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Article

Rediscovery of the Lohmander's collection of Diplopoda from Ukraine

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Abstract
The collection of diplopods identified by H. Lohmander during his visit to Kyiv in 1927 was considered to be lost, but it is rediscovered now in the Zoological Department of the National Museum of Natural History of the National Academy of Sciences of Ukraine (Kyiv). It includes syntypes of two species and two subspecies that were described from Kyiv and its vicinities and are still valid with one former subspecies currently recognized in species status: *Brachyiulus jawlowskii* Lohmander, 1928, *Leptoiulus semenkevitschi* Lohmander, 1928, *Megaphyllum kievense* (Lohmander, 1928) and *Polydesmus montanus ukrainicus* Lohmander, 1928. Findings of *L. semenkevitschi* and *P. m. ukrainicus* are especially valuable, because there are no other specimens in known collections and both taxa are officially protected in Ukraine by its Red Book. Catalogue of syntypes is provided with high quality photos. The list of 31 millipedes species from Kyiv and its vicinities in the Lohmander's collection provided with his identifications and notes on current taxonomical status is given.

Key words: Myriapoda, millipedes, type specimens, Europe.

Introduction

In 1927 Swedish zoologist Hans Lohmander (1896–1961) was invited to identify diplopods in the collection of Zoological Museum of Ukrainian Academy of Sciences in Kyiv (now Zoological Department of the National Museum of Natural History of the National Academy of Sciences of Ukraine) by its director, entomologist Prof. Volodymyr Karavayev [also spelled Wladimir Karawajew, etc.] (1864–1939). Numerous Diplopods were collected mainly by Julius Semenkevitsh (1859–1942), a curator of Zoological Museum of Kyiv University; by Theodosius Dobzhansky (1900–1975), a famous American-Ukrainian evolutionary biologist, who worked in the academic Zoological Museum in Kyiv during 1919–1923 at the begging of his career; and by other scientists, including such Kyiv zoologists as V. Aleksandrovsky, S. Panocini (Panotshini), V. Sovinsky, V. Karavayev, W. Dirsch, D. Beling, I. Belanovskiy, A. Ogloblin, G. Shpet etc.

In the result of the work with this collection, as well as collection of Zoological Museum in Berlin (Germany), Lohmander had published a paper containing descriptions of 9 new forms: five species from Caucasus, two species and two subspecies from Kyiv and vicinities (Central Ukraine) (Lohmander 1928). These materials were never mentioned in literature again. Moreover, the deposition place of type material was not specified in the original publication. It was not catalogued as the type specimens in the zoological collections of Kyiv, and was largely considered to be lost during World War II.

Four taxa described by Lohmander (1928) from Kyiv and its vicinities are all valid to date with one former subspecies currently recognized in species status (Lazanyi & Vagalinski 2013; Kime & Enghoff 2017): *Brachyiulus jawlowskii* Lohmander, 1928, *Leptoiulus semenkevitschi* Lohmander, 1928, *Megaphyllum kievense* (Lohmander, 1928) (was described as *Chromatoiulus transsilvanicus kievensis* Lohmander, 1928) and *Polydesmus montanus ukrainicus* Lohmander, 1928. *Leptoiulus semenkevitschi* and *P. m. ukrainicus* are officially protected in Ukraine, they were included to the Red Data Book of Ukraine since 1994 (Red Data Book… 1994, 2009). First species was found only once after Lohmander near Zolotonosha city in Central Ukraine (Kosyanenko 2008). *Polydesmus montanus ukrainicus* was recorded in few locations in Central Ukraine (Chornyi & Golovatch 1993; Chornyi 2001; Chornyi & Kosyanenko 2003). Although, all these additional materials come from the private collection of E. Kosyanenko and their location remain unknown, because after this researcher had quit the scientific work her collection was not deposited in any institution. During the preparation of materials on millipeds for the next edition of the Red Book of Ukraine (I. Balashov) no specimens of *L. semenkevitschi* and *P. m. ukrainicus* were found in any available collections to make new illustrations. This situation initiated the search for original Lohmander's collection and its part from Kyiv was rediscovered by A. Martynov in early 2020. It was not cataloged and its type specimens were not labeled. Many other species of millipedes collected in Kyiv and its vicinities were not mentioned in the Lohamnder's paper, therefore we list them here.

Material and methods

All material is housed in vials with 85% ethanol (Fig. 1) in collection of Department of Zoology of the National Museum of Natural History, National Academy of Sciences of Ukraine [NMNH NASU]. The text of original labels is given in quotes within the chapter "Type material" for every vial containing types. All original labels are combined: they bear the handwritten text (filed in Italic) and printed text (filed in Regular). An additional label with inventory number of the material was added by us to every vial with type material (e.g. – IKOFZ-IT 98, IKOFZ-IT 115 etc.).

Photographs of specimens were taken using a Leica M205A microscope, Leica Z16 APO with Leica DFC450 Digital Camera. Photos were subsequently processed with LAS Core 3.8 software.

The list of 31 species is given by the Lohmander's original labels without checking identifications. Taxonomy is given according to Millibase (millibase.org) and Kime & Enghoff (2017). Original identifications of Lohmander are given in the square brackets if the current combinations are different.

Results and discussion

Catalogue of the type specimens

jawlowskii Lohmander, 1928 **(*Brachyiulus*)** (Figs 2–3)

Type material: 4 specimens (one specimen broken on two parts), "*Brachyiulus jawlowskii* / *Lohmander* / Ukraine: Gegend von Kiev, / *Vila-Lilovskaja / 8.4.1920*. J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 98.

one specimen (broken on three parts), "*Brachyiulus jawlowskii / Lohmander* / Ukraine: Gegend von Kiev, / *Kurenevka* / *14.7.1921*. J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 99.

one specimen, "*Brachyiulus jawlowskii / Lohmander* / Ukraine: Gegend von Kiev, / *Kiev, Lukjanovka / 2.4.1920*. *Shpet leg.* / Hans Lohmander det." – IKOFZ-IT 100.

montanus ukrainicus Lohmander, 1928 **(*Polydesmus*)** (Figs 8–10)
Type material: one specimen, "*Polydesmus montanus / ukrainius Lohmander*. / Ukraine: Gegend von Kiev, / *Kirillovskaja, jary / 15.4.1919.* Dobrzhansky leg. / Hans Lohmander det." – IKOFZ-IT 92.
one specimen, "*Polydesmus montanus / ukrainius Lohmander*. / Ukraine: Gegend von Kiev, / *Kirillovskaja noshtoha. / 26.6.1919.* J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 93.
one specimen (broken on four parts), "*Polydesmus montanus / ukrainius Lohmander*. / Ukraine: Gegend von Kiev, / *Kirillovskaja /15.4.1919.* J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 94.

Figures 1–5. Lohmander's collection of millipedes: 1 – original vials with material; 2, 3 – total lateral view of well-preserved syntype of *Brachyiulus jawlowskii* Lohmander, 1928 (2) and its original label (3); 4, 5 – total lateral view of well-preserved syntype of *Leptoiulus semenkevitschi* Lohmander, 1928 (4) and its original label (5). Scale bars 1 mm.

semenkevitschi Lohmander, 1928 **(*Leptoiulus*)** (Figs 4–5)
Type material: one specimen (only head and several segments of trunk), "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: Gegend von Kiev, / *Pushtsha Voditsa. / 1.5.1919.* J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 101.
4 specimens (three of them broken), "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: Gegend von Kiev, / *Pushtsha Voditsa. / 24.7.1921.* J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 102.

3 specimens, "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: Gegend von Kiev, / *Syrets. / 24.3.1919.* J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 103.
7 specimens, "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: Gegend von Kiev, / *Rudnja-Jablonovskaja. / 18.5.1919.* J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 104.
2 specimens, "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: Gegend von Kiev, / *Syrets. / 17.5.1919*. Dobrzansky leg. / Hans Lohmander det." – IKOFZ-IT 105.
2 specimens (one broken), "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: Gegend von Kiev, / *Meghigorje. / 4.8.1920.* J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 106.
3 specimens (all broken), "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: *Tshernigov,/distr. Oster, Damitsa. / 16.7.1919.* J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 107.
one specimen (broken on two parts), "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: Gegend von Kiev, / Rudnja-*Jablonovskaja. / 10.5.1919*. Dobrzansky leg. / Hans Lohmander det." – IKOFZ-IT 108.
3 specimens, "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: Gegend von Kiev, / *Syrets. / 1.4.1919*. Dobrzansky leg. / Hans Lohmander det." – IKOFZ-IT 109.
8 specimens (3 unbroken and parts of 4 specimens), "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: Gegend von Kiev, / *Kolpyt. / 10.7.1920*. Dobrzansky leg. / Hans Lohmander det. /" – IKOFZ-IT 110.
5 specimens (two of them broken), "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: Gegend von Kiev, / *Fluss Koturka. / 21.5.1919.* J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 111.
2 specimens (both numerously broken), "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: Gegend von Kiev, / *Pushtsha Voditsa. / 20. 4. 1919.* V. Aleksandrovsky leg. / Hans Lohmander det." – IKOFZ-IT 112.
one specimen, "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: Gegend von Kiev, / *Syrets. / 4.7.1919.* J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 114.
one specimen (broken on two parts), "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: Gegend von Kiev, / *Svjavoshino. / 9.8.1919.* J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 115.
3 specimens (two of them broken), "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: Gegend von Kiev, / *Pronjevshtshina / 17.6.1919.* J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 116.
one specimen (broken), "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: Gegend von Kiev, / *Kirillovskaja. / II.1920.* Dobrzansky leg. / Hans Lohmander det." – IKOFZ-IT 117.
empty vial, "*Leptoiulus semenkevitshi / Lohmander* / Ukraine: Gegend von Kiev, / *Meghigorje. / 31.7.1921.* J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 113.

transsilvanicus kievensis Lohmander, 1928 (***Chromatoiulus*)** (Figs 6–7)
Current status: *Megaphyllum kievense* (Lohmander, 1928)
Type material: 2 specimens (numerously broken), "*Chromatoiulus transs. / kievensis Lohmander* / Ukraine: Gegend von Kiev, / *Pushtsha Voditsa, / 28.4.1919.* J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 95.
one specimen (broken into three parts), "*Chromatoiulus transs. / kievensis Lohmander* / Ukraine: Gegend von Kiev, / *Kiev, am Fluss Dnjepr. / 25.7.1919* J. Semenkevitsh leg. / Hans Lohmander det." – IKOFZ-IT 96.
one specimen (broken into three parts), "*Chromatoiulus transs. / kievensis Lohmander* / Ukraine: Gegend von Kiev, / *Irpen. / 1927.W. Dirsch* leg. / Hans Lohmander det." – IKOFZ-IT 97.

List of species and subspecies in Lohmander's collection from Kyiv and its vicinities

Class Diplopoda Blainville, 1844
Subclass Penicillata Latreille, 1831
Order Polyxenida Verhoeff, 1934
Family Polyxenidae Lucas, 1840
1. ***Polyxenus lagurus*** (Linnaeus, 1758)

Subclass Chilognatha Latrielle, 1802
Order Glomerida Brandt, 1833
Family Glomeridae Leach, 1815
2. ***Glomeris connexa*** Koch, 1847
3. ***Glomeris hexasticha*** Brandt, 1833

Figures 6–10. Lohmander's collection of millipedes: **6, 7** – total lateral view of best-preserved syntype of *Megaphyllum kievense* (Lohmander, 1928) (**6**) and its original label (**7**); **8–10**–total dorsal (**8**) and ventral (**9**) views of well-preserved syntype of *Polydesmus montanus ukrainicus* Lohmander, 1928, and its original label (**10**). Scale bars 1 mm.

Order Polyzoniida Cook, 1895
Family Polyzoniidae Newport, 1844
4. ***Polyzonium germanicum*** Brandt, 1837

Order Julida Brandt, 1833
Family Julidae Leach, 1814
5. ***Ommatoiulus sabulosus*** (Linnaeus, 1758) [as *Archiulus sabulosus* L.]
6. ***Brachyiulus jawlowskii*** Lohmander, 1928
7. ***Cylindroiulus britannicus*** (Verhoeff, 1891)
8. ***Cylindroiulus latestriatus*** (Curtis, 1845) [as *Cylindroiulus frisius* Verhoeff]
9. ***Cylindroiulus truncorum*** (Silvestri, 1896)
10. ***Julus terrestris*** Linnaeus, 1758
11. ***Leptoiulus proximus*** (Nemec, 1896)
12. ***Leptoiulus semenkevitschi*** Lohmander, 1928

13. ***Megaphyllum kievense*** (Lohmander, 1928) [as *Chromatoiulus transsilvanicus kievensis* Lohmander, 1928]
14. ***Megaphyllum silvaticum*** (Verhoeff, 1898) [as *Chromatoiulus silvaticus discolor* Verhoeff]
15. ***Megaphyllum sjaelandicum*** (Meinert, 1868) [as *Chromatoiulus sjaelandicus* Meinert]
16. ***Rossiulus kessleri*** (Lohmander, 1927) [as *Schizophyllum kessleri* Lohmander]

Remarks: This species was described by Lohmander based on material from Kyiv collected by Kessler (Lohmander 1927, as *Schizophyllum kessleri*). Five type specimens of this species deposited in Finnish Museum of Natural History (Helsinki, Finland) (inventory number of the sample – MZH 148255). Collection of NMNH NASU houses the non-type material on the species from Kyiv and its vicinities, that was collected in period from 1918 to 1928 by Semenkevitsh, Panocini, Dobrzhansky, Dirsch, Musytshenko, Sovinsky, Karavayev, Alexandrovsky, Beling and unknown collector (totally 166 specimens in 42 vials from about 20 localities). All this material was labelled and determined by Lohmander and therefore can be used to understand Lohmander's treatment of taxa.

17. ***Unciger transsilvanicus*** (Verhoeff, 1899)

Family Nemasomatidae Bollman, 1893
18. ***Isobates varicornis*** (Koch, 1847)

Family Blaniulidae Koch, 1847
19. ***Blaniulus guttulatus*** (Bosc, 1792)
20. ***Choneiulus palmatus*** (Nemec, 1895)
21. ***Cibiniulus phlepsii*** (Verhoeff, 1897) [as *Nopoiulus phlepsii* Verhoeff]
22. ***Nopoiulus kochii*** (Gervais, 1847) [as *Nopoiulus venustus* Meinert]
23. ***Proteroiulus fuscus*** (Am Stein, 1857)

Order Polydesmida Pocock, 1887
Family Polydesmidae Leach, 1815
24. ***Brachydesmus superus*** Latzel, 1884
25. ***Polydesmus denticulatus*** Koch, 1847
26. ***Polydesmus complanatus*** (Linnaeus, 1761)
27. ? *Polydesmus inconstans* Latzel, 1883 [as ***Polydesmus coriaceus*** Porat]

Remarks: The collection of Lohmander contains specimens identified as *Polydesmus coriaceus* Porat, 1870 (2 samples collected in 1928). By the time when Lohmander worked with the collection in NMNH NASU (1927 and later), only a part of known now subspecies and varieties of *P. coriaceus* was already described; also, *Polydesmus inconstans* Latzel, 1883, presently considered as a variety of *P. cariaceus* was described later, a part of subspecies and varieties of *P. coriaceus* were recognized as junior synonyms of *Polydesmus inconstans* Latzel, 1883 (Sierwald & Spelda 2018). Chornyi & Golovatch (1993) listed *P. inconstans* for plain area of Ukraine, while *P. coriaceus* was absent in their list. Thus, it is necessary to check the current taxonomical position of *Polydesmus coriaceus* Porat, 1870 sensu Lohmander.

28. ***Polydesmus montanus ukrainicus*** Lohmander, 1928

Family Paradoxosomatidae Daday, 1889
29. ***Oxidus gracilis*** (Koch, 1847) [as *Orthomorpha gracilis* Koch, 1847]
30. ***Strongylosoma jaqueti*** Verhoeff, 1898
31. ***Strongylosoma stigmatosum*** (Eichwald, 1830) [as *Strongylosoma pallipes* Oliv.]

Remarks: This species is represented by 35 samples in Lohmander's collection at NMNH NASU. All of them were collected mainly after 1919 (only one sample is dated 1913). The material was determined in 1927 and later, when a number of subspecies and varieties for *S. pallipes* had already been described (Sierwald & Spelda 2020). At the present time the nominative subspecies, *S. pallipes pallipes*, is considered as junior synonym of *Strongylosoma stigmatosum* (Eichwald, 1830). Unfortunately, Lohmander (1928) published data only on new species from the discussed collection, and many other taxa were left unpublished. Moreover, the collection was considered lost, therefore Chornyi and Golovatch could not investigate it and relate Lohmander's identifications to current systematics of Diplopoda during preparing of their overview paper on plain areas of Ukraine (Chornyi & Golovatch 1993). However, the synonymy given

by us corresponds to the indication only *S. stigmatosum* by Chornyi & Golovatch (1993), other subspecies and varieties which are now considered as species were not mentioned by them for plain areas of Ukraine.

The preserved part of Lohmander's Diplopoda collection numbers about 1500 specimens, and 57 of them are the syntypes of four taxa: *Brachyiulus jawlowskii* (6 specimens), *Leptoiulus semenkevitschi* (47 specimens), *Megaphyllum kievense* (4 specimens) and *Polydesmus montanus ukrainicus* (3 specimens). Except for these species and subspecies presented with type specimens, Lohmander's collection in NMNH NASU contains material on 27 other species collected in Kyiv and its vicinities in the beginning of XX century (see collectors in Introduction).

To date, there are no check-list or overview paper on Diplopoda of all Ukraine, but Chornyi & Golovatch (1993) gave the list of species, key and short information on both local and general distribution of 50 diplopod species and subspecies of plain areas within Ukraine. This work was later contributed by several other papers on diplopods of Ukraine (e.g., Gologvatch 2010, 2011). The species list of Chornyi & Golovatch (1993) covered all species from Lohmander collection.

This paper is the first step in review of Lohmander's collection of Diplopoda from Ukraine. It rediscovers the type specimens of four forms considered as lost. The provided species list of Diplopoda in the collection of NMNH NASU is aimed to arise interest in specialists for investigation of this historical material.

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