801)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Salcia (SV)	29.04.1964	1	R.G.	R.G.	Z.L.
2	Iţcani (SV)	26.05.1964	1	R.G.	R.G.	Z.L.
3	Suceava (SV)	27.05.1965	1	R.G.	R.G.	Z.L.
4	Iţcani (SV)	02.05.1968	1	R.G.	R.G.	Z.L.
5	Burdujeni (BT)	05.07.1968	1	R.G.	R.G.	Z.L.
6	Suceava (SV)	26.06.1969	1	R.G.	R.G.	Z.L.
7	Rediu (NT)	08.05.1971	8	D.I.	D.I.	Z.L.
8	Rediu (NT)	30.05.1971	1	D.I.	D.I.	Z.L.
9	Slănic (BC)	02.07.1971	1	G.A.	G.A.	Z.L.
10	Ponoare (SV)	13.05.1972	1	R.G.	R.G.	Z.L.
11	Racova (BC)	31.05.1974	1	G.A.	G.A.	Z.L.
12	Hemeiuşi (BC)	15.05.1979	1	M.E.	M.E.	Z.L.
13	Dl Vulpii (NT)	21.05.1984	4	A.P.	A.P.	Z.L.
14	Tudora (BT)	02.05.1985	4	D.I.	D.I.	Z.L.
15	Gherăieşti (BC)	23.05.1993	1	D.A.	D.A.	Z.L.
16	Godovana (BC)	26.04.1994	36	D.A./P.E. C.M./C.G.	P.M./P.E. C.M./C.G.	Z.L.
17	Glodişoare (BC)	16.05.1994	1	H.M.	H.M.	Z.L.
18	Valea Uzului (BC)	05.07.1994	1	C.M.	P.M.	Z.L.
19	Valea Uzului (BC)	06.07.1994	2	H.M.	H.M.	Z.L.
20	Iteşti (BC)	08.05.1997	1	C.M.	C.M.	Z.L.
21	Vl. Budului (BC)	24.09.1997	1	P.E.	P.M.	Z.L.
22	Vl. Budului (BC)	11.05.2001	1	C.M.	Z.L.	Z.L.
23	Şerbăneşti (BC)	29.04.2002	3	T.B.	G.O.	Z.L.
24	Poiana Sărată (BC)	24.07.2002	1	P.M.	P.M.	Z.L.
25	Pomicola (BC)	29.07.2002	18	C.L.	P.M.	Z.L.
26	Cluj (CJ)	03.05.2003	2	Z.L.	Z.L.	Z.L.
27	Vl. Budului (BC)	07.05.2003	1	P.M.	P.M.	Z.L.
28	Vl. Budului (BC)	11.05.2004	1	C.M.	G.O.	Z.L.
29	Livadă (NT)	02.05.2005	1	D.I.	D.I.	Z.L.
30	Pietricica (NT)	10.05.2005	26	D.I.	D.I.	Z.L.
TOTAL			**124**			

Genus *Calambus*
38 *Calambus bipustulatus* (Linnaeus, 1767)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Truşeşti (BT)	11.05.2002	1	C.L.	C.L.	Z.L.
TOTAL			**1**			

Genus *Eanus*
39 *Eanus guttatus* (Germar, 1817)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Gura Tamaş PNPC (BV)	24.05.2004	3	Z.L.	G.O.	Z.L.
TOTAL			**3**			

III. Subfamily Elaterinae
Tribe Ampedini
Genus *Brachygonus*
40 *Brachygonus mergerlei* (Lacordaire, 1935)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Agigea (CT)	07.06.2008	1	Z.L.	G.O.	Z.L.
TOTAL			1			

Genus *Ampedus*
41 *Ampedus sanguineus* (Linnaeus, 1758)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Valea Uzului (BC)	15.07.1993	1	D.A.	H.M.	Z.L.
2	Valea Budului (BC)	15.05.2001	1	C.L.	P.M.	Z.L.
3	P. Sărată (BC)	24.06.2004	1	G.G.	G.O.	Z.L.
TOTAL			3			

42 *Ampedus pomonae* (Stephens, 1830)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Nebunu Lake Delta (TL)	08.06.2000	1	P.O.	P.O.	Z.L.
TOTAL			**1**			

43 *Ampedus sanguinolentus* (Schrank, 1776)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Valea Uzului (BC)	16.07.1993	1	P.E.	P.E.	Z.L.
2	M. Eminescu (BT)	08.06.1994	2	D.I.	D.I.	Z.L.
3	Valea Uzului (BC)	05.07.1997	1	C.M.	P.M.	Z.L.
TOTAL			4			

44 *Ampedus nigerrimus* (Lacordaire, 1835)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Sărărie (BC)	24.06.2002	1	P.M.	P.M.	Z.L.
2	Gura Tamaş PNPC (BV)	24.05.2004	2	Z.L.	G.O.	Z.L.
TOTAL			3			

45 *Ampedus nigroflavus* (Goeze, 1777)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	P. Craiului PNPC (BV)	08.06.2008	1	H.M.	P.M.	Z.L.
TOTAL			**1**			

46 *Ampedus pomorum* (Herbst , 1784)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Covasna (CV)	29.05.1982	1	D.A.	D.A.	Z.L.
2	M. Caşin (BC)	03.05.1996	1	C.M.	C.M.	Z.L.
3	Bibireşti (BC)	22.05.1998	1	P.E.	P.M.	Z.L.
4	Oituz (BC)	31.05.2003	1	C.L.	C.L.	Z.L.
5	Gura Tamaş PNPC (BV)	24.05.2004	1	Z.L.	G.O.	Z.L.
TOTAL			**5**			

47 *Ampedus elongatulus* (Fabricius , 1787)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Valea Uzului (BC)	14.07.1993	2	P.E.	P.E.	Z.L.
TOTAL			**2**			

48 *Ampedus elengatulus* (Schőnher , 1817)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Sărărie (BC)	23.06.2003	1	G.G.	Z.L.	Z.L.
TOTAL			**1**			

49 *Ampedus erythrogonus* (Müller , 1821)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Pietricica (NT)	15.05.2005	1	D.I.	D.I.	Z.L.
TOTAL			**1**			

50 *Ampedus sinuatus* (Germar , 1844)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Tudora (BT)	02.05.1985	1	D.I.	D.I.	Z.L.
2	Iaşi (IS)	15.05.2002	1	C.L.	C.L.	Z.L.
3	Căiuţi (BC)	29.05.2003	2	C.L.	C.L.	Z.L.
TOTAL			**4**			

51 *Ampedus rufipennis* (Stephens , 1830)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Buhoci (BC)	27.05.1996	1	P.E.	P.E.	Z.L.
TOTAL			**1**			

Tribe Elaterini
Genus *Elater*
52 *Elater ferrugineus* (Linnaeus, 1758)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Poiana Sărată (BC)	24.07.2003	1	H.M.	C.L.	Z.L.
TOTAL			**1**			

Tribe Melanotini
Genus *Melanotus*
53 *Melanotus brunnipes* (Germar, 1824)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Suceava (SV)	23.05.1963	1	R.G.	R.G.	Z.L.
2	Almăş (NT)	26.05.1966	1	V.M.	V.M.	Z.L.
3	Dărmăneşti (NT)	17.06.1970	3	V.M.	V.M.	Z.L.
4	Gura-Văii (BC)	17.06.1976	1	G.A.	G.A.	Z.L.
5	Tudora (BT)	02.06.1984	1	D.I.	D.I.	Z.L.
6	Trebeş (BC)	22.07.1993	2	H.M.	H.M.	Z.L.
7	M. Eminescu (BT)	03.06.1994	1	D.I.	D.I.	Z.L.
8	Valea Uzului (BC)	08.07.1994	1	H.M.	H.M.	Z.L.
9	Bălţăteşti (NT)	24.05.1996	1	D.A.	D.A.	Z.L.
10	Făget (CJ)	21.06.1998	1	H.M.	C.L.	Z.L.
11	Cheile Turzii (CJ)	23.06.1998	1	P.E.	P.M.	Z.L.
12	Hemeiuşi (BC)	17.05.2002	1	C.L.	C.L.	Z.L.
13	Gugeşti (VN)	14.06.2003	2	Z.L.	Z.L.	Z.L.
14	Zeletin (BC)	12.05.2004	1	Z.L.	Z.L.	Z.L.
15	Ponoare (SV)	14.06.2005	7	D.I.	D.I.	Z.L.
16	Căiuţi (BC)	25.07.2005	1	Z.L.	P.M.	Z.L.
17	Agigea (CT)	07.06.2008	75	Z.L.	P.M./G.O.	Z.L.
18	Agigea (CT)	23.06.2008	10	Z.L.	P.M.	Z.L.
19	Zeletin (BC)	23.07.2008	2	Z.L.	Z.L.	Z.L.
TOTAL			**113**			

54 *Melanotus fuscipes* (Gyllenhal, 1817)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Neptun (CT)	13.07.1966	1	R.G.	R.G.	Z.L.
2	Mangalia (CT)	09.08.1968	1	R.G.	R.G.	Z.L.
3	Agigea (CT)	27.07.2001	4	G.A.	G.O.	Z.L.
4	Agigea (CT)	28.07.2001	12	G.A.	G.O.	Z.L.
5	Agigea (CT)	27.07.2002	1	G.A.	G.O.	Z.L.
TOTAL			**19**			

55 *Melanotus rufipes* (Herbst, 1884)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Şandru M. (BC)	16.07.1970	1	G.A.	G.A.	Z.L.
2	Fântânele Durău (NT)	09.06.1996	1	T.B.	M.C.	Z.L.
3	Moineşti (BC)	04.06.2003	1	C.L.	C.L.	Z.L.
TOTAL			**3**			

56 *Melanotus castanipes* (Paykull, 1800)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Burdujeni (SV)	13.07.1969	2	R.G.	R.G.	Z.L.
2	Tudora (BT)	07.07.1971	1	D.I.	D.I.	Z.L.
3	Tudora (BT)	25.06.1982	1	D.I.	D.I.	Z.L.
4	M. Eminescu (BT)	03.06.1994	1	D.I.	D.I.	Z.L.
5	Vorona (BT)	18.06.1995	1	D.I.	D.I.	Z.L.
6	M. Eminescu (BT)	12.06.1995	2	D.I.	D.I.	Z.L.
7	Iteşti (BC)	14.05.1997	1	H.M.	H.M.	Z.L.
8	Vl. Budului (BC)	15.05.2000	1	H.M.	H.M.	Z.L.

9	Sărărie (BC)	24.06.2000	1	P.M.	P.M.	Z.L.
10	Truşeşti (BT)	14.05.2002	1	C.L.	C.L.	Z.L.
11	Holt (BC)	21.05.2005	1	A.M.	G.O.	Z.L.
TOTAL			**13**			

57 *Melanotus punctolineatus* (Pélerin, 1800)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Burdujeni (SV)	19.07.1969	2	R.G.	R.G.	Z.L.
2	Cheile Turzii (CJ)	23.06.1998	1	P.E.	P.M.	Z.L.
3	Petreşti (VN)	08.06.2003	1	C.L.	C.L.	Z.L.
4	P. Sărată (BC)	24.07.2004	1	Z.L.	G.O.	Z.L.
TOTAL			**5**			

58 *Melanotus tenebrosus* (Erichson, 1841)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Hemeiuşi (BC)	30.05.1995	1	C.M.	C.M.	Z.L.
2	Agigea (CT)	08.06.2002	1	G.A.	G.O.	Z.L.
3	Pomicola (BC)	17.06.2002	1	C.L.	G.O.	Z.L.
4	Căiuţi (BC)	18.06.2002	1	C.L.	C.L.	Z.L.
5	Hălăciu (IS)	22.05.2003	1	Z.L.	Z.L.	Z.L.
6	Agigea (CT)	07.06.2008	2	Z.L.	G.O.	Z.L.
TOTAL			**7**			

59 *Melanotus crassicollis* (Erichson, 1841)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Burdujeni (SV)	07.06.1964	1	R.G.	R.G.	Z.L.
2	Iteşti (BC)	05.06.1979	1	M.E.	M.E.	Z.L.
3	Racova (BC)	24.06.1980	1	D.L.	D.L.	Z.L.
4	Tudora (SV)	02.06.1984	1	D.I.	D.I.	Z.L.
5	Sascut (BC)	30.06.1988	1	D.A.	D.A.	Z.L.
6	Bacău (BC)	26.06.1993	1	P.E.	P.E.	Z.L.
7	Valea Uzului (BC)	07.07.1993	1	T.B.	T.B.	Z.L.
8	Bacău (BC)	02.08.1993	1	J.O.	J.O.	Z.L.
9	Bacău (BC)	03.08.1993	1	M.C.	M.C.	Z.L.
10	Bacău (BC)	03.08.1994	3	P.E.	P.M.	Z.L.
11	Bacău (BC)	14.05.1996	1	P.E.	P.E.	Z.L.
12	Bacău (BC)	07.06.1996	7	G.G.	G.G.	Z.L.
13	Bacău (BC)	08.06.1996	2	G.G.	G.G.	Z.L.
14	Bacău (BC)	27.06.1996	1	G.G.	G.G.	Z.L.
15	Bacău (BC)	03.08.1998	1	P.E.	P.M.	Z.L.
16	Vultureni (BC)	05.06.1999	1	P.M.	P.M.	Z.L.
17	Gherăieşti (BC)	01.05.2000	1	C.L.	C.L.	Z.L.
18	Căiuţi (BC)	19.05.2001	1	C.L.	C.L.	Z.L.
19	Sărărie (BC)	21.06.2001	1	C.M.	C.L.	Z.L.
20	Poiana Sărată (BC)	28.07.2001	1	G.G.	Z.L.	Z.L.
21	Holt (BC)	17.06.2003	3	A.M.	C.L.	Z.L.
22	Bacău (BC)	20.06.2003	1	P.E.	C.L.	Z.L.
23	Bacău (BC)	28.06.2003	1	P.E.	C.L.	Z.L.
24	Holt (BC)	10.05.2004	2	A.M.	G.O.	Z.L.
25	Holt (BC)	04.07.2004	1	A.M.	G.O.	Z.L.
26	Holt (BC)	08.07.2004	3	A.M.	G.O.	Z.L.
27	Bacău (BC)	09.07.2004	2	P.M.	P.M.	Z.L.
28	Holt (BC)	10.07.2004	1	A.M.	G.O.	Z.L.

29	Bacău (BC)	10.07.2004	2	P.M.	G.O.	Z.L.
30	Bacău (BC)	12.07.2004	13	P.M.	G.O.	Z.L.
31	Holt (BC)	17.07.2004	3	A.M.	G.O.	Z.L.
32	Poiana Sărată (BC)	24.07.2004	1	Z.L.	G.O.	Z.L.
33	Bacău (BC)	25.07.2004	3	P.M.	A.G.	Z.L.
34	Bacău (BC)	31.07.2004	2	P.M.	A.G.	Z.L.
35	Bacău (BC)	25.08.2004	2	P.M.	G.O.	Z.L.
36	Pietricica (NT)	08.05.2005	1	D.I.	D.I.	Z.L.
37	Holt (BC)	21.05.2005	2	A.M.	G.O.	Z.L.
38	Holt (BC)	23.07.2005	2	A.M.	G.O.	Z.L.
39	Bacău (BC)	21.06.2007	1	P.E.	P.M.	Z.L.
40	Agigea (CT)	07.06.2008	3	Z.L.	G.O.	Z.L.
TOTAL			**78**			

Tribe Agriotini
Genus *Agriotes*
60 *Agriotes acuminatus* (Stephens, 1830)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Iţcani (SV)	02.06.1964	2	R.G.	R.G.	Z.L.
2	Vl. Iaşului (AG)	23.06.1968	6	R.G.	R.G.	Z.L.
3	Urecheşti (BC)	10.08.1970	1	G.A.	G.A.	Z.L.
4	Vorona (BT)	04.06.1994	1	D.I.	D.I.	Z.L.
5	Trivale (AG)	25.05.1999	2	G.R	G.R.	Z.L.
6	Căiuţi (BC)	15.05.2001	2	C.L.	C.L.	Z.L.
TOTAL			14			

61 *Agriotes gallicus* (Schaller, 1783)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Onişcani (BC)	30.08.1971	1	G.A.	G.A.	Z.L.
2	Vl. Frumoasei (BC)	15.07.1972	2	G.A.	G.A.	Z.L.
3	Hemeiuşi (BC)	27.07.1972	1	G.A.	G.A.	Z.L.
4	Hemeiuşi (BC)	15.07.1974	2	G.A.	G.A.	Z.L.
5	Perchiu (BC)	29.07.1976	1	G.A.	G.A.	Z.L.
6	N. Bălcescu (BC)	06.06.1977	1	G.A.	G.A.	Z.L.
7	Hemeiuşi (BC)	10.07.1978	2	G.A.	G.A.	Z.L.
8	Racova (BC)	26.06.1979	1	G.A.	G.A.	Z.L.
9	N. Bălcescu (BC)	19.07.1979	1	G.A.	G.A.	Z.L.
10	Răchitoasa (BC)	23.07.1980	1	G.A.	G.A.	Z.L.
11	Hemeiuşi (BC)	25.07.1982	1	D.A.	D.A.	Z.L.
12	Măgura (BC)	23.07.1984	1	D.A.	D.A.	Z.L.
13	Bacău (BC)	04.08.1984	1	D.A.	D.A.	Z.L.
14	Rădăuţi (SV)	18.08.1992	1	P.M.	P.M.	Z.L.
15	Vl. Uzului (BC)	25.08.2000	1	C.L.	C.L.	Z.L.
16	Poiana Sărată (BC)	23.07.2001	1	G.G.	C.L.	Z.L.
17	Roman (Nt)	17.06.2003	1	A.M.	Z.L.	Z.L.
18	Sărărie (BC)	24.06.2003	1	G.G.	Z.L.	Z.L.
19	Poiana Sărată (BC)	22.07.2003	1	G.G.	Z.L.	Z.L.
20	Ponoare (SV)	14.06.2005	1	G.G.	Z.L.	Z.L.
TOTAL			**23**			

62 *Agriotes ustulatus* (Schaller, 1783)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name	variety
1	Tr. Severin (MH)	20.07.1965	1	R.G.	R.G.	Z.L.	f.n.
2	Herculane (CS)	21.07.1965	2	R.G.	R.G.	Z.L.	f.n.
3	Ocloş (BC)	29.07.1966	1	G.A.	G.A.	Z.L.	gilvelus
4	Orşova (MH)	06.07.1967	2	R.G.	R.G.	Z.L.	f.n.
5	Gherăieşti (BC)	10.07.1970	1	G.A.	G.A.	Z.L.	flavicornis
6	Ion Creangă (NT)	21.07.1970	1	G.A.	G.A.	Z.L.	flavicornis
7	Zboina Peak (VN)	27.06.1971	1	G.A.	G.A.	Z.L.	flavicornis
8	Slănic Mold. (BC)	02.07.1971	1	G.A.	G.A.	Z.L.	flavicornis
9	D. Runcului (BC)	14.07.1971	1	G.A.	G.A.	Z.L.	f.n.
10	Agapia (NT)	10.08.1971	1	R.G.	R.G.	Z.L.	f.n.
11	Orşova (MH)	06.07.1972	1	R.G.	R.G.	Z.L.	f.n.
12	Vl. Frumoasei (BC)	14.07.1972	2	G.A.	G.A.	Z.L.	gilvelus
13	Vl. Frumoasei (BC)	15.07.1972	1	G.A.	G.A.	Z.L.	flavicornis
14	Ion Creangă (NT)	21.07.1972	1	G.A.	G.A.	Z.L.	flavicornis
15	Bârzuleşti (BC)	04.08.1972	1	G.A.	G.A.	Z.L.	gilvelus
16	Vl. Budului (BC)	17.07.1973	4	G.A.	G.A.	Z.L.	flavicornis
17	Hemeiuşi (BC)	15.07.1974	1	G.A.	G.A.	Z.L.	flavicornis
18	Hemeiuşi (BC)	18.07.1974	2	G.A.	G.A.	Z.L.	flavicornis gilvelus
19	Hemeiuşi (BC)	11.07.1975	1	G.A.	G.A.	Z.L.	flavicornis
20	Valea Seacă (BC)	14.07.1975	1	H.D.	H..D	Z.L.	flavicornis
21	Valea Seacă (BC)	14.07.1975	1	T.L.	T.L.	Z.L.	flavicornis
22	Brătila (BC)	16.07.1975	1	H.D.	H..D	Z.L.	flavicornis
23	Megheş (BC)	19.08.1975	1	G.A.	G.A.	Z.L.	flavicornis
24	Hemeiuşi (BC)	14.07.1976	5	G.A.	G.A.	Z.L.	4 flavicornis 1 f.n.
25	Măgura (BC)	11.08.1976	1	G.A.	G.A.	Z.L.	flavicornis
26	Hemeiuşi (BC)	27.06.1977	2	G.A.	G.A.	Z.L.	flavicornis
27	N. Bălcescu (BC)	06.07.1977	3	G.A.	G.A.	Z.L.	1 flavicornis 1 gilvelus 1 f.n.
28	Tr Severin (CS)	27.07.1978	1	G.A.	G.A.	Z.L.	flavicornis
29	Racova (BC)	08.08.1978	1	G.A.	G.A.	Z.L.	flavicornis
30	Racova (BC)	26.06.1979	6	G.A.	G.A.	Z.L.	1 f.n. 4 flavicornis
31	Racova (BC)	27.06.1979	1	G.A.	G.A.	Z.L.	flavicornis
32	Runc (BC)	28.06.1979	2	G.A.	G.A.	Z.L.	flavicornis
33	N. Bălcescu (BC)	19.07.1979	3				1 flavicornis 2 gilvelus
34	Răchitoasa (BC)	23.07.1980	1	A.V.	A.V.	Z.L.	flavicornis
35	Urecheşti (BC)	30.06.1981	6	D.A.	D.A.	Z.L.	3 f.n. 3 flavicornis
36	Racova (BC)	04.07.1981	2	D.A.	D.A.	Z.L.	1 f.n. 1 flavicornis
37	Urecheşti (BC)	17.07.1981	1	D.A.	D.A.	Z.L.	flavicornis
38	Hemeiuşi (BC)	25.07.1982	4	D.A.	D.A.	Z.L.	2 f.n. 2 flavicornis
39	Hemeiuşi (BC)	16.08.1982	1	D.A.	D.A.	Z.L.	f.n.
40	Bacău (BC)	20.06.1983	7	D.A.	D.A.	Z.L.	2 f.n. 5 flavicornis
41	Strugari (BC)	19.07.1983	4	D.A.	D.A.	Z.L.	1 f.n. 3 flavicornis
42	Tudora (BT)	01-02.06.1984	5	D.I.	D.I.	Z.L.	f.n
43	Tudora (BT)	20.06.1984	7	D.I.	D.I.	Z.L.	3 f.n 3 flavicornis 1 gilvelus
44	Bacău (BC)	26.07.1984	1	D.A.	D.A.	Z.L.	flavicornis
45	Balcani (BC)	28.07.1984	2	D.A.	D.A.	Z.L.	f.n.
46	Bacău (BC)	04.08.1984	6	D.A.	D.A.	Z.L.	4 f.n. 2 flavicornis
47	D. Vulpii (NT)	19.05.1985	9	D.I.	D.I.	Z.L.	6 f.n 3 flavicornis
48	D. Vulpii (NT)	21.05.1985	3	D.I.	D.I.	Z.L.	2 f.n 1 flavicornis

49	Fântânele (BC)	18.07.1990	1	D.A.	D.A.	Z.L.	gilvelus
50	Hemeiuşi (BC)	18.07.1990	1	D.A.	D.A.	Z.L.	flavicornis
51	Brusturoasa (BC)	27.07.1990	1	D.A.	D.A.	Z.L.	flavicornis
52	Racova (BC)	17.07.1991	13	D.A.	D.A.	Z.L.	10 f.n 3 flavicornis
53	Buhuşi (BC)	23.07.1991	13	P.E.	P.E.	Z.L.	7 f.n. 2 gilvelus 4 flavicornis
54	Buhuşi (BC)	23.07.1991	1	D.A.	D.A.	Z.L.	flavicornis
55	Brusturoasa (BC)	24.07.1991	4	R.D.	D.A.	Z.L.	2 f.n 2 flavicornis
56	V. Uzului (BC)	15.07.1993	1	H.M.	H.M.	Z.L.	f.n.
57	M. Eminescu (BT)	08.05.1994	5	D.I.	D.I.	Z.L.	4 f.n 1 gilvelus
58	Godovana (BC)	26.06.1994	1	D.A.	P.M.	Z.L.	flavicornis
59	Părăul Rai (NT)	12.07.1994	10	D.I.	D.I.	Z.L.	5 f.n 5 flavicornis
60	Rediu (NT)	21.07.1994	1	D.I.	D.I.	Z.L.	f.n
61	Izv. Muntelui (NT)	18.07.1994	1	P.E.	P.E.	Z.L.	flavicornis
62	Perchiu (BC)	27.07.1994	1	P.E.	P.M.	Z.L.	f.n.
63	Slănic Mold. (BC)	11.08.1995	1	C.M.	C.M.	Z.L.	f.n.
64	Liteni (SV)	19.07.1996	1	D.A.	D.A.	Z.L.	f.n.
65	Izvorul Alb (BC)	22.07.1998	2	C.M.	C.M.	Z.L.	f.n.
66	Vl. Uzului (BC)	24.07.1998	1	C.M.	P.M.	Z.L.	f.n.
67	Agigea (CT)	27.07.2000	1	D.A.	P.M.	Z.L.	f.n.
68	Agapia (NT)	27.07.2000	1	C.L.	C.L.	Z.L.	f.n.
69	Agapia Veche (NT)	28.07.2000	1	C.L.	C.L.	Z.L.	f.n.
70	Vânători (NT)	29.07.2000	1	G.G.	G.G.	Z.L.	flavicornis
71	Poiana Sărată (BC)	24.07.2001	1	G.G.	G.O.	Z.L.	flavicornis
72	Poiana Sărată (BC)	25.07.2001	1	P.M.	P.M.	Z.L.	flavicornis
73	Agapia (NT)	29.07.2001	2	C.L.	C.L.	Z.L.	f.n.
74	Huşi (VS)	29.09.2002	7	C.L.	G.O.	Z.L.	5 f.n/2 flavicornis
75	Huşi (VS)	21.05.2003	1	C.L.	G.O.	Z.L.	f.n.
76	Roman (NT)	17.06.2003	3	A.M.	Z.L.	Z.L.	flavicornis
77	Sărărie (BC)	24.06.2003	1	G.G.	Z.L.	Z.L.	flavicornis
78	Poiana Sărată (BC)	23.07.2003	3	G.G./C.M.	Z.L./C.M.	Z.L.	f.n.
79	Ciritei (NT)	29.07.2004	1	D.I.	D.I.	Z.L.	f.n.
80	Ruginoasa (IS)	01.08.2004	1	D.I.	D.I.	Z.L.	f.n.
81	Pietricica (NT)	08.08.2004	1	D.I.	D.I.	Z.L.	f.n.
82	Vl. Budului (BC)	09.08.2004	1	P.M.	P.M.	Z.L.	flavicornis
83	Poiana Sărată (BC)	18.08.2004	1	P.C.	P.M.	Z.L.	f.n.
84	Pietricica (NT)	03.07.2005	4	D.I.	D.I.	Z.L.	2 f.n. 2 flavicornis
85	Pietricica (NT)	14.07.2005	1	D.I.	D.I.	Z.L.	flavicornis
86	Bacău (BC)	25.06.2006	1	G.O.	P.M	Z.L	flavicornis
87	Pietricica (NT)	21.07.2006	2	D.I.	D.I.	Z.L.	f.n.
88	Runc (BC)	08.07.2008	1	G.O.	G.O.	Z.L.	f.n.
89	Dărmăneşti (BC)	29.07.2008	1	P.E.	P.E.	Z.L.	f.n.
TOTAL			**211**				

63 *Agriotes litigiosus* (Rossi, 1792)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Neptun (CT)	13.07.1966	1	R.G.	R.G.	Z.L.
2	Comorova (CT)	11.07.1970	1	R.G.	R.G.	Z.L.
3	Slănic Mold. (BC)	11.06.1971	1	G.A.	G.A.	Z.L.
4	Hemeiuşi (BC)	11.07.1971	2	H.D.	H.D.	Z.L.
5	Vl. Frumoasei (BC)	15.07.1972	1	G.A.	G.A.	Z.L.
6	Gherăieşti (BC)	30.06.1973	1	G.A.	G.A.	Z.L.
7	Hemeiuşi (BC)	18.07.1974	13	G.A.	G.A.	Z.L.
8	Hemeiuşi (BC)	29.07.1974	7	G.A.	G.A.	Z.L.
9	Hemeiuşi (BC)	02.08.1974	1	G.A.	G.A.	Z.L.
10	Hemeiuşi (BC)	11.07.1975	5	G.A.	G.A.	Z.L.

11	Valea Seacă (BC)	14.07.1975	1	G.A.	G.A.	Z.L.
12	Valea Seacă (BC)	08.07.1977	1	G.A.	G.A.	Z.L.
13	Codrul Runc (BC)	28.06.1979	3	G.A.	G.A.	Z.L.
14	Hemeiuşi (BC)	16.07.1980	1	G.A.	G.A.	Z.L.
15	Urecheşti (BC)	17.07.1981	1	D.A.	D.A.	Z.L.
16	Tudora (BT)	20.06.1984	3	D.I.	D.I.	Z.L.
17	Dealul Vulpii (NT)	19.05.1985	15	D.I.	D.I.	Z.L.
18	Dealul Vulpii (NT)	21.05.1985	22	D.I.	D.I.	Z.L.
19	Hemeiuşi (BC)	18.07.1990	2	D.A.	D.A.	Z.L.
20	Fântânele (BC)	18.07.1990	2	D.A.	D.A.	Z.L.
21	Ciritei (NT)	29.07.2004	1	D.I.	D.I.	Z.L.
22	Vărărie (NT)	12.09.2004	1	D.I.	D.I.	Z.L.
23	Pietricica (NT)	03.07.2005	5	D.I.	D.I.	Z.L.
24	Ponoare (SV)	10.07.2005	6	D.I.	D.I.	Z.L.
25	Pietricica (NT)	14.07.2005	8	D.I.	D.I.	Z.L.
26	Pietricica (NT)	21.07.2006	3	D.I.	D.I.	Z.L.
TOTAL			**108**			

64 *Agriotes gurgistanus* (Schőnher, 1871)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Pietricica (NT)	21.07.2006	1	D.I.	D.I.	Z.L.
TOTAL			**1**			

65 *Agriotes pilosellus* (Schőnher, 1871)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name	variety
1	Schit Goleşti (AG)	17.05.1967	1	V.M	V.M.	Z.L.	f.n.
2	Rediu (NT)	20.05.1971	2	D.I.	D.I.	Z.L.	f.n.
3	Botoşani (BT)	29.06.1974	2	D.I.	D.I.	Z.L.	f.n.
4	Tudora (SV)	02.05.1985	3	D.I.	D.I.	Z.L.	f.n.
5	Godovana (BC)	16.05.1994	1	P.M.	P.M	Z.L	buyssoni
6	Pomicola (BC)	18.05.1995	1	D.A.	D.A.	Z.L.	buyssoni
7	Buhoci (BC)	22.05.1996	2	P.E	P.E.	Z.L.	buyssoni
8	Bălţăteşti (NT)	24.05.1996	1	P.E	P.M	Z.L	buyssoni
9	Vl. Budului (BC)	28.05.1996	1	C.C.	C.C	Z.L.	simulator
10	P. Sărată (BC)	18.07.1996	1	D.A.	D.A.	Z.L.	buyssoni
11	Vl. Budului (BC)	17.06.1997	1	C.M.	C.M.	Z.L.	simulator
12	Simeria (HD)	13.05.1998	1	T.B.	C.L.	Z.L.	buyssoni
13	Codrul Runc (BC)	09.05.2000	1	H.M	H.M.	Z.L.	f.n.
14	Vl. Budului (BC)	18.05.2000	1	P.M.	P.M	Z.L	buyssoni
15	Sărărie (BC)	15.07.2000	1	C.L.	C.L.	Z.L.	f.n.
16	Vl. Budului (BC)	15.05.2001	2	G.A.	C.L.	Z.L.	buyssoni
17	Hemeiuşi (BC)	17.05.2002	1	P.M.	P.M	Z.L	simulator
17	Traian (BC)	20.05.2002	1	C.L.	C.L.	Z.L.	simulator
18	Vl. Budului (BC)	07.05.2003	1	P.M.	P.M	Z.L	buyssoni
19	Căiuţi (BC)	29.05.2003	6	C.L.	C.L.	Z.L.	1.flavescens 1.simulator 4. f.n.
20	Sărărie (BC)	25.06.2003	1	C.M.	C.M.	Z.L.	buyssoni
21	Sărărie (BC)	25.06.2003	1	G.G.	C.L.	Z.L.	flavescens
22	Sărărie (BC)	26.06.2003	1	G.G.	C.L.	Z.L.	flavescens
23	Heltiu (BC)	30.04.2004	3	Z.L.	Z.L.	Z.L.	f.n.
24	Vl. Budului (BC)	12.05.2004	1	P.M.	P.M	Z.L	simulator
TOTAL			38				

66 *Agriotes modestus* (Kiesenwetter, 1858)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Poiana Sărată (BC)	08.07.1996	1	H.M.	H..M.	Z.L.
2	Saturn (CT)	10.07.1999	1	D.A.	D.A.	Z.L.
TOTAL			2			

67 *Agriotes lineatus* (Linnaeus, 1767)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Bicăjel Depression (NT)	08.06.1967	1	G.A.	G.A.	Z.L.
2	Poduri (BC)	28.06.1990	1	D.A.	D.A.	Z.L.
3	Lozna (BT)	16.05.1994	1	D.I.	D.I.	Z.L.
4	M. Eminescu (BT)	14.05.1995	1	D.I.	D.I.	Z.L.
5	Hemeiuşi (BC)	10.05.2002	6	C.L.	G.O.	Z.L.
6	Hemeiuşi (BC)	17.05.2002	2	C.L.	G.O.	Z.L.
7	Dumbrava (NT)	28.05.2002	1	C.L.	C.L.	Z.L.
8	Sărărie (BC)	03.06.2002	1	P.M.	P.M.	Z.L.
9	Hemeiuşi (BC)	17.06.2002	4	C.L.	C.L.	Z.L.
10	Ruginoasa (IS)	01.08.2004	1	D.I.	D.I.	Z.L.
11	Ponoare (SV)	14.06.2005	2	D.I.	D.I.	Z.L.
TOTAL			21			

68 *Agriotes obscurus* (Linnaeus, 1758)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Ilişeşti (SV)	14.06.1963	1	R.G.	R.G.	Z.L.
2	Slănic Mold. (BC)	09.05.1971	1	G.A.	G.A.	Z.L.
3	Tudora (BT)	07.07.19781	1	D.I.	D.I.	Z.L.
4	Dumbrava (NT)	28.05.2002	3	C.L.	C.L.	Z.L.
5	Bacău (BC)	02.07.2003	1	Z.L.	Z.L.	Z.L.
TOTAL			7			

69 *Agriotes sputator* (Linnaeus, 1758)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Iţcani (SV)	14.05.1964	3	R.G.	R.G.	Z.L.
2	Iţcani (SV)	08.06.1968	1	R.G.	R.G.	Z.L.
3	Ponoare (SV)	17.05.1968	3	D.I.	D.I.	Z.L.
4	Frumoasa (SV)	17.05.1968	2	R.G.	R.G.	Z.L.
5	Iţcani (SV)	08.06.1968	3	R.G.	R.G.	Z.L.
6	Iţcani (SV)	26.05.1969	2	R.G.	R.G.	Z.L.
7	Urecheşti (BC)	10.06.1970	1	G.A.	G.A.	Z.L.
8	Măgura (BC)	11.07.1970	1	G.A.	G.A.	Z.L.
9	Rediu (NT)	20.05.1971	1	D.I.	D.I.	Z.L.
10	Vl. Frumoasei (BC)	15.07.1972	1	G.A.	G.A.	Z.L.
11	Racova (BC)	28.05.1974	1	G.A.	G.A.	Z.L.
12	Brusturoasa (BC)	30.06.1974	1	G.A.	G.A.	Z.L.
13	Racova (BC)	24.06.1980	1	D.A.	D.A.	Z.L.
14	Tudora (BT)	11.07.1982	1	D.I.	D.I.	Z.L.
15	Tudora (BT)	11.06.1983	5	D.I.	D.I.	Z.L.
16	Tudora (BT)	02.05.1985	17	D.I.	D.I.	Z.L.
17	Tudora (BT)	12.05.1985	8	D.I.	D.I.	Z.L.
TOTAL			**52**			

70 *Agriotes brevis* (Candèze, 1863)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Gherăieşti (BC)	10.06.1977	1	G.A.	G.A.	Z.L.
2	Ceacu (IL)	11.04.1975	1	G.A.	G.A.	Z.L.
TOTAL			2			

Genus *Dalopius*

71 *Dalopius marginatus* (Linnaeus, 1758)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Adâncata (SV)	09.05.1964	4	R.G.	R.G.	Z.L.
2	Iţcani (SV)	09.05.1964	2	R.G.	R.G.	Z.L.
3	Suceava (SV)	14.05.1966	1	R.G.	R.G.	Z.L.
4	Vl. Iaşului (MH)	23.06.1968	1	R.G.	R.G.	Z.L.
5	Bacău (BC)	09.07.1980	1	D.A.	D.A.	Z.L.
6	M. Eminescu (BT)	03.06.1984	3	D.I.	D.I.	Z.L.
7	Piatra Caiului PNPC (BV)	08.06.2001	1	H.M.	P.M.	Z.L.
8	Sărărie (BC)	26.06.2003	1	G.G.	C.L.	Z.L.
9	Vl. Bârsei PNPC (BV)	20.04.2004	4	Z.L.	G.O.	Z.L.
10	Piatra Caiului PNPC (BV)	21.05.2004	1	Z.L.	G.O.	Z.L.
11	Gura Tamaşului PNPC (BV)	24.05.2004	2	Z.L.	G.O.	Z.L.
12	Ruginoasa (IS)	01.08.2004	1	D.I.	D.I.	Z.L.
TOTAL			22			Z.L.

Tribus Adrastini

Genus *Adrastus*

72 *Adrastus limbatus* (Fabricius, 1776)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Coşula (BT)	11.06.1962	2	R.G.	R.G.	Z.L.
2	Suceava (SV)	26.07.1962	1	R.G.	R.G.	Z.L.
3	Lunca Bistriţei (NT)	07.07.2005	1	D.I.	D.I.	Z.L.
4	Pietricica (NT)	27.08.2006	2	D.I.	D.I.	Z.L.
TOTAL			6			

73 *Adrastus lacertosus* (Erichson, 1841)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Pietricica (NT)	27.08.2006	1	D.I.	D.I.	Z.L.
TOTAL			1			

74 *Adrastus rachifer* (Fourcroy, 1785)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Turluceni (BT)	18.07.1969	1	R.G.	R.G.	Z.L.
2	Roman (NT)	21.06.2002	1	C.L.	C.L.	Z.L.
3	Pietricica (NT)	27.08.2006	1	D.I.	D.I.	Z.L.
TOTAL			3			

75 *Adrastus axillaris* (Erichson, 1841)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Pietrul Albe (CJ)	25.07.1968	1	D.I.	D.I.	Z.L.
3	Tudora (BT)	07.07.1971	1	D.I.	D.I.	Z.L.
4	Tudora (BT)	27.07.1982	1	D.I.	D.I.	Z.L.
5	Dealul Vulpii (NT)	19.05.1985	1	D.I.	D.I.	Z.L.
6	Dofteana (BC)	03.07.2002	1	G.G.	Z.L.	Z.L
7	Ponoare (SV)	10.07.2005	2	D.I.	D.I.	Z.L.
8	Pietricica (NT)	14.07.2005	1	D.I.	D.I.	Z.L.
TOTAL			8			

76 *Adrastus montanus* (Scopoli, 1763)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Pietricica (NT)	27.08.2006	1	D.I.	D.I.	Z.L.
2	Dealul Vulpii (NT)	27.07.1982	2	D.I.	D.I.	Z.L.
3	Tudora (BT	27.07.1982	1	D.I.	D.I.	Z.L.
4	Câmpul Lung Mold. (SV)	27.06.1968	1	R.G.	R.G.	Z.L.
TOTAL			**5**			

Genus *Synaptus*
77 *Synaptus filiformis* (Fabricius,1781)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Ilişeşti (SV)	14.06.1963	1	R.G.	R.G.	Z.L.
2	Iţcani (SV)	14.05.1964	1	R.G.	R.G.	Z.L.
3	Frumoasa (SV)	17.05.1968	2	R.G.	R.G.	Z.L.
4	Burdujeni (SV)	05.07.1968	2	R.G.	R.G.	Z.L.
5	Ponoare (SV)	27.05.1972	1	R.G.	R.G.	Z.L.
6	Vorona (IS)	04.05.1984	1	D.I.	D.I.	Z.L.
7	Tudora (BT)	04.05.1984	1	D.I.	D.I.	Z.L.
8	Bacău (BC)	15.06.1993	1	P.E.	P.E	Z.L.
9	M. Eminescu (BT)	29.05.1994	2	D.I.	D.I.	Z.L.
10	G. Enescu (BT)	14.05.1995	1	D.I.	D.I.	Z.L.
11	M. Eminescu (BT)	26.05.1996	1	D.I.	D.I.	Z.L.
12	Vl. Uzului (BC)	07.06.1996	1	H.M.	H.M.	Z.L.
13	Hăneşti (BT)	30.05.1997	1	D.I.	D.I.	Z.L.
14	Piatra Caiului (BV)	07.06.2001	1	G.D.	Z.L.	Z.L.
15	Botoşani (BT)	15.05.2002	4	C.L.	C.L.	Z.L.
16	Copălău (BT)	15.05.2002	5	C.L.	C.L.	Z.L.
17	Ruginoasa (IS)	01.08.2004	1	D.I.	D.I.	Z.L.
TOTAL			**27**			

Tribe Physorhinini
Genus *Idolus*
78 *Idolus picipenis* (Bach,1852)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Brusturoasa (BC)	20.06.1974	1	G.A.	G.A.	Z.L.
2	M. Grohotiş PNPC (BV)	21.06.2003	1	P.O.	C.L.	Z.L.
3	Piatra Mică PNPC (BV)	02.07.2003	1	G.D.	Z.L.	Z.L.
4	Piatra Caiului PNPC (BV)	22.05.2004	2	Z.L.	G.O.	Z.L.
TOTAL			**5**			

I. Subfamily Cardiophorinae
Tribe Cardiophorini
Genus *Cardiophorus*
79 *Cardiophorus gramineus* (Scopoli, 1963)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Brusturoasa (BC)	26.07.1977	1	G.A.	G.A.	Z.L.
TOTAL			**1**			

80 *Cardiophorus discicollis* (Herbst,1806)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Agigea (CT)	08.06.2002	1	D.A.	D.A.	Z.L.
2	Agigea (CT)	07.06.2008	9	Z.L.	G.O.	Z.L.
TOTAL			**10**			

Genus *Dicronychus*
81 *Dicronychus cinereus* (Herbst,1784)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Pomicola (BC)	18.05.1995	1	D.A.	D.A.	Z.L.
2	Gherăieşti (BC)	01.05.2000	1	C.L.	C.L.	Z.L.
TOTAL			**2**			

82 *Dicronychus incanus* (Erichson, 1840)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Agigea (CT)	07.06.2008	6	Z.L.	G.O.	Z.L.
TOTAL			**6**			

83 *Dicronychus equiseti* (Herbst,1784)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Hanu Conachi (GL)	21.06.2001	1	C.L.	C.L.	Z.L.
2	Agigea (CT)	07.06.2008	61	Z.L.	G.O.	Z.L.
3	Agigea (CT)	07.06.2008	18	Z.L.	P.M.	Z.L.
TOTAL			**80**			

Genus *Paracardiophorus*
84 *Paracardiophorus musculus* (Erichson,1840)

Nr crt.	collecting sites	collecting data	no. of specimens	collectors′ name	preservers′ name	identifier′s name
1	Hanu Conachi (GL)	20.05.1976	3	M.A.	M.A.	Z.L.
TOTAL			3			

Results and discussion

In the studied material were identified specimens belonging to 84 species and 32 genera of the following Subfamilies: Agrypninae, Denticollinae, Elaterinae and Cardiophorinae (table 1).

Most of the specimens - 1632 from 36 species belong to the subfamily Denticollinae follwed by the subfamily Elaterinae with 842 specimens icluded in 39 species (figure 1). The species were collected from 196 localities, most of them from Moldova region, the collection beeing representative for the fauna of the eastern part of Romania.

The collection includes comon specie like *Agrypnus murinus*, *Hemicrepidius niger*, *Athous haemorrhoidalis*, *Cidnopus pilosus*, *Prosternon tessellatum*, *Melanotus brunnipes*, *Melanotus crassicollis*, *Agriotes ustulatus*, *Agriotes pilosellus*, *Agriotes sputator*, *Synaptus filiformis* but also rare species, some of them included on the Red Lists of European countries: *Danosoma fasciata*, *Liotrichus affinis*, *Ampedus sanguineus*, *Ampedus erythrogonus*, *Cardiophorus gramineus*, *Paracardiophorus musculus*.

Considering the presented data the collection of „Ion Borcea" Natural Sciences Museum Complex of Bacău includes 60 % of the species quated for our country.

Table 1- Taxonomic catgory of elaterids specimens from the studied collection

Nr. crt	Taxonomical categories	Nr of specimens
	AGRYPNINAE SUBFAMILY	137
	Tribe Agrypini	
1.	*Agrypnus murinus* (Linnaeus, 1758)	135
2.	*Danosoma fasciata* (Linnaeus, 1758)	1
	Tribe Conoderini	
3.	*Drasterius bimaculatus* (Rossi, 1790)	1
	DENTICOLLINAE SUBFAMILY	1632
	Tribe Denticollini	
4.	*Hemicrepidius hirtus* (Herbst, 1784)	153
5.	*Hemicrepidius niger* (Linnaeus, 1758)	440
6.	*Crepidophorus mutilatus* (Rosenhauer, 1847)	13
7.	*Athous vittatus* (Fabricius, 1792)	24
8.	*Athous haemorrhoidalis* (Fabricius, 1801)	73
9.	*Athous sacheri* (Kiesenwetter, 1858)	164
10.	*Athous subfuscus* (Müler, 1764)	47
11.	*Athous zebei* (Bach, 1854)	54
12.	*Athous bicolor* (Goeze, 1777)	3
13.	*Athous austriacus* (Desbrochers, 1873)	21
14.	*Athous mollis* (Reitter, 1889)	6
15.	*Athous jejunus* (Kiesenwetter, 1858)	1
16.	*Athous campyloides* (Newman, 1833)	18
17.	*Athous cavifrons* (Redtenbacher, 1858)	1
18.	*Diacanthous undulatus* (De Geer, 1774)	1
19.	*Denticollis linearis* (Linnaeus, 1758)	2
20.	*Dima elateroides* (Charpentier, 1825)	1
21.	*Cidnopus pilosus* (Leske, 1785)	195
22.	*Nothodes parvulus* (Panzer, 1799)	17
23.	*Limonius minutus* (Linnaeus, 1758)	12
	Tribe Prosternini	
24.	*Ctenicera virens* (Schrank, 1781)	5
25.	*Ctenicera pectinicornis* (Linnaeus, 1758)	19
26.	*Ctenicera heyeri* (Saxesen, 1838)	9
27.	*Ctenicera cuprea* (Fabricius, 1781)	146
28.	*Liotrichus affinis* (Paykull, 1800)	3
29.	*Actenicerus sjaelandicus* (Müller, 1764)	9
30.	*Prosternon tessellatum* (Linnaeus, 1758)	43
31.	*Prosternon chrysocomum* (Germar, 1843)	2
32.	*Anostirus purpureus* (Poda, 1761)	8
33.	*Anostirus gracilicollis* (Stierlin, 1896)	1
34.	*Metanomus infuscatus* (Eschscholtz, 1829)	2
35.	*Selatosomus amplicollis* (Germar, 1843)	3
36.	*Selatosomus aeneus* (Linnaeus, 1758)	8
37.	*Selatosomus latus* (Fabricius, 1801)	124
38.	*Calambus bipustulatus* (Linnaeus, 1767)	1
39.	*Eanus guttatus* (Germar, 1817)	3
	ELATERINAE SUBFAMILY	842
	Tribe Ampedini	
40.	*Brachygonus mergerlei* (Lacordaire, 1935)	1
41.	*Ampedus sanguineus* (Linnaeus, 1758)	3
42.	*Ampedus pomonae* (Stephens, 1830)	1
43.	*Ampedus sanguinolentus* (Schrank, 1776)	4
44.	*Ampedus nigerrimus* (Lacordaire, 1835)	3
45.	*Ampedus nigroflavus* (Goeze, 1777)	1
46.	*Ampedus pomorum* (Herbst , 1784)	5
47.	*Ampedus elongatulus* (Fabricius , 1787)	2

48.	*Ampedus elengatulus* (Schőnher , 1817)	1
49.	*Ampedus erythrogonus* (Müller , 1821)	1
50.	*Ampedus sinuatus* (Germar , 1844)	4
51.	*Ampedus rufipennis* (Stephens , 1830)	1
	Tribe Elaterini	
52.	*Elater ferrugineus* (Linnaeus, 1758)	1
	Tribe Melanotini	
53.	*Melanotus brunnipes* (Germar, 1824)	133
54.	*Melanotus fuscipes* (Gyllenhal, 1817)	19
55.	*Melanotus rufipes* (Herbst, 1884)	3
56.	*Melanotus castanipes* (Paykull, 1800)	13
57.	*Melanotus punctolineatus* (Pélerin, 1800)	5
58.	*Melanotus tenebrosus* (Erichson, 1841)	7
59.	*Melanotus crassicollis* (Erichson, 1841)	78
	Tribe Agriotini	
60.	*Agriotes acuminatus* (Stephens)	14
61.	*Agriotes gallicus* (Schaller, 1783)	23
62.	*Agriotes ustulatus* (Schaller, 1783)	211
63.	*Agriotes litigiosus* (Rossi, 1792)	108
64.	*Agriotes gurgistanus* (Schőnher, 1871)	1
65.	*Agriotes pilosellus* (Schőnher, 1871)	38
66.	*Agriotes modestus* (Kiesenwetter, 1858)	2
67.	*Agriotes lineatus* (Linnaeus, 1767)	21
68.	*Agriotes obscurus* (Linnaeus, 1758)	7
69.	*Agriotes sputator* (Linnaeus, 1758)	52
70.	*Agriotes brevis* (Candèze, 1863)	2
71.	*Dalopius marginatus* (Linnaeus, 1758)	22
	Tribe Adrastini	
72.	*Adrastus limbatus* (Fabricius, 1776)	6
73.	*Adrastus lacertosus* (Erichson, 1841)	1
74.	*Adrastus rachifer* (Fourcroy, 1785)	3
75.	*Adrastus axillaris* (Erichson, 1841)	8
76.	*Adrastus montanus* (Scopoli, 1763)	5
77.	*Synaptus filiformis* (Fabricius,1781)	27
	Physorhinini	
78.	*Idolus picipenis* (Bach,1852)	5
	CARDIOPHORINAE SUBFAMILY	102
	Tribe Cardiophorini	
79.	*Cardiophorus gramineus* (Scopoli, 1963)	1
80.	*Cardiophorus discicollis* (Herbst,1806)	10
81.	*Dicronychus cinereus* (Herbst,1784)	2
82.	*Dicronychus incanus* (Erichson,1840)	6
83.	*Dicronychus equiseti* (Herbst,1784)	80
84.	*Paracardiophorus musculus* (Erichson,1840)	3

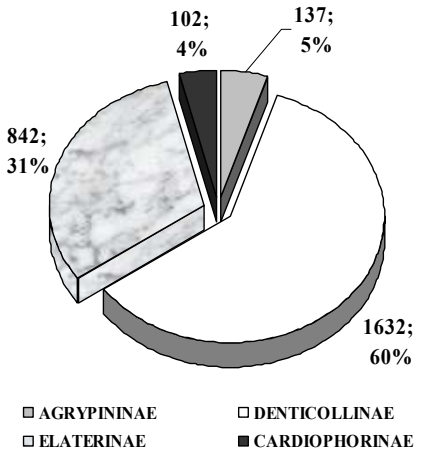

Fig. 1 - Number and percentage of subfamily specimens in studied material

Conclusions

There were analyzed 2897 specimens belonging to the family Elateridae, collected between the years 1956 – 2010, from 196 localities. In the material studied we identified specimens belonging to 84 species and 32 genera of the following Subfamilies: Agrypninae, Denticollinae, Elaterinae and Cardiophorinae

There were identified 137 specimes belonging to 3 species from Agrypninae subfamily; 842 specimens belonging to 39 species from Elaterinae subfamily, 1632 specimens belonging to 36 species from Denticollinae subfamily and 36 species belonging to Cardiophorinae subfamily.

The most abundant species are: *Agrypnus murinus* (135 specimens); *Melanotus brunnipes* (113 specimens), *Agriotes ustulatus* (211 specimens), *Hemicrepidius niger (440 specimens), Athous sacheri* (164 specimens) and *Agriotes ustulatus* (211 specimens).

The species were collected from 196 localities, most of them from Moldova region, the collection beeing representative for the fauna of the eastern part of Romania.

Rezumat

Catalogul colecției de elateride din patrimoniul Complexului Muzeal de Ştiințele Naturii „Ion Borcea" din Bacău cuprinde 2897 exeplare aparținând la 84 de specii din 32 de genuri şi 4 subfamilii. Exemplarele conservate în colecție au foat colectate din 196 de localități, majoritatea situate în Moldova, astfel încât este reprezentativă pentru fauna de elateride a acestei regiuni.

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COMPLEXUL MUZEAL DE ŞTIINȚELE NATURII „ION BORCEA” BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 84 – 89

CONTRIBUTIONS TO THE KNOWLEDGE OF THE DIVERSITY OF CERAMBICIDS (INSECTA, COLEOPTERA, CERAMBYCIDAE) FROM SLĂNIC MOLDOVA, BACĂU COUNTY (II)

GABRIELA GURĂU*

ABSTRACT

The paper presents the results of researches concerning the cerambicids fauna from Slănic Moldova – Bacău County (2008-2009). Thus, it has been identified nineteen species (762 specimens), twelve genera and respectively three subfamilies of Cerambycidae: Lepturinae, Cerambycinae and Lamiinae. This study presents new data about the ecology of the species of cerambicids from the studied area. In order to find out more about the ecology and the connections between the species from Slănic Moldova, the author calculated ecological indexes: abundance, dominance, constancy, ecological significance index and the similarity index. The nomenclature and systematic used in this paper are those published by Danilevsky (Danilevsky, 2003).

Keywords: cerambicids, ecology, abundance, dominance, constancy and significance index.

Introduction

Slănic Moldova is one of the most known tourist resorts situated in the eastern part of Romania, in the South-West part of Bacău County (figure no. 1). The healing Water Springs (discovered in 1801) and Salt Mines of Slănic are characteristic for this pearl of tourism.

Slănic Moldova offers impressive scenery (figure no. 2) for the visitors and a rich fauna generously spread in the Slănic creek valley (530 m altitude). The “Slănic” protected area is part of the national network “Natura 2000”. The interested tourist can find here species like beech and fir woods but also subalpine meadows.

The paper presents data concerning the ecology of some species of cerambicids, collected from Slănic Moldova. In a previous paper (3), the author published data concerning the diversity of cerambicids from Slănic Moldova (1).

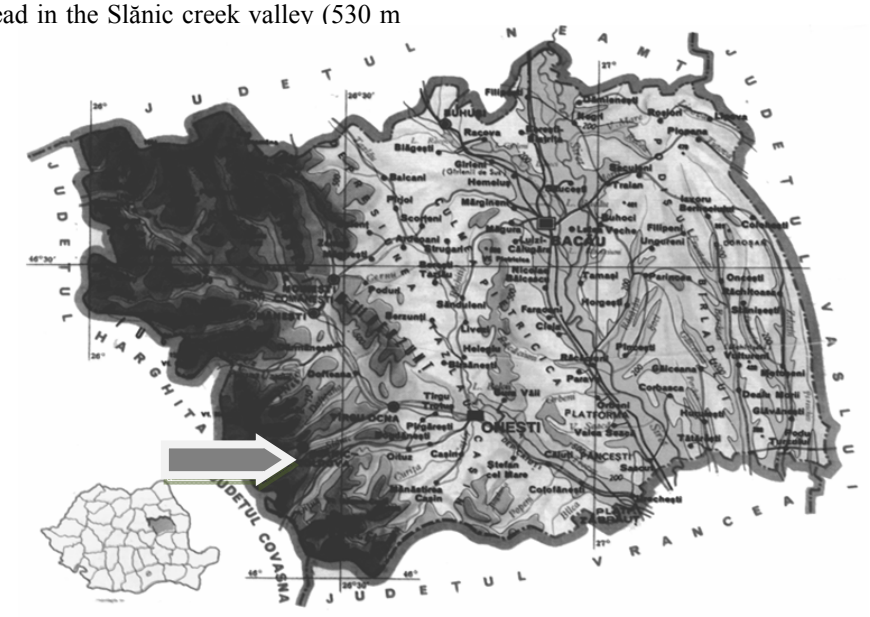

Fig. 1 – Slănic Moldova – the geographical localization (Albotă, 1983).

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Fig. 2 – Slănic Moldova – images from the studied area (original photos).

Material and method

The insects were collected directly from the plants during July and August 2008 and 2009. In order to find out more about the ecology and the coenotic affinities between the species of cerambicids from Slănic Moldova, the author calculated ecology indexes: abundance, dominance, constancy, ecological significance index and the similarity index (6). The identification of the species was made using the literature published by Panin & Săvulescu (1965) (4) and Pesarini & Sabbadini (1994) (5). The nomenclature used in this paper is the one published by Danilevsky (2003) (2). The author was also interested in finding the role and the ecological importance of each species in the studied fauna. For an accurate analysis, it was necessary to represent the coenotic affinities of the species in a dendrograme, using the values of the similarity index.

Results and discussions

The species were identified in the entomological laboratory of the "Ion Borcea" Natural Science Museum Complex of Bacău. The results showed that the 762 individuals collected in 2008 and 2009 belong to nineteen species, three subfamilies: Lepturinae, Cerambycinae and Lamiinae from the Cerambycidae family.

In order to find out more about the ecology of this family of insects, data concerning the identified specimens were grouped in table 1.

Table 1 - The distribution of species and individuals within the subfamilies of Cerambycidae family (Slănic Moldova, 2008-2009).

No.	*SUBFAMILIES*	*SPECIES*	2008		2009		TOTAL	
			A	%	A	%	A	%
1.	*Lepturinae*	*Paracorymbia maculicornis* DeGeer 1775	54	20.78	253	50.40	307	40.28
2.		*Rutpela maculata* Poda 1761	128	49.24	107	21.32	235	30.83
3.		*Stenurella melanura* Linnaeus 1758	59	22.71	44	8.77	103	13.52
4.		*Pachytodes cerambyciformis* Schrank 1781	1	0.38	27	5.39	28	3.67
5.		*Anastrangalia sanguinolenta* Linnaeus 1761	2	0.78	25	4.99	27	3.55
6.		*Carilia virginea* Linnaeus 1758	8	3.07	6	1.20	14	1.84
7.		*Pidonia lurida* Fabricius 1792	1	0.38	7	1.40	8	1.05
8.		*Leptura aethiops* Poda 1761	1	0.38	6	1.20	7	0.92
9.		*Anastrangalia dubia* Scopoli 1763	1	0.38	6	1.20	7	0.92
10.		*Pachytodes erraticus* Dalman 1817	1	0.38	5	0.99	6	0.78
11.		*Paracorymbia scutellata* Fabricius 1781	1	0.38	3	0.60	4	0.52
12.		*Leptura annularis* Fabricius 1801	1	0.38	3	0.60	4	0.52
13.		*Stenurella septempunctata* Fabricius 1792	1	0.38	1	0.19	2	0.26
14.		*Stenurella nigra* Linnaeus 1758	0	0	1	0.19	1	0.14
15.	*Cerambycinae*	*Cyrtoclytus capra* Germar 1824	0	0	3	0.60	3	0.39
16.		*Chlorophorus figuratus* Scopoli 1763	0	0	1	0.19	1	0.14
17.		*Axinopalpis gracilis* Kryniki 1832	0	0	1	0.19	1	0.14
18.		*Gracilia minuta* Fabricius 1781	0	0	1	0.19	1	0.14
19.	*Lamiinae*	*Agapanthia villossoviridescens* DeGeer 1775	1	0.38	2	0.39	3	0.39
TOTAL			**260**	**100**	**502**	**100**	**762**	**100**

The author calculated ecological indexes: abundance, dominance, constancy and ecological significance index (values are grouped in table 2).

The abundance of the species of cerambicids was represented in figure 3.

It comes out that *Paracorymbia maculicornis* was represented by the largest number of individuals (307 – 40.28%). This species is followed by *Rutpela maculata* (235 individuals – 30.83%).

Table 2 The synecological analysis of the species of cerambicids collected from Slănic Moldova (2008-2009).

No.	SPECIES	A	C		D		W	
1	2	5	7	8	9	10	11	12
1.	Paracorymbia maculicornis DeGeer 1775	307	100	C4	40.28	D5	40.28	W5
2.	Rutpela maculata Poda 1761	235	100	C4	30.83	D5	30.83	W5
3.	Stenurella melanura Linnaeus 1758	103	100	C4	13.52	D5	13.52	W5
4.	Pachytodes cerambyciformis Schrank 1781	28	100	C4	3.67	D3	3.67	W3
5.	Anastrangalia sanguinolenta Linnaeus 1761	27	100	C4	3.55	D3	3.55	W3
6.	Carilia virginea Linnaeus 1758	14	100	C4	1.84	D2	1.84	W3
7.	Pidonia lurida Fabricius 1792	8	100	C4	1.05	D2	1.05	W3
8.	Leptura aethiops Poda 1761	7	100	C4	0.92	D1	0.92	W2
9	Anastrangalia dubia Scopoli 1763	7	100	C4	0.92	D1	0.92	W2
10.	Pachytodes erraticus Dalman 1817	6	100	C4	0.78	D1	0.78	W2
11.	Paracorymbia scutellata Fabricius 1781	4	100	C4	0.52	D1	0.52	W2
12.	Leptura annularis Fabricius 1801	4	100	C4	0.52	D1	0.52	W2
13.	Stenurella septempunctata Fabricius 1792	2	100	C4	0.26	D1	0.26	W2
14.	Stenurella nigra Linnaeus 1758	1	50	C2	0.14	D1	0.07	W2
15.	Cyrtoclytus capra Germar 1824	3	50	C2	0.39	D1	0.20	W2
16.	Chlorophorus figuratus Scopoli 1763	1	50	C2	0.14	D1	0.07	W2
17.	Axinopalpis gracilis Kryniki 1832	1	50	C2	0.14	D1	0.07	W2
18.	Gracilia minuta Fabricius 1781	1	50	C2	0.14	D1	0.07	W2
19.	Agapanthia villossoviridescens DeGeer 1775	3	100	C4	0.39	D1	0.39	W2
TOTAL		762	-	-	100	-	-	-

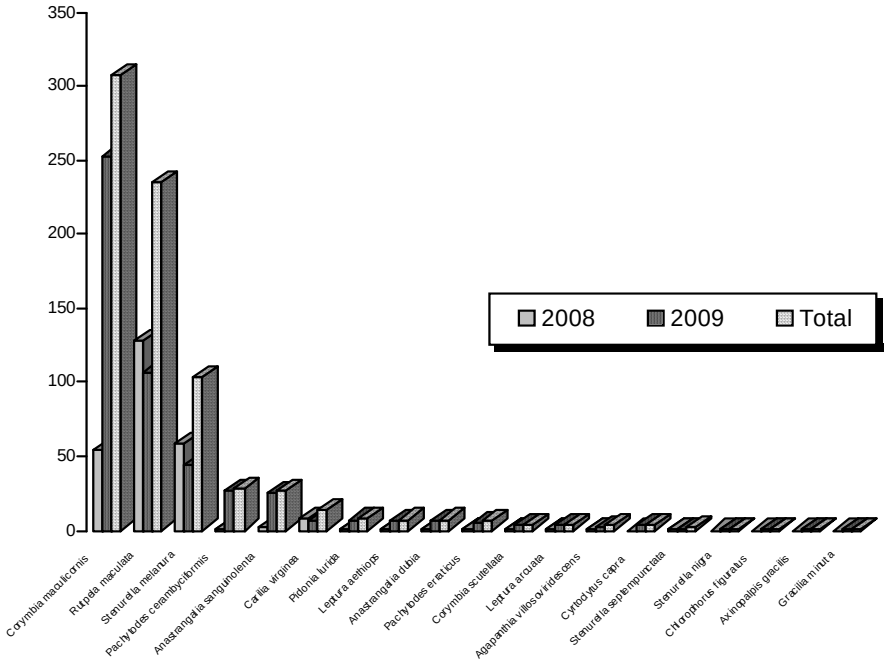

Fig. 3 The abundance of the species of cerambicids identified in Slănic Moldova.

An important number of individuals were also found for *Stenurella melanura* (103 – 13.52%). *Paracorymbia maculicornis*, *Rutpela maculata* and *Stenurella melanura* cumulated 84.63% from the total number of collected individuals.

At the opposite pole are present 4 species: *Stenurella nigra, Chlorophorus figuratus, Axinopalpis gracillis* and *Gracilia minuta* represented by a single individual, representing 0.14% each.

According to the values of constancy index, among the 19 species identified for Slănic Moldova, 14 are euconstant species and 5 are accessories species (fig. 4).

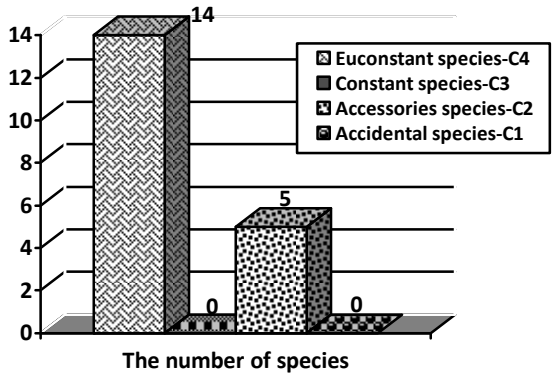

Fig. 4 The constancy of the species of cerambicids collected from Slănic Moldova, in the years 2008 and 2009.

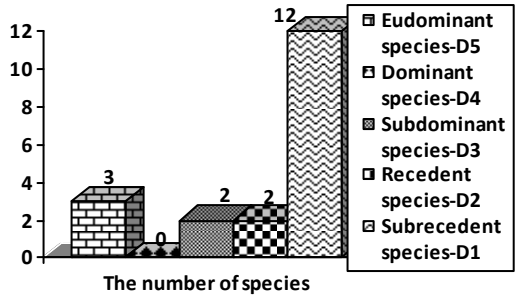

Fig. 5 The dominance of the species of cerambicids collected from Slănic Moldova, in the years 2008 and 2009.

From dominance point of view (fig. 5), the values are: 3 eudominant species, 2 subdominant species, 2 recedent species and 12 subrecedent species. According to the values of the ecological significance index, 3 species are characteristic and 16 are accessories species (fig. 6).

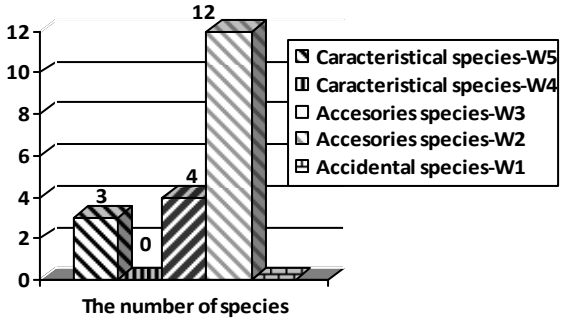

Fig. 6 The ecological significance indicator of the species of cerambicids collected from Slănic Moldova, in the years 2008 and 2009.

Species like *Corymbia maculicornis, Rutpela maculata* and *Stenurella melanura)* are represented by a large number of specimens. The mentioned species dominate the analysed biocoenosis.

In order to find the role and the ecological importance of each species in the studied fauna and for an accurate analysis, the author represented in a dendrograme (fig. 7) the coenotic similarity of the species, using the values of similarity index.

From the cluster analysis, comes out that: three groups of species like *Gracilia minuta-Axinopalpis gracilis-Chlorophorus figuratus-Stenurella nigra, Leptura annularis-Paracorymbia scutellata, Anastrangalia dubia-Leptura aethiops,* present a 100% similarity.

A large similarity present also species like: *Anastrangalia sanguinolenta - Pachytodes cerambyciformis* (94.4%), *Pidonia lurida* with the *Anastrangalia dubia-Leptura aethiops* group (93%), *Agapanthia villosoviridescens* (85.7%) and *Cyrtoclytus capra* (85.8%) both with *Leptura annularis-Paracorymbia scutellata* group.

The most abundant species that dominate the analysed fauna are connected with all the clusters from the dendrograme. *Paracorymbia maculicornis* has a 59.4% similarity with *Rutpela maculata* and *Stenurella melanura* (this species have a similarity of 60.8%).

The synecological analysis shows that the studied fauna is dominated by species like *Paracorymbia maculicornis* (with the larger number of specimens 307 - the most abundant species for the entire period of study), followed by *Rutpela maculata* (with 235 specimens) and *Stenurella melanura* (with 103 specimens).

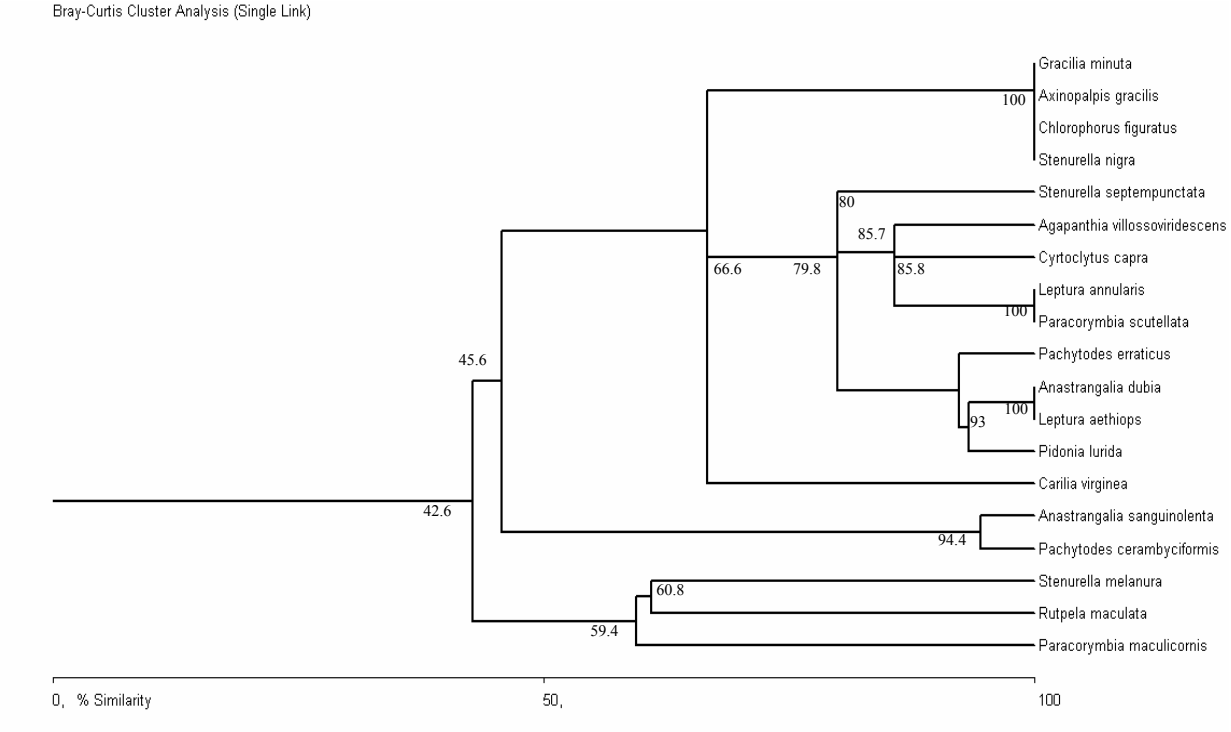

Figure no. 7 The coenotic affinities between the species of cerambicids collected from Slănic Moldova.

Conclusions

1. The 762 identified individuals were collected from Slănic Moldova in 2008 and 2009, are included into three subfamilies thirteen genera and nineteen species from Cerambycidae family.

2. Species present with a large number of individuals is *Corymbia maculicornis* (307 individuals – 40.28%) followed by *Rutpela maculata* (235 individuals – 30.83%). An important number of individuals were found also for *Stenurella melanura* (103 individuals – 13.52%). This species cumulate 84.63% from the total number of collected individuals. At the opposite pole are present 4 species *Stenurella nigra, Chlorophorus figuratus, Axinopalpis gracillis* and *Gracilia minuta* represented by a single individual, representing 0.14%.

3. From the cluster analysis, comes out that three species (*Gracilia minuta*, *Axinopalpis gracilis* and *Stenurella nigra*) present a 100% coenotic affinity.

4. A large similarity present also species like: *Anastrangalia sanguinolenta - Pachytodes cerambyciformis* (94.4%), *Pidonia lurida* with the *Anastrangalia dubia-Leptura aethiops* group (93%), *Agapanthia villosoviridescens* (85.7%) and *Cyrtoclytus capra* (85.8%) both with *Leptura annularis-Paracorymbia scutellata* group.

5. According to the synecological analysis, the values of ecological indicators show the presence of 14 euconstant species, 3 eudominant species and 3 characteristical species. Rationalising, we can say that a number of dominant and characteristical is due to the presence in a large number of specimens of some species (three in the studied area: *Corymbia maculicornis, Rutpela maculata* and *Stenurella melanura)* that dominate the analysed biocoenosis.

Rezumat

Lucrarea prezintă rezultatele cercetărilor cu privire la fauna de cerambicide din Slănic Moldova, județul Bacău, realizate în anii 2008-2009. Au fost identificate 19 specii (762 indivizi) care aparțin la 12 genuri din trei subfamilii ale familiei Cerambycidae: Lepturinae, Cerambycinae and Lamiinae.

Studiul prezintă date noi cu privire la speciile de cerambicide din Slănic Moldova. Pentru a afla detalii cu privire la ecologia şi legăturile dintre speciile din fauna studiată, autorul a calculat următorii indici ecologici: abundența, dominanța, constanța, indicele de semnificație ecologică şi indicele de similaritate. Nomenclatura şi sistematica folosite în lucrare sunt cele publicate de Danilevsky (Danilevsky, 2003).

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COMPLEXUL MUZEAL DE ŞTIINŢELE NATURII „ION BORCEA" BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 90 – 97

THE ECOLOGICAL ASPECTS OF ROOVE-BEETLES (*COLEOPTERA, STAPHYLINIDAE*) FROM THE REPUBLIC OF MOLDOVA

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ABSTRACT

In this work are highlighted ecological aspects of life of rove beetles) from the Republic of Moldova. Because of their present ecological values, this group of insects has important position in natural ecosystems, forests and agricultural habitats. Staphylinides are scattered in different habitats: plains, hills, meadows, forests. They leads a life hidden, live in the shady and humid places.

In present paper are given ecology of 226 species of rove beetles, also, are done the environmental groups that they are included. From all these species 106 are coprobiontes, 45 – mycetobiontes, 117 – pedobiontes, 13 – necrobiontes and 159 – saprobiontes.

Key words: rove-beetles, ecological groups, Republic of Moldova.

Introduction

Rove beetles are completely harmless. These bugs are very common insects that usually go unnoticed. Their bodies are slender, elongated, basically, with rarely medium size (body length from 0.5 mm to 5 cm). The body colours predominantly are dark or dimly. The distinctive characteristic of these group of insects are the elytra which are much shorter than the abdomen and covers only the first segments of the abdomen. Other character of the rove-beetles is: when the insect is disturbed, she raises the tip of its abdomen and may squirt a foul-smelling mist at its enemies.

Most rove-beetles are highly mobile predators, leading a secretive life in the cavities of the upper soil layer and the adjacent substrates, mainly in or near decaying substances of plant and animal origin. The rove-beetles are only terrestrial group, which is associated by habitats with high or sufficient moisture. These beetles are found in almost all populated by insect's landscapes of the Earth. Distributed roves universally, are abundant in the tropics and in temperate latitudes. They also eat dung and feed on other insects that are found in decaying matter - such as maggots (15)

The saprophagous rove-beetles consume different plant species, and are adapted to dry or split, particularly aquatic plants collected in heaps on the banks of rivers and storage basins. These saprophagous rove-beetles are subdivided in: saproxylophagous, which consume tissues of the dead plant; saprophylophagous - prefer to eat only dry bower and fell; saproryzophagous - eat roots of plants and tree physiological aging.

Some species of *Tachyporinae*, *Omaliinae*, *Oxyporinae* and *Aleocharinae* subfamilies are mycophagous. Mycophagous species prefer to suck the contents of mycelium of the mushrooms or to swallow spores and pieces of micelles. In the *Staphylininae* subfamily, and especially in the genus *Philonthus* are present koprophagous species – eat animal faeces, or rather, plant debris undigested from faeces of herbivorous animals, or soil invertebrate. This phenomenon is particularly characteristic to rove-beetles (6).

Materials and methods

The rove-beetles where collected manually, by flotation and by sweeping with sweep net. Also, these insects, where collected easily from under fallen leaves, by shaking those in a film, and under bark of trees by peeling hard shell.

The classification of the rove-beetles in ecological groups by mode of living where done in according with (1, 2, 3, 4, 5, 7, 8, 9, 10) and ours researces efectuated in period of three years (2007-2010) in regions from the centre, north and south of the Republic of Moldova.

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Results and discussion

The rove-beetles have hidden lifestyles and live solitary or in symbiosis with other organisms. Moreover, these insects are termophilous and hygrophilous; diurnal and nocturnal (night vision is very good); good runner, etc. In the day, beetles are hidden beneath the bark of trees, logs and boards, in soil cracks, under clods, stones, moss, flowers, in the galleries of other insects, animal faeces, etc.

In the result of nutrition, rove-beetles take part in the movement of substance and energy. These insects are engaged in the food chain. Also, in their body are accumulates energy as biomass which is transferred to other organisms that feed on their account. A good example can be done frogs (*Rana ridibunda*, *R. terrestris*, *Bufo viridis*, *Bombina bombina*), because the maximum amount of insects found in their stomach where rove-beetles (11, 13).

The rove-beetles are omnivorous and predatory insects. They eat snails, larvae of various insects, etc. Furthermore, these may be considered in nature "health agents", they consume plants dried and decomposed, died animal vertebrates and invertebrates.

Depending on the life cycle (12, 16) has classified the rove-beetles into two groups – stenotopic and eurytopic. The first category, characterized the rove-beetles which living in the dens of the European ground squirrel, moles, field mice – *Quedius cruentus*, *Philonthus* sp., *Heterothops* sp., *Haploglossa* sp etc. The second category includes rove-beetles which appear and disappear spontaneously in the dens of the mammals - *Falagria sulcata*, *Gyrohypnus angustatus*, *Othius* sp., *Haploglossa* sp. etc.

Babenko (10) has described the biology and ecology of the necrophagous and coprophage rove-beetles.

The morphological aspects and the specific content of some mushrooms from *Boletaceae* families, *Agaricaceae* and other, have the role of "attractive source" for a lot species of rove-beetles. So, chalky-brittle ectomycorrhizal mushrooms like: *Russula azureea*, *R. emetic*, *R. vesca*, *Lactarius resimus*, *L. necator*, *L. torminosus*, *Amanita muscaria*, *A. mappa*, etc., hosting the small rove-beetles from *Aleocharinae* subfamily. The tubular mushrooms - *Boletus edulis*, *B. granulatus*, *B. luteus*, *Leccinum aurantiacum* are less populated and consumed by the rove-beetles. In theirs works Burakowski & other (3) and Nikitskii & other (14) have shown the diversity of the rove-beetles which can be seen on the mushroom hats.

In the result of researches and collections made in the zones from the centre, north and south of the Republic of Moldova were studded 278 species of the rove-beetles which belongs to 9 subfamilies. These species where classified in the next ecological groups: coprophilous, mycetophilous, pedophilous, necrophilous and saprophagous. From these 278 species 105 are coprophilous, 51 – mycetophilous, 131 – pedophilous, 86 – necrophilous and 220 saprophagous (Tabel).

Under the influence of unstable weather conditions, processes of migration and adaptation the structure of environmental groups of the specified species of rove-beetles can change annually.

Tabel

Classification of the rove-beetles from the Republic of Moldova in ecological groups

№	Species	Ecological groups				
		Coprophi-lous	Mycetophi-lous	Pedophi-lous	Necro-philous	Sapro-phagous
SUBFAMILY OMALIINAE Macleay, 1825						
1	*Anthophagus caraboides* (Linnaeus, 1758)					
2	*Acrolocha pliginskii* Bernhauer, 1912	+	-	+	-	+
3	*Omalium caesum* Gravenhorst, 1806	-	-	+	-	+
4	*Omalium rivulare* (Paykull, 1789)	-	-	+	-	+
SUBFAMILY TACHYPORINAE MacLeay, 1825						
1	*Parabolitobius formosus* (Gravenhorst, 1806)	-	-	+	-	+
2	*Ischnosoma splendidum* (Gravenhorst, 1806)	-	-	+	-	+
3	*Lordithon lunulatus* (Linnaeus, 1760)	-	+	+	-	+
4	*Lordithon exoletus* (Erichson, 1839)	-	+	+	-	+
5	*Lordithon thoracicus* (Fabricius, 1777)	-	+	+	-	+
6	*Lordithon trinotatus* (Erichson, 1839)	-	+	+	-	+
7	*Mycetoporus forticornis* Fauvel, 1875	-	-	+	-	+

8	*Mycetoporus lepidus* (Gravenhorst, 1806)	-	-	+	-	+
9	*Mycetoporus nigricollis* Stephens, 1835	-	-	-	-	+
10	*Cilea silphoides* (Linnaeus, 1767)	+	-	-	-	-
11	*Sepedophilus immaculatus* (Stephens, 1832)	-	+	-	-	+
12	*Sepedophilus marshami* (Stephens, 1832)	-	+	-	-	+
13	*Sepedophilus obtusus* (Luze, 1902)	-	+	-	-	+
14	*Sepedophilus testaceus* (Fabricius, 1793)	-	+	-	-	+
15	*Tachinus fimetarius* Gravenhorst, 1802	+	-	-	-	+
16	*Tachinus lignorum* (Linnaeus, 1758)	+	-	+	-	+
17	*Tachinus corticinus* Gravenhorst, 1802	+	-	-	-	+
18	*Tachinus rufipes* (Linnaeus, 1758)	+	-	+	-	+
19	*Tachyporus abdominalis* (Fabricius, 1781)	+	+	-	-	+
20	*Tachyporus nitidulus* (Fabricius, 1781)	+	+	+	+	+
21	*Tachyporus hypnorum* (Fabricius, 1775)	-	-	+	-	+
22	*Tachyporus pusillus* Gravenhorst, 1806	-	-	-	+	+
23	*Tachyporus ruficollis* Gravenhorst, 1802	-	-	-	+	+
24	*Tachyporus solutus* Erichson, 1839	-	-	+	-	+
SUBFAMILY HABROCERINAE Mulsant et Rey, 1877						
1	*Habrocerus capillaricornis* (Gravenhorst, 1806)	-	-	+	-	+
SUBFAMILY ALEOCHARINAE Fleming, 1821						
1	*Aleochara bipustulata* (Linnaeus, 1760)	+	+	-	-	-
2	*Aleochara curtula* (Goeze, 1777)	+	+	-	-	-
3	*Aleochara grisea* Kraatz, 1856	+	-	+	-	+
4	*Aleochara lata* Gravenhorst, 1802	-	+	-	-	-
5	*Aleochara laticornis* Kraatz, 1856	-	+	-	-	-
6	*Aleochara laevigata* Gyllenhal, 1810	-	+	-	-	-
7	*Aleochara bilineata* Gyllenhal, 1810	-	+	-	-	-
8	*Aleochara intricata* Mannerheim, 1830	+	+	-	-	-
9	*Acrotona fungi* (Gravenhorst, 1806)	-	-	+	-	+
10	*Astilbus canaliculatus* Fabricius 1787	+	+	-	-	-
11	*Aloconota gregaria* (Erichson, 1839)	+	+	-	-	-
12	*Atheta longicornis* (Gravenhorst, 1802)	-	+	-	-	-
13	*Atheta oblita* (Erichson, 1839)	-	+	-	-	-
14	*Dinaraea angustula* (Gyllenhal, 1810)	-	+	-	-	+
15	*Geostiba circellaris* (Gravenhorst, 1802)	-	-	-	-	+
16	*Liogluta granigera* (Kiesenwetter, 1850)	+	-	-	-	+
17	*Lyprocorrhe anceps* (Erichson, 1839)	-	-	-	+	-
18	*Nehemitropia lividipennis* (Mannerheim, 1830)	+	-	-	-	+
19	*Autalia impressa* (Olivier, 1795) *	+	+	-	-	-
20	*Autalia rivularis* (Gravenhorst, 1902)	+	+	-	-	-
21	*Falagria caesa* Erichson, 1837	+	-	-	-	+
22	*Falagria splendens* Kraatz, 1858	+	-	-	-	+
23	*Falagria sulcatula* (Gravenhorst, 1806)	+	-	-	-	+
24	*Falagrioma thoracica* (Stephens, 1832)	+	+	-	+	+
25	*Gymnusa brevicollis* (Paykull, 1800)	+	-	+	-	+
26	*Bolitochara mulsanti* Sharp, 1875	+	-	+	-	+
27	*Anaulacaspis nigra* (Gravenhorst, 1802)	-	+	-	-	+
28	*Cordalia obscura* (Gravenhorst, 1802)	+	+	-	-	+
29	*Leptusa fumida* (Erichson, 1839)	-	+	-	-	+
30	*Gyrophaena joyi* Wendeler, 1924	-	+	+	-	+
31	*Gyrophaena pulchella* Heer, 1839	-	+	+	-	+
32	*Gyrophaena affinis* Mannerheim, 1830	-	+	+	-	+
33	*Cypha longicornis* (Paykull, 1800)	+	-	-	-	+
34	*Holobus flavicornis* (Boisdul & Lacordaire, 1835)	+	-	-	-	+
35	*Oligota pusillima* (Gravenhorst, 1806)	-	+	-	-	+
36	*Drusilla canaliculata* (Fabricius, 1787)	+	-	-	-	-
37	*Zyras collaris* (Paykull, 1800)	+	+	-	-	-
38	*Zyras haworthi* (Stephens, 1832)	+	+	-	-	-
39	*Ilyobates mech* (Baudi di Selve, 1848)	+	+	-	-	-

40	*Ocalea badia* Erichson, 1837	-	+	-	-	+
41	*Oxypoda acuminata* (Stephens, 1832)	+	-	-	-	+
42	*Oxypoda abdominalis* (Mannerheim, 1830)	-	-	-	-	+
43	*Brachyusa concolor* (Erichson, 1839)	-	+	-	-	-
44	*Ischnopoda umbratica* (Erichson, 1837)	-	+	-	-	-
45	*Tachyusa constricta* Erichson, 1837	-	+	-	-	-
SUBFAMILY OXYTELINAE Fleming, 1821						
1	*Coprophilus sriatulus* (Fabricius, 1793)	-	-	-	-	+
2	*Coprophilus pennifer* (Motschulsky, 1845)	-	-	-	-	+
3	*Coprophilus piceus* (Solsky, 1866)	-	-	-	-	+
4	*Deleaster dichrous* (Gravenhorst, 1802)	-	-	+	-	+
5	*Anotylus insecatus* (Gravenhorst, 1806)	+	-	-	-	+
6	*Anotylus intricatus* (Erichson, 1840)	+	-	+	-	+
7	*Anotylus nitidulus* (Gravenhorst, 1802)	+	+	+	-	+
8	*Anotylus rugosus* (Fabricius, 1775)	+	+	-	-	+
9	*Anotylus sculpturatus* (Gravenhorst, 1806)	+	+	-	-	+
10	*Anotylus tetracarinatus* (Block, 1799)	+	-	-	-	+
11	*Oxytelus laqueatus* (Marsham, 1802)	+	-	-	-	-
12	*Oxytelus piceus* (Linnaeus, 1767)	+	-	-	-	+
13	*Oxytelus sculptus* Gravenhorst, 1806	+	-	-	-	+
14	*Platystethus cornutus* (Gravenhorst, 1802)	+	-	-	-	+
15	*Platystethus nitens* (C. R. Sahlberg, 1832)	+	-	+	-	+
16	*Platystethus spinosus* Erichson, 1840	+	-	-	-	+
17	*Platystethus arenarius* (Geoffroy, 1785)	+	-	-	-	+
18	*Bledius bicornis* (Germar, 1822)	-	-	+	-	+
19	*Bledius cribricollis* Heer, 1839	-	-	+	-	+
20	*Bledius dissimilis* Erichson, 1840	-	-	+	-	-
21	*Bledius gallicus* (Gravenhorst, 1806)	-	-	+	-	+
22	*Bledius furcatus* (Olivier, 1811)	-	-	+	-	-
23	*Bledius tricornis* (Herbst, 1784)	-	-	+	-	+
24	*Carpelimus anthracinus* (Mulsant et Rey, 1861)	-	-	-	-	+
25	*Carpelimus corticinus* (Gravenhorst, 1806)	-	-	+	-	+
26	*Carpelimus fuliginosus* Gravenhorst, 1802	+	-	+	-	+
27	*Carpelimus gracilis* (Mannerheim, 1830)	-	-	+	-	-
28	*Carpelimus halophilus* (Kiesenwetter, 1844)	-	-	+	-	-
29	*Carpelimus bilineatus* (Stephens, 1834)	+	-	+	-	+
30	*Carpelimus pusillus* (Gravenhorst, 1802)	+	-	+	-	+
31	*Carpelimus nitidus* (Baudi de Selve, 1848)	-	-	+	-	+
32	*Carpelimus rivularis* (Motschulsky, 1860)	-	-	+	-	+
33	*Carpelimus exiguus* (Erichson, 1839)	-	-	+	-	+
34	*Carpelimus gusarovi* Gildenkov, 1997	-	-	-	-	+
35	*Planeustomus heydeni* (Eppelsheim, 1884)	-	-	+	-	+
36	*Planeustomus palpalis* (Erichson, 1839)	-	-	+	+	+
SUBFAMILY OXYPORINAE Fleming, 1821						
1	*Oxyporus rufus* (Linnaeus, 1758)	-	+	-	-	+
SUBFAMILY STENINAE MacLeay, 1825						
1	*Stenus flavipalpis* Thomson, 1860	+	-	+	-	-
2	*Stenus ater* Mannerheim, 1830	-	-	+	-	+
3	*Stenus argus* Gravenhorst, 1806	-	-	-	-	+
4	*Stenus boops* Ljungh, 1804	-	-	+	-	-
5	*Stenus comma* Leconte, 1863	-	-	+	-	+
6	*Stenus morio* Gravenhorst, 1806	-	-	+	-	+
7	*Stenus planifrons* Rey, 1884	-	-	+	-	+
8	*Stenus cicindeloides* (Schaller, 1783)	+	-	-	-	+
9	*Stenus clavicornis* Scopoli, 1863	-	-	+	-	+
10	*Stenus ganglbaueri* Bernhauer, 1905	-	-	+	-	+
11	*Stenus impressus* Germar, 1824	-	-	+	-	+
12	*Stenus ochropus* Kiesenwetter, 1858	-	-	+	-	+
13	*Stenus claritaris* Puthz, 1971	-	-	+	-	+

14	*Stenus montenegrinus* Puthz, 1972	-	-	-	-	-
15	*Stenus pallitarsis* Stephens, 1833	-	-	+	-	+
16	*Stenus providus* Erichson, 1839	+	-	+	-	+
SUBFAMILY PAEDERINAE Fleming, 1821						
1	*Astenus bimaculatus* (Erichson, 1840)	-	-	+	-	+
2	*Astenus gracilis* (Paykull, 1789)	-	-	+	-	+
3	*Astenus lyonessius* (Joy, 1908)	+	-	+	-	+
4	*Ochthephilum fracticorne* (Paykull, 1800)	-	-	-	-	+
5	*Leptobium gracile* (Gravenhorst, 1802)	-	-	-	-	+
6	*Achenium depressum* (Gravenhorst, 1802)	-	-	+	-	+
7	*Achenium humile* (Nicolai, 1822)	-	-	+	-	-
8	*Lathrobium brunnipes* (Fabricius, 1793)	+	-	+	-	+
9	*Lathrobium elongatum* Linnaeus, 1767	+	-	-	-	+
10	*Lathrobium fovulum* Stephens, 1833	-	-	+	-	+
11	*Lathrobium fulvipenne* Gravenhorst, 1806	-	-	-	-	+
12	*Lathrobium furcatum* Czwalina, 1888	-	-	+	-	+
13	*Lathrobium geminum* Kraatz, 1857	-	-	+	-	+
14	*Lathrobium longulum* Gravenhorst, 1802	+	-	+	-	+
15	*Lathrobium quadratum* (Paykull, 1789)	+	-	+	-	+
16	*Lathrobium taxi* Bernhauer, 1902	-	-	+	-	+
17	*Cryptobium fracticorne* (Paykull, 1800)	-	-	+	-	+
18	*Tetartopaeus terminatus* (Gravenhorst, 1802)	-	-	-	-	+
19	*Lithocharis nigriceps* Kraatz, 1859	+	-	-	-	+
20	*Lithocharis ochracea* (Gravenhorst, 1802)	+	-	+	-	+
21	*Sunius fallax* (Lokay, 1919)	-	-	+	-	+
22	*Sunius melanocephalus* (Fabricius, 1793)	-	-	-	+	+
23	*Paederus linearis* (Olivier, 1795)	-	-	+	-	-
24	*Paederus littoralis* Gravenhorst, 1802	-	-	+	-	-
25	*Paederus fuscipes* Curtis, 1826	-	-	+	-	+
26	*Paederus riparius* (Linnaeus, 1758)	-	-	+	+	-
27	*Scopaeus laevigatus* Gyllenhal, 1827	-	-	+	-	+
28	*Rugilus angustatus* Geoffroy, 1785	-	-	+	-	+
29	*Rugilus orbiculatus* (Paykull, 1789)	+	-	+	-	+
30	*Rugilus rufipes* Germar, 1836	-	-	-	-	+
31	*Rugilus similis* Erichson, 1839	-	-	+	-	+
32	*Rugilus subtilis* Erichson, 1840	+	-	+	-	+
SUBFAMILY STAPHYLININAE Latreille, 1802						
1	*Othius punctulatus* (Goeze, 1777)	-	+	+	-	+
2	*Abemus chloropterus* (Panzer, 1796)	-	-	-	-	+
3	*Bisnius fimetarius* (Gravenhorst, 1802)	+	-	-	-	+
4	*Bisnius nigriventris* (Thomson, 1867)	-	-	-	-	+
5	*Bisnius nitidulus* (Gravenhorst, 1802)	-	-	+	-	+
6	*Bisnius scribae* (Fauvel, 1867)	-	-	-	-	+
7	*Bisnius sordidus* (Gravenhorst, 1802)	-	-	-	-	+
8	*Erichsonius cinerascens* (Gravenhorst, 1802)	-	-	+	-	+
9	*Hesperus rufipennis* Gravenhorst, 1806	-	-	+	-	+
10	*Gabrius exspectatus* Smetana, 1952	-	-	+	-	+
11	*Gabrius femoralis* (Hochhuth, 1851)	-	-	+	-	+
12	*Gabrius nigritulus* (Gravenhorst, 1802)	+	-	-	-	+
13	*Gabrius osseticus* (Kolenati, 1846)	+	-	+	-	+
14	*Gabrius piliger* Mulsant et Rey, 1876	+	-	+	-	+
15	*Gabrius splendidulus* (Gravenhorst, 1802)	-	-	-	-	+
16	*Gabrius suffragani* Joy, 1913	+	-	-	-	+
17	*Neobisnius procerulus* (Gravenhorst, 1806)	-	-	+	-	+
18	*Philonthus albipes* (Gravenhorst, 1802)	+	-	-	-	-
19	*Philonthus addendus* Sharp, 1867	+	-	+	-	+
20	*Philonthus atratus* (Gravenhorst, 1802)	-	-	+	-	+
21	*Philonthus caucasicus* Nordmann, 1837	+	+	+	-	+
22	*Philonthus carbonarius* (Gravenhorst, 1802)	+	-	+	-	+

23	*Philonthus cognatus* Stephens, 1832	+	-	+	-	+
24	*Philonthus concinnus* (Gravenhorst, 1802)	+	-	+	-	+
25	*Philonthus confinis* A. Strand, 1941	+	-	+	-	+
26	*Philonthus corruscus* (Gravenhorst, 1802)	-	-	+	-	+
27	*Philonthus coprophilus* Jarrige, 1949	+	-	-	-	-
28	*Philonthus cruentatus* (Gmelin, 1790)	+	-	+	-	+
29	*Philonthus discoideus* (Gravenhorst, 1802)	+	+	+	-	+
30	*Philonthus diversiceps* Bernhauer, 1901	+	-	-	-	+
31	*Philonthus debilis* (Gravenhorst, 1802)	+	-	+	-	+
32	*Philonthus decorus* (Gravenhorst, 1802)	+	+	+	-	+
33	*Philonthus ebeninus* (Gravenhorst, 1802)	+	+	+	-	+
34	*Philonthus intermedius* (Lacordaire, 1835)	+	-	-	-	-
35	*Philonthus laevicollis* (Lacordaire, 1835)	+	-	+	-	+
36	*Philonthus laminatus* (Creutzer, 1799)	+	-	-	-	+
37	*Philonthus longicornis* Stephens, 1832	+	-	-	-	-
38	*Philonthus mesomelinus* (Marsham, 1802)	+	-	-	-	-
39	*Philonthus micans* (Gravenhorst, 1802)	+	-	-	-	-
40	*Philonthus nana* (Paykull, 1800)	+	-	-	-	-
41	*Philonthus nitidicollis* (Lacordaire, 1835)	+	-	+	-	+
42	*Philonthus parvicornis* (Gravenhorst, 1802)	+	-	-	-	-
43	*Philonthus politus* (Linnaeus, 1758)	+	+	+	-	+
44	*Philonthus punctus* (Gravenhorst, 1802)	-	-	+	-	+
45	*Philonthus quisquiliarius* (Gyllenhal, 1810)	-	-	+	-	+
46	*Philonthus rectangulus* Sharp, 1874	+	-	+	-	+
47	*Philonthus rubripennis* Stephens, 1832	+	-	-	-	+
48	*Philonthus rufipes* (Stephens, 1832)	-	-	+	-	+
49	*Philonthus salinus* Kiesenwetter, 1844	-	-	+	-	+
50	*Philonthus spinipes* Sharp, 1874	+	-	-	-	+
51	*Philonthus splendens*(Fabricius, 1793)	+	-	-	-	+
52	*Philonthus succicola* C.G.Thomson, 1860	+	-	+	-	+
53	*Philonthus temporalis* Mulsant et Rey, 1853	+	-	+	-	+
54	*Philonthus tenuicornis* Mulsant et Rey, 1853	+	-	-	-	-
55	*Philonthus umbratilis* (Gravenhorst, 1802)	+	-	+	-	+
56	*Philonthus varians* (Paykull, 1789)	+	-	+	-	+
57	*Philonthus ventralis* (Gravenhorst, 1802)	+	-	+	-	+
58	*Philonthus virgo* Gravenhorst, 1802	-	-	+	-	+
59	*Astrapaeus ulmi* (Rossi, 1790)	-	-	+	-	+
60	*Heterothops dissimilis* (Gravenhorst, 1802)	-	-	+	-	+
61	*Heterothops quadripunctulus* (Gravenhorst, 1806)	-	-	+	-	+
62	*Quedius cinctus* (Paykull, 1790)	+	-	-	-	+
63	*Quedius cruentus* (Olivier, 1795)	-	-	-	+	+
64	*Quedius lateralis* Gravenhorst, 1802	-	+	+	-	+
65	*Quedius fulgidus* (Fabricius, 1793)	+	-	+	-	-
66	*Quedius invreae* Gridelli, 1924	+	-	+	-	+
67	*Quedius maurus* (C.R. Sahlberg, 1830)	-	-	-	+	-
68	*Quedius ochripennis* (Menetries, 1832)	+	-	-	-	-
69	*Quedius tenellus* (Gravenhorst,1806)	-	-	+	-	+
70	*Quedius fuliginosus* (Gravenhorst, 1802)	-	-	-	+	+
71	*Quedius molochinus* (Gravenhorst, 1806)	-	-	+	-	+
72	*Quedius humeralis* Stephens, 1832	-	-	+	-	+
73	*Quedius limbatus* (Heer, 1839)	-	-	+	-	+
74	*Quedius lucidulus* (Erichson, 1839)	+	-	-	-	+
75	*Quedius nemoralis* Baudi di Selve, 1848	+	-	+	-	+
76	*Quedius picipes* (Mannerheim, 1830)	-	+	+	-	+
77	*Quedius suturalis* Kiesenwetter, 1845	-	-	+	-	+
78	*Quedius umbrinus* Erichson, 1839	-	-	+	-	+
79	*Velleius dilatatus* (Fabricius, 1787) *	+	-	+	-	+
80	*Creophilus maxillosus* (Linnaeus, 1758)	+	+	+	-	+
81	*Emus hirtus* (Linnaeus, 1758)	+	+	-	-	+

82	*Ocypus brunnipes* (Fabricius, 1781)	-	-	+	-	+
83	*Ocypus nitens* (Schrank, 1781)	-	-	+	-	+
84	*Ocypus olens* (O. Muller, 1764)	-	-	+	-	+
85	*Ocypus ophtalmicus* (Scopoli, 1763)	-	-	+	-	+
86	*Ocypus fulvipennis* Erichson, 1840	-	-	+	-	+
87	*Ocypus picipennis* (Fabricius, 1793)	+	-	+	-	+
88	*Ocypus similis* (Fabricius, 1792)	-	-	+	-	+
89	*Ocypus tenebricosus* (Gravenhorst, 1846)	-	-	+	-	+
90	*Ontholestes haroldi* (Eppelsheim, 1884)	+	-	-	-	+
91	*Ontholestes murinus* (Linnaeus, 1758)	+	-	-	-	+
92	*Ontholestes tesselatus* (Geoffroy, 1785)	+	-	-	-	+
93	*Platydracus chalcocephalus* (Fabricius, 1801)	+	+	+	-	+
94	*Platydracus fulvipes* (Scopoli, 1763)	+	-	+	-	+
95	*Platydracus latebricola* (Gravenhorst, 1806)	+	-	+	-	+
96	*Platydracus stercorarius* (Olivier, 1794)	+	-	+	-	+
97	*Staphylinus caesareus* Cederhjelm, 1798	+	-	-	-	+
98	*Staphylinus erythropterus* Linnaeus, 1758	+	-	+	-	+
99	*Tasgius melanarius*(Heer, 1839)	-	-	+	-	+
100	*Tasgius morsitans* (Rossi, 1790)	-	-	+	-	+
101	*Tasgius winkleri* (Bernhauer, 1906)	-	-	+	-	+
102	*Tasgius ater* (Gravenhorst, 1802)	-	-	+	-	+
103	*Tasgius pedator* (Gravenhorst, 1802)	-	-	-	-	+
104	*Gauropterus fulgidus* (Fabricius, 1787)	+	-	+	-	+
105	*Gyrohypnus angustatus* Stephens, 1833	+	+	+	-	+
106	*Gyrohypnus fracticornis* (O. Mueller, 1776)	+	-	-	-	+
107	*Gyrohypnus punctulatus* (Paykull, 1789)	+	-	-	-	+
108	*Leptacinus batychrus* (Gyllenhal, 1827)	+	-	-	-	-
109	*Leptacinus intermedius* Donisthorpe, 1936	+	-	-	-	+
110	*Leptacinus sulcifrons* (Stephens, 1833)	+	-	+	-	+
111	*Megalinus flavocinctus* Hochhuth, 1849	+	-	+	-	+
112	*Phacophallus parumpunctatus* (Gyllenhal, 1827)	+	-	-	-	-
113	*Stenistoderus cephalotes* (Kraatz, 1858)	-	-	-	-	+
114	*Xantholinus distans* Mulsant et Rey, 1853	-	-	-	-	+
115	*Xantholinus linearis* (Olivier, 1795)	+	+	+	+	+
116	*Xantholinus fortepunctatus* Motschulsky, 1860	+	-	-	-	+
117	*Xantholinus dvoraki* Coiffait, 1956	-	-	+	-	+
118	*Xantholinus decorus* Erichson, 1839	-	-	+	-	+
119	*Xantholinus tricolor* (Fabricius, 1787)	-	-	+	-	+
Total		**105**	**51**	**131**	**86**	**220**

* New species for the Republic of Moldova

***Velleius dilatatus* (Fabricius, 1787)** – collected in Căpriana (Strășeni District), 22.07.2006 – 1 ex., with pitfall trap (leg by V. Ciubcic).

***Autalia impressa* (Olivier, 1795) –** Cioreşti (Nisporeni District), 12.06.1968 – 1 ex., collected in the wood on the mushrooms (leg. V.Ostaficiuc).

Conclusion

1. In result of investigation where collected 278 species which belong to 9 subfamilies: *Omaliinae* – with 4 species, *Tachyporinae* – 24, *Habrocerinae* – 1, *Aleocharinae* – 45, *Oxytelinae* – 36, *Oxyporinae* – 1, *Steninae* – 16, *Paederinae* – 32, and *Staphylininae* with 119.

2. For the first time where collected two new species of rove-beetles for the Republic of Moldova: *Velleius dilatatus* (Fabricius, 1787) and *Autalia impressa* (Olivier, 1795).

3. From these 278 species 105 are coprophilous, 51 – mycetophilous, 131 – pedophilous, 86 – necrophilous and 220 saprophagous.

Rezumat

În lucrare sunt evidențiate aspectele bioecologice ale stafilinidelor (Coleoptera, Staphylinidae). Acestea, după modul de nutriție şi trai sunt clasificate în cinci grupe ecologice: coprobionte, saprobionte, pedobionte, micetobionte, saprobionte, necrobionte. Sunt indicați reprezentanți din subfamiliile Omaliinae, Tachyporinae, Habrocerinae, Aleocharinae, Oxytelinae, Oxyporinae, Steninae, Paederinae, Staphylininae.

Noutate ştiinţifică pentru Republica Moldova reprezintă stafilinidele Velleius dilatatus (Fabricius, 1787) şi Autalia impressa (Olivier, 1795).

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COMPLEXUL MUZEAL DE ŞTIINŢELE NATURII „ION BORCEA" BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 98 – 105

FAUNISTICAL AND ECOLOGICAL ASPECTS CONCERNING THE CARABIDS (INSECTA: COLEOPTERA: CARABIDAE) FROM VÂNĂTORI NEAMŢ NATURE PARK (NEAMŢ COUNTY, ROMANIA)

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ABSTRACT

The paper presents different aspects concerning the coenosis of Carabidae from Vânători Neamț Nature Park (Neamț County, Romania). The researches were made in 2000 and 2002 and the material was collected by the method of Barber pitfalls placed in 4 different locations. Systematically, the fauna analysed for this area (573 carabids) belongs to 11 subfamilies 25 genera and 45 species. *Limodromus assimilis* (Paykull 1790) (22.16%), *Abax (Abax) parallelepipedus* (Piller & Mitterpacher 1783) (17.1%), *Carabus (Megodontus) violaceus* Linne 1758 (8.55%) and *Pterostichus (Bothriopterus) oblongopunctatus* (Fabricius 1787) (8.2%) were represented by the larger number of specimens. The coenosis of Carabidae is formed by 29 (64.44%) mesophilous, forest species, 12 species (26.67%) of open places and 4 (8.89%) common species.

Key words: Carabidae, diversity, Vânători Neamț Nature Park

Introduction

The faunistical and ecological researches concerning the carabids from Vânători Neamț Nature Park were made in 2000 and 2002. These studies were included in an ample fauna and flora monitoring programme.

Geographically, the Vânători Neamț Nature Park covers the east slope of Stânișoarei Mountains (part of Neamțului Mountain situated in the east-part of Eastern Carpathians), Neamțului sub-Carpathians (that belong to Eastern sub-Carpathians) and also the Ozana and Cracău basins. The Vânători Neamț Nature Park is characterized by three geomorphological areas: mountain area, sub-Carpathian depression area and sub-Carpathian hills area.

Material and method

The entomological material analyzed in this paper was collected in Vânători-Neamț Natural Park, from four different locations placed along Secu and Neamțului Monasteries areas (2000) and along two tourist routs: Agapia Monastery-Sihla Monastery-Sihăstria Monastery and Agapia Monastery-Secu Monastery 2002.

The insects were collected with the help of Barber pitfalls (four batteries) placed in deciduous forests, conifers forests and along the tourist routs mentioned anterior. A battery included ten pitfalls placed on a 50 m x 50 m area.

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Results and discussions

In 2000 and 2002, 573 specimens of carabids were collected in Vânători Neamț Nature Park. Systematically, this material belongs to 11 subfamilies (Cicindelinae, Carabinae, Nebriinae, Harpalinae, Pterostichinae, Platyninae, Panagaeinae, Licininae, Brachininae, Lebiinae and Trechinae), 25 genera and 45 species – tab. 1.

The eleven subfamilies collected in Vânători Neamț Nature Park are represented by different number of species and specimens:

- The Pterostichinae was the most well represented subfamily:268 individuals (46.77%), respectively 14 species (31.11%); Carabinae Subfamily was represented by 104 specimens (18.15%), respectively 13 species (28.90%). The dominance of these two subfamilies in the studied biocoenosis is explained by the numerous mesophilous, forest species and some mountain species from the Pterostichinae and Carabinae Subfamilies
- The Harpalinae Subfamily was represented by 13 individuals (2.27%) that belong to 6 species (13.33%). All the Harpalinae were collected from open places (roadsides, glades, grass lands). The reduce presence of this subfamily has an ecological explanation: generally, the Harpalinae

Subfamily includes xerophilous species that can be found in open places, at lower altitudes;

- The other nine subfamilies (Cicindelinae, Nebriinae, Platyninae, Panagaeinae, Licininae, Brachininae, Lebiinae and Trechinae) were represented only by one or three species;

All the 11 subfamilies together with their species (for each species there are indicated the abundance and the dominance) are presented in tab. 2.

According to the data presented in tab. 2, the 25 genera are represented by different numbers of species:

- The genera *Carabus* and *Pterostichus* are the most well represented: by 10 and respectively 6 species;
- *Limodromus* and *Abax* genera include one and respectively three species, but they are represented by a large number of specimens: 127 (22.16%) and 139 individuals (24.26%). The species of *Limodromus* and *Abax* are frequently found in deciduous and conifers forests;
- The following genera: *Cicindela*, *Calosoma*, *Nebria*, *Leistus*, *Notiophilus*, *Anisodactylus*, *Ophonus*, *Molops*, *Amara*, *Zabrus*, *Agonum*, *Limodromus*, *Calathus*, *Panageus*, *Licinus*, *Aptinus*, *Microlestes and Metallina* are represented by one single species;
- Four species are represented by the larger number of specimens: *Limodromus assimilis* (Paykull 1790) (22.16%), *Abax (Abax) parallelepipedus* (Piller & Mitterpacher 1783) (17.10%), *Carabus (Megodontus) violaceus* (Linnaeus 1758) (8.55%) and *Pterostichus (Bothriopterus) oblongo-punctatus* (Fabricius 1787) (8.20%).

Table 1 – Distribution of species and individuals within the subfamilies of Carabidae collected in the Vânători Neamț Nature Park (2000 and 2002)

No.	Subfamilies	No. of species	%	No. of specimens	%
1.	Cicindelinae	1	2.22	2	0.35
2.	Carabinae	13	28.90	104	18.15
3.	Nebriinae	3	6.67	29	5.06
4.	Harpalinae	6	13.33	13	2.27
5.	Pterostichinae	14	31.11	268	46.77
6.	Platyninae	3	6.67	131	22.86
7.	Panagaeinae	1	2.22	1	0.18
8.	Licininae	1	2.22	5	0.87
9.	Brachininae	1	2.22	16	2.79
10.	Lebiinae	1	2.22	1	0.18
11.	Trechinae	1	2.22	3	0.52
	TOTAL	**45**	**100**	**573**	**100**

Analyzing the data concerning the abundance and the dominance of the 45 species collected in the Vânători Neamț Nature Park (tab. 3), it can be noticed that these analytical indexes vary very much. This variation expresses the adaptative degree to the conditions assured by the respective biotope (Varvara, 1997). For example, *Carabus (Megodontus) violaceus* (Linnaeus 1758) is represented by 40 individuals (D = 81.6%) in Neamțului Monastery area (here the pitfalls were placed in old beech forests) and only by 9 specimens in the other three locations (the pitfalls were placed along the tourist routs or in grass land - 894 m altitude). In Neamțului Monastery and Secu Monastery areas, *Platynus assimilis* was represented by 40 and respectively 73 individuals, but along the tourist routs the abundance was very reduced – 5, respectively 9 specimens.

The numerical variation of carabid population is correlated to the ecological characteristics of the species. Thus, the 45 species of Carabidae identified for Vânători Neamț Nature Park can be classified as follow (Freude, 1976; Varvara, 1997):

- 8 mountain species: *Carabus (Chrysocarabus) auronitens escheri* (Palliardi 1825), *Carabus (Orinocarabus) linnaei* (Panzer 1812), *Cychrus caraboides* (Linnaeus 1758), *Cychrus semigranosus* (Palliardi 1825), *Metallina (Metallina) lampros* (Herbst 1784), *Licinus (Neorescius) hoffmanseggii* (Panzer 1803), *Notiophilus biguttatus* (Fabricius 1779), *Aptinus (Aptinus) bombarda* (Illiger 1800);
- 21 forest species (decidous and coniferous forests): *Calosoma (Calosoma) inquisitor* (Linnaeus 1758), *Carabus (Procrustes) coriaceus* (Linnaeus 1758), *Carabus (Oreocarabus) glabratus* (Paykull 1790), *Carabus (Megodontus) violaceus* (Linnaeus 1758), *Carabus (Tachypus) cancellatus* (Illiger 1798), *Carabus (Chaetocarabus) intricatus* (Linnaeus 1761), *Carabus (Platycarabus) irregularis* (Fabricius 1792), *Carabus (Eucarabus)*

obsoletus (Sturm 1815), *Pterostichus (Platysma) niger* (Schaller 1783), *Pterostichus (Bothriopterus) oblongopunctatus* (Fabricius 1787), *Pterostichus (Pseudomaseus) nigrita* (Paykull 1790), *Pterostichus (Argutor) vernalis* (Panzer 1796), *Pterostichus (Morphnosoma) melanarius* (Illiger 1798), *Pterostichus (Feronidius) melas* (Creutzer 1799), *Molops piceus* (Panzer 1793), *Abax (Abax) parallelepipedus* (Piller & Mitterpacher 1783), *Abax (Abax) parallelus* (Duftschmid 1812), *Abax (Abax) ovalis* (Duftschmid 1812), *Limodromus assimilis* (Paykull 1790), *Nebria (Nebria) brevicollis* (Fabricius 1792), *Leistus (Leistus) piceus* Frölich 1799;

- 16 species were found in open places (grass lands): *Cicindela (Cicindela) hybrida* (Linnaeus 1758), *Carabus (Trachycarabus) scabriusculus* (Olivier 1795), *Anisodactylus (Anisodactylus) binotatus* (Fabricius 1787), *Harpalus (Harpalus) affinis* (Schrank 1781), *Ophonus (Hesperophonus) azureus* (Fabricius 1775), *Harpalus (Harpalus) tardus* (Panzer 1797), *Pseudoophonus (Pseudoophonus) griseus* (Panzer 1796), *Pseudoophonus (Pseudoophonus) rufipes* (De Geer 1774), *Poecilus (Poecilus) cupreus* (Linnaeus 1758), *Poecilus (Poecilus) versicolor* (Sturm 1824), *Calathus (Neocalathus) melanocephalus* (Linnaeus 1758), *Agonum (Olisares) sexpunctatum* (Linnaeus 1758), *Panagaeus (Panagaeus) cruxmajor* (Linnaeus 1758), *Amara (Amara) aenea* (De Geer 1774), *Microlestes minutulus* (Goeze 1777), *Zabrus (Zabrus) tenebrioides* (Goeze 1777).

Table 2 – The fauna of Carabidae collected in the Vânători Neamț Nature Park, in 2000 and 2002.

No.	Subfamily	Species	A	D
1.	Cicindelinae	*Cicindela (Cicindela) hybrida* (Linnaeus 1758)	2	0.35
2.	Carabinae	*Cychrus caraboides* (Linnaeus 1758)	18	3.14
3.		*Cychrus semigranosus* Palliardi 1825	12	2.09
4.		*Calosoma (Calosoma) inquisitor* (Linnaeus 1758)	1	0.17
5.		*Carabus (Chrysocarabus) auronitens escheri* (Palliardi 1825)	7	1.22
6.		*Carabus (Tachypus) cancellatus* (Illiger 1798)	1	0.17
7.		*Carabus (Procrustes) coriaceus* (Linnaeus 1758)	5	0.87
8.		*Carabus (Oreocarabus) glabratus* (Paykull 1790)	1	0.17
9.		*Carabus (Chaetocarabus) intricatus* (Linnaeus 1761)	2	0.35
10.		*Carabus (Platycarabus) irregularis* (Fabricius 1792)	1	0.17
11.		*Carabus (Orinocarabus) linnaei* (Panzer 1812)	3	0.53
12.		*Carabus (Eucarabus) obsoletus* (Sturm 1815)	3	0.53
13.		*Carabus (Megodontus) violaceus* (Linnaeus 1758)	49	8.55
14.		*Carabus (Trachycarabus) scabriusculus* (Olivier 1795)	1	0.17
15.	Nebriinae	*Nebria (Nebria) brevicollis* (Fabricius 1792)	22	3.84
16.		*Leistus (Leistus) piceus* Frölich 1799	6	1.05
17.		*Notiophilus biguttatus* (Fabricius 1779)	1	0.17
18.	Harpalinae	*Anisodactylus (Anisodactylus) binotatus* (Fabricius 1787)	2	0.35
19.		*Pseudoophonus (Pseudoophonus) griseus* (Panzer 1796)	2	0.35
20.		*Pseudoophonus (Pseudoophonus) rufipes* (De Geer 1774)	3	0.53
21.		*Ophonus (Hesperophonus) azureus* (Fabricius 1775)	2	0.35
22.		*Harpalus (Harpalus) tardus* (Panzer 1797)	1	0.17
23.		*Harpalus (Harpalus) affinis* (Schrank 1781)	3	0.53
24.	Pterostichinae	*Pterostichus (Argutor) vernalis* (Panzer 1796)	1	0.17
25.		*Pterostichus (Bothriopterus) oblongopunctatus* (Fabricius 1787)	47	8.2
26.		*Pterostichus (Feronidius) melas* (Creutzer 1799)	3	0.53
27.		*Pterostichus (Morphnosoma) melanarius* (Illiger 1798)	3	0.53
28.		*Pterostichus (Platysma) niger* (Schaller 1783)	32	5.59
29.		*Pterostichus (Pseudomaseus) nigrita* (Paykull 1790)	5	0.87
30.		*Poecilus (Poecilus) cupreus* (Linnaeus 1758)	2	0.35
31.		*Poecilus (Poecilus) versicolor* (Sturm 1824)	1	0.17
32.		*Molops piceus* (Panzer 1793)	31	5.41
33.		*Abax (Abax) parallelepipedus* (Piller & Mitterpacher 1783)	98	17.1
34.		*Abax (Abax) ovalis* (Duftschmid 1812)	12	2.1
35.		*Abax (Abax) parallelus* (Duftschmid 1812)	29	5.06
36.		*Amara (Amara) aenea* (De Geer 1774)	3	0.53
37.		*Zabrus (Zabrus) tenebrioides* (Goeze 1777)	1	0.17
38.	Platyninae	*Agonum (Olisares) sexpunctatum* (Linnaeus 1758)	2	0.35
39.		*Limodromus assimilis* (Paykull 1790)	127	22.16
40.		*Calathus (Neocalathus) melanocephalus* (Linnaeus 1758)	2	0.35

No.	Subfamily	Species	A	D
41.	Panagaeinae	*Panagaeus (Panagaeus) cruxmajor* (Linnaeus 1758)	1	0.17
42.	Licininae	*Licinus (Neorescius) hoffmanseggii* (Panzer 1803)	5	0.87
43.	Brachininae	*Aptinus (Aptinus) bombarda* (Illiger 1800)	16	2.8
44.	Lebiinae	*Microlestes minutulus* (Goeze 1777)	1	0.17
45.	Trechinae	*Metallina (Metallina) lampros* (Herbst 1784)	3	0.53
	TOTAL		**573**	**100**

Table 3 - The abundances and the dominances of the species of the Carabidae collected in the Vânători Neamț Nature Park, in 2000 and 2002: 1 = Secu Monastery; 2 = Neamțului Monastery; 3 = Agapia Monastery-Sihla Monastery-Sihăstria Monastery tourist rout; 4 = Agapia Monastery-Secu Monastery tourist rout

No.	Species	2000				2002				TOTAL	
		1		2		3		4			
		A	D	A	D	A	D	A	D	A	D
1.	*Cicindela hybrida* L.		-		-		-	2	6.06	2	0.35
2.	*Cychrus caraboides* L.	5	2.3	11	3.84		-	2	6.06	18	3.14
3.	*Cychrus semigranosus* Palliardi		-	9	3.15		-	3	9.09	12	2.09
4.	*Calosoma inquisitor* L.		-	1	0.35		-		-	1	0.17
5.	*Carabus auronitens escheri* Palliardi	1	0.46	5	1.75	1	2.7		-	7	1.22
6.	*Carabus cancellatus* Ill.		-	1	0.35		-		-	1	0.17
7.	*Carabus coriaceus* L.	3	1.38	2	0.7		-		-	5	0.87
8.	*Carabus glabratus* Paykull		-	1	0.35		-		-	1	0.17
9.	*Carabus intricatus* L.	2	0.93		-		-		-	2	0.35
10.	*Carabus irregularis* Fabr.	1	0.46		-		-		-	1	0.17
11.	*Carabus linnaei* Panzer	1	0.46	1	0.35		-	1	3.03	3	0.53
12.	*Carabus obsoletus* Sturm	2	0.93		-		-	1	3.03	3	0.53
13.	*Carabus violaceus* L.	2	0.93	40	13.99	4	10.82	3	9.09	49	8.55
14.	*Carabus scabriusculus* Olivier		-		-	1	2.7		-	1	0.17
15.	*Nebria brevicollis* Fabr.	19	8.76	2	0.7	1	2.7		-	22	3.84
16.	*Leistus piceus* Frölich	3	1.38	3	1.05		-		-	6	1.05
17.	*Notiophilus biguttatus* Fabr.		-	2	0.7		-		-	2	0.35
18.	*Anisodactylus binotatus* Fabr.		-	2	0.7	1	2.7		-	3	0.53
19.	*Pseudoophonus griseus* Panzer	1	0.46	2	0.7		-		-	3	0.53
20.	*Pseudoophonus rufipes* De Geer		-		-	2	5.41		-	2	0.35
21.	*Ophonus azureus* Fabr.		-		-	1	2.7		-	1	0.17
22.	*Harpalus affinis* Schrank		-	2	0.7		-		-	2	0.35
23.	*Harpalus tardus* Panzer	3	1.38		-		-		-	3	0.53
24.	*Pterostichus vernalis* Panzer		-		-	2	5.41		-	2	0.35
25.	*Pterostichus oblongopunctatus* Fabr.		-		-	2	5.41		-	2	0.35
26.	*Pterostichus melas* Creutzer	16	7.37	16	5.59	-	-		-	32	5.59
27.	*Pterostichus melanarius* Ill.		-		-	-	-	1	3.03	1	0.17
28.	*Pterostichus niger* Schaller		-	4	1.4	-	-	1	3.03	5	0.87
29.	*Pterostichus nigrita* Paykull	15	6.91	27	9.44	3	8.11	2	6.06	47	8.2
30.	*Poecilus cupreus* L.	-	-		-	1	2.7		-	1	0.17
31.	*Poecilus versicolor* Sturm	2	0.93	1	0.35	-	-		-	3	0.53
32.	*Molops piceus* Panzer	17	7.83	11	3.84	3	8.11		-	31	5.41
33.	*Abax parallelepipedus* Piller & Mitterp.	54	24.88	36	12.59	5	13.51	3	9.09	98	17.1
34.	*Abax (Abax) ovalis* Duftschmid	11	5.07	1	0.35		-	-	-	12	2.1
35.	*Abax parallelus* Duftsch.	4	1.84	23	8.04		-	2	6.06	29	5.06
36.	*Amara aenea* De Geer		-	1	0.35		-		-	1	0.17
37.	*Zabrus tenebrioides* Goeze		-	5	1.75		-		-	5	0.87
38.	*Agonum sexpunctatum* L.	1	0.46	1	0.35		-		-	2	0.35
39.	*Limodromus assimilis* Paykull	40	18.43	73	25.52	5	13.51	9	27.28	127	22.16
40.	*Calathus melanocephalus* L.	14	6.45	2	0.7		-		-	16	2.8
41.	*Panagaeus cruxmajor* L.		-	1	0.35		-		-	1	0.17
42.	*Licinus hoffmanseggii* Panzer		-		-	3	8.11		-	3	0.53
43.	*Aptinus bombarda* Ill.		-		-	1	2.7		-	1	0.17
44.	*Microlestes minutulus* Goeze		-		-	1	2.7		-	1	0.17
45.	*Metallina lampros* Herbst		-		-		-	3	9.09	3	0.53
		217	**100**	**286**	**100**	**37**	**100**	**33**	**100**	**573**	**100**

Based on the values of diversity index (tab. 3), the 45 species of Carabidae can be distribute into the corresponding groups. Thus, for the four locations the authors identified the following eudominant and dominant species:

- For the Secu Monastery area, the eudominant species are *Abax (Abax) parallelepipedus* (Piller & Mitterpacher 1783) and *Limodromus assimilis* (Paykull 1790) and the dominant species are *Nebria (Nebria) brevicollis* (Fabricius 1792), *Molops piceus* (Panzer 1793), *Pterostichus (Platysma) niger* (Schaller 1783), *Pterostichus (Bothriopterus) oblongopunctatus* (Fabricius 1787), *Abax (Abax) ovalis* (Duftschmid 1812) and *Aptinus (Aptinus) bombarda* (Illiger 1800);
- For the Neamțului Monastery area, the eudominant species are *Carabus (Megodontus) violaceus* (Linnaeus 1758), *Abax (Abax) parallelepipedus* (Piller & Mitterpacher 1783) and *Limodromus assimilis* (Paykull 1790) and the dominant species are *Pterostichus (Platysma) niger* (Schaller 1783), *Pterostichus (Bothriopterus) oblongopunctatus* (Fabricius 1787) and *Abax (Abax) parallelus* (Duftschmid 1812);
- For the Agapia-Sihla-Sihastria tourist rout the eudominant species are*: Carabus (Megodontus) violaceus* (Linnaeus 1758), *Abax (Abax) parallelepipedus* (Piller & Mitterpacher 1783) and *Limodromus assimilis* (Paykull 1790), and the dominant species are: *Ophonus (Hesperophonus) azureus* (Fabricius 1775), *Pterostichus (Bothriopterus) oblongopunctatus* (Fabricius 1787), *Poecilus (Poecilus) cupreus* (Linnaeus 1758), *Calathus (Neocalathus) melanocephalus* (Linnaeus 1758), *Molops piceus* (Panzer 1793), *Amara (Amara) aenea* (De Geer 1774);
- For the Agapia-Secu tourist rout, *Limodromus assimilis* (Paykull 1790) is the eudominat species and *Cicindela (Cicindela) hybrida* (Linnaeus 1758), *Cychrus caraboides* (Linnaeus 1758), *Cychrus semigranosus* (Palliardi 1825), *Calosoma (Calosoma) inquisitor* (Linnaeus 1758), *Carabus (Megodontus) violaceus* (Linnaeus 1758), *Pterostichus (Bothriopterus) oblongopunctatus* (Fabricius 1787), *Abax (Abax) parallelepipedus* (Piller & Mitterpacher 1783 *Abax (Abax) parallelus* (Duftschmid 1812) and *Metallina (Metallina) lampros* (Herbst 1784) are the dominant species.

For searching the coenotic affinities between the species, it was necessary to evaluate the presence of the 45 species into the four locations from the Vânători Neamț Nature Park (tab. 4).

The coenotic affinities between the 45 species of Carabidae collected in the Vânători Neamț Nature Park area (2000-2002) are illustrated in fig. 1.

Analyzing the dendrogram presented in fig. 1, the authors identified four groups of species with maximum coenotic affinity (100%): a group that contains five species: *Carabus (Trachycarabus) scabriusculus* (Olivier 1795) - *Ophonus (Hesperophonus) azureus* (Fabricius 1775) - *Poecilus (Poecilus) cupreus* (Linnaeus 1758) - *Aptinus (Aptinus) bombarda* (Illiger 1800) - *Microlestes minutulus* (Goeze 1777); a group that contains four species *Calosoma (Calosoma) inquisitor* (Linnaeus 1758) - *Carabus (Tachypus) cancellatus* (Illiger 1798) - *Carabus (Oreocarabus) glabratus* (Paykull 1790) - *Amara (Amara) aenea* (De Geer 1774); *Notiophilus biguttatus* (Fabricius 1779) - *Harpalus (Harpalus) affinis* (Schrank 1781); a goup with three species: *Pseudoophonus (Pseudoophonus) rufipes* (De Geer 1774) - *Pterostichus (Argutor) vernalis* (Panzer 1796) - *Pterostichus (Bothriopterus) oblongopunctatus* (Fabricius 1787) and a group with two species: *Notiophilus biguttatus* (Fabricius 1779) - *Harpalus (Harpalus) affinis* (Schrank 1781). The high affinity is explained by the fact that each group contains species that were collected from the same locations and they represented by the same number of individuals.

A high coenotic affinity (90.91%) is registered for two other species: *Carabus (Procrustes) coriaceus* (Linnaeus 1758) and *Leistus (Leistus) piceus* Frölich 1799. These two species were collected only from first two locations and each species were represented by 2 (*Carabus (Procrustes) coriaceus* (Linnaeus 1758) in the second location) or three specimens (both species in first location and *Leistus (Leistus) piceus* Frölich 1799 in the second location).

The dendrogram also relives other two groups that present an 85.71% coenotic affinity each – the species from these two groups were collected from the same locations and the values of their abundance were almost the same (very little differences). These groups are *Abax (Abax) ovalis* (Duftschmid 1812) with *Calathus (Neocalathus) melanocephalus* (Linnaeus 1758) and *Pterostichus (Feronidius) melas* (Creutzer 1799) with *Molops piceus* (Panzer 1793).

As it is known, the biodiversity is influenced by a several factors as: the heterogeneity of the relief, the vegetation, the humidity, the human impact. For the four studied locations from the Vânători Neamț Nature Park, the authors remarked that 29 species (64.44%) were collected from biocoenosis characterized by wood vegetation, 12 species (26.67%) were identified for biocoenosis characterized by grass vegetation and the rest - 4 species (8.89%) were present in all the studied biocoenosis (tab. 5).

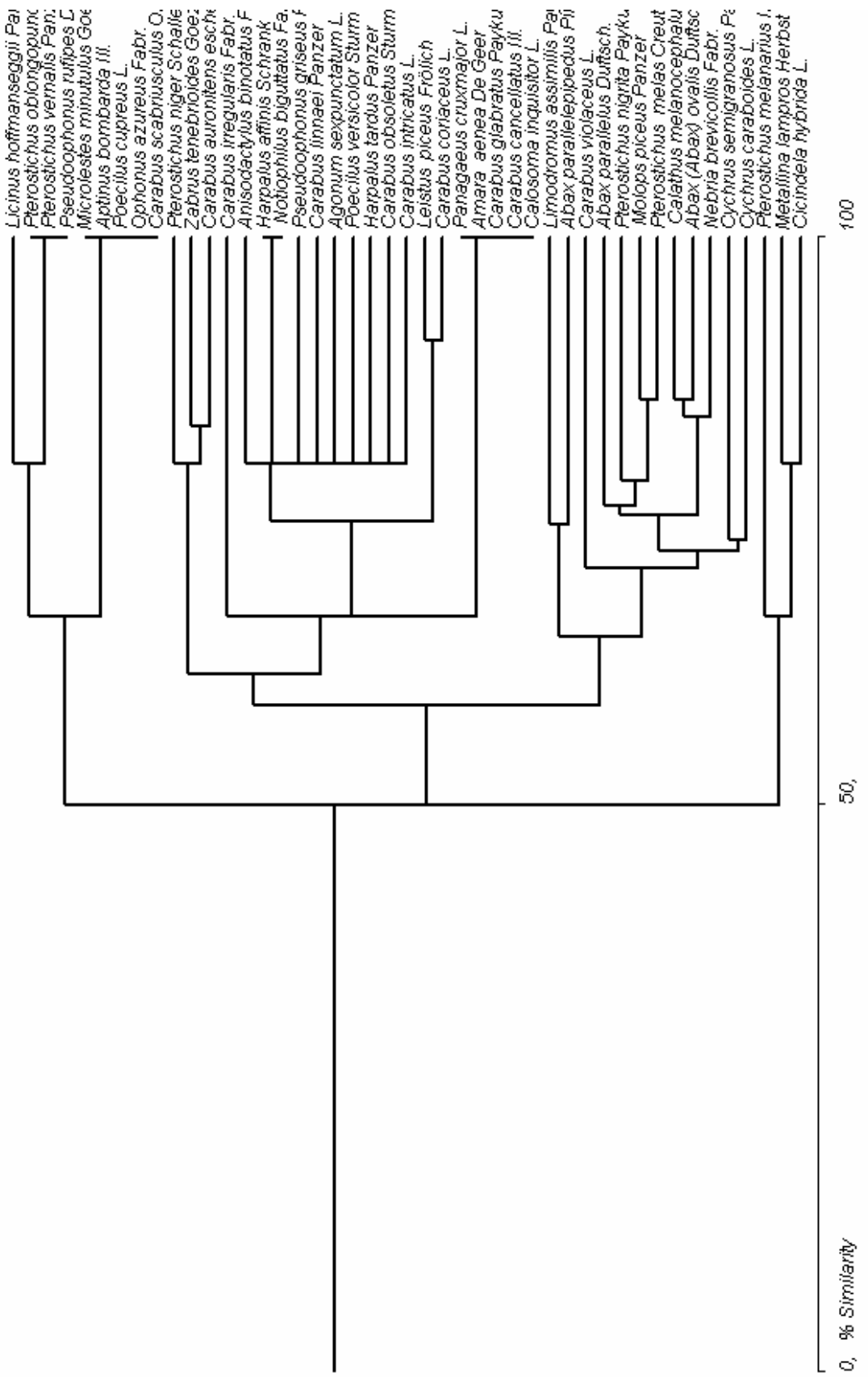

Fig. 1 - The coenotic affinities between the Carabidae species collected in the Vânători Neamț Nature Park area (2000-2002)

Table 5 - The presence of the 45 Carabidae species in different biocoenosis: wood vegetation (beech forests and mixed forests – *Fagus – Abies - Picea*) and grass vegetation (grass lands, glades and roadsides) from the Vânători Neamț Nature Park

Species	Wood vegetation	Grass vegetation
Cicindela hybrida L.	-	+
Cychrus caraboides L.	+	
Cychrus semigranosus Palliardi	+	
Calosoma inquisitor L.	+	-
Carabus auronitens escheri Palliardi	+	-
Carabus cancellatus Ill.	+	-
Carabus coriaceus L.	+	-
Carabus glabratus Paykull	+	-
Carabus intricatus L.	+	-
Carabus irregularis Fabr.	+	-
Carabus linnaei Panzer	+	-
Carabus obsoletus Sturm	+	-
Carabus violaceus L.	+	+
Carabus scabriusculus Olivier	-	+
Nebria brevicollis Fabr.	+	-
Leistus piceus Frolich	+	-
Notiophilus biguttatus Fabr.	+	-
Anisodactylus binotatus Fabr.	+	-
Pseudoophonus griseus Panzer	+	-
Pseudoophonus rufipes De Geer	+	+
Ophonus azureus Fabr.	-	+
Harpalus affinis Schrank	+	+
Harpalus tardus Panzer	-	+
Pterostichus vernalis Panzer	-	+
Pterostichus oblongopunctatus Fabr.	+	-
Pterostichus melas Creutzer	+	-
Pterostichus melanarius Ill.	+	-
Pterostichus niger Schaller	+	-
Pterostichus nigrita Paykull	+	-
Poecilus cupreus L.	-	+
Poecilus versicolor Sturm	-	+
Molops piceus Panzer	+	-
Abax parallelepipedus Pill. & Mitterp.	+	+
Abax (Abax) ovalis Duftschmid	+	-
Abax parallelus Duftsch.	+	-
Amara aenea De Geer	-	+
Zabrus tenebrioides Goeze	-	+
Agonum sexpunctatum L.	+	-
Limodromus assimilis Paykull	+	-
Calathus melanocephalus L.	-	+
Panagaeus cruxmajor L.	-	+
Licinus hoffmanseggii Panzer	+	-
Aptinus bombarda Ill.	+	-
Microlestes minutulus Goeze	-	+
Metallina lampros Herbst	+	-

Conclusions

1. The studies concerning the coenosis of Carabidae from the Vânători Neamț Nature Park were made in 2000 and 2002. The insects were collected using pitfalls placed in deciduous forests, conifers forests and along the two tourist routs: Agapia Monastery-Sihla Monastery-Sihăstria Monastery and Agapia Monastery-Secu Monastery.

2. Systematically, the 573 specimens of Carabidae, collected in the Vânători Neamț Nature Park, belong to 11 subfamilies (Cicindelinae, Carabinae, Nebriinae, Harpalinae, Pterostichinae, Platyninae, Panagaeinae, Licininae, Brachininae, Lebiinae and Trechinae), 25 genera and 45 species.

3. The Pterostichinae and Carabinae Subfamilies were very well represented. Together, they totalize 27 species (60%) and 372 individuals (64.92%).

4. The larger number of specimens belongs to *Limodromus assimilis* (Paykull 1790) (22.16%), *Abax (Abax) parallelepipedus* (Piller & Mitterpacher 1783) (17.10%), *Carabus (Megodontus) violaceus* (Linnaeus 1758) (8.55%) and *Pterostichus (Bothriopterus) oblongopunctatus* (Fabricius 1787) (8.20%).

5. Four groups of species present maximum coenotic affinity (100%): *Carabus (Trachycarabus) scabriusculus* (Olivier 1795) - *Ophonus (Hesperophonus) azureus* (Fabricius 1775) - *Poecilus (Poecilus) cupreus* (Linnaeus 1758) - *Aptinus (Aptinus) bombarda* (Illiger 1800) - *Microlestes minutulus* (Goeze 1777); *Calosoma (Calosoma) inquisitor* (Linnaeus 1758) - *Carabus (Tachypus) cancellatus* (Illiger 1798) - *Carabus (Oreocarabus) glabratus* (Paykull 1790) - *Amara (Amara) aenea* (De Geer 1774); *Notiophilus biguttatus* (Fabricius 1779) - *Harpalus (Harpalus) affinis* (Schrank 1781); *Pseudoophonus (Pseudoophonus) rufipes* (De Geer 1774) - *Pterostichus (Argutor) vernalis* (Panzer 1796) - *Pterostichus (Bothriopterus) oblongopunctatus* (Fabricius 1787) and *Notiophilus biguttatus* (Fabricius 1779) - *Harpalus (Harpalus) affinis* (Schrank 1781).

6. The coenosis of Carabidae is formed by 29 (64.44%) mesophilous, forest species, 12 species (26.67%) of open places and 4 (8.89%) common species.

Rezumat

Fauna de Carabidae din Parcul Natural Vânători Neamț a fost studiată în 2000 şi 2002. insectele au fost colectate cu ajutorul capcanelor de sol Barber. Au fost folosite baterii a câte 10 capcane amplasate în păduri de foioase şi de conifere precum şi în locuri deschise – pajişti şi de-a lungul traseelor turistice: Mănăstirea Agapia – Mănăstirea Sihla – Mănăstirea Sihăstria şi Mănăstirea Agapia – Mănăstirea Secu. În cei doi ani de studiu au fost

colectate 573 de carabide, care din punct de vedere sistematic aparţin la 11 subfamilii (Cicindelinae, Carabinae, Nebriinae, Harpalinae, Pterostichinae, Platyninae, Panagaeinae, Licininae, Brachininae, Lebiinae şi Trechinae), 25 de genuri şi 45 de specii.

Cele mai bine reprezentate specii au fost: *Limodromus assimilis* (Paykull 1790) (22,16%), *Abax (Abax) parallelepipedus* (Piller & Mitterpacher 1783) (17,10%), *Carabus (Megodontus) violaceus* (Linnaeus 1758) (8,55%) and *Pterostichus (Bothriopterus) oblongopunctatus* (Fabricius 1787) (8,20%).

Există patru grupe de specii pentru care afinitatea cenotică este de 100%: *Carabus (Trachycarabus) scabriusculus* (Olivier 1795) - *Ophonus (Hesperophonus) azureus* (Fabricius 1775) - *Poecilus (Poecilus) cupreus* (Linnaeus 1758) - *Aptinus (Aptinus) bombarda* (Illiger 1800) - *Microlestes minutulus* (Goeze 1777); *Calosoma (Calosoma) inquisitor* (Linnaeus 1758) - *Carabus (Tachypus) cancellatus* (Illiger 1798) - *Carabus (Oreocarabus) glabratus* (Paykull 1790) - *Amara (Amara) aenea* (De Geer 1774); *Notiophilus biguttatus* (Fabricius 1779) - *Harpalus (Harpalus) affinis* (Schrank 1781); *Pseudoophonus (Pseudoophonus) rufipes* (De Geer 1774) - *Pterostichus (Argutor) vernalis* (Panzer 1796) - *Pterostichus (Bothriopterus) oblongopunctatus* (Fabricius 1787) and *Notiophilus biguttatus* (Fabricius 1779) - *Harpalus (Harpalus) affinis* (Schrank 1781).

Cenoza de carabide din Parcul Natural Vânători Neamţ a fost reprezentată de 29 de specii (64.44%) mezofile, de pădure, 12 specii (26,67%) specii caracteristice locurilor deschise şi 4 specii comune (8,89%).

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COMPLEXUL MUZEAL DE ŞTIINŢELE NATURII „ION BORCEA" BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 106 – 115

THE CHECKLIST OF ANDRENIDAE FAMILY (HYMENOPTERA: APOIDEA: APIFORMES) OF ROMANIA

BOGDAN TOMOZII *

ABSTRACT

The species of the family Andrenidae of Romania are listed with comments. The checklist includes 162 species recorded over the past 135 years by various specialists and comprises 154 species belonging to the genus *Andrena*, 3 species to the genus *Camptopoeum*, 2 species to the genus *Panurgus*, 1 species to the genus *Panurginus* and 2 species to the genus *Melitturga*.

Key words: checklist, Andrenidae, Romania

Introduction

In Romania, the species of the family Andrenidae are cited in various papers since **the late 19th century.**

Since then several authors have contributed to the knowledge of this family: FRIVALDSZKY (1873), HEINRICH (1880-1884), MOCSÁRY (1900), ZILAHI - KISS (1904), MÓCZÁR & HENTER (1906), SZILADY (1914), ZILAHI - KISS (1915), MÓCZÁR, (1947), IUGA (1948), IUGA & PALADE (1960), WARNCKE (1967), MÓCZÁR & WARNCKE (1972), WARNCKE & PALADE (1980), CIURDĂRESCU (1983), PASCU (1996, 2006), BAN & TOMOZEI (2006), TOMOZEI & PATINY (2006), TOMOZEI (2003, 2005, 2006a, 2006b), CALEFARIU & MATACHE (2008), TOMOZEI (2008).

A significant **contribution** to the knowledge of this group of bees **has been brought by** KLAUS WARNCKE and XENIA SCOBIOLA PALADE (1980) that by verifying the bees collections of the „Gr. Antipa" National Museum of Natural History and centralizing the records published up to that date, lists a number of 141 species and 15 subspecies.

The purpose of this paper is to update the species checklist of the family Andrenidae recorded in the past 135 years in Romania. Latest revision of the names, synonymies and validity of the species status were considered using the modern taxonomic literature (GUSENLEITNER & SCHWARZ, 2002).

Species of doubtful presence in Romania are discussed and dealt separately.

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Matherial and method

Result and discussions

List of species

Subfamily ANDRENINAE Dalla Torre et Friese 1895

Genus *ANDRENA* Fabricius 1775

I. Subgenus ACIANDRENA Warncke 1968

1) ***Andrena aciculata*** MORAWITZ 1886 *in* Móczár & Warncke, 1972; Warncke & Palade, 1980; Calefariu & Matache, 2008; Tomozei, 2008.

- as *Andrena tenuis* MORAWITZ 1878 *in* Zilahi-Kiss, 1915.

II. Subgenus AENANDRENA Warncke 1968

2) ***Andrena aeneiventris*** MORAWITZ 1972 *in* Zilahi-Kiss, 1904; Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu, 1996, 2006; Calefariu & Matache, 2008; Tomozei, 2003, 2008.

3) ***Andrena bisulcata*** MORAWITZ 1877 *in* Warncke, 1967; Móczár & Warncke, 1972; Warncke & Palade, 1980.

4) ***Andrena hedikae*** JAEGER 1934 *in* Móczár & Warncke, 1972.

5) ***Andrena hystrix*** SCHMIEDEKNECHT 1883 *in* Zilahi-Kiss, 1915.

III. Subgenus AGANDRENA Warncke 1968

6) ***Andrena agilissima*** SCOPOLI 1770 *in* Tomozei, 2008.

IV. Subgenus ANDRENA Fabricius 1775

7) ***Andrena apicata*** SMITH 1847 *in* Zilahi-Kiss, 1915; Móczár & Warncke, 1972; Tomozei, 2008.
8) ***Andrena bulgariensis*** WARNCKE 1965 *in* Warncke & Palade, 1980; Tomozei, 2008.
9) ***Andrena clarkella*** **(**KIRBY 1802) *in* Móczár & Warncke, 1972; Warncke & Palade, 1980; Tomozei B., 2008.
10) ***Andrena fucata*** SMITH 1847 *in* Mocsáry, 1900; Móczár & Warncke, 1972; Warncke & Palade, 1980.
11) ***Andrena fulva*** **(**MÜLLER 1766) *in* Mocsáry, 1900; Warncke & Palade, 1980; Pascu, 1996, 2006; Tomozei, 2008.
- as *Andrena fulva* SCHRANK 1781 *in* Zilahi-Kiss, 1915.
- as *Andrena fulva* ssp. *romanienis* WARNCKE 1980 *in* Warncke & Palade, 1980.
12) ***Andrena helvola*** (LINNAEUS 1758) *in* Zilahi-Kiss, 1915; Móczár & Warncke, 1972; Tomozei, 2008.
13) ***Andrena lapponica*** ZETTERSTEDT 1838 *in* Zilahi-Kiss, 1915; Móczár & Warncke, 1972; Warncke & Palade, 1980.
14) ***Andrena mitis*** SCHMIEDEKNECHT 1883 *in* Zilahi-Kiss, 1915; Móczár & Warncke, 1972; Warncke & Palade, 1980.
15) ***Andrena nycthemera*** IMHOFF 1868 *in* Zilahi-Kiss, 1915; Móczár & Warncke, 1972; Warncke & Palade, 1980.
16) ***Andrena praecox*** **(**SCOPOLI 1763) *in* Mocsáry, 1900; Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu, 1996, 2006; Tomozei, 2008.
- as *Andrena smithella* (KIRBY 1802) *in* Heinrich, 1881.
17) ***Andrena synadelpha*** PERKINS 1914 *in* Tomozei, 2008.
18) ***Andrena varians*** (KIRBY 1802) *in* Zilahi-Kiss, 1904, 1915; Szilady, 1914; Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu, 1996, 2006; Calefariu & Matache, 2008; Tomozei, 2008.

V. Subgenus TRACHANDRENA Robertson 1902

19) ***Andrena haemorrhoa*** **(**FABRICIUS 1781) *in* Móczár & Warncke, 1972; Warncke & Palade,1980; Pascu, 1996, 2006; Calefariu & Matache, 2008; Tomozei, 2003, 2005; Ban &Tomozei, 2006.
- as *Andrena albicans* auct. (nec MÜLLER 1776) *in* Heinrich,1883; Mocsáry, 1900; Zilahi-Kiss, 1904; Szilady,1914.

VI. Subgenus BRACHYANDRENA Pittioni 1948

20) ***Andrena colletiformis*** (MORAWITZ 1874) *in* Warncke & Palade, 1980; Tomozei, 2008.

VII. Subgenus CAMPYLOGASTER Dours 1873

21) ***Andrena erberi*** MORAWITZ 1871 *in* Warncke & Palade, 1980

VIII. Subgenus CARANDRENA Warncke 1968

22) ***Andrena schlettereri*** FRIESE 1896 in Móczár & Warncke, 1972; Warncke & Palade, 1980; Calefariu & Matache, 2008.

IX. Subgenus CHARITANDRENA Hedicke 1933

23) ***Andrena hattorfiana*** **(**FABRICIUS 1775) *in* Mocsáry, 1900; Móczár & Henter, 1906; Szilady, 1914; Móczár, 1947; Móczár & Warncke,1972; Warncke&Palade, 1980; Pascu, 1996, 2006; Tomozei, 2003, 2005, 2006a, 2008.

X. Subgenus CHLORANDRENA Pérez 1890

24) ***Andrena cinereophila*** WARNCKE 1965 *in* Warncke, 1967.
25) ***Andrena clypella*** STRAND 1921 *in* Zilahi-Kiss, 1915; Warncke&Palade, 1980.
- as *Andrena clypella* ssp. *hasitata* WARNCKE 1973 *in* Warncke 1973; Warncke&Palade, 1980.
26) ***Andrena humilis*** IMHOFF 1832 *in* Mocsáry, 1900;Móczár&Henter,1906;Móczár&Warncke,1972 ;Warncke&Palade, 1980; Pascu, 1996, 2006; Goagă, Chimişliu&Tomozei, 1999; Tomozei, 2008.
- as *Andrena fulvescens* SMITH 1847 *in* Heinrich, 1880.
27) ***Andrena taraxaci*** GIRAUD 1861 *in* Mocsáry, 1900; Móczár&Warncke, 1972; Szilady, 1914; Warncke&Palade, 1980; Pascu, 1996, 2006; Ban & Tomozei, 2006; Tomozei, 2008.

XI. Subgenus CHRYSANDRENA Hedicke 1933

28) ***Andrena fulvago*** **(**CHRIST 1791) *in* Mocsáry, 1900 Zilahi-Kiss, 1915 Móczár&Warncke, 1972; Warncke&Palade, 1980; Pascu, 1996, 2006; Calefariu&Matache, 2008; Tomozei, 2008.

XII. Subgenus CNEMIANDRENA Hedicke 1933

29) ***Andrena denticulata*** **(**KIRBY 1802) *in* Mocsáry, 1900; Szilady, 1914; Móczár&Warncke, 1972; Warncke&Palade, 1980; Tomozei, 2003, 2008.
30) ***Andrena fuscipes*** **(**KIRBY 1802) *in* Mocsáry, 1900; Warncke&Palade, 1980; Calefariu&Matache, 2008; Tomozei, 2008.
31) ***Andrena nigriceps*** **(**KIRBY 1802) *in* Zilahi-Kiss, 1915; Móczár&Warncke, 1972; Tomozei, 2008.

XIII. Subgenus CORDANDRENA Warncke 1968

32) ***Andrena cordialis*** (MORAWITZ 1877) *in* Zilahi-Kiss, 1915; Warncke&Palade,1980; Calefariu&Matache, 2008; Tomozei, 2008.

XIV. Subgenus CRYPTANDRENA Warncke 1968

33) ***Andrena brumanensis*** FRIESE 1899 *in* Warncke &Palade, 1980.

- as *Andrena clypeata* BRULLÉ 1832 *in* Zilahi-Kiss, 1915.

34) ***Andrena ventricosa*** DOURS 1873 *in* Zilahi-Kiss, 1915; Móczár&Warncke, 1972; Warncke & Palade, 1980.

XV. Subgenus DIDONIA Gribodo 1894

35) ***Andrena nasuta*** GIRAUD 1863 *in* Mocsáry, 1900; Móczár &Henter, 1906; Móczár&Warncke, 1972; Warncke&Palade, 1980; Pascu,1996, 2006; Calefariu&Matache, 2008; Tomozei, 2008.
36) ***Andrena mucida*** KRIECHBAUMER 1873 *in* Tomozei, 2008.

XVI. Subgenus DISTANDRENA Warncke, 1968

37) ***Andrena distinguenda*** SCHENCK 1871 *in* Pascu, 2006.

XVII. Subgenus EUANDRENA Hedicke 1933

38) ***Andrena bicolor*** FABRICIUS 1775 *in* Mocsáry, 1900; Móczár&Warncke, 1972; Warncke&Palade, 1980; Pascu, 1996, 2006; Ban &Tomozei, 2006; Calefariu&Matache, 2008; Tomozei, 2003, 2006a, 2008.

- as *Andrena Gwynana* KIRBY 1802 *in* Heinrich 1883; Mocsáry, 1900; Szilady, 1914.

- as *Andrena laeviuscula* SCHENCK 1853 *in* Heinrich 1880.

39) ***Andrena chrysopus*** PÉREZ 1903 *in* Móczár & Warncke, 1972.

40) ***Andrena rufula*** SCHMIEDEKNECHT 1883 *in* Mocsáry, 1900; Zilahi-Kiss, 1915; Warncke, 1972; Móczár&Warncke, 1972.
41) ***Andrena symphyti*** SCHMIEDEKNECHT 1883 *in* Mocsáry, 1900; Szilady, 1914; Zilahi-Kiss, 1915; Móczár&Warncke, 1972; Warncke&Palade, 1980; Ban&Tomozei, 2006; Calefariu&Matache, 2008; Tomozei, 2008.

XVIII. Subgenus GRAECANDRENA Warncke 1968
42) ***Andrena graecella*** WARNCKE 1965 *in* Móczár&Warncke, 1972.
43) ***Andrena hyemala*** WARNCKE 1973 *in* Warncke&Palade, 1980.
44) ***Andrena impunctata*** PÉREZ 1895 *in* Warncke&Palade, 1980; Calefariu&Matache, 2008.

XIX. Subgenus HOLANDRENA Pérez 1890

45) ***Andrena decipiens*** SCHENCK 1861 *in* Móczár & Warncke, 1972; Warncke & Palade, 1980; Tomozei, 2003, 2008.
46) ***Andrena fimbriata*** BRULLÉ 1832 *in* Mocsáry, 1900.
47) ***Andrena labialis*** (KIRBY 1802) *in* Mocsáry, 1900; Zilahi-Kiss, 1904; Móczár, 1947; Móczár&Warncke, 1972; Warncke&Palade, 1980; Ban & Tomozei, 2006; Tomozei, 2003, 2008.
48) ***Andrena variabilis*** SMITH 1853 *in* Mocsáry, 1900; Móczár&Warncke,1972; Warncke&Palade, 1980; Iuga&Palade, 1960; Calefariu&Matache, 2008; Tomozei, 2003, 2008.

XX. Subgenus HOPLANDRENA Pérez 1890

49) ***Andrena bucephala*** STEPHENS 1846 *in* Mocsáry, 1900; Szilady, 1914; Zilahi-Kiss, 1915; Móczár&Warncke, 1972; Warncke&Palade, 1980.
50) ***Andrena carantonica*** PÉREZ 1902 *in* Tomozei, 2008.

- as *Andrena jakobi* PERKINS 1921 *in* Pascu, 1996, 2006.

- as *Andrena sabulosa* (SCOPOLI 1763) *in* Móczár&Warncke, 1972; Warncke&Palade, 1980.

51) ***Andrena ferox*** SMITH 1847 *in* Mocsáry,1900; Zilahi-Kiss, 1915; Móczár&Warncke, 1972; Tomozei, 2008.
52) ***Andrena rosae*** PANZER 1801 *in* Heinrich 1882; Mocsáry, 1900; Szilady, 1914; Móczár & Warncke, 1972; Warncke&Palade, 1980; Pascu, 2006; Tomozei, 2003, 2008.
53) ***Andrena stragulata*** ILLIGER 1806

- as *Andrena eximia* SMITH 1847 *in* Heinrich 1881; Mocsáry,1900; Pascu 2006 (misspelled as *exima*).

54) ***Andrena trimmerana*** **(**KIRBY 1802) *in* Mocsáry, 1900; Móczár&Warncke, 1972; Warncke&Palade, 1980; Calefariu&Matache, 2008; Tomozei, 2003, 2008.

- as *Andrena spinigera* **(**KIRBY 1802) *in* Zilahi-Kiss, 1915.

XXI. Subgenus LEIMELISSA Osytshnjuk 1984

55) ***Andrena ispida*** WARNCKE 1965 *in* Warncke, 1966.

XXII. Subgenus LEPIDANDRENA Hedicke 1933

56) ***Andrena curvungula*** THOMSON 1870 *in* Mocsáry, 1900; Müller, 1930; Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu, 2006; Tomozei, 2003, 2006a.

57) ***Andrena dorsalis*** BRULLÉ 1832 *in* Móczár & Warncke, 1972; Warncke & Palade, 1980; Calefariu & Matache, 2008.

58) ***Andrena florivaga*** EVERSMANN, 1852 *in* Warncke & Palade, 1980.

59) ***Andrena mocsaryi*** SCHMIEDEKNECHT 1884 *in* Warncke & Palade, 1980; Calefariu & Matache, 2008.

60) ***Andrena pandellei*** PÉREZ 1895 *in* Zilahi-Kiss 1915; Warncke & Palade, 1980; Tomozei, 2003.

- as *Andrena pandellei* ssp. *europaea* WARNCKE 1967 *in* Móczár & Warncke, 1972.

61) ***Andrena paucisquama*** NOSKIEWICZ 1924 *in* Warncke, 1966; Móczár & Warncke, 1972; Warncke & Palade, 1980.

XXIII. Subgenus LEUCANDRENA Hedicke 1933

62) ***Andrena argentata*** SMITH 1844 *in* Mocsáry, 1900; Móczár & Warncke, 1972.

63) ***Andrena barbilabris*** **(**KIRBY 1802) *in* Móczár & Warncke, 1972; Warncke & Palade, 1980.

- as *Andrena albicrus* KIRBY 1802 *in* Mocsáry, 1900.

64) ***Andrena parviceps*** KRIECHBAUMER 1873 *in* Móczár & Warncke, 1972.

XXIV. Subgenus MARGANDRENA Warncke 1969

65) ***Andrena marginata*** Fabricius 1776 *in* Heinrich 1883; Mocsáry, 1900; Zilahi-Kiss, 1904; Szilady, 1914; Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu, 1996, 2006; Tomozei, 2003, 2008.

- as *Andrena Schrankella* (?Nyl.) KIRBY 1802 *in* Heinrich 1883.

XXV. Subgenus MELANAPIS Cameron. J. 1902

66) ***Andrena fuscosa*** ERICHSON 1835 *in* Müller, 1929-1930; Móczár & Warncke, 1972; Warncke & Palade, 1980; Ban &Tomozei, 2006; Tomozei, 2008.

- as *Andrena ephippium* var. *dilecta* MOCSÁRY 1879 *in* Pascu, 2006 (misspelled as *ephippidium* var. *delecvta* Moc.)

XXVI. Subgenus MELANDRENA Pérez 1890

67) ***Andrena albopunctata*** **(**ROSSI 1792) *in* Mocsáry, 1900; Warncke & Palade, 1980; Pascu, 2006; Tomozei, 2008.

- as *Andrena albopunctata* ssp. *funebris* PANZER 1798 *in* Müller, 1929-1930.

68) ***Andrena atrotegularis*** HEDICKE 1923 *in* Warncke & Palade, 1980.

69) ***Andrena assimilis*** RADOSZKOWSKI 1876 *in* Tomozei, 2008.

- as *Andrena assimilis* ssp. *gallica* SCHMIEDEKNECHT 1883 *in* Móczár & Warncke, 1972; Warncke & Palade, 1980.

70) ***Andrena barbareae*** PANZER 1805

- as *Andrena cziblesana* ZILAHI-KISS 1915 *in* Zilahi-Kiss, 1915

- as *Andrena fumipennis* SCHMIEDEKNECHT 1880 *in* Mocsáry, 1900; Pascu, 2006.

71) ***Andrena cineraria*** (LINNAEUS 1758) *in* Frivaldszky, 1873; Mocsáry, 1900; Szilady, 1914; Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu, 1996, 2006.

- as *Andrena cineraria* ssp. *danuvia* E. Stöckhert 1950 *in* Warncke & Palade, 1980.

- as *Andrena danuvia* E. STOECKHERT 1950 *in* Calefariu & Matache, 2008.

72) ***Andrena limata*** SMITH 1853 *in* Móczár & Warncke, 1972; Calefariu & Matache, 2008.

- as *Andrena nitida* ssp. *limata* SMITH 1853 *in* Mocsáry, 1900; Warncke & Palade, 1980.

- as *Andrena pectoralis* SCHMIEDEKNECHT 1883 *in* Mocsáry, 1900.

73) ***Andrena magna*** WARNCKE 1965 *in* Warncke & Palade, 1980; Ban & Tomozei, 2006; Calefariu & Matache, 2008.

74) ***Andrena morio*** BRULLÉ 1832 *in* Zilahi-Kiss, 1904; Müller, 1929-1930; Ban & Tomozei, 2006; Pascu, 1996, 2006**.**

75) ***Andrena nigroaenea*** **(**KIRBY 1802) *in* Móczár & Warncke, 1972; Pascu, 2006; Tomozei, 2008.

76) ***Andrena nitida*** (MÜLLER 1776) *in* Heinrich 1880-1884; Mocsáry, 1900; Móczár & Henter, 1906; Szilady, 1914; Móczár, 1947; Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu 1996, 2006; Calefariu & Matache, 2008; Tomozei, 2003, 2008.

77) ***Andrena comta*** EVERSMANN 1852

- as *Andrena orenburgensis* SCHMIEDEKNECHT, 1884 *in* Móczár & Warncke, 1972.

78) ***Andrena thoracica*** (FABRICIUS 1775) *in* Heinrich 1880-1884; Mocsáry, 1900; Szilady, 1914; Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu, 2006; Calefariu & Matache, 2008; Tomozei, 2008.

79) ***Andrena vaga*** PANZER 1799 *in* Warncke & Palade, 1980; Pascu, 2006; Tomozei, 2003.

- as *Andrena ovina* KLUG 1810 *in* Szilady, 1914.

XXVII. Subgenus MICRANDRENA Ashmead 1899

80) ***Andrena alfkenella*** PERKINS 1914 *in* Móczár & Warncke, 1972; Warncke & Palade, 1980; Calefariu & Matache, 2008; Tomozei, 2008.

81) ***Andrena enslinella*** STOECKHERT 1924 *in* Iuga & Scobiola, 1960; Móczár & Warncke, 1972; Warncke & Palade, 1980; Calefariu & Matache, 2008; Tomozei, 2008.

82) ***Andrena falsifica*** PERKINS 1915 *in* Warncke & Palade, 1980.

83) ***Andrena floricola*** EVERSMANN 1852 *in* Mocsáry, 1900; Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu, 2006; Calefariu & Matache, 2008; Tomozei, 2003.

84) ***Andrena illyrica*** WARNCKE 1975 *in* Warncke & Palade, 1980.

85) ***Andrena magunta*** WARNCKE 1965 *in* Warncke & Palade, 1980; Calefariu & Matache, 2008.

86) ***Andrena minutula*** (KIRBY 1802) *in* Heinrich, 1883; Zilahi-Kiss, 1904; Szilady, 1914; Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu, 1996, 2006; Calefariu & Matache, 2008; Tomozei, 2008.

- as *Andrena parvula* (Kirby, 1802) *in* Heinrich, 1883; Mocsáry, 1900; Zilahi-Kiss, 1904.

87) ***Andrena minutuloides*** PERKINS 1914 *in* Móczár & Warncke, 1972; Warncke & Palade, 1980; Calefariu & Matache, 2008; Tomozei, 2008;

88) ***Andrena nana*** (KIRBY 1802) *in* Heinrich, 1880-1884; Mocsáry, 1900; Szilady, 1914; Tomozei, 2008.

89) ***Andrena niveata*** FRIESE 1887 *in* Móczár & Warncke, 1972; Warncke, 1974; Iuga & Scobiola, 1960; Warncke & Palade, 1980; Tomozei, 2003; Calefariu & Matache, 2008.

90) ***Andrena proxima*** (KIRBY 1802) *in* Heinrich, 1880; Mocsáry, 1900; Móczár & Warncke, 1972; Warcke & Palade, 1980; Pascu, 1996, 2006; Tomozei, 2003; Ban & Tomozei, 2006; Calefariu & Matache, 2008.

91) ***Andrena pusilla*** PÉREZ 1903 *in* Tomozei, 2008.

- as *Andrena spreta* ssp. *pusilla* PÉREZ 1903 *in* Warncke & Palade, 1980.

92) ***Andrena rugulosa*** STOECKHERT 1935 *in* Warncke & Palade, 1980; Tomozei, 2008.

93) ***Andrena saxonica*** STOECKHERT 1935 *in* Móczár & Warncke, 1972; Tomozei, 2008.

94) ***Andrena semilaevis*** PÉREZ 1903 *in* Warncke & Palade, 1980.

95) ***Andrena simontornyella*** NOSKIEWICZ 1939 *in* Móczár & Warncke, 1972; Warncke & Palade, 1980; Calefariu & Matache, 2008; Tomozei, 2008.

96) ***Andrena subopaca*** NYLANDER 1848 *in* Móczár & Warncke, 1972; Warncke & Palade, 1980; Calefariu & Matache, 2008; Tomozei, 2006a, 2008.

97) ***Andrena tringa*** WARNCKE 1973 *in* Warncke 1973; Warncke & Palade, 1980; Calefariu & Matache, 2008; Tomozei, 2008.

XXVIII. Subgenus NOBANDRENA Warncke 1968

98) ***Andrena anatolica*** ALFKEN 1935 *in* Tomozei, 2006b.

99) ***Andrena athenensis*** WARNCKE 1965 *in* Warncke, 1965; Tomozei, 2008.

100) ***Andrena flavobila*** WARNCKE 1965 *in* Tomozei, 2008.

101) ***Andrena nobilis*** MORAWITZ 1874 *in* Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu, 1996, 2006; Tomozei, 2008.

XXIX. Subgenus NOTANDRENA Pérez 1890

102) ***Andrena chrysosceles*** (KIRBY 1802) *in* Warncke & Palade, 1980; Pascu, 1996, 2006; Calefariu & Matache, 2008; Tomozei, 2008.

103) ***Andrena curvana*** WARNCKE 1965 *in* Móczár & Warncke, 1972; Warncke & Palade, 1980; Tomozei, 2008.

104) ***Andrena* (*Notandrena*) *griseobalteata*** DOURS 1872

- as *Andrena erythrocnemis* MORAWITZ 1870 *in* Mocsáry, 1900.

105) ***Andrena nitidiuscula*** SCHENCK 1853 *in* Mocsáry, 1900; Zilahi-Kiss, 1904; Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu, 2006; Calefariu & Matache, 2008; Tomozei, 2008.

- as *Andrena lucens* IMHOFF 1868 *in* Zilahi-Kiss, 1904; Szilady, 1914; Zilahi-Kiss, 1915.

- as *Andrena Petroselini* PÉREZ 1903 *in* Zilahi-Kiss, 1915.

106) ***Andrena pallitarsis*** PÉREZ 1903 *in* Móczár & Warncke, 1972; Warncke & Palade, 1980.

107) ***Andrena pontica*** WARNCKE 1972 *in* Móczár & Warncke, 1972.
108) ***Andrena ungeri*** MAVROMOUSTAKIS 1952 *in* Móczár & Warncke, 1972; Warncke & Palade, 1980; Calefariu & Matache, 2008.

XXX. Subgenus OPANDRENA Robertson 1902

109) ***Andrena schencki*** MORAWITZ 1866 *in* Heinrich, 1880-1884; Mocsáry, 1900; Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu, 1996, 2006; Tomozei 2003, 2008.

XXXI. Subgenus ORANDRENA Warncke 1968

110) ***Andrena oralis*** MORAWITZ 1876 *in* Iuga & Scobiola, 1960; Warncke, 1967; Warncke & Palade, 1980; Ban & Tomozei, 2006; Calefariu & Matache, 2008.

XXXII. Subgenus PALLANDRENA Warncke 1968

111) ***Andrena braunsiana*** FRIESE 1887 *in* Tomozei, 2008.

XXXIII. Subgenus LARANDRENA LaBerge 1964

112) ***Andrena ventralis*** IMHOFF 1832 *in* Mocsáry, 1900; Szilady, 1914; Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu, 2006; Tomozei, 2003, 2008.
113) ***Andrena sericata*** IMHOFF 1868 *in* Zilahi-Kiss, 1904; Warncke, 1967; Móczár & Warncke, 1972; Pascu, 2006; Tomozei, 2003, 2008.

XXXIV. Subgenus PARANDRENELLA Popov 1958

114) ***Andrena atrata*** FRIESE 1887 *in* Mocsáry, 1900; Móczár & Warncke, 1972; Warncke & Palade, 1980; Tomozei, 2003.
115) ***Andrena figurata*** MORAWITZ 1866 *in* Warncke & Palade, 1980; Ban & Tomozei, 2006.

XXXV. Subgenus PLASTANDRENA Hedicke 1933

116) ***Andrena apiformis*** KRIECHBAUMER 1873
- as *Andrena grossa* FRIESE 1887 *in* Zilahi-Kiss, 1915.

117) ***Andrena bimaculata*** (KIRBY 1802) *in* Zilahi-Kiss, 1915; Warncke & Palade, 1980; Pascu, 1996, 2006; Calefariu & Matache, 2008; Tomozei, 2008.
- as *Andrena Morawitzii* v. *Paveli* SCHMIEDEKNECHT 1883 *in* Mocsáry, 1900.
- as *Andrena bimaculata* ssp. *bimaculata* (KIRBY 1802) *in* Móczár&Warncke, 1972.
- as *Andrena bimaculata* ssp. *morawitzi* THOMSON 1872 *in* Warncke&Palade, 1980.
- as *Andrena morawitzi* THOMSON 1872 *in* Tomozei, 2008.
- as *Andrena nitida* var. *vitrea* SMITH 1847 *in* Zilahi-Kiss, 1915.

118) ***Andrena pilipes*** FABRICIUS 1781 *in* Tomozei, 2008.
- as *Andrena carbonaria* Linne 1767 *in* Mocsáry, 1900; Zilahi-Kiss, 1904; Móczár & Warncke,1972; Warncke & Palade, 1980; Ban & Tomozei, 2006; Pascu, 1996, 2006; Tomozei, 2003, 2008.

119) ***Andrena tibialis*** (KIRBY 1802) *in* Heinrich, 1880-1884; Mocsáry, 1900; Szilady, 1914; Pascu, 1996, 2006; Tomozei, 2003, 2008;
- as *Andrena tibialis* ssp. *tibialis* (KIRBY 1802) *in* Móczár & Warncke, 1972.
- as *Andrena tibialis* ssp. *vindobonensis* E. STOECKHERT 1950 *in* Móczár & Warncke, 1972.

XXXVI. Subgenus POECILANDRENA Hedicke 1933

120) ***Andrena labiata*** FABRICIUS 1781 *in* Heinrich 1880-1884; Mocsáry, 1900; Zilahi-Kiss, 1915; Móczár, 1947; Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu, 2006; Calefariu & Matache, 2008; Tomozei, 2008.
121) ***Andrena potentillae*** PANZER 1809 *in* Warncke & Palade, 1980; Tomozei, 2008.
- as *Andrena genevensis* SCHMIEDEKNECHT 1884 *in* Mocsáry, 1900.

122) ***Andrena seminuda*** FRIESE 1896 *in* Móczár & Warncke, 1972; Tomozei, 2008.
123) ***Andrena viridescens*** VIERECK 1916 *in* Mocsáry, 1900; Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu, 1996, 2006; Calefariu & Matache, 2008; Tomozei, 2008.
- as *Andrena cyanescens* NYLANDER 1852 *in* Heinrich, 1884; Mocsáry, 1900.

XXXVII. Subgenus POLIANDRENA Warncke 1968

124) ***Andrena florea*** FABRICIUS 1793 *in* Mocsáry, 1900; Móczár & Warncke, 1972; Pascu, 1996, 2006; Tomozei, 2008.
- as *Andrena rubricata* SMITH *in* Heinrich, 1883.
- as *Andrena austriaca* PANZER 1798 *in* Mocsáry, 1900; Szilady, 1914.

125) ***Andrena limbata*** EVERSMANN 1852
- as *Andrena limbata* ssp. *squamea* GIRAUD 1863 *in* Móczár &Warncke, 1972.

126) ***Andrena tarsata*** NYLANDER 1848 *in* Mocsáry, 1900; Iuga & Scobiola, 1960; Tomozei, 2008.

127) ***Andrena polita*** SMITH 1847 *in* Mocsáry, 1900; Móczár & Warncke, 1972; Warncke & Palade, 1980; Ban & Tomozei, 2006; Tomozei, 2008.

XXXVIII. Subgenus PTILANDRENA Robertson 1902

128) ***Andrena fulvata*** STOECKHERT 1930

- as *Andrena angustior* ssp. *fulvata* STOECKHERT 1930 *in* Móczár & Warncke, 1972.

XXXIX. Subgenus SCITANDRENA Warncke 1968

129) ***Andrena scita*** EVERSMANN 1852 *in* Warncke & Palade,1980; Pascu, 2006; Ban & Matache, 2006; Tomozei, 2003, 2008.

XL. Subgenus SIMANDRENA Perez 1890

130) ***Andrena combinata*** (CHRIST 1791) *in* Mocsáry, 1900; Szilady, 1914; Iuga & Palade, 1960; Móczár & Warncke,1972; Pascu, 1996, 2006; Tomozei 2008.

131) ***Andrena congruens*** SCHMIEDEKNECHT 1884 *in* Mocsáry, 1900; Móczár &Warncke, 1972.

132) ***Andrena dorsata*** (KIRBY 1802) *in* Zilahi-Kiss, 1904; Zilahi-Kiss, 1915; Warncke & Palade, 1980; Pascu, 1996, 2006; Calefariu & Matache, 2008; Tomozei, 2005; 2008.

- as *Andrena dorsata* ssp. *dorsata* (KIRBY 1802) *in* Móczár & Warncke, 1972.

-as *Andrena dorsata* ssp. *propinqua* SCHENCK 1853 *in* Móczár & Warncke, 1972.

- as *Andrena propinqua* SCHENCK 1853 *in* Mocsáry, 1900; Zilahi-Kiss, 1904; Warncke & Palade, 1980; Tomozei, 2003, 2008.

- as *Andrena dubitata* SCHENCK 1870 *in* Móczár & Henter, 1906.

- as *Andrena lewinella* (KIRBY 1802) *in* Heinrich 1881.

133) ***Andrena lepida*** SCHENCK 1861 *in* Warncke & Palade, 1980; Calefariu & Matache, 2008; Tomozei, 2003.

- as *Andrena separanda* SCHMIEDEKNECHT 1884 *in* Zilahi-Kiss, 1915.

134) ***Andrena susterai*** ALFKEN 1914 *in* Móczár & Warncke, 1972.

135) ***Andrena transitoria*** MORAWITZ 1871 *in* Warncke & Palade, 1980; Tomozei, 2008.

XLI. Subgenus OREOMELISSA Hirashima & Tadauchi 1975

136) ***Andrena coitana*** (KIRBY 1802) *in* Móczár & Warncke, 1972; Warncke & Palade, 1980; Tomozei, 2006a; 2008.

-as *Andrena shawella* KIRBY 1802 *in* Mocsáry, 1900.

XLII. Subgenus SUANDRENA Warncke 1968

137) ***Andrena suerinensis*** FRIESE 1884 *in* Tomozei, 2008.

XLIII. Subgenus TAENIANDRENA Hedicke 1933

138) ***Andrena aberrans*** EVERSMANN 1852 *in* Warncke & Palade, 1980.

139) ***Andrena gelriae*** VAN DER VECHT 1927 *in* Móczár & Warncke, 1972; Warncke & Palade, 1980; Tomozei, 2008.

140) ***Andrena intermedia*** THOMSON 1870 *in* Móczár & Warncke, 1972; Warncke & Palade, 1980.

141) ***Andrena lathyri*** ALFKEN 1899 *in* Zilahi-Kiss, 1915; Móczár & Warncke, 1972; Warncke & Palade, 1980; Pascu, 1996, 2006; Tomozei, 2008.

142) ***Andrena producta*** WARNCKE 1973 *in* Calefariu & Matache, 2008; Tomozei, 2008.

- as *Andrena gelriae* ssp. *producta* WARNCKE 1973 *in* Warncke & Palade, 1980.

143) ***Andrena similis*** SMITH 1849 *in* Zilahi-Kiss, 1915; Iuga & Scobiola, 1960; Tomozei, 2008.

144) ***Andrena wilkella*** (KIRBY 1802) *in* Móczár & Warncke, 1972; Warncke & Palade, 1980; Tomozei, 2008.

- as *Andrena xanthura* (Nyl. ?) (KIRBY 1802) *in* Szilady, 1914.

- as *Andrena convexiuscula* (KIRBY 1802) *in* Mocsáry, 1900; Zilahi-Kiss, 1904; Szilady, 1914.

145) ***Andrena ovatula*** (KIRBY 1802) *in* Warncke & Palade, 1980; Pascu, 1996; 2006; Ban & Tomozei, 2006; Calefariu & Matache, 2008.

- as *Andrena Afzeliella* (KIRBY 1802) *in* Zilahi-Kiss, 1915.

XLIV. Subgenus THYSANDRENA Lanham 1949

146) ***Andrena hypopolia*** SCHMIEDEKNECHT 1884 *in* Tomozei, 2008.

- as *Andrena numida* ssp. *hypopolia* SCHMIEDEKNECHT 1884 *in* Móczár & Warncke, 1972.

- as *Andrena numida* ssp. *holosericea* BRAMSON 1879 *in* Warncke & Palade, 1980.

- as *Andrena setosa* (?Alfk.) PÉREZ 1903 *in* Zilahi-Kiss, 1915.

XLV. Subgenus TRUNCANDRENA Warncke 1968

147) ***Andrena truncatilabris*** MORAWITZ 1877 *in* Mocsáry, 1900; Iuga & Scobiola, 1960; Móczár &

Warncke, 1972; Warncke & Palade, 1980; Ban & Tomozei, 2006; Tomozei, 2003, 2005, 2008
148) ***Andrena tscheki*** MORAWITZ 1872 *in* Mocsáry, 1900; Pascu, 2006.

XLVI. Subgenus ULANDRENA Warncke 1968

149) ***Andrena combaella*** WARNCKE 1966 *in* Warncke & Palade, 1980; Tomozei, 2008.
150) ***Andrena elegans*** GIRAUD 1863 *in* Warncke, 1967; Warncke & Palade, 1980.
151) ***Andrena osychniukae*** OSYTSHNJUK 1977
- as *Andrena abbreviata* ssp. *osychniuki* WARNCKE 1973 *in* Warncke & Palade, 1980; Ban & Tomozei, 2006; Calefariu & Matache, 2008.

XLVII. Subgenus ZONANDRENA Hedicke 1933

152) ***Andrena chrysopyga*** SCHENCK 1853 *in* Mocsáry, 1900; Szilady, 1914; Iuga & Scobiola, 1960; Móczár, 1947; Móczár & Warncke, 1972; Tomozei, 2003; 2008.
153) ***Andrena flavipes*** PANZER 1799 *in* Zilahi-Kiss, 1904; Móczár & Henter, 1906; Szilady, 1914; Móczár, 1947; Iuga & Scobiola, 1960; Warncke & Palade, 1980; Pascu, 1996; Ban & Tomozei, 2006; Calefariu & Matache, 2008; Tomozei, 2005, 2008.
- as *Andrena interrupta* SCHENCK 1869 *in* Heinrich, 1880.
- as *Andrena flavipes* var. *continua* KIRBY 1802 *in* Zilahi-Kiss, 1915.
- as *Andrena flavipes* var. *cinerascens* EVERSMANN 1852 *in* Zilahi-Kiss, 1915.
154) ***Andrena gravida*** IMHOFF 1832 *in* Szilady, 1914; Müller, 1929-1930; Móczár, 1947; Iuga & Scobiola, 1960; Móczár & Warncke, 1972; Warncke & Palade, 1980; Tomozei, 2003, 2008.
- as *Andrena picicrus* SCHENCK 1853 *in* Heinrich, 1883; Mocsáry, 1900.
- as *Andrena extricatus* Smith 1849 *in* Mocsáry, 1900; Zilahi-Kiss, 1904; Szilady, 1914 (misspelled as *extriata* K.).

Subfamily PANURGINAE Schenck 1859

Genus *CAMPTOPOEUM* Spinola 1843

Subgenus CAMPTOPOEUM Spinola 1843

155) ***Camptopoeum frontale*** FABRICIUS, 1804 *in* Mocsáry, 1900; Zilahi-Kiss, 1904; Pascu, 1996, 2006; Tomozei & Patiny, 2006.
156) ***Camptopoeum friesei*** MOCSÁRY 1894 *in* Mocsáry,1900; Móczár & Henter, 1906; Iuga & Palade, 1960; Pascu, 1996, 2006; Tomozei, 2003; Tomozei & Patiny, 2006.

Subgenus EPIMETHEA Morawitz 1876

157) **Camptopoeum variegatum** *MORAWITZ, 1876* in *Tomozei & Patiny, 2006.*

Genus *PANURGUS* Panzer 1806

Subgenus PANURGUS Panzer 1806

158) ***Panurgus calcaratus*** SCOPOLI, 1763 *in* Mocsáry 1900; Móczár&Henter 1906; Szilady 1914; Pascu 1996, 2006; Tomozei 2005, 2008.
- as *Panurgus lobatus* (PANZER 1799) *in* Heinrich, 1883.
- as *Panurgus calcaratus* v. *macrocephala* FRIESE 1897 *in* Pascu, 2006.

Subgenus EURYVALVUS Patiny 1999

159) ***Panurgus banksianus*** KIRBY, 1802 *in* Mocsáry, 1900; Pascu, 1996, 2006; Tomozei, 2005, 2006a.

Genus *PANURGINUS* Nylander 1848

160) ***Panurginus labiatus*** EVERSMANN 1852 *in* Mocsáry, 1900; Warncke & Palade, 1980; Pascu, 1996, 2006.

Genus *MELITTURGA* Latreille 1089

161) ***Melitturga clavicornis*** LATREILLE, 1806 *in* Frivaldsky, 1876; Mocsáry, 1900; Iuga, 1948; Iuga & Scobiola, 1960; Ciurdărescu, 1983; Tomozei, 2003.
162) ***Melitturga praestans*** GIRAUD 1861 *in* Pascu, 1996.

Species of doubtful presence in **Romania:**

Andrena (Aciculata) varicornis PÉREZ 1895
This species was cited by Zilahi - Kiss (1915) as *Andrena variicornis* Per. from Maramureş region, north-west of Romania. The species it is far from its distribution area (Warncke, 1974: North Africa and Canary Islands), so we believe that this species was wrongly identified.

Andrena (Hyperandrena) bicolorata (ROSSI 1790)
This species has been reported in Transylvania by Zilahi – Kiss (1915) as *Andrena Lichteinsteini* Schmied. The species is common in

southern Europe from France Italy, Spain, Crete, Sardinia, Sicily to Turkey (Warncke, 1974). We believe that this species was wrongly identified.

Andrena (*Thysandrena*) *numida* LEPELETIER 1841

Warncke&Palade (1980) quotes *Andrena numida* Lep. and *Andrena numida holosericea* Bram. in Romania. *Andrena numida* is similar with *Andrena hypopolia*, but they have a different distribution being considered allopatric species. The range of *Andrena numida* includes: Italy, Morocco, Algeria, Tunisia, Libya and eastern Turkey. Thus, the species cited in Romania as *Andrena numida* is actually *Andrena hypopolia,* found from Portugal to the Balkans and to western Turkey.

Andrena (*Ulandrena*) *leucorhina* Morawitz, 1876

This species is recorded by Calefariu & Matache (2008) from Budeşti, Călăraşi, south of Romania. *Andrena leucorhina* is a Central Asian species and we think it was misinterpreted.

After carefully studying **the literature published** since 1873 in conjunction with data from our investigations, a number of 162 species from the family Andrenidae results as belonging to the Romanian fauna. 154 species belongs to the genus *Andrena*, 3 species to the genus *Camptopoeum*, 2 species to the genus *Panurgus*, 1 species to the genus *Panurginus* and 2 species to the genus *Melitturga*.

Comparing the specific diversity of the family Andrenidae from Romania with the neighboring countries, it seems that Ukraine has the same number of species (162), followed by Hungary (141), Bulgaria (84), former Republic of Yugoslavia (61) and Republic of Moldavia (26) (Fauna Europaea database version 2.4 /2011) and due to geographical position of Romania, whose territory lies at the confluence of five biogeographic regions, a higher diversity is expected, with more species to be found especially in the southern part of the country.

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COMPLEXUL MUZEAL DE ŞTIINŢELE NATURII „ION BORCEA” BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 116 – 124

DATA CONCERNING SOME FISH COMMUNITIES FROM THE SOUTH PART OF ROMANIA

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ABSTRACT

The paper presents the results of an ecological study on the: Călmăţui, Ialomiţa and Mostiştea rivers, fish community.

Using an electrofisher FEG 500 they were captured, in 39 sample sites, a number of 1929 fish specimens belonging to 32 species. They were calculated a series of ecological metrics and indexes in order to assess the fish community structure. Based on this data we were able to conclude that fish community is still in good state, having a balanced ecological structure, even they are some negative human impacts on the aquatic habitats. In the area they are present a some fish species that are protected at European or national level.

Keywords: ichthyofauna, fish communities, Ialomiţa River

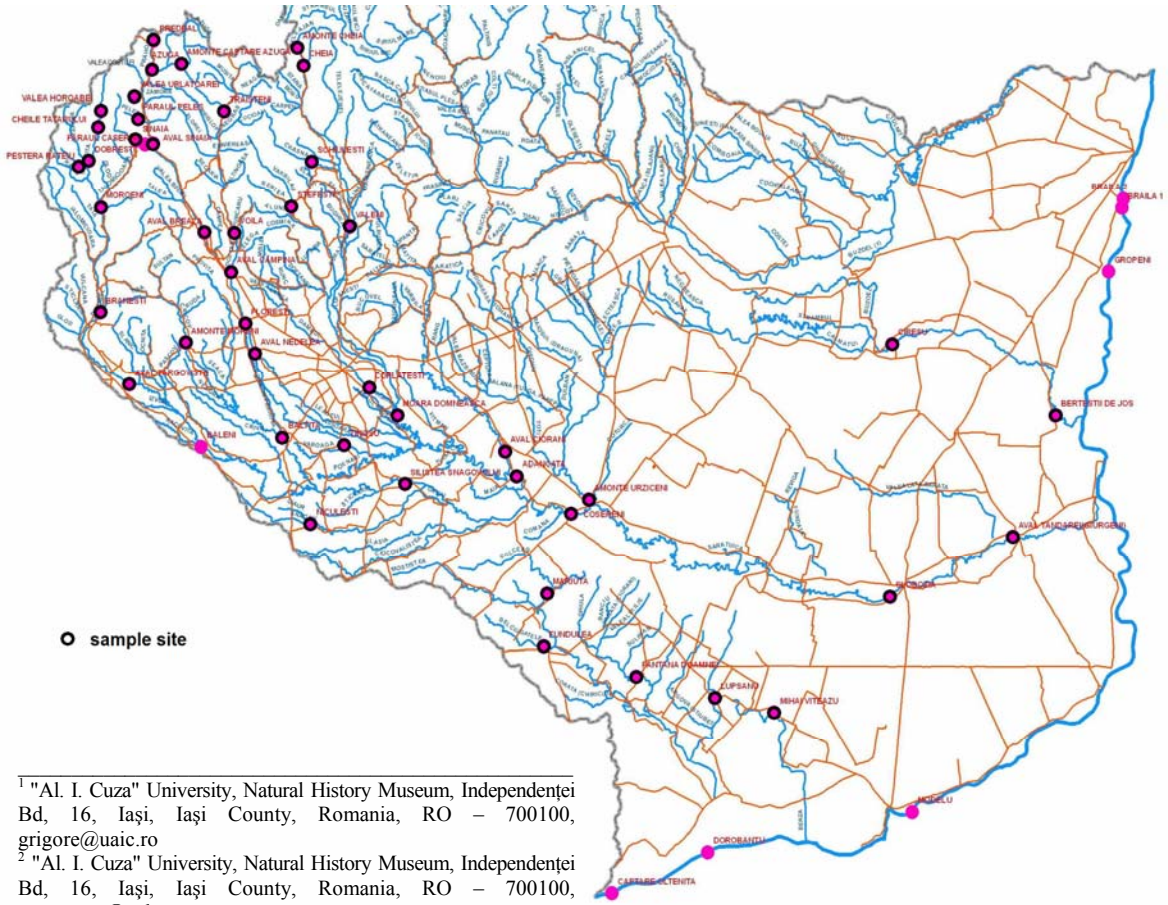

Figure 1- The map of Ialomiţa river basin , with sample sites

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Introduction

The fish fauna survey on the Ialomița river basin is part of the national wide program of the Romanian Water Authority for monitoring of the water quality using biological indicators. Ialomița river has a basin of 8 863 km^2 with sources located in the Leaota and Bucegi mountains at 2 395 m altitude. Its length is of 414 km and it's confluence with Danube is at 8 m altitude close to Țăndărei city. Mostiștea river basin has 520 km^2, with ists sources at 112 m and a total length of 92 km. Călmațui river basin has km^2, starts at 87 m altitude and the total length is of 144km.

Table 1 - The list of fish species with number of sites where was sampled and number of individuals captured for each species

	Sistematic position and species name	**Sites number**	**Abundance**	**Origin**	**Conservation status**
	Ord. Salmoniformes				
	Fam. Salmonidae				
1	*Rhabdofario mykiss Walbaum 1792*	1	1	introduced	
2	*Salmo fario Linnaeus 1758*	9	53	native	
	Ord. Cypriniformes				
	Fam. Cyprinidae				
2	*Abramis brama Linnaeus 1758*	1	1	native	
3	*Alburnoides bipunctatus Bloch 1782*	2	7	native	
4	*Alburnus alburnus Linnaeus 1758*	9	83	native	
5	*Aspius aspius Linnaeus 1758*	3	4	native	protected
6	*Barbus petenyi Heckel 1852*	13	208	native	
7	*Carassius gibelio Bloch 1783*	15	798	native	
8	*Chondrostoma nasus Linnaeus 1758*	2	6	native	
9	*Ctenopharyngodon idella Valenciennes 1844*	1	3	introduced	
10	*Cyprinus carpio Linnaeus 1758*	3	4	native	
11	*Gobio obtusirostris Valenciennes 1844*	13	73	native	
12	*Romanogobio uranoscopus Agassiz 1828*	1	1	native	
13	*Hypophthalmichthys molitrix Valenciennes 1844*	1	1	introduced	
14	*Idus idus Linnaeus 1758*	2	13	native	
15	*Phoxinus phoxinus Linnaeus 1758*	4	19	native	
16	*Pseudorasbora parva Schlegel 1842*	7	104	introduced	
17	*Rhodeus amarus Bloch 1782*	5	59	native	protected
18	*Rutilus rutilus Linnaeus 1758*	5	115	native	
19	*Squalius cephalus Linnaeus 1758*	14	94	native	
	Fam. Nemacheilidae				
20	*Orthrias barbatulus Linnaeus 1758*	13	50	native	
	Fam. Cobitidae				
21	*Cobitis elongatoides Băcescu&Mayer 1969*	6	31	native	
22	*Misgurnus fossilis Linnaeus 1758*	1	2	native	
23	*Sabanejewia vallachica, Nalbant 1957*	11	66	native	
	Ord. Siluriformes				
	Fam. Siluridae				
24	*Silurus glanis Linnaeus 1758*	1	2	native	
	Ord. Perciformes				
	Fam. Percidae				
25	*Gymnocephalus cernuus Linnaeus 1758*	1	3	native	
26	*Perca fluviatilis Linnaeus 1758*	4	72	native	
27	*Stizostedion lucioperca Linnaeus 1758*	2	6	native	
	Fam. Centrarchidae				
28	*Lepomis gibbosus Linnaeus 1758*	2	14	introduced	
	Fam. Gobiidae				
29	*Neogobius gymnotrachelus Kessler 1857*	3	20	native	
30	*Proterorhinus marmoratus Pallas 1814*	1	4	native	protected
	Ord. Scorpaeniformes				
	Fam. Cottidae				
31	*Cottus gobio Linnaeus 1758*	4	12	native	

Material and method

The samples were collected by electro fishing during 2006 year summer, using a FEG 5000 electro fisher (5). The sample area varied in between 250 and 500 m^2 depending of the river width (Figure 1, Figure 5). Most of the samples, 35, were collected on Ialomița river, four samples were collected on Mostiştea and two others on Călmățui rivers.

For each sample we covered at least 100 m length (one or both banks, depending of the local conditions) covering all the habitat types in the area. In 39 sample sites (Figure 1) we collected a total number of 1929 specimens, belonging to 5 orders, 6 families and 32 species.

The identification was done using, identification guidebooks (3, 4, 6, 7). Less than 5% of fish were retained as specimens for the Natural History Museum collections, the rest were set free.

We obtained a series of qualitative and quantitative data concerning the fish populations in the sample sites: the fish species list, the absolute numeric abundance for each species in each of the sites. These data were computed using statistical methods (1, 2) in order to calculate a series of ecological metrics and indexes for characterize the fish communities in the studied area.

Table 2 -The list of sample sites with number of species and individuals captured at each site

	River name / closest city, village	Species number	Individuals number
1.	Argova / Lupşani	4	186
2.	Azuga / Azuga upstream	3	11
3.	Azuga / downstream	2	2
4.	Belciugatele / Fundulea	5	638
5.	Berza / Mihai Viteazul	3	34
6.	Călmățui / Berteşti	2	6
7.	Călmățui / Cireşu	9	70
8.	Colceag/Mariuța	9	105
9.	Cricovul Dulce / Băltița	8	57
10.	Cricovul Dulce / Moreni	3	64
11.	Cricovul Sărat / Ciorani	4	12
12.	Doftana / Câmpina	5	58
13.	Doftana / Trăisteni	1	2
14.	Doftana /Voila	1	3
15.	Ialomicioara / Padina	1	12
16.	Ialomița / Băleni	5	11
17.	Ialomița / Brăneşti	6	41
18.	Ialomița / Coşereni	10	43
19.	Ialomița / Dobreşti	1	2
20.	Ialomița / Cheile Tătarului	1	2
21.	Ialomița / upstream Cheia	1	16
22.	Ialomița / Moroeni	2	2
23.	Ialomița Târgovişte upstream	5	36
24.	Ialomița / Siliştea Snagovului	6	94
25.	Ialomița / Slobozia	5	27
26.	Ialomița / Țăndărei	5	16
27.	Prahova / Adâncata	4	8
28.	Prahova / Breaza	4	46
29.	Prahova / Floreşti	3	25
30.	Prahova / Nedelea	4	8
31.	Prahova / Predeal	2	5
32.	Prahova / Tinosu	4	17
33.	Rătei / Peştera	1	2
34.	Sărata / Urziceni	10	135
35.	Teleajen / Cheia	2	15
36.	Teleajen / Moara Domnească	4	14
37.	Teleajen / Văleni	4	50
38.	Vânăta / Fântâna Doamnei	7	40
39.	Vârbilău / Ştefeşti	2	14

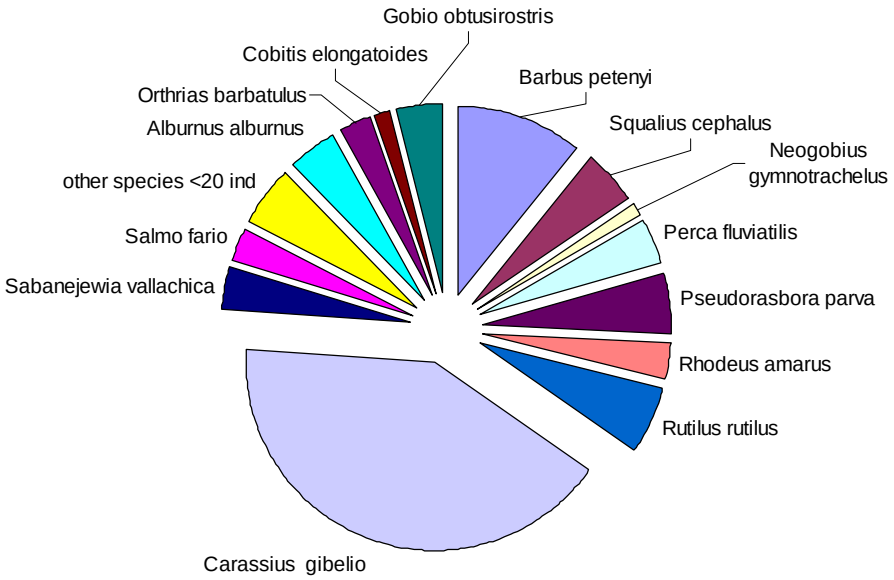

Figure 2 - Pie chart showing species distribution in total capture

Results and discussions

From the total number of 32 species, 26 species are native and 6 species are introduced. We found both *Ctenopharingodon idella*, *Hipophthalmiychthis mollitrix* and *Rhabdofario mykiss* that were introduced for economic purposes, as well as small, non valuable species, as *Lepomis gibossus* and *Pseudorasbora parva,* that were introduced by accident. The number of species varies in between 10 in Ialomița and Sărata and 1 for some basin head, high altitude sites (Table 2). The relatively high number of species in Ialomița river sites is due to the increasing diversity of habitats and the natural increase of species number downstream of the big rivers. For Sărata river is a peculiar situation due to the local high level of organic matter that offer food supply for fish. The quantitative differences in between sites are important. They are caused by the differences of habitat typology of each site and the human impact pressures on ecological systems.

From the Table 1 and 2 one can find that in terms of total abundance the most important species is *Carassius gibelio* with a total number of 798 individuals and then came *Barbus petenyi*-208, *Rutilus rutilus* with 115 fallowed by *Pseudorasbora parva*-105 and *Alburnus alburnus*-83. The first three species comprises more than 50% of total capture.

The most common species is *Carassius gibelio* found in 15 sites and then *Gobio obtusirostris* and *Squalius cephalus*, found in 14 sites; *Barbus petenyi* and *Orthrias barbatula* were found in 13 sites each.

For the 39 sites sampled there is a mean of 50 individuals captured at each site, with a maximal 638 at Belciugatele, were we sampled a small pond with a huge number of small *Carassius gibelio* specimens. The lowest number was 2 specimens for some of the small rivulets at head of basins (Figure 2).

Table 3 presents the values of some ecological descriptors of the studied fish communities. We calculated the constancy, the dominance of different species in order to appreciate their ecological significance for the fish community. The most important species are *Carassius gibelio* W=15,91% followed by *Barbus petenyi* W=3,59%. Other important species for this basin are *Squalius cephalus, Gobio obtusirostris, Alburnus alburnus, Sabanejewia vallachica, Pseudorasbora parva*.

Table 3 -The values of the ecological indexes calculated and the ecological significance index calculated for the entire area

Species name	Abundance absolute #	Constancy	C class	Dominance	D class	Ecological significance	W class
Carassius gibelio	798	38,46	C2	41,36	D5	15,91	W5
Barbus petenyi	208	33,33	C2	10,7828	D5	3,5943	W3
Rutilus rutilus	115	12,82	C4	5,9616	D4	0,7643	W2
Pseudorasbora parva	104	17,9487	C4	5,3914	D4	0,9677	W2
Squalius cephalus	94	35,8974	C3	4,873	D3	1,7493	W3
Alburnus alburnus	83	23,0769	C4	4,3027	D3	0,9929	W2
Gobio obtusirostris	73	33,3333	C3	3,7843	D3	1,2614	W3
Perca fluviatilis	72	10,2564	C4	3,7325	D3	0,3828	W2
Sabanejewia vallachica	66	28,2051	C3	3,4215	D3	0,965	W2
Rhodeus sericeus	59	12,8205	C4	3,0586	D3	0,3921	W2
Salmo fario	53	23,0769	C4	2,7475	D3	0,634	W2
Orthrias barbatulus	50	30,7692	C3	2,592	D3	0,7975	W2
Cobitis elongatoides	31	15,3846	C4	1,6071	D2	0,2472	W2
Neogobius gymnotrachelus	20	7,6923	C4	1,0368	D2	0,0798	W1
Phoxinus phoxinus	19	10,2564	C4	0,985	D1	0,101	W2
Lepomis gibbosus	14	5,1282	C4	0,7258	D1	0,0372	W1
Leuciscus idus	13	5,1282	C4	0,6739	D1	0,0346	W1
Cottus gobio	12	10,2564	C4	0,6221	D1	0,0638	W1
Alburnoides bipunctatus	7	5,1282	C4	0,3629	D1	0,0186	W1
Chondrostoma nasus	6	5,1282	C4	0,311	D1	0,016	W1
Stizostedion lucioperca	6	5,1282	C4	0,311	D1	0,016	W1
Aspius aspius	4	7,6923	C4	0,2074	D1	0,016	W1
Cyprinus carpio	4	7,6923	C4	0,2074	D1	0,016	W1
Proterorhinus marmoratus	4	2,5641	C4	0,2074	D1	0,0053	W1
Ctenopharyngodon idella	3	2,5641	C4	0,1555	D1	0,004	W1
Gymnocephalus cernuus	3	2,5641	C4	0,1555	D1	0,004	W1
Misgurnus fossilis	2	2,5641	C4	0,1037	D1	0,0027	W1
Silurus glanis	2	2,5641	C4	0,1037	D1	0,0027	W1
Abramis brama	1	2,5641	C4	0,0518	D1	0,0013	W1
Gobio uranoscopus	1	2,5641	C4	0,0518	D1	0,0013	W1
Hypophthalmichthys molitrix	1	2,5641	C4	0,0518	D1	0,0013	W1
Rhabdofario mykiss	1	2,5641	C4	0,0518	D1	0,0013	W1
	1929						

Analyzing the index of species similarity graph, (Figure 3), we may notice that they are a series of sites that are grouped at the top part of the graph (sites from the mountain area of the basin) with a very high similarity because they only have 2 species. At the middle part of the graph there are a number of sites with similarity higher tahn 50% and containing in between 4-6 species most of them being tolerant species. That are also some sites grouped at the lower part of the graph having a similarity higher than 40% with a high number of species also, they represents the downstream portion of the rivers that have a good quality and high species number.

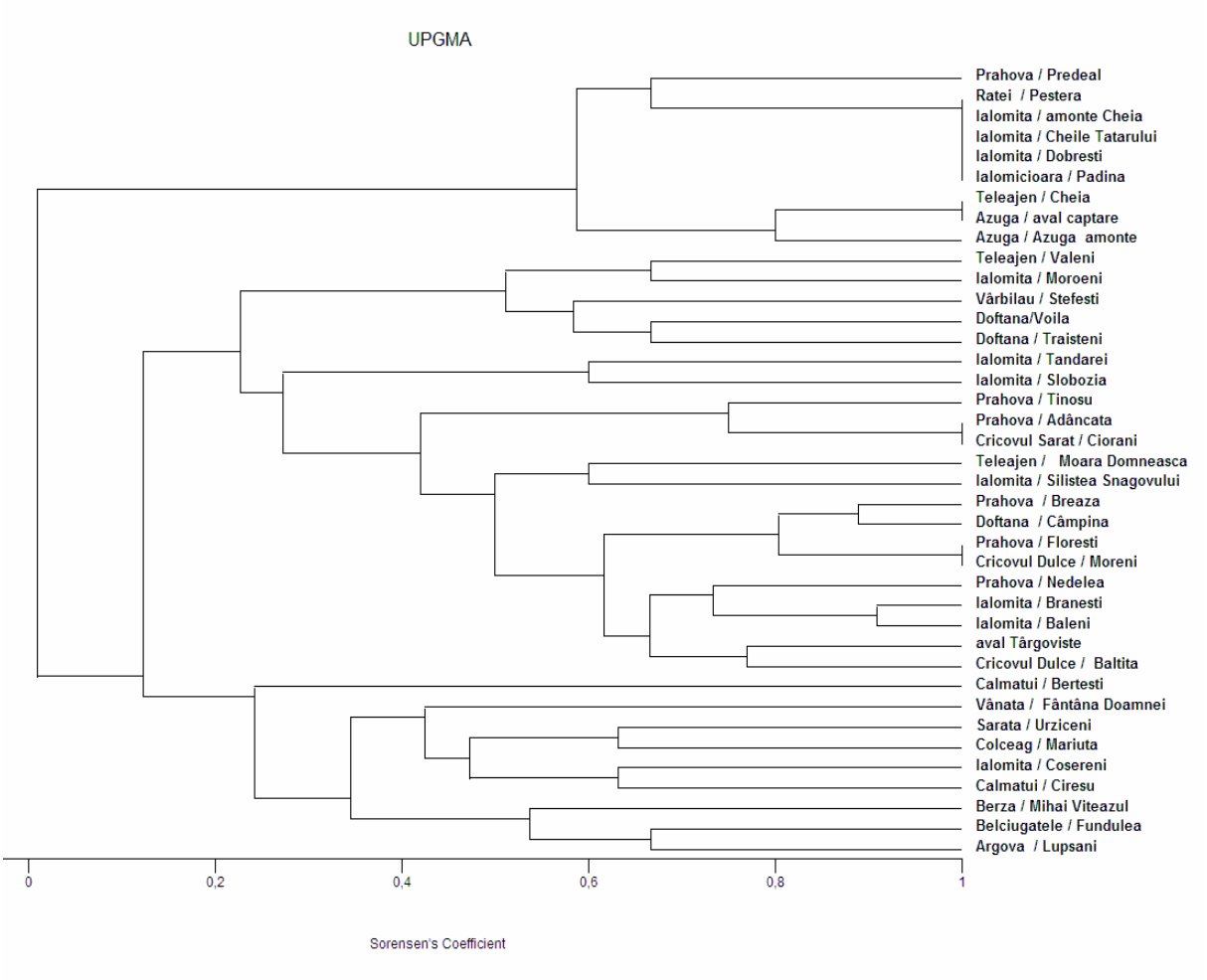

Figure 3 - The graph of the species similarity

The index of cenotic affinity (Figure 4) was calculated in order to appreciate the affinity in between species, which is due to the common preferences for certain habitat descriptors. On the graph, we find that *Proterorhinus marmorartus* and *Misgurnus fossilis* have highest cenotic affinity 100%, that is an artifact caused by the fact that these species are quite rare and they were found in only one sample The species with an affinity index in between 51-81% forms two groups that have preferences for similar habitats like: *Sabanejewia, Squalius, Barbus* species group well adapted to ecological conditions in the hilly region of medium size rivers. A second group is formed by: *Neogobius, Leuciscus, Aspius* that prefers large rivers in plains region.

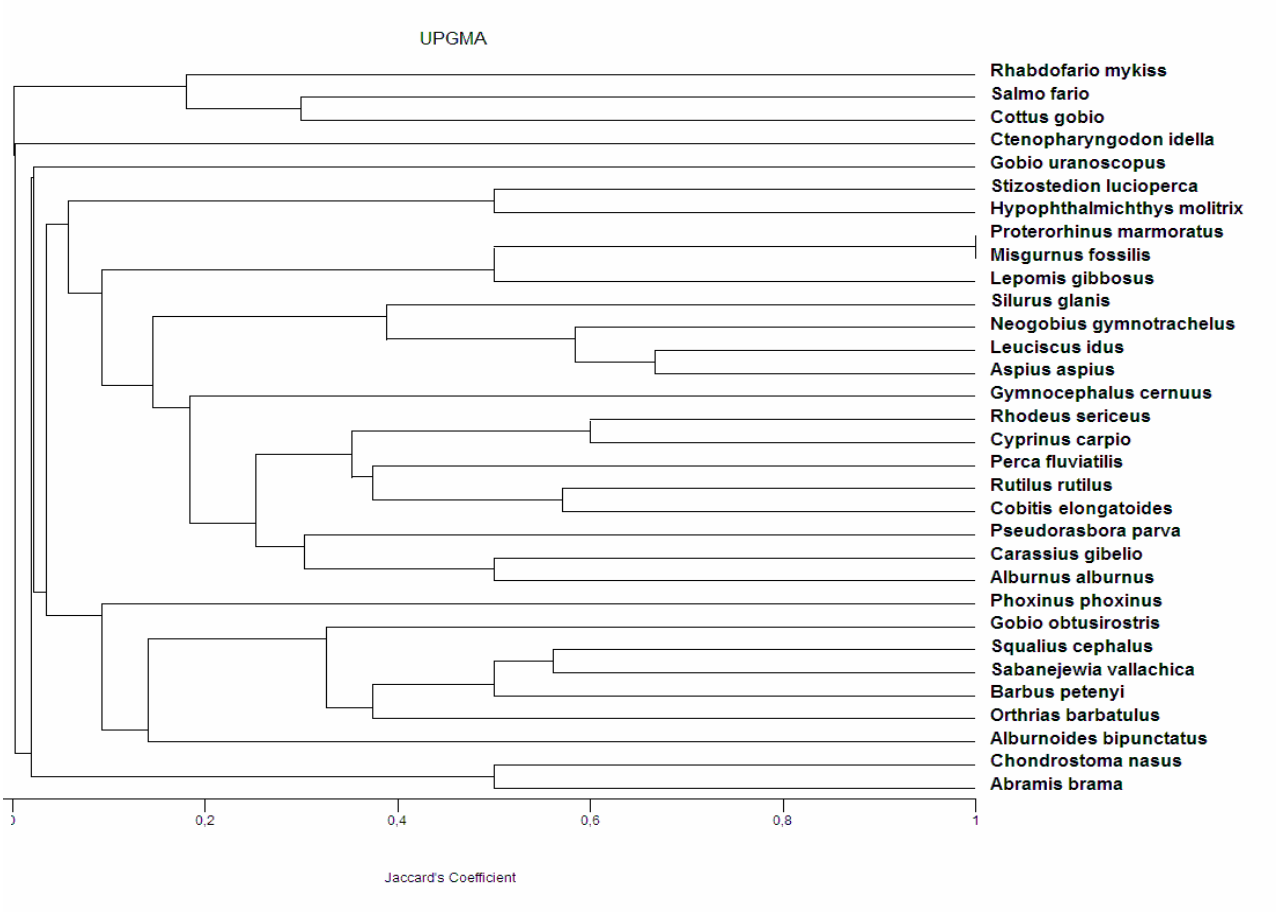

Figure 4 - The graph of the cenotic affinity index.

The Diversity Index Shannon and the Equitability Index, presented in the Table 4 and Figure 5, were calculated in order to find more about the stability and structure of the fish community. From these figures we may conclude that the fish community is relatively diverse and well balance for the entire studied area. A number of 8 samples have more than 5 fish species and the values of the evenness varies in between 962 and 167. For other 12 samples the species number varies in between 3 and 5, the others having a smaller species number. For 11 samples the species number is as low as 2 or 1, this is the case for some of the samples collected in the top head of basins in small mountain rivulets.

The high value for both diversity and eveness indexes indicates, especially when correlated with high species number, a well balanced community with a stabile structure: Cireşu, Baltiţa, Braneşti, Coşereni.

From these data (corelated with species similarity results) we may also appreciate that the conditions along the riverbed divided in at least 2 major habitat types, mountain rivulets and small plane rivers.

Table 4 - The values of the Shannon-Weaver diversity index and eveness, calculated for the samples sites.

Sample site	Diversity Index	Evenness	Num.Spec.
Argova / Lupşani	0,478	0,794	4
Azuga / Azuga upstream	0,398	0,834	3
Azuga / downstream	0,301	1	2
Belciugatele / Fundulea	0,117	0,167	5
Berza / Mihai Viteazul	0,324	0,679	3
Calmăţui / Berteşti	0,301	1	2
Calmăţui / Cireşu	0,816	0,855	9
Colceag / Măriuţa	0,658	0,689	9
Cricovul Dulce / Băltiţa	0,672	0,744	8
Cricovul Dulce / Moreni	0,389	0,815	3
Cricovul Sărat / Ciorani	0,486	0,807	4
Doftana / Câmpina	0,384	0,55	5
Doftana / Trăişteni	0,301	1	2
Doftana/Voila	0	0	1
Ialomicioara / Padina	0	0	1
Ialomiţa / Băleni	0,504	0,72	5
Ialomiţa / Brăneşti	0,714	0,918	6
Ialomiţa / Coşereni	0,757	0,757	10
Ialomiţa / Dobreşti	0	0	1
Ialomiţa / Cheile Tătarului	0	0	1
Ialomiţa / upstream Cheia	0	0	1
Ialomiţa / Moroeni	0,301	1	2
Ialomiţa downstream Târgoviste	0,529	0,757	5
Ialomiţa / Siliştea Snagovului	0,512	0,658	6
Ialomiţa / Slobozia	0,591	0,846	5
Ialomiţa / Ţăndărei	0,504	0,721	5
Prahova / Adâncata	0,466	0,774	4
Prahova / Breaza	0,363	0,603	4
Prahova / Floreşti	0,36	0,756	3
Prahova / Nedelea	0,574	0,953	4
Prahova / Predeal	0,292	0,971	2
Prahova / Tinosu	0,564	0,936	4
Ratei / Peştera	0	0	1
Sărata / Urziceni	0,521	0,521	10
Teleajen / Cheia	0,252	0,837	2
Teleajen / Moara Domnească	0,579	0,962	4
Teleajen / Văleni	0,545	0,905	4
Vânata / Fântâna Doamnei	0,703	0,832	7
Vârbilău / Ştefeşti	0,178	0,592	2

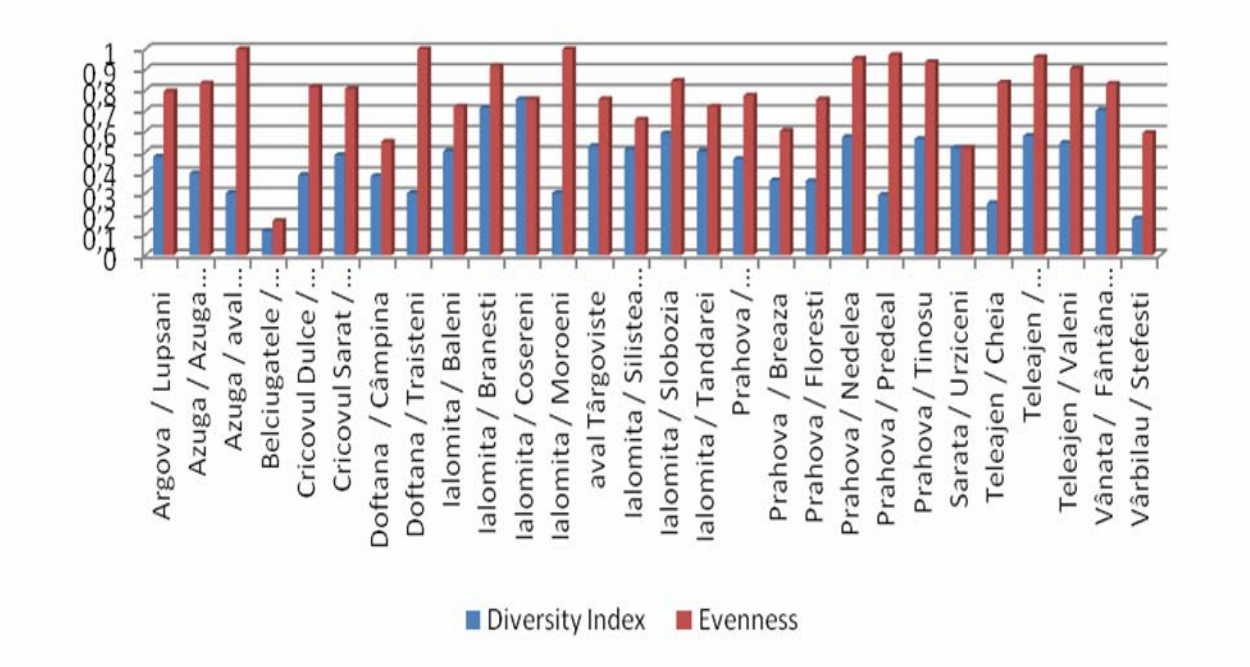

Figure 5 - The graph of the Shannon Diversity Index and Index of equitability.

Conclusions

The fish communities of the Ialomița river basin comprise 32 species: 26 native and 6 introduced species – *Carassius gibelio, Rhabdofario mykiss, Pseudorasbora parva, Ctenopharingodon idella, Hipophthalmichthys mollitrix* and *Lepomis gibossus*. The dominant species are: *Carassius gibelio, Barbus petenyi,* and *Pseudorasbora parva. Gobio uranoscopus, Misgurnus fossilis* are rare species. The fish communities composition is characteristic for the *Leuciscus* zone (European ecological delineation), small rivers in the hilly region. The river bed consists in sand, clay and moderate flow velocity. The human impact is caused by the hydro technical melioration works, drainage of the flood plains, dam construction and other.

These works reduce the natural diversity of habitat, destroying the shelter and feeding areas of many fish species. The abundance of fish for one sample are varying in between: 2 and 638. The data are important due to the scarce information on fish species that are available on these basins. It is important to mention the presence of species protected both at national and international level: *Aspius aspius*, *Cobitis taenia (elongatoides)*, *Rhodeus amarus*, that are protected by the Habitat Directive of the EEC, and *Proterorhinus marmoratus* that is protected by Bern Convention.

Aknowledgements

The financial support for the study was provided by the National Company Romanian Waters, the Buzau-Ialomița basin branch contributed for the logistical support.

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COMPLEXUL MUZEAL DE ŞTIINȚELE NATURII „ION BORCEA" BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 125 – 130

DATA REGARDING THE PHENOTIPICAL VARIATION OF SOME POPULATIONS OF *LACERTA AGILIS* LINNAEUS 1758 FROM ROMANIA

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ABSTRACT

We studied 60 samples of *Lacerta agilis* from four localities of Romania (20 samples from Borca – Bacau County, 19 samples from Ocloş – Bacau County, 5 samples from Greci – Tulcea County and 16 samples from Bordei Verde – Galati County). We analyzed characteristics of the pholydosys and biometric characteristics. After that, we calculated the ratio of each investigated character and the variation quotient. Besides the existences of a special inter-population variability, we noticed the existence of large intra-population variability. Almost all the investigated characters in the analyzed populations of *Lacerta agilis* are heterogeneous or little heterogeneous.

Key words - *Lacerta agilis agilis*, *Lacerta agilis chersonensis*, pholydosis, phenotipical variation, Romania

Introduction

We meet this species throughout central Europe to central Russia. In our country, *Lacerta agilis agilis* occupy Western Europe, the Transilvanian plateau and both sides of the Carpathians. It lives in open spaces, good sunshine, and grass or shrub vegetation on the banks of mountain streams, often in the same biocenosis with mountain lizard (*Zootoca vivipara*). In plain and in the outside hills we meet the subsp. *Lacerta agilis chersonesis*. We often meet on the cultivated fields, on the waves of roads and highways, and the forest edge (FUHN & VANCEA 1961, FUHN 1969).

In Romania, some studies have been conducted on some pholidosis and biometric characters of some populations of *Lacerta agilis* (FUHN & VANCEA 1961, ION ET AL. 2006, TÖRÖK 2008).

Material and method

We studied 60 samples of *Lacerta agilis* from four localities of Romania (20 samples from Borca – Bacau County, 19 samples from Ocloş – Bacau County, 5 samples from Greci – Tulcea County and 16 samples from Bordei Verde – Galati County), all parts of herpetology collection from "Ion Borcea" Natural Sciences Museum, Bacau.

To study specimens of *Lacerta agilis*, we started with morphological indications of FUHN & VANCEA (1961), supplementing this data with our personal observations.

We followed the form and number of 24 scales categories (Fig. 1) and 13 biometric characters (Fig. 2). We modified the working key during our study, according to observations made on specimens examined. In case of the pholidosis we noted in short each scale (rostral = R, internasal = I, etc.). In case of scales that have bilateral arrangement, they've been studied separately in the right side and left side of the head. Given that asymmetric differences that might occur if these scales are small, irrelevant, in the end we used the arithmetic average of the number of scales on the right and left.

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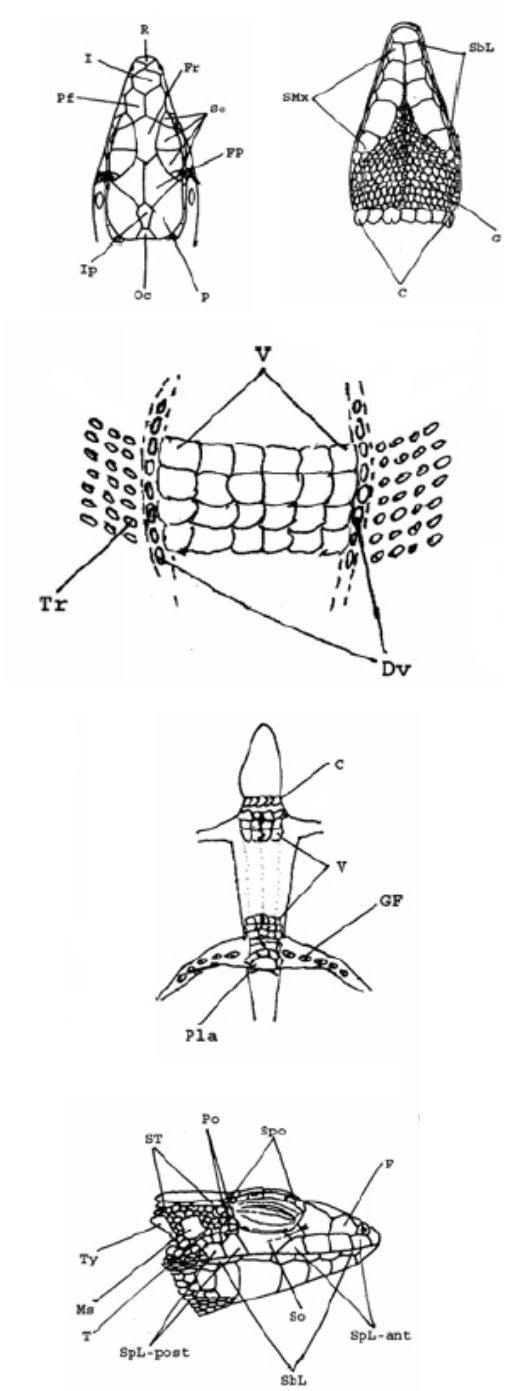
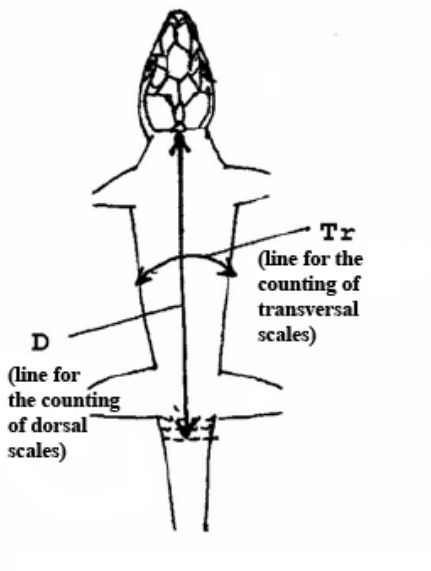
Figure no. 1 Pholidosis at *Lacertidae* (according to FUHN & VANCEA 1961, DÉLY 1978 b)





Biometric measurements were made using a calliper with electronic display, watching the characters described in the literature (FUHN & VANCEA 1961):

LT - is the *total length* of the body including body length and tail length, measured from the tip of snout to tail tip;

Lb - body length is measured from the tip of the snout to the anal opening, and includes head length, trunk length and abdomen;

Lh - head length is measured between the tip of the snout and the distal end of occipital scales or distal end of colars scales;

Wh - head width is measured in temporal area;

Hh - head height is measured at the tympanum level;

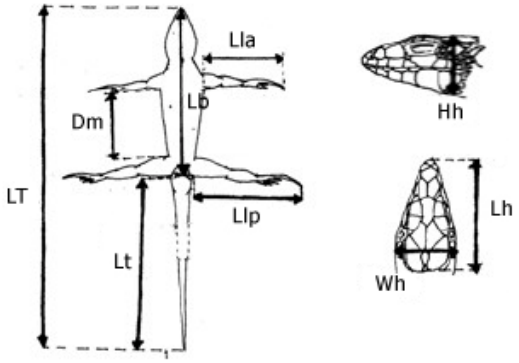
Lla – anterior leg length is measured from the anterior body joint to longest fingertip (4);

Llp – posterior leg length is measured from the posterior joint body to the longest fingertip (4);

Dm - the distance between members is measured between the joints of the front and rear legs;

Lt - tail length is calculated from total body length **(Lt)** and body length **(Lb)**.

Figure no. 2 Measurements at *Lacertidae* (according to FUHN & VANCEA 1961, DÉLY 1978 b)



Results and Discussions

Pholidosis Study

R – *Rostral Scale* in most individuals of the four analyzed populations is separated from fronto-nasal, except three samples analyzed in population from Borca. Only in a few individuals of all four analyzed populations we found situations where rostral, internasal and supranasal (frontonasal) scales are joined at one point, and the edges of the scales are forming an X. In any cases, is not apearing a 3rd scale between rostral and frontonasal scales.

I – *Internasal Scale* (frontonasal) in most lizards studied of all populations, is separated from the frontal scale. In a number of two individuals in the population of Borca and two of Oclos is joined with frontal scale and in an individual of Oclos appears an 3rd scale linking frontonasal and frontal.

Pf – *Prefrontal scales (frontonasals)* are paired scales, which in most specimens may form a suture between them, can achieve a point or be completely separated (FUHN & VANCEA 1961). Prefrontal scales can be separated by the appearance of a rectangular or circular scale which is interposed between them or that frontal and internasal scales, which are normally distant one from another, come into contact.

F – *Frenals* in 70% of the population of Borca and Ocloş appear in number 2; this figure contradicts the determining key of *Lacerta agilis* according to FUHN & VANCEA 1961, who believe that the difference between the standard species *Lacerta agilis agilis* and *Lacerta agilis chersonensis* is the difference between the number of postnasal scales (2 and 1) and not of frenals. In the other two populations (Greci, Bordei Verde) most specimens, except three, showed only one frenal. There was also a case in which these scales were missing in a sample of the Ocloş population.

Fr – *Frontal scale* appears elongated anterior-posterior and is unique in all cases. In one case, we observed the presence of a 3rd scale between frontonasal and frontal. We noticed only four samples in which observed contact between these two scales.

Ip – *Interparietal* is a small scale, with a large heterogenity within each studied population. Thus may be rhomb, triangular, pointing back, rectangular, elongated and thin (needle form), round or oval, or sometimes difficult to define forms.

Oc – *Occipital scale* has the same shape heterogeneity as we noted in the case above. Has usually trapezoid shape. Occipital scales appears in the following forms: trapeze with wide or narrow base; the trapezoid with rounded or pointed base; rectangle with sides equal to the transverse or longitudinal side; elongated round or oval, being elongated transverse or longitudinal; transverse elongated, hexagonal form; as octagonal, elongated longitudinally. In most analyzed samples, occipital scale is in contact with interparietal scale. Exceptions are five samples, in which there is contact between these two scales, and in two studied specimens we observed a 3rd scale between occipital and interparietal.

T – *Temporal scales*, in most studied individuals are numerous, small, but sometimes can be larger sizes (FUHN & VANCEA 1961). Specimens may occur, in which the size of the temporal scales is not identical to the right and left side of the body.

Ms – *Masseteric scale* is present in most studied specimens, except the five who did not have this scale. Communicate with about 30% of cases with supratemporal scales. In most cases consists of one piece, rarely is composed of two pieces (1 specimen).

Spo – *Supraocularia*, occurs in studied animals by us in number of 4 (FUHN & VANCEA 1961), finding situations in which rarely occur in numbers of 2, 3 or 5.

Grs – *Supraciliary granules* are rarely present in studied specimens of *Lacerta agilis chersonensis*. Should that occur, may be in the number 1-4, 0-12 in some subspecies (FUHN & VANCEA 1961). In case of standard species *Lacerta agilis agilis* these granules always appeared at analyzed lizards in the number which may varies (1-7).

ST – *Supratemporal scales* are in the majority in number of two. Only in the three cases of the analyzed specimens we found 1 or 3 supratemporal scales.

Po – *Postocular scales* in most individuals are in the number of 3. More rarely appear individuals with two or four scales.

Sc – *Supraciliary scales* at most of the specimens studied are in number of five, but four supraciliary scales appear quite frequently. Situations rarely occur in which the number of these scales is 3, 6 or 7 (FUHN & VANCEA 1961).

SpL - *Supralabials*, in about 60% of animals studied are the number of 5. At approximately 30% of studied individuals appear in numbers of 6. We've rarely encountered situations with three or seven scales.

SpLa – *Anterior Supralabials* presents a numerical variation, but only in rare cases, their number being in the majority of four. In rare cases we encountered situations of individuals with three or five anterior supralabials (FUHN & VANCEA 1961).

SbL – *Sublabials*, in the vast majority of examined lizards are in number of six. We have rarely encountered situations with five, seven and even eight scales.

SMx – *Submaxillary Scales*, at most majority of samples appears in number of 5. Rarely appears individuals with four or six submaxillary scales.

C – *Collar Scales* compose a neck collar and according to our observations the number is between 8-13, in the most frequent cases 9 and 11. After FUHN & VANCEA 1961 the number of collar scales is 8-13 (average 10).

G – *Gular Scales* can vary from 14 to 24, in most cases being 16 to 21. According to the specialty literature the number of gular scales is 14-20 (17) (FUHN & VANCEA 1961).

D - *Dorsal Scales*. We followed in the dorsal scales the number of transverse scales. After our observations they are present in numbers of 31-56 in most cases with values between 35 and 42. According the literature, number of these scales is between 33 and 44 (38) (FUHN & VANCEA 1961). Many scales we met in the Greci population, with the numbers between 50 and 56.

V - *Ventral Scales* in the four studied populations by us are in numbers between 25 and 33. Their average is about 29 in case of all studied populations. After literature data the number of line ventral scales is between 26 and 29 (27 in average) (FUHN & VANCEA 1961).

GF – *Femoral Glands (femoral pores)*. The number of openings of femoral glands at studied populations by us is between 9 and 20. Only in the population of *Lacerta agilis agilis* from the Greci we met 18 to 20 femoral glands. In most cases the number is between 11and 15. After literature data the number of these glands is between 12/11-14/15 (FUHN & VANCEA 1961).

Study of the biometric parameters

Differences arising among biometric relations between the two studied populations are not significant, except only standard population of *Lacerta agilis agilis* from the Greci.

Table no. 1 Data and reports obtained from biometric study

Borca													
	Lt	Lc	Lcp	Ltcp	Îcp	Pa	Pp	Dm	Cd	Cd/Lc	Pp/Lc	Pa/Dm	Pp/Dm
Minimum	134,3	60,05	14,11	9,37	7,62	20	28,79	29,63	69,3	0,9631	0,3920	0,4613	0,6810
Average	177,06	72,6771	16,1128	11,5135	10,0728	22,3507	32,1471	38,8814	104,3829	1,4347	0,4432	0,5835	0,8359
Maximum	205,07	81,88	19,88	18,82	17,82	28,44	40,64	45,71	123,89	1,6963	0,5006	0,7502	1,0182
Ocloş													
	Lt	Lc	Lcp	Ltcp	Îcp	Pa	Pp	Dm	Cd	Cd/Lc	Pp/Lc	Pa/Dm	Pp/Dm
Minimum	143,02	53,06	12,24	8,53	7,46	17,61	25,9	25,11	77,73	1,0032	0,3713	0,4846	0,6638
Average	174,33	69,9910	16,6710	11,7305	10,8352	21,1689	30,7594	36,1384	104,3389	1,5008	0,4412	0,5947	0,8629
Maximum	214,15	80,36	20,03	15,54	14,29	23,92	35,3	47,42	134,92	1,8878	0,5248	0,7805	1,1091
Bordei Verde													
	Lt	Lc	Lcp	Ltcp	Îcp	Pa	Pp	Dm	Cd	Cd/Lc	Pp/Lc	Pa/Dm	Pp/Dm
Minimum	160,86	66,46	14,48	9,1	7,98	19,13	28,67	32,96	87,48	1,0725	0,4034	0,4613	0,7130
Average	188,69	76,561	16,834	11,351	9,925	22,751	34,505	39,876	112,13	1,4709	0,4516	0,5767	0,8734
Maximum	220,68	86,71	19,24	13,99	12,21	24,79	37,53	48,18	138,55	1,8397	0,5048	0,7046	1,0318
Greci													
	Lt	Lc	Lcp	Ltcp	Îcp	Pa	Pp	Dm	Cd	Cd/Lc	Pp/Lc	Pa/Dm	Pp/Dm
Minimum	219,91	65,1	16,97	10,2	8,43	26,71	44,98	29,97	149,3	2,0477	0,6454	0,6815	1,1592
Average	239,17	72,8	18,714	11,286	9,366	29,07	50,942	37,862	166,37	2,2838	0,6989	0,7735	1,3534
Maximum	278,38	77,97	21,91	12,85	11,71	33,97	59,44	42,02	200,41	2,5703	0,7623	0,8912	1,5008

Conclusions

The purpose of our study was not only to bring new data on phenotypic variation of sandlizard from Romania, but also to compare differences between the four analyzed populations, based on the idea that standard population of *Lacerta agilis agilis* from Greci (Tulcea County) is isolated of the Danube from Galati and Bacau populations.

We found that intra- and inter- population variability is high. In order to establish intra-populational variability we calculated the coefficient of variation, indicating the degree of homogeneity of populations.

Table no. 2 The Arithmetic Average (A), Standard Deviation (S) and Coefficient of Variation (CV) for pholidosis

	ST - average		
	A	S	CV
Borca	2,05	0,2179	10,629
Ocloş	2	0	0
Greci	2	0	0
Bordei Verde	2	0	0

	PO - average		
	A	S	CV
Borca	2,25	0,5361	23,826
Ocloş	2,63	0,5813	22,102
Greci	3	0	0
Bordei Verde	2,375	0,4841	20,383

	Sc - average		
	A	S	CV
Borca	4,35	0,7262	16,694
Ocloş	4,9	0,6244	12,742
Greci	5,6	0,7999	14,283
Bordei Verde	5,0625	0,5555	10,972

	SbL – average		
	A	S	CV
Borca	6,0526	0,6046	9,989
Ocloş	5,8888	0,3142	5,3355
Greci	6,4	0,7999	12,489
Bordei Verde	6	0,3535	5,8916

	SpLa - average		
	A	S	CV
Borca	4,05	0,2179	5,380
Ocloş	3,9	0,3	7,692
Greci	4	0	0
Bordei Verde	4,125	0,3307	8,016

	SMx – average		
	A	S	CV
Borca	5	0	0
Ocloş	5	0	0
Greci	5	0	0
Bordei Verde	5,06	0,2420	4,782

	GF – average		
	A	S	CV
Borca	11,85	1,3883	11,715
Ocloş	12,70	1,4525	11,437
Greci	16,40	2,5768	15,712
Bordei Verde	14,62	1,0532	7,203

Values of the coefficients of variation for most characters show that the two populations are heterogeneous, possibly less homogeneous. The only character of pholidosis after all studied populations are homogeneous is the sumaxillary scales. But sumaxillary scales is characteristic at both species and genus level, so that uniformity is not surprising.

Considering that most of the characters of analyzed populations are less heterogeneous highlights the special variability of this species. Probably during the glacial relict inhabiting this territory of our country was only enough to show some intra-population homogenity.

High coefficient of variation recorded for the species *Lacerta agilis* characters seems to highlight how the sandlizard after postglaciar colonized Romania in several directions, respectively meeting in Romania of immigrants from at least two glacial refuges, east and west Carpathians.

Regarding subspecies of *Lacerta agilis* in Romania, key determination of FUHN & VANCEA 1961, shows that *Lacerta agilis chersonensis* usually have a postnasal and a frenal scales, while *Lacerta agilis agilis* has two postnasal and a frenal scales, arranged in a triangle. Thus, the two populations of Bacau (Borca and Ocloş) had mostly subspecies *L. a. chersonensis* characters. The population of Bordei Verde (Galati County) has characters both of standard population and of subspecies *chersonensis*, perhaps because it is closer to the territory it occupies standard species (Dobrogea). This population is separated from the Greci standard population (Tulcea County) of the Danube.

Rezumat

Am studiat 60 de probe de *Lacerta agilis* din patru localităţi din România (20 probe de la Borca - judeţul Bacău, 19 probe de la Ocloş - judeţul Bacău, 5 probe de la Greci - judetul Tulcea şi 16 probe de la Bordei Verde - judetul Galaţi). Am analizat caracteristici legate de folidoză şi caracteristici biometrice. După aceea, am calculat raportul dintre fiecare caracter investigat şi coeficientul de variaţie.

Pe lângă existenţa unei variabilităţi interpopulaţionale, am observat existenţa unei mari intra-variabilităţi în cadrul populaţiilor. Aproape toate caracterele investigate la populaţiile analizate de *Lacerta agilis* sunt eterogene sau puţin eterogene.

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COMPLEXUL MUZEAL DE ŞTIINȚELE NATURII „ION BORCEA" BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 131 – 133

DISTRIBUTION OF *NANNOSPALAX LEUCODON* (MAMMALIA: RODENTIA) IN NORTH PARTS OF R. MOLDOVA AND THEIR POPULATION DYNAMICS

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ABSTRACT

The distribution of lesser mole rat (*Nannospalax leucodon*) was studied in north parts of the Prut River, R. Moldova. The population density and spatial distribution in different habitats of natural and anthropogenic ecosystems were studied. The analysis of their population dynamics were compared with the data received for the long-term research.

Key words. *Nannospalax leucodon* N., distribution, north regions of R. Moldova, population dynamics, rodent pest.

Introduction

Nannospalax leucodon is a typical rodent representative of Moldavian fauna; it can be found practically everywhere. As all other species of subfamily *Spalacinae* this species adapted to burrowing and living underground. Thus, they have the short limbs, wedge-shaped skulls, strong neck muscles, large incisor teeth. Mostly they have the isolated underground lifestyle in the burrow systems disposed usually near/within root systems at the depth of 22 cm (PUZACHENKO A., VLASOV A., 1993). *Nannospalax leucodon* N. is medium\small mole rat: length of body is about 240 mm, length of foot up to 27.5 mm (TOPACHEVSKII V., 1969). Cranium size is variable with the maximum length about 44.2-51.8 mm and cranium high - 18-20 mm (OGNEV S., 1947). Female size is considerably less than male (IANGOLENKO E., 1965; PESHEV D., 1981). Their basic food preference consists of the subterranean plant parts (rhizomes, tubers, bulbs etc.). Food spectrum includes about 60 species of plants among which families *Compositae* and *Fabacea* prevalence (IANGOLENKO E., 1965). Juveniles (age of 2-2.5 months) usually feed only the green parts of plants when they start their own life and nourishment. In a diet of adults increases the rough parts of plants rich with cellulose (STARCA F., 1964; POPESCU, TORCEA, 1968). Also the changes of seasonal food preferences were observed. Thus, the increasing portion of green part in food diet in spring time (especially for females in lactation period) and it's gradually reduction with the increasing portion of subterranean plant parts towards to winter period were revealed (LOZAN M., 1971a). The typical habitats of *N. leucodon* in R.Moldova are: narrow gullies, slopes, plain, not waterlogged valleys on chernozem and loamy soils. Their preference habitats are no plough lands and pastures. Also they are numerous upon sowing of

lucerne and other perennial herbs, potato, cereals, sugar beet and other plantations of commercial and private sectors (LOZAN M., 1971a). This species wide spreads in the natural and anthropogenic ecosystems such as forest, steppe grassland, meadow and pasture, forest belt, monoculture and perennial fields/orchards. The digging activity of mole rats has sometimes the essential negative influences such as the damage of root systems of plants and soil structures, distribution of the dangerous plant diseases, infringement of structure of soils and irrigation systems etc. *N. leucodon* can cause substantial damage to the agricultural plants and their quantitatively-qualitative characteristics of crops. In particular, mole rats are able to reduce the harvest of sugar beet to/above 21,1%, potato harvest - 14,9% and corn harvest - 9,8% (IANGOLENKO E., 1965).

On other hand their activities influence on the micro-relief and biochemical activities of soils, enriching the content of mineral and organic elements, also regulating aeration and humidification. Mole rat's burrows are used by ants; orthopterous insects, reptiles etc. (OVCINNIKOVA L., 1971a; PAHOMOV A.; 1987, BULAHOV B.,1998;). At present time the most control methods

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of *N.leucodons* activity are mainly mechanical. Chemical methods have no effects, in view of the fact that poison and chemicals, which are can be used for treating plants against *N.leucodon*, also exert harmful influence on humans and domestic animals health (CIOCÎRLAN V., 2000).

This research aim dedicates to the distribution and population densities of *N. leucodon* in the natural and anthropogenic landscapes along the Prut River, R.Moldova and the comparative analysis of *N.leucodon* data collected in period 1971-2010 (LOZAN M., 1971; CIOCÎRLAN V., 2000, MOROZOV A. 2010 etc.).

Material and methods

Site description

Most of this study has been done in the northern part of R.Moldova, Edinests district, close to the village Badradgii Vechi (48°01'N, 27°06'E). The study area - steppe zone located in the average on 100 m above s.l., close to the Prut River. Majority territories of this north region are utilized upon the agriculture fields and orchards of commercial and private sectors, pastures, meadows and forest belts. Most of these territories were outside of human activities as the transborder zone along the Prut River. The numerous populations of mole rats were revealed last years under unspecific conditions without the real human impact. Further their populations negatively influence on private agriculture fields especially sugar beet, onion, corn, potato etc. In the studied region chernozem and the natural grasslands with miscellaneous herbs create the favorable conditions for *N.leucodon*s vital activities and their numerous populations can be dangerous for private fields.

Field and laboratory work

The routing method was used to collect the data about the population densities of mole rats and their distributions on 1ha in different natural and agricultural habitats. For the quantitative estimation of the mole rats populations on 1 ha studied territory the number of found "working" galleries were used. Galleries and captured individuals were examined using methods which were developed by CIOCÎRLAN. The skeleton was processed and preserved by the standard methods for the mammalian collection and future researches (CIOCÎRLAN V., 2000, Materialele şi metodica cercetărilor). Mostly the structure and shape of casts and borrows of *N. leucodon* were used for its identification because it is the only representative of his subfamily in R.Moldova, that's why there is no need to capture individuals. *N.leucodon* galleries can be identified by its typical soil casts, outwardly differ from *Talpa europaea*s casts (CIOCÎRLAN V., 2000). Also the public poll has been used to collect information about *N. leucodons* presence and distributions on the private agro-lands and about damage caused by its activity.

Results and discussions

During this study the big difference of population densities from 2 up to 19 individuals of *N.leucodon* per hectare were found in the natural, commercial and private areas in the north region of R.Moldova. Most often *N.leucodons* galleries can be revealed on potato, sugar and fodder beet plantations upon 19 ind. per 1 hectare. Its populations are less numerous on plantations of wheat and corn - 8-10 ind. per 1 ha. In the different meadows their numbers were very variable from 2 till 8 ind. per 1 ha. The mole rats were absent in the observed forest belts situated closed to the agricultural fields. The average number of mole rats for all studied locations is 13-15 individuals per 1 ha. But at recalculation on the big territories taking into account hills, ravines, valleys of the rivers and other places not suitable for *N.leucodons* life the number indicator will make approximately 1.2-2.3 individuals for 1 hectare.

In the comparison with data collected by CIOCÎRLAN in year 2000, using the same methods of sampling materials, on almost the same collecting fields and territories, the number of population individuals increased at 10-12% that can be depends from the changes in agro-climatic conditions and management methods for agriculture.

Public poll results about presence, distribution and negative influence of mole rats, which took place in Badragii Vechi village, showed that their high populations and wide distributions in that private fields lowers harvests, and changes micro-relief. From 50 interrogated families 38 suffers from *N.leucodons* negative influence. It is necessary to notice that the population isn't capable to struggle effectively with this rodent pest. Also it is necessary to notice that the village population often confuses *N. leucodon* with *Talpa europaea* and wrongly assume that the damage is caused by moles.

Types of the studied galleries varied from poorly branched out systems (on meadows) to strongly branched out (on plantings of a lucerne, beet plantations). The galleries areas varied from 159 sq.m. up to 367 sq.m. (Fig.1).

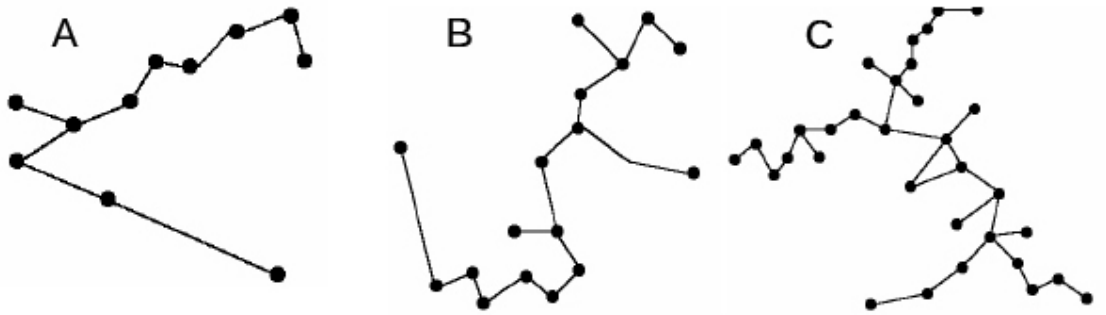

Fig. 1. Galleries types (by CIOCÎRLAN V.)
A- galleries system poorly branched out, B - galleries system normally branched out,
C - galleries system strongly branched out

Conclusions

As results of study of the distribution and population densities of *Nannospalax leucodon* in the different natural and agriculture habitats along the Prut River in north part of R.Moldova were revealed high variation of population densities - from 2 up to 19 ind. per 1 ha with maximum on potato, sugar and fodder beet plantations. In the comparison with data collected by LOZAN (1971) and CIOCÎRLAN (2000), using the same methods of sampling materials, on almost the same collecting fields and territories, the number of population individuals increased at 20-25% (compare with 1971) and at 10-12% (2000), that can be depends from the changes in agro-climatic conditions and management methods for agriculture. Public poll results showed that *N.leucodons* high populations and wide distributions in the private fields lowers harvests, and changes micro-relief.

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COMPLEXUL MUZEAL DE ŞTIINȚELE NATURII „ION BORCEA" BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 134 – 137

ASPECTS RELATED TO INTERSPECIFIC RELATIONS OF RODENTS (MAMMALIA: RODENTIA) IN A MAIZE CROP (BEREŞTI-TAZLĂU, BACĂU COUNTY)

DALIA PARASCHIV*

ABSTRACT

The paper presents the results of studies conducted in an agricultural maize field in Bereşti-Tazlău, Bacău County, during 2008-2010, regarding the diversity of rodents and their interspecific relations. The material captured in the three years of study was represented by 95 individuals, which systematically belong to Rodentia Order, to 2 families (Arvicolidae and Muridae), 4 genera and 7 species. Among these, 2 species are euconstant: *Apodemus agrarius* and *Microtus arvalis*. The species *Apodemus agrarius, Microtus arvalis* and *Mus spicilegus* were identified as eudominant and characteristic to this agroecosystem type. The greatest cenotical affinity is established between the *Microtus arvalis* şi *Apodemus agrarius* species (71,87%).

Key words: rodents, maize crop, ecological signifiance index (W)

Introduction

Beresti Tazlau commune is situated in the central part of Bacau County (46º28' N, 26º40' E), its territory being geographically situated in the Eastern Subcarpathians, in the Tazlau depression. This hilly area varies in altitude between 250 and 550 m. The climate here is influenced in summer by the Azores anticyclone and in the winter by the Siberian anticyclone. The area is crossed by the Tazlau river with its tributaries: the Cernu, the Strâmba, and the Nadişa. The vegetal carpet was formed on a clay substratum and the area presents a vegetation period ranging between 170 and 180 days. The main vegetal association here is *Querco-petreae-Carpinetum,* with a rich specific composition, having as recognition species *Melamphyrum nemorosum, Staphyllea pinatta, Stellaria holostea, Lathyrus venetus.* The shrub stratum is mainly composed of *Crataegus monogyna, Ligustrum vulgare, Euonymus europaea, Cornus sanguinea, C. mas, Rosa canina, Viburnum lantana, Staphylea pinnata***.** In this area, there can be found good conditions of development for cereals, such as: *Zea mays, Triticum aestivum, Avena sativa, Secale cereale* (1).

Material and method

During the July-November period of the years 2008, 2009 and 2010 a total number of 95 rodents were identified. The material was captured by using 50 live traps laid in the field in a network with 10 m between each other, 3 days consecutively per month (5). Thus, for each year of study 5 samples were analysed and 15 samples for the whole period of study.

The material was determined by using the specialty literature (2,3,4).

To realize a synecological analysis we calculated a series of ecological indexes: abundance, constancy, dominance, the ecological significance index (W) and the similarity index (6).

Results and discussions

During 2008-2010 in the maize crop researched we captured 95 individuals belonging to Rodentia Order: 36 individuals in 2009, 28 in 2009 and 31 in 2010. From a systematical point of view, these individuals belong to 2 families, 4 genera and 7 species. In table 1 we present the species identified in the researched agroecosystem for each year of study and the whole period of study.

The synecological analysis for the 7 identified rodent species in the 15 samples analyzed in the 3 years of study (2008, 2009 and 2010) is shown in table 2. According to data in this table, two species are euconstant: *Apodemus agrarius* and *Microtus arvalis*, one is constant (*Mus spicilegius*), three are accesory (***Mus musculus, Apodemus sylvaticus*** and ***Apodemus flavicollis*****)** and one is accidental (***Rattus norvegicus)*****.**

From the dominance point of view, the results indicate three eudominant species (***Apodemus***

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agrarius, Microtus arvalis and ***Mus spicilegus***) and two dominant species (***Mus musculus*** şi ***Apodemus sylvaticus***). To these there can be added a subdominant species (***Apodemus flavicollis***) and one subrecedent species (*Rattus norvegicus*).

The ecological significance index (W) indicates three characteristic species (the eudominant ones) which are best accomodated to the ecological factors in this type of ecosystem. Besides these, three species are accesory (the dominant and the subdominant ones) and one is accidental (the subrecedent one).

To underline the cenotical affinities among the seven rodent species we found it necessary to calculate the similarity index (Table 3). On the basis of this index, we were able to realize the dendrogram in Fig. 1 which graphically illustrates the affinities among species.

According to this dendrogram, the greatest cenotical affinity is established between the *Microtus arvalis* and ***Apodemus*** *agrarius* species (71,87%).

Table 1 - **Species of rodents colected in the maize crop (Beresti Tazlau, Bacau County)**

No.	Order	Family	Species	No. of specimens			Total
				2008	2009	2010	
1	Rodentia	Arvicolidae	***Microtus arvalis*** **(Pallas, 1779)**	9	7	14	30
2		Muridae	***Rattus norvegicus*** **(Berkenhout, 1769)**	0	0	1	1
3			***Mus musculus*** **(Linnaeus, 1758)**	3	2	4	9
4			***Mus spicilegus*** **(Nordmann, 1840)**	4	5	3	12
5			***Apodemus agrarius*** **(Pallas, 1771)**	15	11	8	34
6			***Apodemus flavicollis*** **(Melchior, 1834)**	3	1	0	4
7			***Apodemus sylvaticus*** **(Linnaeus, 1758)**	2	2	1	5
8			**Total**	36	28	31	95

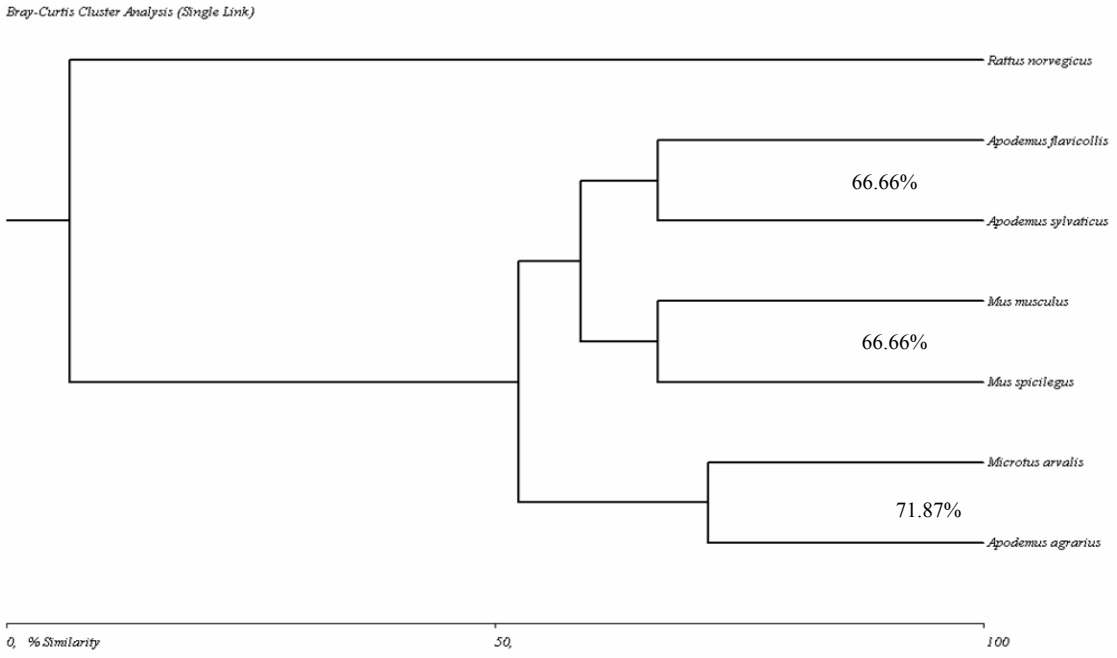

Fig. 1 - The cenotic affinities among rodent species collected in the maize crop (2008-2010)

Table 2 - **The synecological analysis for the rodent species collected in the maize crop (2008-2010)**

No	Species	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	S_{10}	S_{11}	S_{12}	S_{13}	S_{14}	S_{15}	A	C		D		W	
																		%	cls	%	cls	%	cls
1	*Apodemus agrarius*	1	2	2	5	5	1	0	1	4	5	0	1	2	2	3	34	86.66	C4	35.79	D5	31.01	W5
2	*Microtus arvalis*	1	1	2	2	3	0	1	1	2	3	2	2	3	3	4	30	93.33	C4	31.59	D5	29.48	W5
3	*Mus spicilegus*	1	0	0	1	2	1	0	1	1	2	0	0	0	2	1	12	60	C3	12.63	D5	7.58	W4
4	*Mus musculus*	0	0	0	1	2	0	1	0	1	0	1	0	0	2	1	9	46.66	C2	9.47	D4	4.42	W3
5	*Apodemus sylvaticus*	0	0	0	1	1	0	0	0	1	1	0	0	0	1	0	5	33.33	C2	5.26	D4	1.75	W3
6	*Apodemus flavicollis*	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0	4	26.66	C2	4.21	D3	1.12	W3
7	*Rattus norvegicus*	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	6.66	C1	1.05	D1	0.07	W1
Total		3	3	5	11	14	2	2	3	9	12	3	4	5	10	9	95	-	-	100	-	-	-

Table 3 - **The values of the similarity index calculated for the rodent species colected in the maize crop (2008-2010)**

	Species	1	2	3	4	5	6
1	*Apodemus agrarius*						
2	*Microtus arvalis*	71,875					
3	*Mus spicilegus*	52,1739	52,381				
4	*Mus musculus*	32,5581	46,1538	66,6667			
5	*Apodemus sylvaticus*	25,641	28,5714	58,8235	57,1429		
6	*Apodemus flavicollis*	21,0526	23,5294	37,5	30,7692	66,6667	
7	*Rattus norvegicus*	5,7143	6,4516	0	0	0	0

Conclusions

1. During the July-November period of the years 2008, 2009 and 2010 in the maize crop in Bere□ti-Tazlău village, Bacău County, there were captured 95 individuals belonging to Rodentia order: 36 individuals in 2008, 28 in 2009 and 31 in 2010. From a systematical point of view, the individuals belong to 2 families, 4 genera and 7 species.
2. For the researched agroecosystem there were identified tho euconstant species (*Apodemus agrarius* and *Microtus arvalis)* and three eudominant species (*Apodemus agrarius, Microtus arvalis* and *Mus spicilegus)*.
3. The species characteristic to the researched maize crop are the three eudominant ones, the *Rattus norvegicus* species being subrecedent and accidental.
4. The greatest cenotical affinity is established between the *Microtus arvalis* şi *Apodemus agrarius* species (71,87%).

Rezumat

Lucrarea prezintă rezultatele studiilor efectuate într-o cultură agricolă de porumb din comuna Bereşti-Tazlău, județul Bacău, în perioada 2008-2010, cu privire la diversitatea rozătoarelor şi a relațiilor interspecifice dintre acestea. Materialul capturat în cei trei ani de studiu a fost reprezentat prin 95 de indivizi, care din punct de vedere sistematic aparțin Ordinului Rodentia, la 2 familii (Arvicolidae şi Muridae), 4 genuri şi 7 specii. Dintre acestea, două specii sunt euconstante: *Apodemus agrarius* şi *Microtus arvalis*. Speciile: *Apodemus agrarius, Microtus arvalis* şi *Mus spicilegus* au fost identificate ca fiind eudominante şi caracteristice pentru acest tip de agroecosistem. Cea mai mare afinitate cenotică există între speciile *Microtus arvalis* şi *Apodemus agrarius* (71,87%).

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STUDII ŞI COMUNICĂRI 2010	Vol. 23: 138 – 140

CONTRIBUTIONS TO THE KNOWLEDGE OF SMALL MAMMALS FAUNA IN HEMEIUS DENDROLOGICAL PARK, BACAU COUNTY

DALIA PARASCHIV *

ABSTRACT

This study follows the knowledge of small mammal fauna in Hemeius Dendrological Park, Bacau County. It is situated in Hemeius commune, along the Bacau-Piatra Neamt highway, 10 Km from Bacau and it was created through the modification of a waterside mixed foliage forest situated on the right bank of Bistrita river. The material collected in 2008 and 2009 (June, July, August and September) is composed of 42 specimens of small mammals which systematically belong to 2 Orders (Rodentia and Insectivora), 4 families (Arvicolidae, Muridae, Myoxidae and Soricidae), 5 genera and 6 species. During the whole period of study we noticed a numerical dominance of the species *Apodemus sylvaticus* (Linnaeus, 1758), followed by *Apodemus flavicollis* (Melchior, 1834).

Key words: small mammals, fauna, Hemeius Dendrological Park.

Introduction

The Hemeiuş tree group is a valuable dendrological collection for Moldova area, being situated in the Hemeiuş commune, on Bacău – Piatra Neamţ highway, at the periphery of Liliecii de Sus village, at 10 km distance to Bacău town (figure 1) (1).

The geographical coordinates are: 46°37' northern latitude, 26°56' eastern longitude, 180 m absolute altitude. The Hemeiuş tree group is extended on a 49,5 ha area and it was created through the arrangement of a mixed foliage riverside forest situated on the right bank of Bistriţa river at the western limit of Moldavian Plateau at the interference with Moldavian Subcarpathians.

The paper is a preliminary study upon the small mammal fauna in a forest ecosystem with deciduaous and undeciduaous tree groups, comprizing the following species: *Quercus*, *Fagus*, *Pseudotsuga*, *Pinus*, *Picea*, *Fraxinus* and a grass vegetation with the following species: *Polygonatum latifolium*, *Geum urbanum*, *Geranium phaeum*, *Asperula odorata*, *Urtica dioica, Asarum europaeum* etc. (2)

Material and method

The material studied by us has 42 small mammal individuals and was captured by 50 metallic spring traps, grouped in batteries of 5 each at several meters distance to each other, kept in the field 7 days per month. The collecting was made in June, July, August and September 2008 and 2009. In the two years of study 42 small mammal individuals: 23 in 2008 and 19 in 2009, which were identified and determined in laboratory (3, 4).

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Results and discussions

The 42 small mammal individuals collected in Hemeiuş Dendrological Park in 2008 and 2009 belong, fron a systematical point of view, to 2 Orders (*Rodentia* and *Insectivora*), 4 families (*Arvicolidae, Muridae, Myoxidae* and *Soricidae*), 5 genera and 6 species: *Clethrionomys glareolus* (Schreber, 1780), *Mus musculus* Linnaeus, 1758, *Apodemus sylvaticus* (Linnaeus, 1758), *Apodemus flavicollis* (Melchior, 1834), *Muscardinius avellanarius* (Linnaeus, 1758)), *Sorex araneus* Linnaeus, 1758. In table 1 we present the species identified for the whole period of study in this area and their taxonomical belonging.

During the whole period of study the *Apodemus sylvaticus* species was the best numerically represented with 13 individuals captured, followed by *Apodemus flavicollis* (Melchior, 1834) with individuals captured.

In 2008, 23 small mammal individuals were collected belonging to 5 species. The most individuals belonged to Arvicolidae family. The species *Apodemus sylvaticus* (Linnaeus, 1758) was dominant having 30% of the total indiduals captured in this year, followed by *Apodemus flavicollis* (Melchior, 1834) having 26% of the total small mammal individuals captured in this habitat (table 2, figure 2).

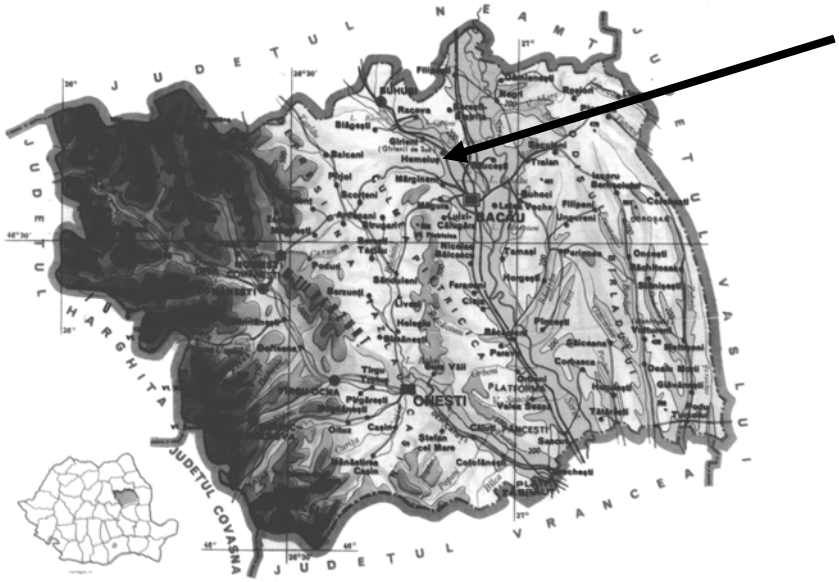

Fig. 1 - The physical-geographical map of Bacau County (1)

Table 1 – Small mammals species collected in Hemeius Dendrological Park

No.	Order	Family	Specie	No. of specimens
1	Rodentia	Arvicolidae	*Clethrionomys glareolus* (Schreber, 1780)	9
2		Muridae	*Mus musculus* Linnaeus, 1758	3
3			*Apodemus flavicollis* (Melchior, 1834)	11
4			*Apodemus sylvaticus* (Linnaeus, 1758)	13
5		Myoxidae	*Muscardinus avellanarius* (Linnaeus, 1758)	1
6	Insectivora	Soricidae	*Sorex araneus* Linnaeus, 1758	5
	Total			42

Table 2 – Abundance and dominance of the small mammals collected in 2008 year

No.	Specie	A	D%
1	*Clethrionomys glareolus* (Schreber, 1780)	5	21
2	*Mus musculus* Linnaeus, 1758	2	9
3	*Apodemus flavicollis* (Melchior, 1834)	6	26
4	*Apodemus sylvaticus* (Linnaeus, 1758)	7	30
5	*Sorex araneus* Linnaeus, 1758	3	14
Total		23	100

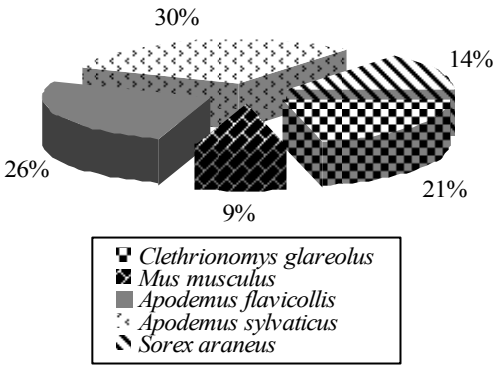

Fig. 2 – Dominance of the small mammals collected in 2008 year

In 2009, 19 small mammal individuals were collected belonging to 6 species. Even if the number of small mammal captured is smaller to the previous year the most individuals still belonged to *Apodemus sylvaticus* (Linnaeus, 1758) species having 31% of the total small mammal individuals captured in this habitat (table 3, figure 3).

Table 3 - Abundance and dominance of the small mammals collected in 2009 year

No.	Specie	A	D%
1	*Clethrionomys glareolus* (Schreber, 1780)	4	21
2	*Mus musculus* Linnaeus, 1758	1	6
3	*Apodemus flavicollis* (Melchior, 1834)	5	26
4	*Apodemus sylvaticus* (Linnaeus, 1758)	6	31
5	*Muscardinus avellanarius* (Linnaeus, 1758)	1	6
6	*Sorex araneus* Linnaeus, 1758	2	10
Total		19	100

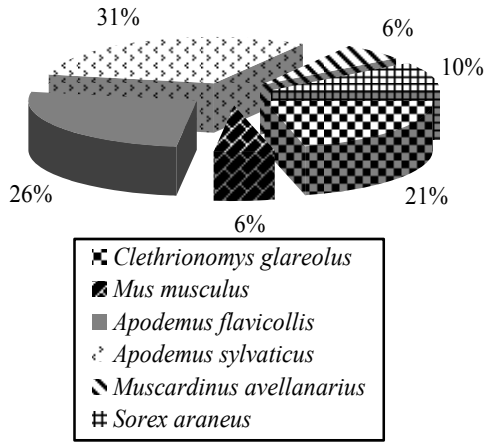

Fig. 3 – Dominance of the small mammals collected in 2009 year

Conclusions

In the months June, July, August and September of 2008 and 2009, in the Hemeiuş Dendrological Park, Bacău County 42 small mammal individuals were collected: 23 in 2008 and 19 in 2009.

From a systematical point of view the small mammals collected in the period before mentioned belong to 2 orders (Rodentia and Insectivora), 4 families (Arvicolidae, Muridae, Myoxidae and Soricidae), 5 genera and 6 species: *Clethrionomys glareolus* (Schreber, 1780), *Mus musculus* Linnaeus, 1758, *Apodemus sylvaticus* (Linnaeus, 1758), *Apodemus flavicollis* (Melchior, 1834), *Muscardinius avellanarius* (Linnaeus, 1758), *Sorex araneus* Linnaeus, 1758.

During the whole period of study the numerically dominant species was *Apodemus sylvaticus* (Linnaeus, 1758) with 13 individuals captured followed by *Apodemus flavicollis* (Melchior, 1834) with 11 individuals captured.

Acknowledgements

I am grateful to Professor Cătălin Rang for his support in the field and laboratory activities.

Rezumat

Studiul de faţă urmăreşte cunoaşterea faunei de micromamifere din Parcul Dendrologic Hemeiuş, judeţul Bacău. Acesta este situat în raza comunei Hemeiuş, pe şoseaua Bacău-Piatra Neamţ, la 10 Km de oraşul Bacău şi a fost creat prin amenejarea unui şleau de luncă, situat pe terasa de pe malul drept al râului Bistriţa. Materialul colectat în anii 2008 şi 2009 (lunile iunie, iulie, august şi septembrie) se compune din 42 exemplare de mamifere mici care din punct de vedere sistematic aparţin la două Ordine (Rodentia şi Insectivora), patru familii (Arvicolidae, Muridae, Myoxidae şi Soricidae), 5 genuri şi 6 specii. Pe toată perioada de studiu s-a constatat o dominare numerică a speciei *Apodemus sylvaticus* (Linnaeus, 1758) urmată de *Apodemus flavicollis* (Melchior, 1834).

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PART III – ECOLOGY

BUILDING-UP THE INDIVIDUAL ENVIRONMENT BETWEEN UMWELT AND INNENWELT

GH. MUSTAȚĂ [1], MARIANA MUSTAȚĂ [1]

ABSTRACT

Life appeared in the aquatic environment, but not before being prepared for the emergence of the first living beings. Since the emergence of life the whole Planet Terra has been modified in the relationship between biotic and abiotic. Biosphere represents life as a planetary phenomenon, and the life has as environment the Ecosphere. Both the vital phenomenon and Ecosphere had a coevolution during the geological time. Biocoenosis together with its biotope form an ecosystem. Ecosystem is the most beautiful and compelling example of what it means the unity of life and its environment, whether we think of **bioskene, biochorion or biome**. The species occupies a certain area, which represents its life environment (the entire complex of abiotic factors). Also, the individual has its life environment. We should call it **habitat,** but this term is often used differently in different comprising spheres. However, every living being, every individual, regardless of what species, Phylum or Kingdom is part of has its life environment, a proper environment, achieved by selection in a much more comprehensive environment. This environment has two parts harmoniously combined, forming a unitary whole: the **Umwelt** and the **Innenwelt**.

So in one and the same environment (broad) each species realizes its own living environment as each individual realizes its life environment in a broader environment in which it lives.

Key words: environment, individual environment, Umwelt, Innenwelt, internal environment.

Introduction

The notion of environment or surrounding environment was introduced in the strict ecological sense by the German biologist Jakob von Uexküll (1925, 1936), in his **Teoretische Biology**. He defines the environment as being "**Umgetung"** - the outside world that surrounds the living beings in proportion as it is perceived by sense and locomotion organs of animals and also the outside world imposes them certain behavioral actions.

As indicates Ion Dediu (2007): "*each species" **choices** "from the general environment those elements which correspond, on a small space, in the most useful way of its genetic nature".*

The same author, Jacob von Uexküll used the notion of Umwelt, by which he understands the specific environment or the efficient environment of a being. This term would be widely used in biosemiotics. The efficient environment represents those components of the general environment that have a direct influence on the life of a living organism.

We want to strengthen Jacob von Uexküll's conception on the environment with emphasis on the fact that an individual (a being) chooses from the general environment those elements that correspond to its requirements. It was easily passed over this aspect in the interpretation of the living environment.

W.C. Alle et coll. (1949) considers that the efficient environment represents those components of the general environment having a direct influence on the life of a living organism.

Out of those presented we must deduce that the surrounding environment is a subsystem of factors with which other subsystem interacts, the living one and that which, taken together, due to relationships (mutual exchange of matter, energy and information), forms a unitary and inseparable system, composed of these two subsystems: the organism and the environment (I. Dediu, 2007).

The environment –organism unity does not consist only in the fact that the organism lives in the environment, but that it takes from the environment, by selection only of those elements it needs and only to a certain extent, shaping the environment in such a way to be in its favour.

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In fact, as Jacob von Uexküll demonstrates us the individual lives in a more comprehensive environment in which it is building its own proper environment, an individual environment. This individual environment is the **specific** or **efficient environment** of the respective being and represents the so-called **Umwel**t.

Because of the interaction between organism and environment the individual is able to assimilate certain elements from the environment, to internalize them, so to transformer the external environment into the internal one. This internal environment enriched with elements taken from the environment represents the so-called **Innenwelt.** As we will see, the Innenwelt is not equivalent to the notion of internal environment currently used in the animal and human physiology because it is the resultant of the interaction between organism and environment.

In the following we have proposed ourselves to present the interrelations between Umwelt and Innenwelt and to elucidate certain aspects referring to the building of internal environment.

Individual environment building

If by environment we understand the surrounding nature or the totality of abiotic and biotic factors with that a living being is in contact, then we must understand that all the living beings that live in a certain environment need the same living conditions? In a water basin there live beings belonging to different. Kingdoms and even from different regions, we can realize that their claims to life are different.

We can not doubt about the fact that the creatures from the respective aquatic basin, being aquatic they can not live but in water, except the fact that some could be amphibious. What we want to nuance here is the fact that in one and the same aquatic basin the life requirements can be different from one species to another and even from one individual to another.

Some still believe that all organisms living in the same environment shall enjoy the same conditions and that they use in the same extent the same environmental factors. Though they live in the same environment (more comprehensive), the individuals of a species realize their own environment by selection, depending on the interests, needs and proper capabilities. So, every species, every individual living in the same environment uses to a certain extent its factors, as they would create their proper environment.

Certainly Alexandru Dragomir (2004) is right when he states that: "*Always the environment belongs to someone, it is proper to someone".*

We all know that in a glade sheep eat certain plants, goats others, rabbits have other preferences and we can continue in this sense. It is as if each animal would choose the favorite food. We can think in another way: the plants are attacked by different phytophagous species, some **polyphagou**s species attack very many plant species, others, that we call them **olygophagous** species, prefer a small number of plant species and few species do not use for food but one species, being **monophagous**. We realize that the phytophagous species choose their only preferred plant species. Moreover than that, if several phytophagous plant species attack the same plant species, then they attack organs even different tissues not to get too much in competition. From here we can deduce that the environment can offer endless possibilities that can be exploited by living beings.

Such preferences are for other environmental factors, too (nature of soil, humidity, light, air currents, etc.).

Things seem to clear up: each species, as well as each individual living in an environment use certain factors in a certain extent, building their own environment in a more comprehensive one. **Environment is a proper creation of each species and each individual, and it is done by extracting from a broader environment of the factors that they need to ensure the existence and adaptation.**

The building of the own environment (individual) is performed by the interpenetration of the external environment with the internal environment.

The internal and external environments must be understood on the direction of Jacob von Uexküll's conception of **Umwelt** and **Innenwel**t, which means the penetration in the semiotic universe. Applying this thinking way we shall understand that every being becomes an individuality as a result of its ability to decode more or less the signals coming from the environment and to integrate them into its Umwelt. This thinking way must be applied to all species and all individuals, regardless of taxonomic group of which they belong.

"*An amoeba is a temporal creature being able to distinguish and act on the selective features of the environment, and to participate in the incorporation of the present in the future*" (J. Hoffmeyer, 1992).

To strengthen Hoffmeyer's affirmations, we mention that Shapiro (1988) considered that "*the bacteria develop behavioral skills and they are able to process and respond to external signals*", and Sorin Sonea describes the bacterial world as "*being similar to a global organism which, even if it is*

dispersed, is bound by a general exchange of information among bacteria".

The indiviual environment presents, alongside of Umwelt, an Innenwelt, too, that defines it, and that is integrated into the wider environment (Uexküll, 1925; J. Deely, 1990). Being the problem about Umwelt, as it was understood by Jacob von Uexküll, we realize that we talk of an environment that not only we realize it, but we assimilate it, too. It is actually what a child begins to realize after birth. He begins to select from the appropriate environment in which he exists, only what it is necessary for him, which has a major significance for him. Child after birth begins to create his own environment, an environment in which he learns to move and live. He discovers his mother, first mother's breast and then the facial expression, the voice timbre and warmth of his body, he discovers his hands and later his feet (he tastes them, he puts them into his mouth), the sucking bottle with baby's dummy and so he broadens his horizon from nearly to nearly. He approaches those from around with his social smile before enjoying and smiling consciously, he forms his own universe, of which he needs, in which he lives, which it then expands to beyond of maturity. How many things are around him of which he does not need, these do not enter within his Umwelt.

My environment belongs to me. I feel well in a place or not: my clothes fit me and start to become part of me, to represent me; I can wear anything, but not with the same pleasure with which I wear those that like me; I can eat anything, but not any food is favorable to me and I like that food from my mother. I can hear any kind of music, but as the music of my people nothing can move me, I can stretch my Umwelt to the folk music, to the classical music or to any kind of music, but I'm the one who chooses it and I choose the one that suits me as if is part of me. In my training I can tend to any profession, but only in the job that I like and make progress.

You stay one day in a library and watch how diversely is the book request; excepting the school or work obligations, the requests are as much different as the fingerprints of each individual, too.

We can live in the same house, in the same family, we can sleep in the same bed, but how differently can we be in our experiences, in our behavior, in our way of being. We can go together to the same show, to the same Pinacoteca and we see the same movie, but how differently our emotional experiences can be. But why are they different? Because each of us has his Umwelt, because each of us selects in it and for it what we like, what suits us, what fits better in the accumulations of our Umwelt. The environment we built is ours as it is the shirt for us, as it is the color of our eyes, etc..

We can live in the same environment but we can be so different in terms of our Umwelt, so, only in this way we can realize that it is a creation of each of us, that each can realizes his own environment.

Families with many children represent a gift from God. You can not have many children if you do not love them, or better said it is a sin to have many children and not love them, without being preoccupied of their education. Although they are brothers, although they have a genetic background that comes from the same root, their genetic fingerprint is different, and their Umwelt is more different, even though some are univitelline twins. How not, if everyone chooses from the environment what suits him, what he can and how much he can, what he can accumulate for later or for his whole life. The Umwelt is my environment, it is part of me, as if I am part of it. As biological individual it is I with my Umwelt. Wherever I go, I go with my qualities, with my habits, with all my feelings, with my way of being and my way of manifesting; They can not be separated from my Umwelt because they form a unitary whole, as a living being it is I with my Umwelt. One can not understand by this that I can not sleep in another bed, in another house, or I can not leave my village, the country or even the continent, but wherever I go, I go with my prolongation.

In our existence we form ourselves certain habits, certain behavioral schemes, which we have achieved in our external environment. They belong to us and characterize us. It is as if we assimilate the external environment in the internal environment. We tend to believe that in the formation of a new family the married couple besides that they like one another and love one another, they have to understand how different they are by their Umwelt. A wife does not enter in the family only with her equip married but with her Umwelt, sometimes problems can arise from here when it is too different and too reserved.

As Kinji Imanishi (2002) considers, living beings can be understood only together with the environment to which they belong, together with that they evolved. It's an evolution of both living beings and the environment, a coevolution. Life appeared on Earth in an anaerobic environment, however, in its evolution it has completely changed the environment, made it aerobic. Oxygen on Earth is of photosynthetic nature. Beings act on the environment, animate it, transforming it in an extension of the self.

The Umwelt determines the assimilation of some elements from the external environment in the

internal environment. Since the nineteenth century Herbert Spencer has grasped the role of the adaptation in the transformation of the external environmental in the internal environment. But this brilliant observation appeared before time, until today ecologists, physiologists and evolutionists have come to this truth using the cybernetic principles.

In the transition from Protozoans to Metazoans it began to form an internal environment that has got very important adaptive and physiological dimensions together with evolution. If unicellular individuals are bathed in the external environment with which they realize directly changes of matter and energy, the transition to pluricellular metazoans determined the isolation of the inner cells from the direct contact with the external environment.

For the exchange of energy and substance among cells it was necessary the creation of an internal environment to bathe the body's cells. This medium consists of hemolymph in the lower organisms and of circulatory medium in the superior ones, which have a closed circulatory apparatus. In this situation the internal medium is composed of blood, interstitial fluid and lymph, to which it is added some circulating liquids. The internal medium has undergone an impressive morphophysiological progress in the evolution of animals reaching to a perfect homeostasis in the homothermic vertebrates (birds and mammals).

But we can not speak of Umwelt without making a natural connection with what we call Innenwelt, ie the internal medium. But the Innenwelt does not mean just the circulating and noncirculating body humors, but endless more. The Innenwelt becomes richer depending on accumulations based on experience.

The Innenwelt is a medium selectively realized, depending on the needs, interests and the possibilities of the individual.

What is very important to understand here is the fact that at the realization both of the Umwelt and of the Innenwelt we participate with our whole being. We even if we are "**thrown away"** in an environment (no creature at birth is able to choose its parents, the geographical area or the historical period in which to live), step by step we realize ourselves with our environment, an individual environment.

The Innenwelt allows to individual to find his way in life, the way in the environment and to insert himself in a relationship of communication, interest and living that each has in common with others of the same species and with the individuals belonging to other species. Biosemiotics demonstrates us that the systems that communicate with the outside world (open systems) and create themselves an Umwelt are systems capable of learning. Messages coming from the environment are subject to interpretation, being mediated by receptors (Meystel A., 1998, TA Sebeok, 1979).

Behavioral schemes which the child forms them, help him in exploring the environment and in his existence. Taking into account that at birth the human child is still not a man, but he becomes a man in the social environment through education, then we understand what it means the individual accumulations in the realization of the personality and of the individual environment. It is considered that the man is the statue that sculpts himself. Each is the result of his work, the life experience is accumulated through labor. The experience accumulated in one area or another is accumulated in Innenwelt and marks the personality of an individual for the whole life because it belongs to his human accumulations. We realize that the interaction between Umwelt and Innenwelt leads to the formation of a unitary whole.

Starting from a handful of unconditioned reflexes the child forms himself a series of conditioned reflexes and human stereotypes which will lay at the basis of the behavior. The environmental schemes ensure the conquering of the environment and they are at the basis of learning.

Learning can modify the functional parameters of any being. Learning enters in the treasury's Innenwelt. Training of reflexes and stereotypes advantages the driver in avoiding serious accidents, learning and experience accumulated allow to the individual the finding of some saving solutions in emergency cases. Accumulation of any kind (intellectual, technical, artistic, etc.). enter in the sphere of the Innenwelt and allow a better adaptation to the environment.

Adaptation contributes to the realization of what we call the organism – environment unity with the resonance in the genealogic tree of the beings. Using a modern language, based on cybernetic principles, we can speak of what rightfully George Kampis considers (1998, 2002), as being an assimilation of the environment, ie a transformation of the external environment in the internal medium. This aspect is particularly interesting because the notion of environment can not be understood any more just as a physiological characteristic of the organism, being much enlarged. It is also spoken today by an internal environment at the level of species (populations), of a biocoenosis etc.. Man can not be viewed any more just as a biological being

that "**bathes**" in an environment, but as a being who accumulating some elements from the environment, put his mark on it, changing it. Our reactions to environmental challenges are different, depending on the human-specific individual accumulation. In fact, intelligence and human experience accumulated appear as being components of the Innenwelt. The transformation of the external environment in the internal medium is performed differently from one individual to another depending on the structure or the treasure accumulated in the Innenwelt.

In front of the same universal masterpieces of painting our emotional experiences are much different, depending on the degree of culture of each individual.

Learning (accumulation of any area of human existence) enters in the Innenwelt's structure and allows the extension, sometimes it's unlimited. The "**beating"** or the vector of inter human relationships of a polyglot is a timeless longer than of a person who does not know any foreign language, but is forced to stand among strangers.

The voice quality is an attribute of the biology, but a perfectly pleasant and cultivated voice becomes a quality of the Innenwelt that opens the Umwelt's vector over a long distance in the direction of human interrelationships.

The environment can not be regarded as something detached from us, as something truly new from outside and independent of us, especially in the situation in which we understand the adaptation as a process of assimilation of the outside environment (in its inside).

The interiornalization can not be formulated as a process of assimilation, of learning, as physiological, ethological and ecological research proves. Pavlov's dog has interiorized the sounds of the bell as a signal for receiving food. But how many environmental signals do we not interiornalinalize?

Biosemiotics teaches us that no living being exists that it does not emit and does not receive and processes signals.

We must accept that in the environment is launched a multitude of signals and that it works endless symbols: "*Life is just this environment of symbols that is protected and perpetuated*" believes Jacob von Uexküll (1925, 1936). And we must not refer only to human, but we must descend to the simplest living beings which is the origin of a **"self**" and of a "**subject**", as we have seen in amoeba and in bacteria. Around us it is a system of signs because life generates them by **intentionality.**

The semiotic dialogue ensures us our entire existence as biological being. The **intentionality** must be accepted as an adaptation strategy. Our Innenwelt assimilates signals from environment that determine then some behavioral schemes with lower or higher significance in our existence (Gabor Forrai, George Kampis, 2005).

Applying this thinking mode even just in human, we shall understand that every human being becomes an individuality as a result of his ability to decipher and interpret more or less signals and integrate them into its environment. The Umwelt contributes to the realization of an Innenwelt thus structured so as to provide the necessary feedback for the development of the Umwelt.

We read a book we like, or see a certain show, our heroes become so close that they seem to be part of our family, in our environment as if they are flesh from our flesh. We hear a beautiful melody and we like it so much that we never forget it and we would like to hear it again; it entered into the treasure of our Innenwelt.

A certain signal of the environment is interiorinalized and begins to make part from us. Environment is part of us as we are also part of the environment. But we take from the environment only what we want, only what it is passing through our own filter. Only in this way we are building our personal environment.

I form part of an environment, I participate in the activities of a collective, but my presence within the team is not just physical, or biological, I penetrate within the collective with my Umwelt and Innenwelt. My aura is determined by my environment, which is part of me. I do not read the students a lecture, but I make a lecture emanating from my being, according to my understanding and my understanding is dependent on the wealth or treasure of my Innenwelt, so of my accumulations in the field as well as my physiological and mental state.

Broadening the concept of Innenwelt as internal environment we must accept that there is a particular internal environment in which the genes carry on their activity and existence, too (Dawkins R., 1976).

The activity of the genes depends largely on the environment in which they act. But what does it mean the environment for genes?

The niche of a gene is that part of the cellular and organic environment that enables its replication. The cellular environment is multidimensional depending on the constellation of genes with which each gene can establish interrelationships and on the autopoietical network of the cell. It is known the fact that a gene gets penetrance and expressiveness, is dominant or recessive depending on the genes with which it comes into contact.

The environment in which genes carry on their activity is a component part of the Innenwelt. The immune reaction of the organism depends on both the individual's constellation of genes and the environment in which the genes carry on their activity.

David Deutsch (2006) believes that "*the genes incorporate knowledge about their niches: "Life means the physical embodiment of the knowledge. An entity is adapted to its niche if it captures knowledge that makes the niche to keep that knowledge in existence"*.

It is as if the genes know what to do the cell, when and how it has to act. The cell executes several commands required from the level of the organism, from the level of some organs or tissues. To believe that the cell does not know what it makes, it is a naïve understanding. To say that the genes know what to do in a cell or within the organisms is not a hazardous statement. If a cell receives an order for the synthesis of a substance (protein or enzym) then it ocurrs the activation of the respective gene, copying the information and the formation of the mRNA and the starting of the synthesis process. The order for the synthesis of the respective substance is not illusory and it does not remain uncontrolled.

The order contains precise information about the quality and quantity ordered for the synthesis. If the synthesis process is underway and if we introduce into the cell a certain amount of substance that just is synthesized, we shall find that the cell knows about our intervention. It **"analyses"** the created situation and act according to the real quantity of substance that is in the respective moment stopping the synthesis process if there is enough substance or it will continue it until it is obtained the programmed amount.

Nothing is random. Deutsch's affirmation is not hazardous. It is not hazardous to think that the Universe is based on knowledge and that this knowledge (Smart) has a material in the vital structures. The knowledge enters in the treasure of the Innenwelt' s accumulations. "*What I want to say* - affirms D. Deutsch (2006), *is that although all known life forms are based on replicators, the phenomenon of life refers to knowledge actually*".

An organism invaded by a pathogenic agent learns immediately about the penetration of it in its interior (by the complement system, formed of 30 seric and membrane proteins) and it begins to take the necessary measures for its elimination.

After the organism realizes the knowledge of the pathogenic agent, if it was or not into contact with it, it mobilizes the active army that must phagocvtize the cells of the pathogenic agent and to eliminate them. If the fight takes place with difficulty it is mobilized the "*reserve army*", too. (Mustață Gh., Mustață Tiberiu, 2003).There are drawn to action the macrophagous cells from different tissues and put into circulation. The active defense process of the organism continues until the pathogenic agent is eliminated and a state of immunity is ensured. All these are related to what we call Innenwelt and we can affirm that they are based on knowledge.

The organism always knows the state in which is find and it acts according to the concrete situation.

We should understand that by the interrelation between Innenwelt and Umwelt is also ensured the realization of the individual environment of a being; it means creation, it means the history of existence of the respective individual in the world around.

The organism of a living being governs and controls not only its own body but also its environment. The living being is the master of its own environment, moreover than that, it can build its own environment in a broader environment (wider) (Mustață Gh., Mustață Mariana, 2006).

Language, society, education, race, gender, family, and the own genetic material, faith and our thoughts, habits and routines and all human accumulations recorded in our Innenwelt decide how we understand and how we experience ourselves and how we see the world around us and interact with it. We are so caught in our own way of being and seeing the things that we forget that our filters stained us the perspective, that we continue to project them on the world, but we believe what we see in "**outside"** is an objective reality (G. Kampis, 2002, 2004). The things are much influenced by our own filters.

Perhaps they are right those who argue that the way in which we see the world is a mirror of what happens inside us. Often the problems we face in the outside world are reflections of the hot unresolved issues, which racks our thinking and marks us the self (there are problems of our inner world).

Imanishi King (1941) considers that the creatures can not exist without the environment. Their beings can not be understood only in a system that includes the environment, too, of which they belong to, the environment being a part of the world which co-evolved with the beings. The recognition of the environment by the beings is the recognition of something necessary to their existence. And because they live in the environment, they animate it (it confers it the character of a living being) transforming it in an extension of the self.

"*Only an environment which is recognized by a creature can be considered suitable for this and for the context of its external world. In this world the being is mistress: so it must be interpreted as governing and controlling not only its own body but also the surrounding environment*" (I. Kinji, 2002).

Imanishi King called the integrated nature of the creatures, which consists in the own government and of the surrounding world as **shutaise**i (I. Kinji, 1984).

The life of the living beings consists in the assimilation of the environment and in the control of the world, this meaning the inherited shutaisei.

I. Kinji does not separate man from the world of creatures and considers that the subjectivity is a feature of the creatures since its early beginnings. He sees our genesis starting on the evolution path of the living world.

It seems to him natural that, if we consider the cells as having a life of the plants, then why should it be absurd to see a cellular "mind" in cells and one of the plants in plants, even if we have to make an obvious distinction between these. (Yoshimi Kawade, 1998).

I. Kinji demonstrates that the living beings and the environment are not independent entities because they influence each other. Life could not appear before forming a favorable environment for life but after its appearance life shapes its environment.

I. Kinji teaches us to see what we do not want to see or not even we think to see. He draws our attention that in schools one does not learn that, besides the constituents of nature, there is also the nature on its whole.

So, we should not see the nature as a sum of objects and phenomena, as a "**bunch**" of this kind, but as something unitary, perfectly integrated, from which they belong. Nature is the whole in which **all depend on all** those existing (Hoffmeyer, 1995, 1996, Kull Kalevi, 1998).

The individual environment is achieved through the twinning of the external environment with the internal environment, or more complex and more subtle said, to the twinning of the Umwelt with the Innenwelt.

Conclusions

In the present paper we have proposed ourselves to present the individual environment as an essential ecological factor. The environment as an ecological factor has an important significance as evolutionary strategy for both species and for individual.

As Biosphere has its environment, **Ecosphere**, with which it forms a unitary whole, and the biocoenosis with the biotope forms an ecosystem, and so the species has its environment in which it carries on its existence and the evolution, namely the areal. But we must understand that there is no being, regardless of what species, Phylum or Kingdom belongs, not to have his living environment

This environment could be called **habitat**, but this term is so much used with different meanings, that it did not precisely outline its comprising sphere.

What we would like to point out in this paper is that each individual builds, by selection, an environment of its own, a proper environment, in a broader, more comprehensive environment. The individual environment is realized at the intersection of the internal environment with the external environment or, in biosemiotic terms, through the fusion of the Umwelt with the Innenwelt in the meaning given by Jacob von Uexküll.

The Innenwelt notion is more comprehensive than that of internal medium used in the Physiology of Animals and Human, that it is reduced at the circulating or non-circulating body humors, and their homeostasis. The Innenwelt includes the entire treasure, too, which the individual accumulates it in its existence by learning and by transforming of the external environment into internal one.

As the ecological niche of a species is the creation of the respective species, so the individual environment of a being is its creation.

Even the genes function in a proper ecological environment. And here the principle is applied after which every biological system creates its own environment. One and the same gene expresses its penetrance and expressiveness, is dominant or recessive, depending on its environment that it can realize it and the relationships with other genes, which are different from one individual to another.

The unity between organism and its own life environment is so strong that today we can not imagine the biological individual than together with its life environment.

Rezumat

Viața a apărut în mediul acvatic, nu însă înainte de a fi pregătit pentru apariția primelor ființe vii. De la apariția vieții întreaga planetă Terra a fost modificată în interrelația dintre biotic şi abiotic. Biosfera reprezintă viața ca fenomen planetar; iar viața are ca mediu ecosfera. Atât fenomenul vital cât şi ecosfera au avut o coevoluție în timp geologic.

Biocenoza împreună cu biotopul său formează un ecosistem. Ecosistemul reprezintă cel mai frumos şi mai convingător exemplu de ceea ce înseamnă unitate dintre viaţă şi mediul său, fie că ne gândim la **bioskenă**, **biochorion** sau **biom**. Specia ocupă un anumit areal, care reprezintă mediul său de viaţă (întregul complex de factori abiotici). Şi individul îşi are mediul său de viaţă. Ar trebui să-l numim **habitat**, însă acest termen este folosit adesea în mod diferit, în sfere de cuprindere diferite. Totuşi, fiecare fiinţă vie, fiecare individ, indiferent din ce specie, încrengătură sau regn face parte îşi are mediul său de viaţă; un mediu al său, un mediu propriu, realizat prin selecţie într-un mediu mult mai cuprinzător. Acest mediu are două părţi armonios îmbinate, care formează un tot unitar: **Umwelt-ul** şi **Innenwelt-ul**.

Deci, în unul şi acelaşi mediu (cuprinzător) fiecare specie îşi realizează mediul de viaţă propriu, aşa cum şi fiecare individ îşi realizează mediul său de viaţă într-un mediu mai larg în care trăieşte.

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COMPLEXUL MUZEAL DE ŞTIINȚELE NATURII „ION BORCEA" BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 149 – 158

THE MONITORING OF WATER RESOURCES IN THE SIRET HYDROGRAPHICAL BASIN

DAN DĂSCĂLIȚA

ABSTRACT

The current status of Romania, European Community membership gives, in addition to a number of rights, many obligations concerning esspecialy the implementation and compliance with relevant EU regulations.

In Romania the water's monitoring system has been working since the early twentieth century, but since 1976 when the Water Directorate at basinal level were established this system has been developing into a scientific and defining structure. Water monitoring network has continuously suffered additions and improvements, but since 2002 the question of the modernization and the development of water integrated monitoring system was raised so it could meet the European standards and the monitoring requirements and it could run in a dynamic, complex process and with spiral development. Nowadays water's quality state in Romania is systematically watched according to the structure and the methodological principles of water integrated monitoring system in Romania (SMIAR), restructured in accordance with the requirements of European directives in the water sector. In this paper we presented some aspects concerning the synthesis of integrated water monitoring system, important mechanism for water resources management, applied to the Siret Basin by Siret River Basin Administration (ABAS).

Keywords: water integrated monitoring, body of water, good water status.

Introduction

Water Integrated Monitoring System aims coherent and comprehensive assessment of the status of water bodies and its evolution over time so that programs of measures and their effectiveness can be established and it involves the crossing of distinct phases:

- establishing monitoring subsystems;
- establishing the investigating media;
- determining the spatial structure;
- identification of monitoring types;
- establishing the quality elements to be monitored;
- establishing the monitoring frequencies;
- establishing the hierarchy of laboratories.

In Romania, Water Integrated Monitoring System has been operating in a scientific and definite structure since 1976 when the Basin Water Directorates were established. The water's monitoring system had been working since the early twentieth century, but at a much lower level, through an insufficient monitoring network and without an integrated quantity - quality approach, and with a greater emphasis on hydrometric measurements at few stations located especially on the major rivers of the first order. Water monitoring network has continuously suffered additions and improvements, but since 2002 the question of the modernization and the development of water integrated monitoring system was raised so it could meet the European standards and the monitoring requirements and it could run in a dynamic, complex process and with spiral development.

1. Material and method

1.1. Types, subsystems and specific programs of water integrated monitoring

In accordance with the Water Framework Directive 60/2000/CE fully transposed into Romanian legislation, the National Monitoring System Integrated Management (SMIAR) includes three types of monitoring:

- Surveillance Monitoring;
- Operational Monitoring;
- Investigation Monitoring.

Surveillance monitoring - serves in the assessment of water status within each river basin or sub basin. Surveillance Monitoring provides information for the validation of the impact assessment procedure, for the efficient design of the future monitoring programs and for the assessment of long-term trend of variation of water resources.

Operational monitoring should be conducted for all water bodies, which upon the impact

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according to Annex II of the Framework Directive, or upon the basis of surveillance monitoring, were identified as not likely to carry out the environmental objectives. It seeks to define the status of aquatic ecosystems at risk or wich present risk of failing to meet environmental objectives. This type of monitoring should be conducted for all water bodies in which priority substances are discharged.

Investigation Monitoring – is carried out to certificate the causes due to which a water body failes to achieve environmental objectives and to identify the causes of exceedances of limits of quality standards.

Monitoring system provided by the Water Framework Directive and the other European Directives approaches three areas of investigation, namely water, sediment / suspended solids and biota and includes six subsystems:

- River Subsystem;
- Lakes Subsystem;
- Transitional Waters Subsystem;
- Coastal Waters Subsystem;
- Groundwater Subsystem;
- Wastewater Subsystem.

Achieving integrated water monitoring system is currently done through specific monitoring programs, namely:

1. Surveillance monitoring program (S), applied to surface water and groundwater;
2. Operational monitoring program (O), applied to surface water and groundwater;
3. Investigation monitoring program (I) applied to surface water;
4. Sections of reference program (R) applied to surface water;
5. Intercalibration program for ecological status (IC), applied to surface water;
6. Drinking water program (P), applied to surface water and groundwater;
7. Vulnerable areas program (ZV), applied to surface water and groundwater;
8. Ichthyofauna monitoring program (IH) applied to surface water;
9. Habitats and Species Protection Program (HS), applied to surface water;
10. International conventions program (CI), applied to surface water and groundwater;
11. The knowledge of morphological alterations pressures program (CAPM), applied to surface waters;
12. "The best available section" program (CBSD) applied to surface streams.

1.2. Evaluation of the quality of water resources

The evaluation of surface water and groundwater status is achieved in accordance with the Framework Directive 60/2000/CE, transposed in diffrent laws in Romania based on the normative definitions of employment quality status and based on specific parameters for which maximum limits have been set for each quality state separately, as it follows:

1.2.1. Surface water

For grading and classification of surface water bodies in ecological states conditions, five regulatory environmental status were defined (very good, good, moderate, poor, bad) as follows (Table 1):

Table 1 - General definitions of ecological status of surface waters

Very good status	Good status	Moderate status	Poor status	Bad status
• There are slight anthropogenic alterations of the values of physico-chemical and hydro-morphological quality elements for the type of surface water bodie, compared with normally associated values with that type in no change conditions. • The values of biological quality elements for the type of surface water body reflects the values normally associated with that type, in unchanged conditions. The indicated deflections are zero or there are few evidences of disturbance. • Conditions are specific to the type and the communities.	Values for biological quality elements for such a surface water body present low levels of modifications due to human activities and deviate slightly from those values associated normally with the body type of surface water in unchanged conditions.	Values for biological quality elements for such a surface water body deviates moderately from those associated with the body type of surface water in unchanged conditions. Values present moderate signs of disturbance due to human activities and are more disturbed than those corresponding to the values of good conditions.	Waters which are showing evidence of major deterioration of values of biological quality elements for such a surface water body and in wich the relevant biological communities deviate significantly from the values associated normally with the surface water body type in unchanged conditions are classified as beening of poor quality.	Waters showing evidence of major deterioration of the biological values of quality for the type of water body surface and are absent in large parts of important biological communities, which are normally associated with the surface water body type in unchanged conditions are classified as beening of bad quality.

According to these definitions, to ensure conditions and supportability degrees of aquatic environments, for each quality indicator were set allowable limits for classification in the five ecological status. Using these indicators, based on the principle of the most unfavorable value, is made the classification of water bodies in corresponding states of quality. The quality elements for classification of ecological status of surface waters are:

- biological parameters;
- Hydro-morphological parameters supporting the biological elements;
- Chemical and physico-chemical parameters supporting the biological elements:
  - General parameters as: thermal conditions, oxygenation conditions, salinity, acidification status, nutrient conditions and in lakes transparency analysis;
  - Specific pollutants (pollution with all priority substances identified as being discharged into water bodies, pollution with other substances identified as being discharged in significant quantities into water bodies).

Characterization process of surface flowing water quality implies global assessment of analytical results obtained in systematic campaigns under specific operating manuals. To process the information at the control sections of specific water bodies and specific monitoring programs these steps are followed:

- The estimation of the typical values: maximum, arithmetic mean, minimum, standard deviation, percentile 50% and percentile 90% for each quality indicator.
- Characterization of water quality in each monitoring section of the body of water, than the global water quality, considering the cumulative effect (weighted) of all indicators of a characteristic group.

To assess overall water quality in each monitoring section for each quality indicator in part are calculated the mean and percentile values of 90% and 10% for dissolved oxygen, and these values are compared with limit values of quality grades under the regulations (currently limits for the five classes as provided in Order 161/2006). Following these procedures results the classification of each section in one of the five quality categories, namely quality status of each section characterizing surface water body. Normative indicators for the five classes (Order 161/2006) were divided into five main groups namely: system of oxygen, nutrients, general ions, salinity, toxic pollutants and specific natural origin, other relevant chemical indicators.

The general quality class is assessed on the basis of the five classes of the representative groups of indicators mentioned. The calculation of global quality index is done with the relationship:

$$i = \frac{1}{n} \times \sum_{1}^{n} \frac{c_m}{c_a}$$ where:

c_m - determined (made) concentrations of quality indicators (arithmetic average, 90% percentile) [mg/l];
c_a - the regulatory concentration limits allowed for the five classes of quality and quality indicators analyzed [mg/l];
n - number of indicators.

Depending on where i>1, similar calculation for the next classis is runed, this calculation being repeated for the limit concentrations related to quality grades, up to the situation in which i<1. Overall quality indicator of the control section is given by the group of indicators with the worst classification.

Water quality data are variable and their value are influenced by many causes. Processing these datas is done using statistical-mathematical procedures and has as result the classification of monitoring sections in quality classes, the distribution of watercourses lengths in quality classes and the comprehensive characterization of the status of water quality on river basins.

Assessing water quality status of lakes is done through the interpretation of analytical data obtained from regional laboratories for water management (quality values of specific indicators analyzed in water samples taken from typical sections of the lakes) using statistical methods in water samples taken from characteristic sections.

1.2.2. Groundwater

For determination of groundwater quality state, definitions were established for classifying distinct good quantitative and qualitative status (Table 2):

For classification of quantitative status of groundwater 'The groundwater level" evaluation parameter was established and for the classification tof he chemical status of groundwater were established two types of parameters: conductivity and general parameters from wich the essential elements monitored in all the groundwater bodies are: oxygen, pH, conductivity, nitrates and ammonium, the list of parameters being supplemented by specific quality indicators for the monitored area.

Table 2 - General definitions of quantitative and qualitative good groundwater status

Elements	a. Parameters for assessing good groundwater quantitative status
Groundwater level	Groundwater levels in the groundwater body is such that the available groundwater resource is not exceeded by an annual average flow captured in the long term. Consequently, groundwater levels are subject to anthropogenic changes that could lead to: - not being aible to complie with the environmental objectives for surface water bodies and groundwater and the associated surface water ; - Any significant diminution of the status of such waters; - Significant damage to terrestrial ecosystems directly depending on groundwater bodies; - Changes in direction of flow, due to the level changes that may occur temporarily or continuously in a spatially limited area, but which does not cause penetration or intrusion of salt water and does not indicate a sustained trend of change identified clearly, influenced by anthropogenic activities of flow direction which would lead to the intrusion.
Elements	**b. Parameters for assessing good groundwater quality**
General	The chemical composition of groundwater body is such that pollutant concentrations: - Do not show effects of saline intrusion and other penetrations; - Do not exceed the applicable quality standard; - Do not have as a result the failure of the environmental objectives for surface water bodies and groundwater, for surface water associated,and do not have any significant impact in decreasing the ecological or chemical quality of these bodies of water and do not damage or significant disturbe the terrestrial ecosystems directly dependent on groundwater bodies.
Conductivity	Conductivity changes are not characteristic to the intrusion of saline or to other intrusions into the groundwater body.

The knowing process of the groundwater quality at the level of hidrographic basins is conducted on hydrogeomorphological units and within them on aquifers (underground) structures, using the laboratory analysis of water samples taken from water drilling hydrological observation stations of the national network.

Characterization of groundwater quality in natural conditions shall be based on general indicators covering natural regime and on some specific indicators – determined by the types of existing pollution in the area (industrial sites, human agglomerations, agricultural sources of pollution (pollution by nitrates), mining, etc. In the locations within the perimeters of major industrial sites, potential sources of groundwater pollution, local systems for the monitoring of the groundwater quality are placed. Through these systems both the possible occurrence of a pollution of underground aquiferis and also their dynamic evolution are watched, in relation with the measures taken to combat the causes that have produced these pollution.

1.3. Evaluation of the wastewater

The overall quality of wastewater sources is assessed having in mind the following features:

- **volumes of wastewater evacuated în natural receptors (rivers), divided on various categories, depending on the workload and how is carried out their treatment, namely:**
- waste water that does not require treatment;
- wastewater that require treatment: untreated sewage, poorly treated sewage, sufficient treated wastewater (adequate to quality standards and regulation in terms of water management);
- **quantities of pollutants discharged temporarily, monthly, respectively annual;**
- **the way the wastewater treatment functioned (statistical evaluation):**
- properly functioning of the sewage plants;
- inadequate functioning of the sewage plants.

1.4. The Monitoring System of Water Resources in the work area of the Siret River Basin Administration

Siret River Basin Administration (ABAS) administrates the Siret River Basin, which is the largest basin in Romania, with an area of 47,610 square kilometers, of which 42890 km on Romanian territory. In this basin area, Siret River Basin Administration Bacău manages 27,402 km. The density of the river network is 0.35 km/sq. km. Siret River, springs from the Carpathian Woody Mountains, in Ukraine, enters in Romania near the city of Siret and flows into the Danube, upstream the Galati city. The total length of the Siret River is 726 km, of which the territory of Romania, 559 km. The main tributaries of the Siret River are Suceava River, Moldova River, Bistrita River, Trotus River, Bârlad River, Putna River, Ramnicu Sarat River and Buzau River, which together with other smaller tributaries, contribute to a multi-annual average flow of Siret

River upstream the confluence with the Danube, approximately 240 m^3 s corresponding to a multi-annual average stock of about 7.6 billion cubic meters. The total length of the river system of the Siret River Basin, is 15836 km, of which on the territory of Romania, 15157 km, and managed by Siret River Basin Administration of 10280 km.

The monitoring system of water resources quality, currently applied by Bacau Siret River Basin Administration is carried out in accordance with the provisions of the Water Framework Directive 60/2000 and the other European Directives transposed into the laws concerning water management in Romania, namely by Water Law 107/1996 with subsequent amendments and completions. This system includes four specific subsystems, namely:

- Rivers Subsystem;
- Lakes Subsystem ;
- Groundwater subsystem;
- Wastewater Subsystem;

Siret River Basin Administration does not monitor the "transitional waters" "coastal waters", subsystems which are not specific of its area of activity.

Siret River Basin Administration is pursuing three areas of investigation, namely: water, sediment/suspended matters, biota and applies 12 types of monitoring programs to characterize these environments depending on the specific monitoring subsystem analysed. Analysis of water samples is carried out at five own modern and properly equipped laboratories, where for most of the analyzed indicators the methods have been approved by the certifying body RENAR from 29/01/2007 under ISO / IEC 17025/2005.

In 2010, the application of the 12 types of monitoring programs is systematically made, according to the analysed subsystem and having the configuration from Table 3.

The monitoring network for the water quality in the area of activity of Siret River Basin Administration for the "rivers" subsystem is systematically covering 2889 km of river from the 10280 km of water courses administered by:

88 monitoring water quality sections for streams:

- 10 reference sections;
- 17 drinking water sections;
- 21 vulnerabile areas sections;
- 39 sections with other monitoring programs;
- 1 section of the border.

The rest of the river system is monitored depending on the situation by investigation monitoring. In sections with high risk of pollution ABAS seeks the quality of surface water through systematic fast flow (daily or weekly frequency as appropriate). In case of accidental pollution, the monitoring of water resources is carried in special regime, the monitoring frequency in some cases beeing hourly.

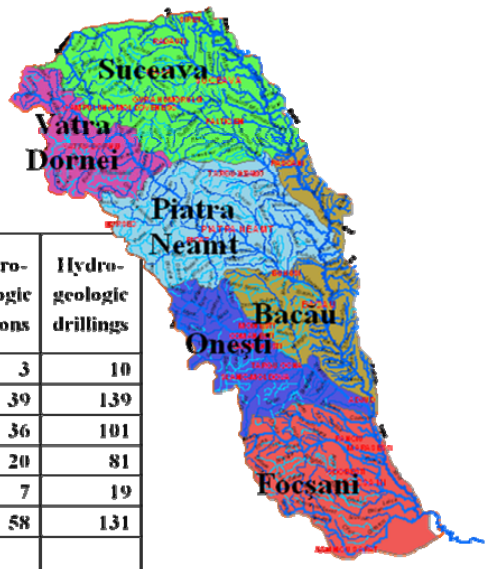
Table 3 - Monitoring programs implemented by Siret River Basin Administration

No. crt.	Types of monitoring programs	Total number of monitoring sections	Rivers	Lakes	Ground waters	Waste water
1.	Surveillance	318	70	31	556	
2.	Operațional	255	37	15	62	141
3.	Investigation	Whenever necessary				
4.	Drinking water	63	13	4	46	
5.	Reference	18	10	8		
6.	Ichthyofauna	114	86	28		
7.	Vulnerable areas	152	21		131	
8.	Habitats and Species Protection	21	7	14		
9.	"The best section available"	6	6			
10.	Intercalibration	21	16	5		
11.	International Convention	1	1			
12.	The knowing of the hydro-morphological deterioration impact on water	15	15			

Quantitative monitoring system of surface water in the area of activity of the Siret River Basin Administration is done through six hydrological stations, as follows:

- Suceava Hydrological Station: in the basins of the rivers Siret (up to Lespezi), Suceava and Moldova (until Timişeşti);
- Vatra Dornei Hydrological Station: in the upper catchment of the river Bistrita (up to the confluence with Neagra river Brosteni)
- Piatra Neamt Hydrological station: in the basins of the rivers Siret (Neamt county territory), Moldova (lower sector), and Bistrita (middle and lower sectors);
- Bacau Hydrological Station: in the middle basin of the Siret river (across Bacau County) and sub-basin Tazlău
- Onesti Hydrological Station: in the basin of the river Trotus (without the sub-basin Tazlău);
- Focsani hydrological station: in the lower basin of the Siret river and in the Putna and Ramnicu Sarat catchments;
- Suha Basin – the representative basin of Suha is organized in the Suha river basin right tributary of the Moldova river.

Each hydrologic station monitors the water resources for a number of parameters for each subsystem: rivers, lakes, groundwater and wastewater (for systemic use), through a network of hydrometer, rain and geological stations, located in characteristic sections with hydromorphological, hydrogeological and use of water flow specific. This network is presented briefly in Fig. 1, separately for each hydrological station. The activity of the hydrological stations in Siret River Basin Administration is presented in Table 4. divided on subsystems.



HYDROLOGICAL STATIONS MANAGED BY SIRET RIVER BASIN ADMIINISTRATION

No. crt.	Hydrological station	Hydrological stations			Pluvio-metric stations	Hydro-geologic stations	Hydro-geologic drillings
		Rivers	Lakes	Systematic water users			
1	Vatra Dornei	17	-	-	17	3	10
2	Suceava	25	4	1	30	39	139
3	Piatra Neamț	30	4	1	34	36	101
4	Bacau	16	8	3	15	20	81
5	Onești	17	1	8	25	7	19
6	Focsani	24	1	1	24	58	131
7	Suha River Representative Basin	8			6		
TOTAL		137	18	14	151	163	481

Fig. 1 - Map of areas of activity of hydrological stations in the Siret River Basin Administration and the main monitoring parameters

Table 4. The activity of hydrological stations at Siret River Basin Administration

Nr. crt.	ACTIVITY	U.M.	TOTAL measurements per year
1.	**Subsystem "surface streams"**	no.	**1057**
	-hydrometric stations for levels monitoring(including visual pollution)	no.	174
	- hydrometric monitoring stations for water flow	no.	323
	- hydrometric monitoring stations for silt flow	no.	62
	- hydrometric monitoring stations for air / water temperature	no.	158
	- hydrometric monitoring stations for rainfall	no.	131
	- hydrometric monitoring stations for interfluves evaporative	no.	7
	- hydrometric monitoring stations for nivometer	no.	73
	- hydrometric monitoring stations for daily / special broadcast	no.	110/29
2.	**Subsystem "natural and artificial lakes "**	no.	**55**
	- hydrometric stations monitoring for water levels	no.	18
	- hydrometric monitoring stations for air / water temperature	no.	14/12
	- hydrometric monitoring stations for rainfall	no.	10
	- hydrometric monitoring stations for evaporative	no.	1
3.	**Subsystem "groundwater aquifers and springs "**	no.	**240/752**
	- hydrological stations / water drillings for levels monitoring	no.	183/534
	- hydrological station / water drillings for flow monitoring / monitoring springs flow	no.	-/-/61
	- hydrological stations / water drillings for water temperature monitoring	no.	**57/157**
4.	**Water users hydrometry**	no.	**62**
	- systematic measurements at selected users	no.	15
	- expeditionary measurements at selected users	no.	15
	- users without hydrometry posibility - of which:	no.	32
	- for its own administration works	no.	3
	- for water users	no.	29

2. Results and discussion

2.1. Studied surface water categories and short summary of their classification in ecological states, based on biological and physico-chemical monitorised elements in the area of activity of Siret River Basin Administration, in 2009

As part of quality assessment of surface water (rivers and lakes) were studied 382 water bodies located in the Siret River Area (Fig. 2).

Of these, only 64 water bodies have been systematically monitored through physico-chemical and biological analyses, as follows:

- 53 surface water bodies – rivers;
- 9 surface water bodies - artificial lakes;
- 2 surface water bodies – natural lakes.

The remaining 318, low-risk or no risk at pollution, surface water bodies, were evaluated by similarity based on the expert's opinion and also on the investigation monitoring results.

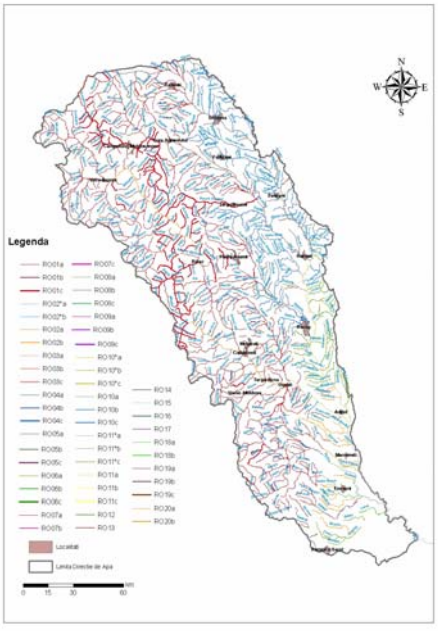


Fig. 2. Typology of water courses B.H. Siret

In 2009, the 382 water bodies, were classified in the next ecological status:

- Very good: 43 bodies of water, representing 11.26%;
- Good: 322 bodies of water, representing 84.29%;Moderate: 17 bodies of water, representing 4.45%;
- Poor: no water body;
- Bad: no water body.

Also, in 2009 the classification in ecological status of the 10280 km lengths of natural water bodies (rivers) in the Siret River Area (Fig. 3) was: (tab.5)

- Very good: 2600.57 km water bodies, representing 25.30%;
- Good: 6719.30 km water bodies, representing 65.36%;
- Moderate: 960.13 km water bodies, representing 9.34%;
- Poor: 0 km water bodies, representing 0%.
- Bad: 0 km water bodies, representing 0%.

Ecological status of 10280 km of rivers Siret ABA administration was assessed as follows:

[Km] 10280,00	All rivers, from which	[%] 100,00
4421,90	Km watercourse through systematic monitoring	43,02
5668,78	Km of water courses through study of similarity	55,14
187,42	Km of water courses related to 2 accumulation lakes	1,82
1,90	Km of water courses related to two natural lakes	0,02

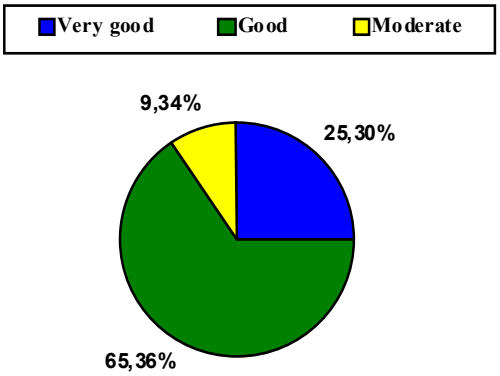


Fig. 3. Total length distribution of ecological status of surface water bodies (rivers) to reach any water activity of the Siret Basin Administration, 2009

Tab. 5 - Synoptic length of water bodies (rivers) cumulated according to the assessment of the ecological status in 2009 Siret Catchment

Total lenght (km)	Distribution of lengths according to the ecological status evaluation										Distribution of lengths according to the chemical status evaluation			
	Very good		Good		Moderate		Poor		Bad		Good		Bad	
	km	%	km	%	km	%	km	%	km	%	km	%	km	%
10280	2600,57	25,30	6719,30	65,36	960,13	9,34	0	0	0	0	-	-	-	-

Tab. 6 - Distribution of reservoirs according to the assessement of the ecological potential and chemical status in 2009 Siret Catchment

Total number of reservoirs	Distribution reservoirs as assess the potential environmental						Distribution of reservoirs in accordance with chemical status assessing			
	Maximum ecological potential		Good ecological potential		Moderate ecological potential		Good		Bad	
	No. Water bodies	%	No. Water bodies	%	No. Water bodies	%	No. Water bodies	%	No. Water bodies	%
9	4	44,44	1	11,12	4	44,44	7	77.77	2	22.23

Subsystem "lakes" is monitored by 31 water quality monitoring sections for 11 representative lakes in the area of activity, of which 9 artificial lakes and 2 natural lakes (Table 7).

Table 7. Systematically monitored lakes in the area of activity of Siret River Basin Administration

Nr. crt.	Watercourse	Monitorated lakes	
		Accumulation	Natural
1.	Siret	Rogojesti	
2.	Siret	Bucecea	
3.	Solcuta	Solca	
4.	Dragomirna	Dragomirna	
5.	Bistrita	Izvorul Muntelui	
6.	Bistrita	Bâtca Doamnei	
7.	Siret	Răcăciuni	
8.	Uz	Poiana Uzului	
9.	Siret	Călimaneşti	
10.	Bicaz		Lacu Rosu
11.	Lala		Lala

Concerning the ecological status of lakes was found that 44% of the 9 monitored accumulation lakes are in moderate state, the remaining 56% being in good and very good ecological status, while from the two natural lakes, 50% are in moderate state and the remaining 50% are in good and very good ecological status.

Table 6 shows the distribution of the 9 lakes according to the asessment of ecological potential and the chemical quality in 2009.

Generaly the lakes water quality is answeres with the required service (water supply, habitat for aquatic ecosystems, etc.).

2.2. The quality status of groundwater in the activity area of Siret River Basin Administration in 2009

Water quality of the subsystem "groundwater" is monitorated through:

- 46 operating water drilling wells (water supply);
- 62 surveillance water drillings located on industrial areas;
- 556 study water drillings owned by National Grid of Hydrogeological water drillings of Romania (including 131 wells located in vulnerable areas).

In general, the groundwaters from the retention pools used for public water supply correspond to the maximum permissible limits for drinking water set out in Law 458/2002 and Law 311/2004.

Concerning the groundwaters related to the industrial platforms, they are tracked by monitoring wells, which still show (in most cases), the continuous trend of maintaining historical pollution from prior periods. Generally these waters have not suffered degradation in the past recent years, however in some cases, there was recorded a slight tendency to improve quality (eg. Platform Roznov, Dărmăneşti Refinery), due to the reducing of industrial platform activity (closure), to natural drainage and to the directed drainage measures of groundwater affected by pollution.

Generally, the groundwater quality related to industrial platforms has an improvement due both to the measures taken by economic agents to reduce and stop pollution and to the reduction of their economic activity. The same trend of improvement is found in groundwater from vulnerable areas affected by nitrates from agricultural activities, mainly due to the reducing of the quantities of nitrogen fertilizers applied onto agricultural land.

2.3. The quality status of wastewater discharged into the receptors by economic agents in the activity area of Siret River Basin Administration in 2009

Wastewater subsystem includes 136 pollution sources (of which 107 pollution sources with sewage plants discharge and 29 discharges from rain and sorting stations of mineral aggregates).

From the total volume of wastewater discharged in 2009 - 106.254 mil.mc in the activity area of Siret River Basin Administration, 43% were sufficiently treated and 57% insufficiently treated. Insufficient treatment of sewage water resulted from the majority of human congestion is mainly due to depreciation of the municipal treatment plants and due to very limited sources of funding for the development of modern treatment plants. However, the effects of historical pollution of groundwater is still most common, both on the premises of former industrial sites as on the areas where lands have been heavily polluted by chemical fertilizers.

3. Conclusions

The permanent knowledge of water resources status is an objective requirement which can not be adequately achieved without a modern integrated water monitoring system. As part of water resource management, monitoring activity has an important place, representing a major mechanism for quality and quantity water protection. The Siret River Basin Administration, permanently makes particular efforts to knowledge the status of wastewater quality

discharged and of the impact of these on water resources, namely to decrease until stoping the quantities of pollutants discharged into water resources. The Administration also acknowledges and takes measures against the economical agents that pollute so they reduce pollution, so they establish automonitoring programs and so they achieve high performance treatment facilities to protect water quality in accordance with quality standards set by the water legislation.

A positive aspect in recent years is the efficient aplication by operators of the automonitoring programs and of the programs to prevent and control accidental pollution, under the direct coordination and supervision of qualified staff of the Siret River Basin Administration. As a result of these measures is the reduction of the number of accidental pollution from more than 30 accidental pollution occurring annually until year 2000 to below 10 accidental pollution occurring annually after 2005.

Among the measures to improve water quality, which Siret River Basin Administration always pursues are noted:

1. Completion of master plans for the building of wastewater treatment plants for human agglomerations;
2. Funding allocation (budget, structural funds, equity) for the development of new treatment plants for municipalities in B.H. Siret;
3. Further action to detect polluters who discharge hazardous substances into sewage systems and natural receivers;
4. Further studies and action programs in the basin and punctually, so that the impact of pollution sources on water bodies to be known;
5. Continously acquisition of materials and installation for the water depollution;
6. Continuously improvement of the Integrated Monitoring Network at punctual and overall level;
7. Making the automonitoring system for treated wastewater discharged into natural receivers by operators.

All these mentioned measures, and others, are primarily aiming to achieve a good ecological status of water bodies and a sustainable development of water resources.

Acknowledgements

Many thanks to my colleagues who undertakes monitoring and protection of water resources.

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COMPLEXUL MUZEAL DE ŞTIINȚELE NATURII „ION BORCEA" BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 159 – 164

PART IV – MUSEOGRAPHY

ENVIRONMENTAL EDUCATION THROUGH ITINERANT EXHIBITION "POLLUTION, WHERE IT GOES…?"

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ABSTRACT

The environmental educational events which involve pupils and students became traditions in the activity of „Ion Borcea" Natural Sciences Museum Complex of Bacău. In the years 2009-2010 in the educational offer of the museum was included an itinerant exhibition named "Pollution, where it goes…?". The aim of this exhibition was to presents the dangers of human activities over the environment. The exhibition was conceived along with additional multimedia materials and presented in a number of 6 schools and high schools from Bacău. At every school were created events in the period when the exhibition was there and pupils answered to a questionnaire. The exhibition and its impact along with conclusions resulted from the statistic interpretation of the questionnaires are presented in this paper.

Keywords: environmental protection, environmental pollution, environmental education.

„If you plan for one year, grow rice, if planning for a decade, plant trees, if planning for a lifetime, educate people" - Chinese proverb

Currently topics such as pollution, environmental protection, energy crisis or global warming, are issues that concern and affect every human being regardless of social position.

Since lately there are more and more reasons to get involved in environmental issues each institution joined our educational project whose theme was within the environmental field by designing a traveling exhibition titled "Pollution, where ...?".

Introduction

Pollution is the prerogative of the global problem of our century, specifically the last three decades, during which world population increased from 5 to more than 6 billion inhabitants. The issue that has preoccupied professionals over time was that if the environment will be able to provide resources needed for survival on the planet. Only in recent decades attention has turned on an issue that proved to be equally important: environmental degradation by human action, intentional or not.

Material and method

Since lately there are more and more reasons to get involved in environmental issues each institution joined our educational project whose theme was within the sphere of environmental protection, working with leading schools in the county of Bacau. The exhibition was conceived by a team of three curators: dr. Lăcrămioara-Gabriela Zaharia, Anca Tudor-Andrei and Florin-Cătălin Tofan.

Theme exhibition was held on 4 panels, one panel for each chapter: *Story environmental, Pollution sources, Planet in danger, To be friends of the environment.* Information about the main sources of environmental pollution have been played as a model.

The ensemble has been touring several schools, where young visitors were given information contained in thematic exhibition, watched multimedia materials submitted by the team of curators, and at the end of the exposure part questionnaires were received. These contained questions referring to the thematic content of the exhibition.

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Proposed objectives

1. Museum involvement in the formation of a generation of young people with a strong environmental education;

2. Argument with scientific notions of the importance of involvement in activities with ecological;

3. Cultivation of the feelings of young environmental responsibility by acquiring environmentally friendly practices

4. Evaluation of responsiveness to the young generation that we have obligations as EU citizens

5. Museum as an institution promoting cultural, scientific and educational offerings to the public.

Shares held

After a documentary was made prior the exhibition theme, then switched to its execution. The itinerary included a map of 12 schools and colleges so the exhibition could be viewed by 1268 pupils, aged between 10 and 20 years. After presenting multimedia exhibition visitors followed the same theme, tailored to age groups. High school students were asked to complete questionnaires with ecological themes, highlighting the following interpretation of the results, the level at which they are based on environmental concerns.

Questions contained in the questionnaire were as follows:

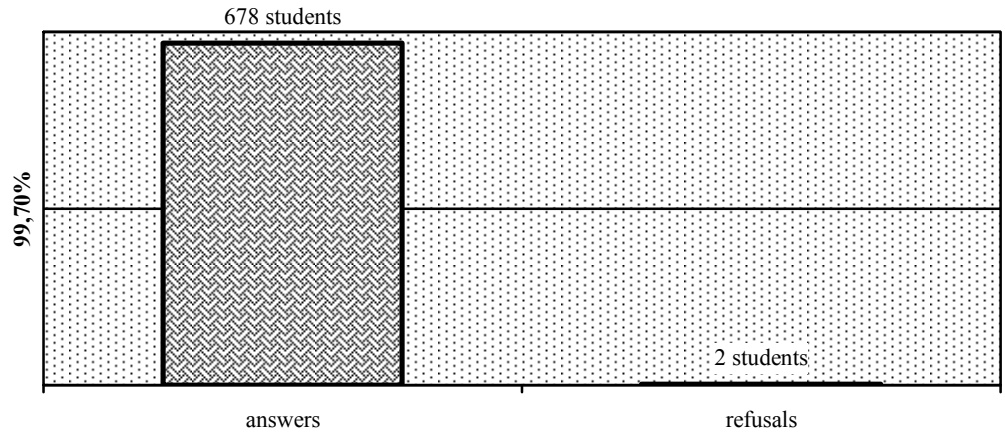
1. **What you use to wash clothes?**
   - Vertical-loading washing machine
   - Front-loading washing machine
   - Front-loading washing machine, phosphate-free detergent and cold water
2. **Prefer you…?**
   - Compact fluorescent bulbs
   - Incandescent bulbs
   - Both models
3. **In which of the options below you find yourself ?**
   - Throw all packaging
   - Reuse some packages
   - Participate in recycling campaigns
4. **Travel use:**
   - Jeep
   - Means of transport
   - Bike
5. **What kind of drinking water?**
   - Bottled water
   - Water mains in the locality
6. **You use…?**
   - An electric or gas-fired water heating
   - Instant water heating device
   - A water heating system based on solar energy
7. **You use…?**
   - Mainly batteries
   - Classic Batteries

Each response option was evaluated with score between 0-2 points, with significant negative response on the environmental impact was noted with 0 points. Students surveyed were able to rank themselves on comparing final score maximum points with a grid with 12.

Results and discussions

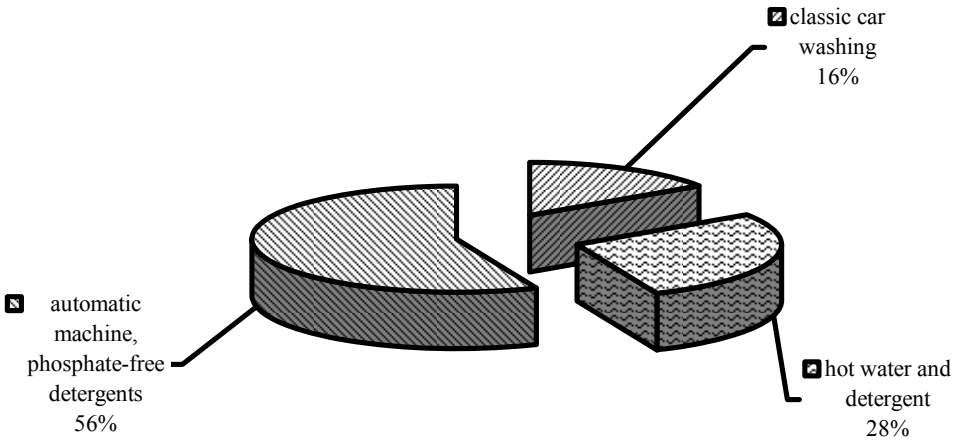
Number of students who were asked to complete the questionnaire was 680, with ages between 15-20 years.

Participating students questionnaire

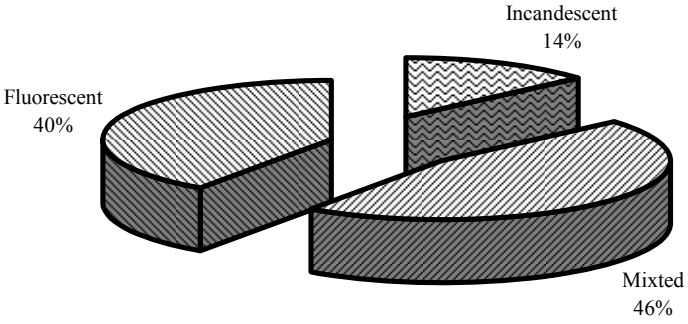


Results students surveyed were processed and interpretations were shown as graphs. Thus score of students who completed questionnaires, each question was appropriate according to the graphs below:

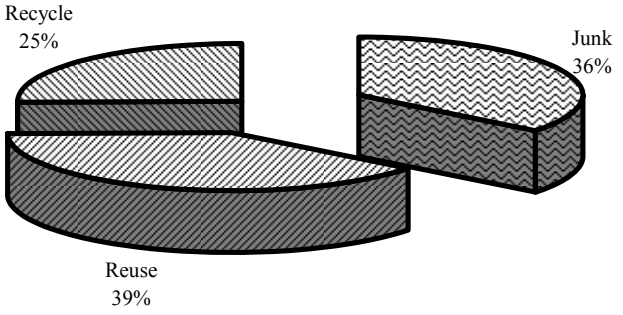
Question 1



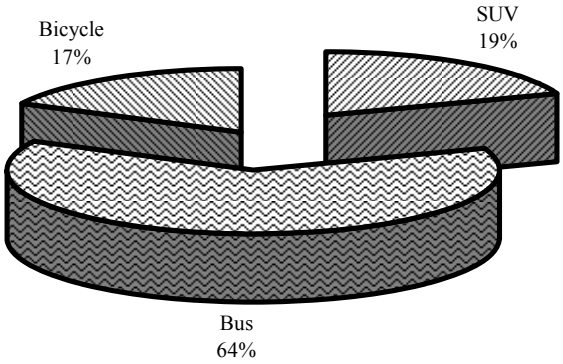
Question 2



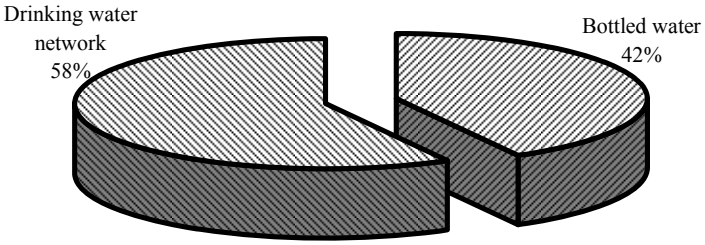
Question 3



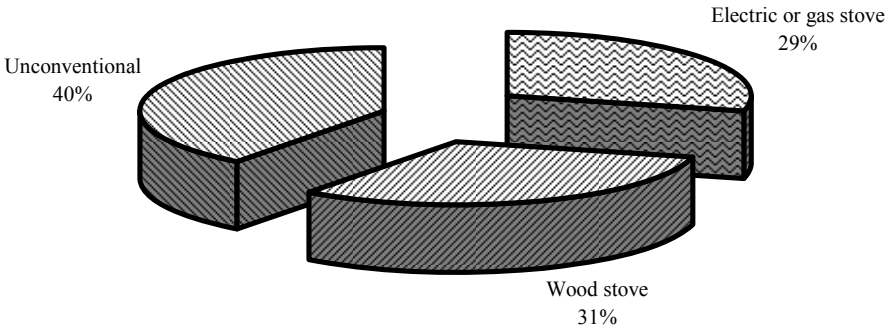
Question 4



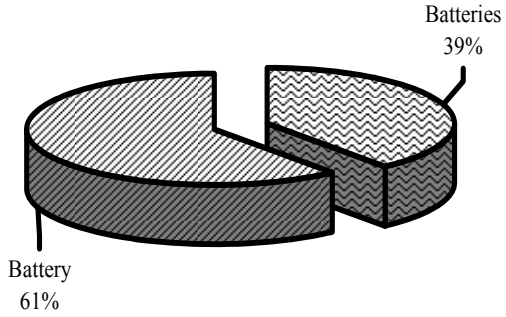
Question 5



Question 6



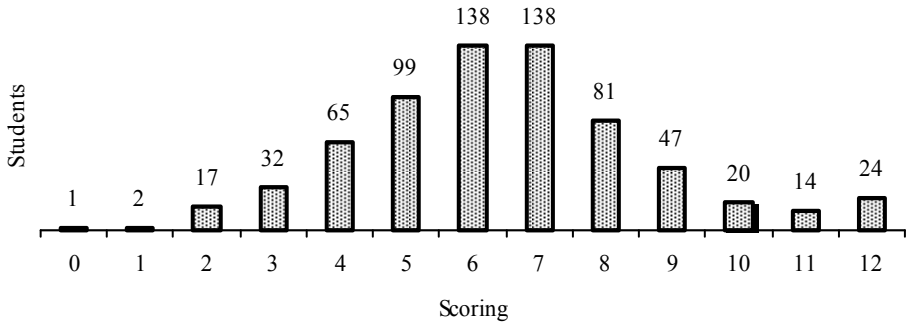
Question 7



Conclusions

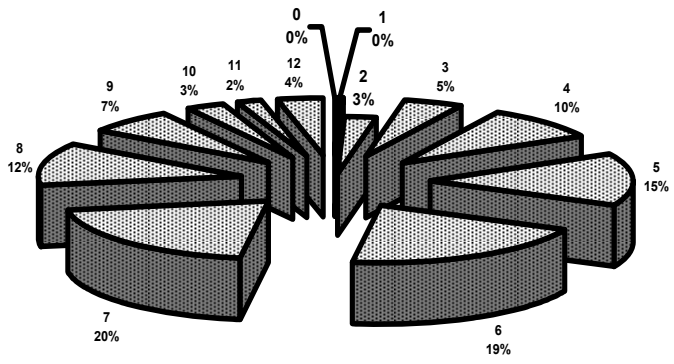
- Students were very receptive to the request to participate in the study, the percentage of completed questionnaires being 99.70%.
- Of participants, 24 were scored (12 points), representing 4%.

Scoring the number of students



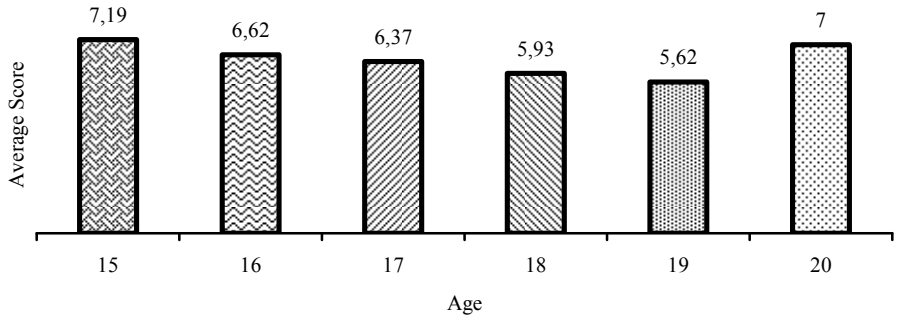
- The percentage of those who have minimum score was 2%, the minimum score was 2 points.
- Most of the students interviewed made 7 points (12 points), representing 20% of participants.

Overall score (1-12 points)



- The highest score was obtained by students aged 15 years, followed by those aged 20 years.
- Lowest score was achieved by pupils aged 19 years.

Average score obtained for each age group



Rezumat

Complexul Muzeal de Ştiinţele Naturii „Ion Borcea" din Bacău a iniţiat în anii 2009 şi 2010 o serie de activităţi de educaţie ecologică printre elevii din şcolile şi colegiile din judeţul Bacău. Una dintre aceste activităţi, desfăşurată sub forma unei expoziţii itinerante intitulată „*Poluarea încotro ... ?*", susţinută şi de o serie de prezentări multimedia realizate de autori, a avut un succes deosebit în toate cele şase şcoli şi colegii în care a fost itinerată. Elevilor li s-a solicitat să participe şi la completarea unor chestionare individuale, în vederea aprecierii deprinderilor ecologice ale acestora, iar rezultatele statistice sunt prezentate în lucrarea de faţă.

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COMPLEXUL MUZEAL DE ŞTIINŢELE NATURII „ION BORCEA" BACĂU

STUDII ŞI COMUNICĂRI 2010	Vol. 23: 165 – 166

PART V – ANNIVERSARIES, COMMEMORATIONS

IN MEMORIAM
VICTOR NADOLSKI
1911-1996

PAVEL VALERIA *

ABSTRACT

This study is dedicated to Victor Nadolschi, who was a brilliant teacher, a remarkable man and a great astronomer of the University of Iasi.

He had administered with great authority the Astronomical Observatory of Iasi, an objective that was damaged during the second world war, and that was then transformed into a research laboratory. Nadolschi has initiated, for the first time in Iasi, studies and methods of astrophysics, also astral photometry and mathematics' statistics in the astronomical area. He has been a real scholar in the art of communication; the lessons with professor Nadolschi were truly the achievement of a natural born teacher. He was a great admirer of the nature and a passionate entomologist that created a precious collection of butterflies (of over 15000 pieces), that is now part of the heritage of Natural Sciences Museum from Bacau.

Many great personalities have made brilliant figures in their époque, but their marks fade away under the cruel wind of Sciences; other personalities still catch our attention from time to time and hover in the memory of the collectivity as brilliant Science proffesors, through their whole activity.

Victor Nadolschi was born on the 4th of July 1911 in Chisinau. Victor was the only child of Nadolschi family. His parents, Luca and Franciska, Polish, have been established in Chisinau from 1908. In the fall of 1919, he became a student of the French primary school and then he went to "B. P Hasdeu" High School in Chisinau. High School has been a tremendous source of general knowledge for this child athirst with science, and has aided him to cultivate his passion for History, Geography, Literature, Science, Mathematics, Physical Science etc. In high-school, he succeeded to have a good command of Latin, Greek and German. Afterwards, he opened two more "gates" towards the world, by assimilating 2 more languages: English and Italian. There's no wonder that, with this high preparation, young Nadolschi has made it in the first 4, out of 311 candidates that had competed the only 80 places for the entrance exam at the Polytechnics University, in Timisoara, in the fall of 1930. In 1933, he had completed the courses of the Electromechanics section. During these years, he manifested special inclinations towards descriptive geometry, industrial drawing, and remarkable ingenuity in practical applications. For pecuniar reasons, he is constraint to drop back, closer to home, in Iasi, where he studies at the Agronomy Faculty, and he also follows the philology courses at the Philosophy Faculty and the matemathics courses at the Faculty of Science. At the Mathematics Section there were employed teachers of high academical standard, like Alexandru Myller, the creator of the mathematic seminar and the founder of the first universitary geometry school, Octav Mayer, a scholar and a geometrician of international reputation, Ioan Placinteanu, student of the M. Planck and Albert Einstein. In this admirable series of teachers, he has found the light that has absorbed and fascinated him. In 1935, when he was still a student, he started to work at the Observatory of Iasi, with the talented astronomer, Vintila Siadbei. The encounter with Vintila Siadbei had been a decisive moment in choosing his career. In December 1937 he sustains his final paper in Maths under the coordination of professor Ioan Placinteanu. In 1938, he is a preparatory at the Mechanics laboratory in the Rational and Applied Mechanics Department. In the new, sober, working atmosphere of the Mathematics Seminary, where he takes benefit of an excellent library and of the inestimable tradition of the Mathematics school and also of the innovative spirit of its members, young

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Nadolschi feels, there, the beginning of his future evolution and the affirmation of his inner energies.

In 1941. he is being promoted as an assistant, in the Mechanics and Astronomy Department. In 1942, he sustains his final doctorate paper with the title: "About a new integrable moving case of a solid object around a fixed point", in front of a board that also included the teachers O. Mayer and I. Placinteanu. In 1943, he becomes the coordinator at the Mechanics Department, and in 1946 he will be a titular lecturer and a honorary manager of the astronomical Observatory in Iasi. He has dedicated the most beautiful years of his life to the Astronomical Observatory in Iasi.

V. Nadolschi was a great admirer of the nature. During his high-school, little Victor used to go out in nature with his father, a craftsmen at the winegrowing school, where he "caught" the taste for the butterfly collections, a passion that he was to keep for the rest of his life. After his retirement, V. Nadolschi hadn't stop his work. His passion for collecting butterflies flourished. He had also collected plenty of entomological material (butterflies) that he had dispensed with a lot of patience.

The illustrated guides with different species of butterflies are of very much interest. They are copied after the original, where he succeeded in giving with much care, patience and responsability the exact shape and colour of each sample of butterfly, determining its species and enframing them systematically. He had worked with many entomologists from Romania, like A. Popescu Gorj, from "Antipa" Museum in Bucharest, dr. Konig from Timisoara, dr. I. Stanoiu from Craiova, M. Moldoveanu from Reghin, and also with many foreign entomologists: dr. Skala from Czechoslovakia, Pering- Lindenfals from RFG, with whom he excenged lepidopterological material and he had received valuable samples from different regions of the country. In this way he made a valuable collection of butterflies with over 13000 samples enframed in 18 super-families that was given to the Natural Sciences Museum, in 1976, together with all the documentation the he had used in his work, and with his personal library, that included textbooks, astronomy and entomology also, and that are now part of the patrimony of Natural Sciences Museum in Bacau. What makes the collection so valuable is not only the great number of butterfly specimens but also the many butterfly species that are protected by law (Iphiclides podalirius, Papilio machaon, Parnassius mnemosyne, etc), that are very rare species for the moldavian area, but also very rare in our country too: Proserpinus proserpina f. brunea Geest- Sphingidae.

He had worked with professor doctor Nicolae Barabas, the former manager of the Natural Sciences Museum and with other employees of the Museum. He had given a special attention to the Astronomical Observatory from Bacau: he had equiped the Observatory with a telescope glass of 450 mm and he had dispensed over 120 butterfly species, that had been collected during the branch activities of the museum, and all have enriched the heritage of the institution.

Proffesor Victor Nadolski was a man with many new ideas, which he had shared with generosity with his collaborators. He was a loved and respected person, he had an irresistible charm, and he made you feel important when talking to him. This was proffesor and explorer, Victor Nadolschi. He died on the 9 th of May 1996, in Bacau. The light that he had left behind still delights and impels us to reflect more at the person that has been a glamorous teacher, a remarcable astronomer, a passionate etnomologist, and, not lastly, a true human being.