

NEW RECORDS ON COLLEMBOLA (INSECTA: COLLEMBOLA) FROM THE “PLAIUL FAGULUI” STATE NATURE RESERVE

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Abstract. The paper includes 14 species of Collembola new for the ‘Plaiul Fagului’ State Nature Reserve. Three of them are for the first time cited in the Republic of Moldova. Thus, the number of species from this reserve increased up to 116. Twelve species have a large zoogeographical distribution: cosmopolitan (5), Holarctic (4), Palearctic (2) and Mediterranean (1) and the area of two species was expanded.

Keywords: Collembola, species diversity, forest reserve.

Rezumat. Date noi privind colebolele (Insecta: Collembola) Rezervației Naturale de Stat “Plaiul Fagului”. Lucrarea include 14 specii de colebole identificate ca noi pentru Rezervația Naturală de Stat “Plaiul Fagului”. Trei dintre ele sunt pentru prima dată citate în Republica Moldova. Ca rezultat al studiului efectuat numărul total al speciilor din rezervație a crescut la 116. Douăsprezece dintre speciile identificate au o distribuție zoogeografică largă: cosmopolite (5), Holarctice (4), Palearctice (2) și Mediteraneenă (1), iar pentru două specii arealul de răspândire a fost extins.

Cuvinte cheie: Collembola, diversitatea specifică, rezervație forestieră.

INTRODUCTION

The natural ecosystems are very rare nowadays and we cannot talk about non modified territories. For the Republic of Moldova, ‘Plaiul Fagului’ State Nature Reserve is one of the last spot of natural ecosystems. The first results of the study of Collembola species collected in the soil, litter and mosses from the ‘Plaiul Fagului’ State Nature Reserve are presented by BUȘMACHIU in 2006. Since then, several papers have been dedicated to the study of species diversity, seasonal fluctuation and communities’ structure of Collembola from this reserve (BUȘMACHIU, 2007, 2008).

As a result of the new investigations, the list of Collembola from ‘Plaiul Fagului’ State Nature Reserve increased with 14 species and their total number grew up to 116. Among them, two species have been described as new for sciences (BUȘMACHIU & DEHARVENG, 2008; BUȘMACHIU & WEINER, 2008).

MATERIALS AND METHODS

The ‘Plaiul Fagului’ State Nature Reserve is situated in the North – West of the Central Moldavian Hills, 70 km away from Chisinau – the capital of the country, at approximately 28°01' E longitude and 47°17' N latitude. This reserve is an important part of the Moldavian protected areas with a total surface of 5,558.7 sq km. The vegetation of the reserve consists of several types of temperate mixed forests with dominant oak or mono-dominant beech trees, typical for the European region. The rare species of plants and vertebrate animals are mentioned here, including some Carpathian elements (Natura Rezervatiei „Plaiul Fagului”, 2005).

Samples were collected from the forest soil and litter, rotten trunks of *Quercus robur* covered by moss, meadows and shores of the lakes during 2008-2009. Additionally, the specimens of Collembola from the trees, herbs and aquatic plants were collected by exhaustor. Specimens were extracted using flotation method and fixed in 80% ethyl alcohol. The specimens were mounted on permanent slides and identified using several keys: ARBEA & WEINER (1992); BABENKO et al. (1994); BRETFFELD (1999) and GISIN (1960).

RESULTS

As a result of investigation 14 species of Collembola belonging to twelve genera and 9 families (Hypogastruridae, Brachystomellidae, Odontellidae, Onychiuridae, Isotomidae, Entomobryidae, Neelidae, Arrhopalitidae and Sminthurididae) were found. The list of Collembola species from ‘Plaiul Fagului’ State Nature Reserve are completed with 14 new species; three of them marked with an asterisk (*) are for the first time mentioned in the Republic of Moldova. The total number of Collembola species from this reserve increased up to 116 species that belong to 56 genera and 17 families. The species, including their taxonomy, number of specimens, date of collection, distribution, and some aspects of ecology, have been included in the Table 1.

Table 1. The list of new Collembola species for 'Plaiul Fagului' State Nature Reserve.
 Tabel 1. Lista speciilor de colembole noi pentru Rezervația Naturală de Stat "Plaiul Fagului".

No.	Family and species	Number of individuals and date of collection	Habitat	Distribution
Family Hypogastruridae				
1.	* <i>Ceratophysella bengtssoni</i> (ÅGREN 1904)	1 specimen, February 16, 2009	rotten trunk	Holarctic
Family Brachystomellidae				
2.	<i>Brachystomella curvula</i> GISIN, 1948	1 specimen, June 16, 2008	rotten trunk	Mediterranean
3.	<i>Brachystomella parvula</i> (SCHÄFFER 1896)	2 specimens, May 29, 2009	shore of lake	cosmopolitan
Family Odontellidae				
4.	<i>Superodontella lamellifera</i> AXELSON 1903	1 specimen, June 16, 2008; 1 specimen, February 16, 2009	moss on rotten trunk	cosmopolitan
5.	* <i>Superodontella montemaceli</i> ARBEA & WEINER 1992	numerous specimens, April 23, 2008; February 16, 2009; June 10, 2008.	rotten trunk	Poland, Republic of Moldova and Ukraine
Family Onychiuridae				
6.	<i>Orthonychiurus rectopapillatus</i> (STACH, 1933)	numerous specimens, October 9, 2008; February 16, 2009	rotten trunk	Poland, Romania, Republic of Moldova, Ukraine
7.	<i>Protaphorura armata</i> (TULLBERG 1869)	32 specimens, October 9, 2008	rotten trunk	cosmopolitan
8.	<i>Micraphorura absoloni</i> (BÖRNER 1901)	2 specimens, December 3, 2008	rotten trunk	Holarctic
Family Isotomidae				
9.	* <i>Vertagopus arboreus</i> (LINNAEUS 1758)	2 specimens, February 16, 2009	under bark of tree	Palearctic
10.	<i>Proisotoma minuta</i> (TULLBERG, 1871)	4 specimens, February 16, 2008	rotten trunk	cosmopolitan
Family Entomobryidae				
11.	<i>Lepidocyrtus curvicolis</i> BOURLET 1839	2 specimens, October 09, 2008	rotten trunk	Holarctic
Family Neelidae				
12.	<i>Neelides minutus</i> (FOLSOM 1901)	3 specimens, December 3, 2008	rotten trunk	cosmopolitan
Family Sminthurididae				
13.	<i>Sminthurides aquaticus</i> (BOURLET 1842)	4 specimens, June 16, 2008	aquatic plants and water surfaces	Holarctic
Family Arrhopalitidae				
14.	<i>Pygmarrhopalites secundarius</i> GISIN 1958	3 specimens, December 3, 2008	forest soil	Palearctic

Species marked with an asterisk (*) are new for the Republic of Moldova.

Some aspects regarding the distribution and ecology of the new species for the fauna of the Republic of Moldova are given below.

The specimens of *Ceratophysella bengtssoni* occur in the open field habitats, as well as in the forest (THIBAUD et al., 2004). They are also present in compost or in other organic deposits (possibly eurytopic) (FJELLBERG, 1998).

The species *Vertagopus arboreus* is corticolous, occurs in moss and lichens on the tree trunks and under bark. It is abundant in winter season (POTAPOV, 2001).

The species *Superodontella montemaceli* has been described from Poland (Pieniny Mt.) (ARBEA & WEINER, 1992) and then found in the litter and soil of leafy forest from Ivano-Frankivs'k, Zakarpattia and L'viv districts in Ukraine (KAPRUS', 2009). It is a forest species that lives in the litter, under the bark of dead tree (FJELLBERG, 1998) or in the moss on wood decompose.

Most of the studied species have been extracted from the rotten trunk, three of them have been found in different habitat such as: aquatic plants, shore of the lake and under the bark of tree. Among the found species, twelve have a large zoogeographical distribution: cosmopolitan (5), Holarctic (4), Palaearctic (2) and Mediterranean (1). The distribution of two species *Orthonychiurus rectopapillatus* and *Superodontella montemaceli* expanded.

Four species *Ceratophysella bengtsoni*, *Superodontella lamellifera*, *Brachystomella curvula* and *Vertagopus arboreus* are very rare and register only a few individuals in the studied biotopes.

CONCLUSIONS

The investigation carried out in the “Plaiul Fagului” State Nature Reserve increase the number of Collembola species from this reserve up to 116; three of them are new for the fauna of the Republic of Moldova. Twelve species have a large zoogeographical distribution: cosmopolitan (5), Holarctic (4), Palaearctic (2) and Mediterranean (1). The distribution of two species *Orthonychiurus rectopapillatus* and *Superodontella montemaceli* expanded.

ACKNOWLEDGEMENTS

I'm warmly grateful to Prof. Wanda Weiner from the Institute of Systematics and Evolution of Animals, Krakow, Poland for the help in the identification of some species and scientific support.

REFERENCES

- ARBEA J. I. & WEINER W. M. 1992. *Deux nouvelles especes europeennes de Superodontella Stach (Collembola: Odontellidae)*. Bulletin de la Société Entomologique de France. **96**(5): 419-425.
- BABENKO A., POTAPOV M., STEBAEVA S., CHERNOVA N. 1994. *Collembola of Russia and adjacent countries: Family Hypogastruridae*. Moscow: 335 pp.
- BRETFELD GALINA. 1999. *Synopses on Palaearctic Collembola. Symphypleona*. Görlitz. **5**(2): 318 pp.
- BUȘMACHIU GALINA. 2008. *Collembola (Insecta) from the „Plaiul Fagului”, State Nature Reserve*. Muzeul Olteniei Craiova. Oltenia. Studii și comunicări. Științele Naturii. Craiova. **24**: 57-60.
- BUȘMACHIU GALINA. 2006. *Particularitățile structurale ale comunităților de colembole și diversitatea lor specifică din Rezervația Naturală de Stat „Plaiul Fagului”*. Muzeul Olteniei Craiova. Oltenia. Studii și comunicări. Științele Naturii. Craiova. **22**: 122-125.
- BUȘMACHIU GALINA. 2007. *Seasonal fluctuation and some aspects of Collembola distribution from the “Plaiul Fagului” Natural Forest Reserve*. Muzeul Olteniei Craiova. Oltenia. Studii și comunicări. Științele Naturii. **23**: 77-80.
- BUȘMACHIU GALINA & DEHARVENG L. 2008. *Neanurinae and Morulininae of Moldova (Collembola: Neanuridae), with description of Neanura moldavica sp.n.* Polonia. Zootaxa. **1714**: 61-66.
- BUȘMACHIU GALINA & WEINER W. M. 2008. *Species of Xenylla (Collembola: Hypogastruridae) from the Republic of Moldova, with description of Xenylla andrzeji sp.nov.* Polonia. Zootaxa. **1959**: 65-68.
- FJELLBERG A. 1998. *The Collembola of Fennoscandia and Danmark*. Part.I. Poduromorpha. Brill: 184 pp.
- GISIN H. 1960. *Colembolenfauna Europas*. Genève: 312 pp.
- KAPRUS' I. J. 2009. *Superodontella Stach, 1949 (Collembola, Odontellidae) of Ukraine: new species, comparative morphological analysis and distribution*. Acta zoologica cracoviensia. **52B**(1-2): 21-34.
- POTAPOV M. 2001. *Synopses of Palaearctic Collembola. Isotomidae*. Görlitz. **5**(3): 603 pp.
- THIBAUD J.-M., SCHULZ H.-J., DA GAMA ASSALINO M. M. 2004. *Synopses of Palaearctic Collembola. Isotomidae*. Görlitz. **5**(4): 287 pp.
- ***. 2005. *Natura Rezervației „Plaiul Fagului”*. Chișinău: 431 pp.

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Received: April 19, 2010
Accepted: July 5, 2010