NEW SPECIES OF COLLEMBOLA (HEXAPODA) FROM THE REPUBLIC OF MOLDOVA

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Abstract. The paper includes new data about Collembola collected in the Republic of Moldova. Four species – *Proisotoma clavipila, Friesea claviseta, Desoria neglecta* and *Entomobrya superba* – are recorded for the first time. Of the revealed species, two are from Ivancea, one from Plaiul Fagului Reserve and one from the Codri Reserve. The total list of Collembola species from the Republic of Moldova was expanded to 260.

Keywords: Collembola, new record, forest reserve, Republic of Moldova.

Rezumat. Specii de Collembola (Hexapoda) noi pentru Republica Moldova. Lucrarea include date noi privind colembolele identificate în Republica Moldova. Ca rezultat al studiului efectuat patru specii (*Proisotoma clavipila*, *Friesea claviseta*, *Desoria neglecta* și *Entomobrya superba*) sunt citate pentru prima dată. Două specii au fost depistate în pădurea din localitatea Ivancea, câte una în rezervațiile Pliul Fagului și Codrii. Lista speciilor de colembole din Republica Moldova a fost extinsă până la 260.

Cuvinte cheie: Collembola, specii noi, rezervație forestieră, Republica Moldova.

INTRODUCTION

The faunistic data on Collembola from the Republic of Moldova have been summarized in the form of a checklist by BUȘMACHIU (2010). During the last ten years, a large number of collembolan species have been identified and published (BUȘMACHIU et al., 2017; BUSMACHIU & WEINER, 2017; MUNJIU et al., 2018; WEINER & BUȘMACHIU, 2018).

Almost every natural habitat in the Republic of Moldova was studied carefully, allowing us to reveal and describe a new species for science. So, during the study of Collembola communities along the bank of the Dniester River, three new species for the country and one new species for science were revealed and described (BUSMACHIU & WEINER, 2013). Between the papers which includes species cited for the first time we include the revision of the family Arrhopalitidae with description of one species new for science and five species new for the Republic of Moldova (VARGOVITSH & BUȘMACHIU, 2015). The study of collembolan communities of the calcareous canyons allows us to identify other four new species (BUȘMACHIU et al., 2015).

In 2017 BUȘMACHIU & WEINER published the revision of the Hypogastruridae species collected during 15 years in the Republic of Moldova, where five species belonging to this family are quoted for the first time. The paper by BUȘMACHIU et al., 2017 covers the study of Collembola communities from two different riparian habitats located along the bank of the Prut River in northern Moldova, from which nine new cited species resulted. One more species was recorded as being collected in the pasture along the bank of the Dniester River near Leuntea and published in 2018 by MUNJIU et al. Also în 2018 WEINER & BUȘMACHIU cited one genus and 6 species new for the fauna of the Republic of Moldova identified în the Protected Area "Vila Nisporeni".

The aim of this paper is to reveal the new species of Collembola for the fauna of the Republic of Moldova, and increase the total number of known species with four new ones.

MATERIAL AND METHODS

Sites descriptions. The oldest forest reserve in the Republic of Moldova – Codri was founded in 1971 and is situated 50 km from Chisinau, the capital of the country. The reserve is located in the north-west of the Central Moldavian Hills between the rivers of Nistru and Prut, approximately 5 km from Lozova, Strășeni district, at a longitude of 28° 30' E and latitude of 47° 01' N. This reserve is an important part of Moldavian protected areas with the surface of 5177 km^2 (Fig. 1).

The Plaiul Fagului State Nature Reserve is situated in the north-west of the Central Moldavian Hills, 70 km away from Chisinau, at approximately 28° 01' E longitude and 47° 17' N latitude. The reserve covers an area of 5,558.7 km^2. The vegetation of the reserve consists of several types of temperate mixed forests, plots of mono-dominant beech trees and four lakes (Natura Rezervației "Plaiul Fagului", 2005).

Ivancea, part of the Orhei National Park, is located to the north-east of the capital, 30 km away from Chisinau, at longitude 28° 51' E and latitude 47° 17' N. The surface of the Orhei National Park is 337.9 km^2, including calcareous canyons on the bank of Dniester River (Fig. 2).

The vegetation of all above-mentioned reserves consists of natural deciduous-mixed forest with a predominance of oak trees (*Quercus petraea* and *Q. robur*) in combination with lime, ash, hornbeam (*Tilia tomentosa*, *T. cordata*, *Fraxinus excelsior*, *Carpinus betulus*) typical for the European region. The rare species of plants and vertebrate animals are mentioned, including some Carpathian elements.

Figure 1. Codrii Reserve (original).

Figure 2. Orhei Național Park (original).

Collection of materials. The samples of soil, litter, wood decompose and moss were collected and studied during 2013-2020 years. Additional material was taken along the shores of lakes.

The Collembola were extracted from the soil using the flotation method according to BUŞMACHIU et al. (2015). The specimens were fixed in 96% ethyl alcohol, sorted in a binocular stereomicroscope, cleared in lactic acid and KOH and mounted on permanent slides using Marc André II solution. The specimens were identified to the species level using a LEICA 2500 phase contrast microscope and the following major taxonomical sources: FJELLBERG (1998), POTAPOV (2001) and JORDANA (2012). The distribution of some species is presented according to Fauna Europaea and FJELLBERG (1998).

RESULTS AND DISCUSSIONS

As a result of the multiannual investigation of Collembola species diversity among already known species, the following four (*Proisotoma clavipila*, *Friesea claviseta*, *Desoria neglecta* and *Entomobrya superba*) are highlighted for the first time in the fauna of the Republic of Moldova. The first three species that are small in size have been stored on slides, while *E. superba* in alcohol collection of the Museum of Entomology, Institute of Zoology.

Among the listed species two belong to the family Isotomidae, other families Neanuridae and Entomobryidae are represented by one species each.

***Proisotoma clavipila* (Axelson, 1903)**
Material: 05.10.2013, 1 spec., wood decompose, Codri Forest Reserve.
Ecology. Species characteristic for rotten bark on tree. Size 1.0 mm, colour greyish.
Distribution. Austria, Poland, Finland, Norwegian mainland, Northwest and Central European Russia.

***Friesea claviseta* Axelson, 1900**
Material: 10.01. 2014, 2 specs., litter and wood decompose, forest, Ivancea.
Ecology. Corticicolous species, size 1.0 mm, colour bluish, present on both dead or life trees, in moss and lichens on wood or rock (FJELLBERG, 2007).
Distribution. Cosmopolitan species.

***Desoria neglecta* (Schaeffer, 1900)**
Material: 10.01.2014, 3 specs., litter and wood decompose, forest, Ivancea.
Ecology. Hygrophilous species, size 1.8 mm, with preference to humid places and open areas.
Distribution. North and West Europe and European part of Russia.

***Entomobrya superba* (Reuter, 1876)**
Material: 11.05.2020, 1 spec., meadows on the shore of lake, Plaiul Fagului Reserve (Fig. 3).
Ecology. Species with distinct body colour pattern (Fig. 4), typical for moist meadows.
Distribution. Palaearctic, occurs across Europe.

Figure 3. Lake shore, Plaiul Fagului State Nature Reserve (original).

Figure 4. *Entomobrya superba*, lateral color pattern (original).

The species diversity of Collembola from the Codri Reserve was reflected in several papers, among which the most important is the survey with a total of 112 counted species (BUSMACHIU, 2015). As a result of newly recorded species, their list increases up to 113.

The structure of collembolan communities of the Plaiul Fagului Sate Nature Reserve has been published by BUSMACHIU, 2007, 2008, 2010 or in papers such as BUSMACHIU & DEHARVENG, 2008, BUSMACHIU & WEINER, 2008. The long-term investigation carried out in the Plaiul Fagului State Nature Reserve increase the number of Collembola species from Reserve up to 117.

Special research on species diversity of Collembola from the Orhei National Park has not been published separately. It is included in several investigations carried out in the forest and the calcareous canyons of the Dniester River (BUȘMACHIU & DEHARVENG, 2008; BUȘMACHIU & WEINER, 2008; BUȘMACHIU et al., 2015).

Counting the data on Collembola species recorded during last ten years and the number of species from the checklist (BUȘMACHIU, 2010) the total number of findings in the Republic of Moldova species was expanded up to 260.

CONCLUSIONS

In spite of a long-term investigation conducted in the Plaiul Fagului, Codri and Orhei National Park reserves, new Collembola species can still be identified. Four new identified species are probably ecologically and habitat-restricted.

The maintenance of intact patches of native forest, with some quantity of decomposed wood and wood covered by moss, preservation of more or less intact meadows could improve collembolan diversity. The presence of the rare species as well as newly identified species indicates the importance and conservation value of studied habitats.

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