First records of pseudoscorpions (Arachnida: Pseudoscorpiones) from Lithuania

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First records of pseudoscorpions from Lithuania are presented based on specimens preserved in Lithuanian collections and new material collected during the latest ten years. Pseudoscorpions were collected at 25 localities in both deciduous and coniferous forests at altitudes of 5 to 186 m above the sea level. Sifting of litter and moss, pitfall traps and collecting by picking under the bark of deadwood were used as the collecting methods. Altogether 132 specimens belonging to eight species from three families were recorded. The findings of Neobisium crassifemoratum (Beier, 1928) represent the northernmost known records of the species.

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1. Introduction

The arachnid order Pseudoscorpiones represents a group of predators that occur in a wide range of terrestrial habitats in most parts of the world including oceanic islands. A majority of the species occurs in tropics and subtropics. On the other hand, many pseudoscorpions live in temperate zones, even extending far to the north, having a circumpolar distribution or occurring only in the northern hemisphere, but they are absent from Antarctica (Weygoldt 1969, Harvey 2013).
Table 1. List of localities where pseudoscorpions were studied in Lithuania.

<table>
<thead>
<tr>
<th>No.</th>
<th>Locality</th>
<th>Latitude (N)</th>
<th>Longitude (E)</th>
<th>Altitude (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alksynė</td>
<td>21.115071</td>
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<td>2</td>
<td>Ignalina</td>
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<td>3</td>
<td>Jonava</td>
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<td>55.078683</td>
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<td>55.117371</td>
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</tr>
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<td>24.480209</td>
<td>55.128604</td>
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<td>Juodkrantė</td>
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<td>38</td>
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<td>8</td>
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<td>24.354713</td>
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<td>54.850097</td>
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</tr>
<tr>
<td>10</td>
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<td>54.851565</td>
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<td>54.853769</td>
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<td>14</td>
<td>Nagliai Nature Reserve</td>
<td>21.066666</td>
<td>55.433333</td>
<td>5</td>
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<tr>
<td>15</td>
<td>Rokiškis</td>
<td>25.803195</td>
<td>55.789402</td>
<td>115</td>
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<td>16</td>
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<td>Šakiai</td>
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<td>55.027992</td>
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<td>Varėna</td>
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<td>152</td>
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</table>

Approximately 3,500 pseudoscorpion species and subspecies are recognized from around the world and about 787 valid species names are applied to the European fauna (Harvey 2013). However, even in Europe the knowledge on the distribution appears rather sporadic and fragmentary. In Northern Europe, there is a lack of studies dedicated to this arachnid order in general. In the Nordic countries, 20 species are known from Sweden, 19 from Denmark, 19 from Norway, 17 from Finland, 2 in Iceland and 1 in The Faroe Islands (Stol 2006, Uddström & Rinne 2014, Henriksen & Hilmo 2015, Fjellberg & Lissner 2016). Recently, Sammet et al. (2016) published an annotated checklist for Estonia that includes nine species listed for the Estonian pseudoscorpion fauna for the first time. The number of Estonian pseudoscorpion species is now set at 15 species (Sammet et al. 2016). From the neighbouring countries of Lithuania, 12 species have been recorded from Latvia (Tumšis 1934, Jansson & Hultgren 2002, Telnov & Salmane 2015), none has been published from Belorussia, but a considerably high number of species (38) has been recorded in Poland (Harvey 2013) where the Carpathian system interferes and the country is located in a different climatic zone. In Lithuania, no pseudoscorpion research has been carried out until now.

Each faunistic study of a new area improves the knowledge about pseudoscorpion diversity and distribution. The present paper adds new data about distributions of pseudoscorpions in the Northern Europe by summarizing their first records in Lithuania as a checklist.

2. Materials and methods

The litter samples were collected outside of the growing season (October – April) in 2006, 2010, 2013 and 2014. The litter samples comprised moss, leaf or needles litter and humus layer to the depth of 5 cm from the surface of the layer.

The pseudoscorpions were extracted from the litter samples manually using sieves with a mesh size of 5, 3 and 1 mm and collected using an aspirator. The specimens found under the tree bark were collected individually under the bark of unspecified deadwood in 2004 – 2008, 2015 and 2017. In Nagliai Nature Reserve, the collecting was carried out using pitfall traps with two or three weeks sampling intervals during 2012 – 2015.

The pitfall traps were placed in transects through each studied biotope (grey dunes with lichens and mosses, open grey dunes, old Alnus forest, white dunes with Elymus arenarius, white dunes with free sand). Few specimens from Lithuanian collections obtained from different collectors lacked proper data about biotopes. List of localities is included in Table 1.

For identification, the specimens were mounted as temporary slide mounts without preparation, using lactic acid for clearing. The specimens were photographed using a Leica DM1000 compound microscope with ICC50 Camera Module (LAS EZ application, 1.8.0). Measurements needed for proper identification were taken from photographs using the Axio-
Fig. 1. Distributions of pseudoscorpion records in Lithuania. – a. Neo-

bisium carcinoides. – b. Neobisium crassi-
femoratum. – c. Chelifer cancradoes. – d. 

Chernes cimicoides. – e. Chernes hahnnii. 

– f. Dendrochernes cyrneus. – g. Allocher-
nes wideri. – h. Psela-

phochernes scorpioides. For locality numbers, see Table 1.

Vision 40LE application (version 4.5). The pseudoscorpions were identified using the key in Christophorová et al. (2011). The nomenclature for all taxa follows Harvey (2013). The material is deposited in the zoological collections of Kaunas T. Ivanauskas Zoological Museum (KZM). All specimens are preserved in 70% eth-

anol.
3. Results

Altogether 132 specimens belonging to eight species and three families were identified. One damaged specimen remains identified only to family level (Cheliferidae). Both found neobisiid species are considered to be epigeic and were collected by sifting of litter and moss and using pitfall traps. Species from Cheliferidae and Chernetidae were obtained by picking under the bark of deadwood, except *Pselaphochernes scorpioides* (Hermann, 1804) that was found in pitfall traps.

The list of the collected taxa is given below with locality number (see Table 1) in parentheses, biotope and sample type, date and the number of collected individuals of each developmental stage (male: ♂, female: ♀, adult: damaged specimen, tritonymph, deutonymph, protonymph) and collector’s name.

3.1. List of Lithuanian pseudoscorpion taxa

3.1.1. Neobisiidae

*Neobiusm crassifemoratun* (Beier, 1928) (Fig. 1b) – Jonava (5), 10.X.2013, *P. sylvestris* forest, moss sifting, 4♂♀, 6♀♀, 1 deutonymph, 1 tritonymph, leg. V. Tamutis; Kaunas (13), 24.VI.2006, deciduous forest, litter sifting, 1♂, leg. R. Ferenc; Nagliai NR (14), 2.V.–11.XI.2013, pitfall trap, 2♂♂, 1♀, leg. P. Ivinskis, O. Machać; Ukmėrė (21), 10.X.2013, *P. sylvestris* forest, moss sifting, 1♂, 2♀♀, 1 protonymph, 1 deutonymph, leg. V. Tamutis.

3.1.2. Cheliferidae

*Chelifer canroides* (Linnaeus, 1758) (Fig. 1c) – Šakiai (18), 3.VI.2006, under deadwood bark, 2♂♂, leg. R. Ferenc. In addition, an unidentified damaged cheliferid specimen was found in Kaisiadorys (8) under deadwood bark on 23.VIII.2005, leg. B. Paulavičiūtė.

3.1.3. Chernetidae

*Chernes cimicoides* (Fabricius, 1793) (Fig. 1d) – Rokiškis (15), 7.V.2004, under deadwood bark, 2♂♂, leg. R. Ferenc; Šakiai (16), 17.VI.2007, under deadwood bark, 1♀, leg. R. Ferenc; Šakiai (17), 24.VI.2008, under deadwood bark, 1♂, leg. R. Ferenc; Tauragė (20), 18.VIII.2006, under deadwood bark, 1♂, leg. R. Ferenc.

*Chernes hahni* (C. L. Koch, 1839) (Fig. 1e) – Kaunas (9), 9.V.2006, under deadwood bark, 1♂, leg. R. Ferenc; Šakiai (17), 24.VI.2008, under deadwood bark, 1♂, leg. R. Ferenc; Šakiai (19), 06.05.2017, under bark of *Alnus incana* deadwood, 1♂, leg. R. Ferenc; Varėna (24), 10.IX.2015, under *P. sylvestris* bark, 1♀, leg. R. Ferenc.

*Dendrochernes cyrneus* (L. Koch, 1873) (Fig. 1f) – Kaisiadorys (7), 26.IV.2007, deciduous forest, under deadwood bark, 1♀, leg. R. Ferenc; Varėna (23), 4.V.2006, under deadwood bark, 1 tritonymph, leg. R. Ferenc.

*Allochernes wideri* (C. L. Koch, 1843) (Fig. 1g) – Kaisiadorys (7), 18.V.2006, deciduous forest, under deadwood bark, 1♀, leg. R. Ferenc.

*Pselaphochernes scorpioides* (Hermann, 1804) (Fig. 1h) – Nagliai NR (14), 2.V.–11.XI.
4. Discussion

The occurrence of *N. carcinoides* in the Nordic countries is well known (Weygoldt 1969, Stol 2006, Sammet *et al.* 2016), and in the current research in Lithuania the species was the most numerous one. However, the occurrence of *N. crassifemoratum* in Lithuania was unexpected. Its previously known range reached from Greece and Turkey in the south to Germany in the north (Drogl & Lippold 2004, Harvey 2013). Its closest occurrence to Lithuania was recorded by Rafalski (1967), who found the species in Bieszczady Mountains, southern Poland. Accordingly, the findings of *N. crassifemoratum* at four localities in Lithuania represent the northernmost known records of the species.

Most species in the samples belonged to Chernetidae family. *Chernes cimicoides*, *C. hahnii* and *A. wederi*, found in the current study under the bark of unspeciﬁed deadwood, were considered as the species with the closest association with tree microhabitats in the latest studies in Slovakia (Christophoryová 2010, Krajčovičová & Christophoryová 2014).

The occurrence of *C. cimicoides*, *D. cyneus*, *A. wederi* and *P. scorpioideus* in the Nordic countries has already been recorded (Stol 2006, Sammet *et al.* 2016) and the presence of *C. hahnii* in Latvia, neighbouring Lithuania, was recently recorded by Telnov and Salmane (2015). The current findings of these species in Lithuania further improved the knowledge of their distributions.

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References


