

New records of springtails (Hexapoda: Collembola) for Romanian fauna

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Abstract

During the collection of Collembola in the Southern Romania, two new records for Romania fauna were found. *Neotullbergia ramicuspis* (Gisin, 1953) and *Ceratophysella stercoraria* (Stach, 1963) were added to the Romanian springtails fauna. Notes on them taxonomic status, ecology and distribution are given.

Rezumat

Noi semnalări privind fauna de colembole (Hexapoda: Collembola) din România

Au fost semnalate 2 specii de colembole noi pentru fauna României. *Neotullbergia ramicuspis* (Gisin, 1953) și *Ceratophysella stercoraria* (Stach, 1963) au fost adăugate listei de specii de colembole din România. În lucrare sunt date câteva informații privind statutul taxonomic, ecologia și distribuția celor două specii.

Key-words. Collembola, *Neotullbergia ramicuspis*, *Ceratophysella stercoraria*, new record, Southern Romania

Introduction

Springtails are a rather underrepresented group in the research of Hexapoda, even though there are about 7889 species described (BELLINGER et al. 1996-2008). The number of all existing Collembola species in Romania is estimated to be at least 388 species (FIERA 2007). The knowledge of the springtails' faunistics in Romania is also rather poor, which is true if we look at the whole world as well as if we look within the adjacent countries: Hungary: 412 species (DÁNYI & TRASER 2008), Ukraine: 527 species (KAPRUS et al 2004), Moldova: 170 species (BUȘMACHIU personal communication), Bulgaria: 199 species.

In Romania the research on Collembola started relatively early. Jenő TÖMÖSVÁRY (1883) was the first who started scientific investigation. GRUIA, the most important Romanian Collembola-researcher discussed the group in 29 works. She described 24 Collembola species new to the science from Romania, most of them she found in caves. Beside and after GRUIA, many new records of the Romanian fauna were published by the following authors: IONESCU, STACH, MACK-FIRĂ, CASSAGNAU & PEJA, RUSEK, MARI MUTT & STOMP, DEHARVENG, BULIMAR, HARȘIA, POPA and FIERA.

Collembola (springtails) are microarthropods which, together with mites, constitute an important component of soil mesofauna in almost all terres-

trial ecosystems. Collembola are usually highly specialized feeders on soil microbiota (fungi, bacteria, actinomycetes, algae) and control the population dynamics of these organisms in soil (PARKINSON 1983). Many epigeic, hemiedaphic and euedaphic species belong to animals which mechanically degrade and shred dead organic matter, including litter. Collembola play a major role in forming the soil microstructure in some arctic, alpine and weakly developed soils in the early succession stages. Sometimes the entire soil profile of these soils is formed primarily by collembolan droppings of characteristic shape, size and inner structure (RUSEK 1975a).

Material and methods

Our research were done in 2006, in a *Quercus petraea* and *Fagus sylvatica* mixed forest, located on the Doftana Valley, Câmpina Forestry Department (45° 10' 94" N, 25° 47' 84" E, 515 m elevation on sloped land, facing east, 25° inclination, microrelief fragmented by deep and medium torrents.), state-owned forest. The soil is alluvial stratified, moderately humiferous on the first 25 cm, deep, poorly semiskeletal, with gravel at the basis; medium trophicity. The mixed *Quercus petraea* and *Fagus sylvatica* forest, over 100 years old, grows on the shadowed, steep slopes, with deep valleys and processes of surface erosion (VASILIU-OROMULU et al 2008).

The second site was Cernica forest (44° 26.1' 80" N, 26° 15.26' 73" E, 56 m elevation), situated near Bucharest, at about 20 km². *Quercus cerris*, *Acer camperstris* and *Tillia* sp. are the main dominant trees in the forest.

The sampling of soil and litter samples was done using MacFadyen cylinder, 3x10 cm; 10 samples soil from each site were collected. The extraction of the biological material was done at Berlesse-Tullgren, keeping five days there. After extraction, the collecting individuals were preserved in ethanol 96% and then were labeled. The sorting of animals was done at Binocular Lupe. The pigmented individuals were clarified using KOH 10 % and then, they were laid on slides in Schwann medium for identification at species level (RUSEK 1975b).

Results and discussion

The examination of the material 2006 led us to discovery of *Neotullbergia ramicuspis* (Gisin, 1953) and *Ceratophysella stercoraria* (Stach, 1963) two new records for Romanian springtails fauna.

5 specimens of *N. ramicuspis* and 2 individuals of *C. stercoraria* were found.

Neotullbergia ramicuspis (Gisin, 1953)

Neotullbergia is a new genus for Romanian Collembola. The genus *Neotullbergia* belongs to the Tullbergiidae family. Through the world, there are 4 species described from *Neotullbergia* genus, 3 European species: *N. crassispis* (Gisin, 1943), *N. tricuspis* (Börner, 1902) and *N. ramicuspis* (Gisin, 1953) and an American one: *N. americana* Bonet, 1944 (BELLINGER et al. 1996-2008).

The structure of the anal spines is at present, the only way to separate the European species. Members of the genus *Neotullbergia* have very distinctive anal spines that bear prominent lateral projections. In *N. ramicuspis* the two anal spines are quite long with lateral teeth clearly anterior to the tips of the main spines (Fig. 1). The outer side of each anal spine has a very weak projection. The foot does not possess an empodium and the post-antennal organ is long and thin with about 30 simple double vesicles (HOPKIN 2000). A detailed re-description was provided by FJELLBERG (1998).

N. ramicuspis can easily recognized by the peculiar anal spines. In *N. crassispis* the two anal spines are quite broad with a prominent outer spine on each; the inner side of each anal spine has a very weak projection; and, in the last European species, *N. tricuspis* the two anal spines are long with a prominent spine on the inner and outer side of each.

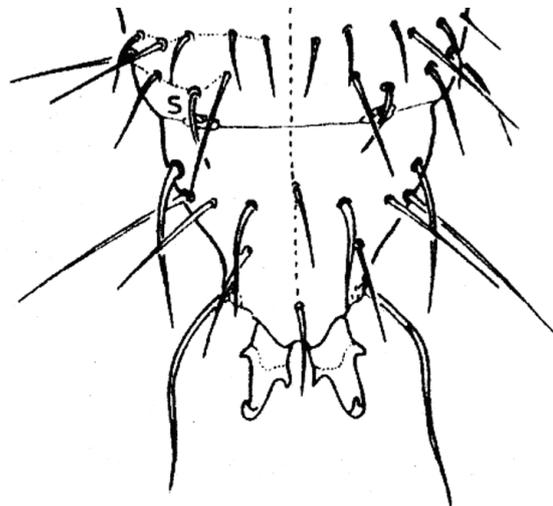


Fig. 1 *Neotullbergia ramicuspis*: anal spines, according to FJELLBERG (1998)

Distribution and ecology. Denmark, in cultivated fields (FJELLBERG 1998), Ireland, in grassland soil (BOLGER 1986), urban green, in Poland (STERZYŃSKA et al. 2007), Mediterranean vineyard, in France (RENAUD et al. 2004), Germany, Austria, Hungary, Italia, Portugal, Spain, Switzerland) (DEHARVENG 2007), most records being from agricultural cultures and from forest soils (ZIMDARS & DUNGER 1994).

Ceratophysella stercoraria (Stach, 1963).

The genus *Ceratophysella* belongs to the Hypogastruridae family. At present 5 species of the *C. denticulata* –group occur in Romania (Fiera 2007), namely as: *C. denticulata* (Bagnall, 1941), *C. engadinensis* (Gisin, 1949), *C. gibbosa* (Bagnall, 1940), *C. succinea* (Gisin, 1949) and *C. stercoraria* (Stach, 1963). They clearly differ from each other in many essential characters and probably differ also in ecological preferences.

C. stercoraria belongs to the *denticulata* –group of *Ceratophysella* genus, with some characters typical for this group: body chaetotaxy, slightly serrated setae, arrangement and shape of antenna 4 sensilla, claws with distinct inner tooth and two pairs of weak lateral teeth, tibiotarsal hairs distinctly shorter than claws and the presence of a strongly granulated swelling on abdomen 5 (Fig. 2) (SKARZYŃSKI 2000). *C. stercoraria* is closely related to *Ceratophysella gibbosa* (Bagnall, 1940), *Ceratophysella caucasica* Martynowa, 1971 sensu Babenko et al., 1994 and *Ceratophysella denticulata* (Bagnall, 1941). *C. gibbosa* has a swelling on abd. 5 similar to *C. stercoraria*, but it differs clearly in the absence of setae m3 on th. 2, a1 on abd. 4 and a2' on abd. 5. *C. denticulata* has 10-20 sensillae of variable size and shape in ant. 4 ventral file, seta m3 on th. 2 absent and no semicircular swelling on abd.

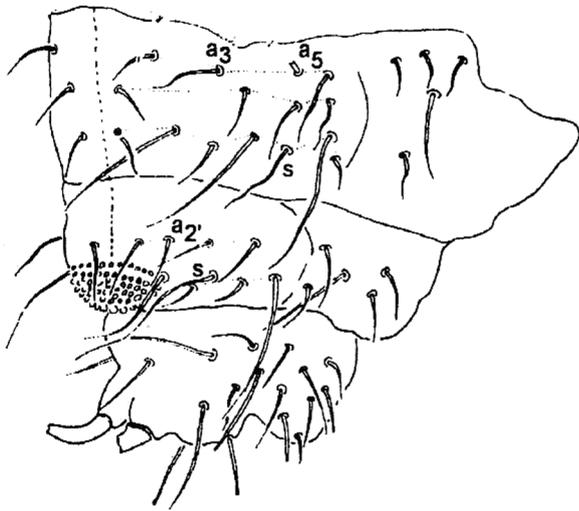


Fig. 2. *Ceratophysella stercoraria*: Chaetotaxy pf Abd IV- VI (upon SKARZYŃSKI 2000)

5, but populations with slightly protruding strong granules are known (Skarzyński 2000, Thibaud et al. 2004).

Distribution and ecology. *C. stercoraria* is known from Afghanistan, Ethiopia, Central Asia, Kazakhstan, Georgia, Azerbaijan, Ukraine, Russia (Babenko et al. 1994), Poland, Bulgaria, most records being from forest litter, flood debris, composts, gardens and one from the cave (Skarzyński 2000).

Conclusion

Based on information of the occurrence of springtails in surrounding countries, many new species are to be expected for the fauna of Romania. Especially, peat bogs, (Fiera in press.) coastal and island sand dunes near the Black Sea, heather fields and the littoral zone have been poorly studied. These habitats should have the special attention of Collembola specialists during the next years.

However, it has to be mentioned that even in adjacent countries new species are discovered every year and that numerous species occur in neighbouring areas which can be expected from Romania as well.

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