ÖDÖN TÖMÖSVÁRY (1852-1884), PIONEER OF HUNGARIAN MYRIAPODOLOGY

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ABSTRACT
Ödön (=Edmund) Tömösváry (1852-1884) immortalised his name in the science of myriapodology by discovering the peculiar sensory organs of the myriapods. He first described these organs in 1883 on selected species of Chilopoda, Diplopoda and Pauropoda. On the occasion of the 150th anniversary of Tömösváry's birth, his unfortunately short though productive scientific career is overviewed, in this paper only from the myriapodological point of view. A list of the 32 new species and two new genera described by him are given and commented, together with a detailed bibliography of Tömösváry's 24 myriapodological works and subsequent papers dealing with his taxa.

INTRODUCTION
Ödön Tömösváry is certainly one of the Hungarian zoologists (if not the only one) whose name is well-known worldwide. This is due to the discovery of a peculiar sensory organ which was later named after him, and it is called Tömösváry's organ uniformly in almost all languages (French: organ de Tömösváry, German: Tömösvárysche Organ, Danish: Tömösvarys organ, Italian: organo di Tömösváry, Czech: Tömösváryho organ and Hungarian: Tömösváry-féle szerv). The organ itself is believed to be a sensory organ with some kind of chemical or olfactory function (Hopkin & Read 1992). However, although its structure was studied in many respects (Bedini & Mirolli 1967, Haupt 1971, 1973, 1979, Hennings 1904, 1906, Tichy 1972, 1973, Figures 4-6), the physiological background is still not clear today. It occurs not only in the four classes of myriapods, but also in some of the lower hexapod groups.

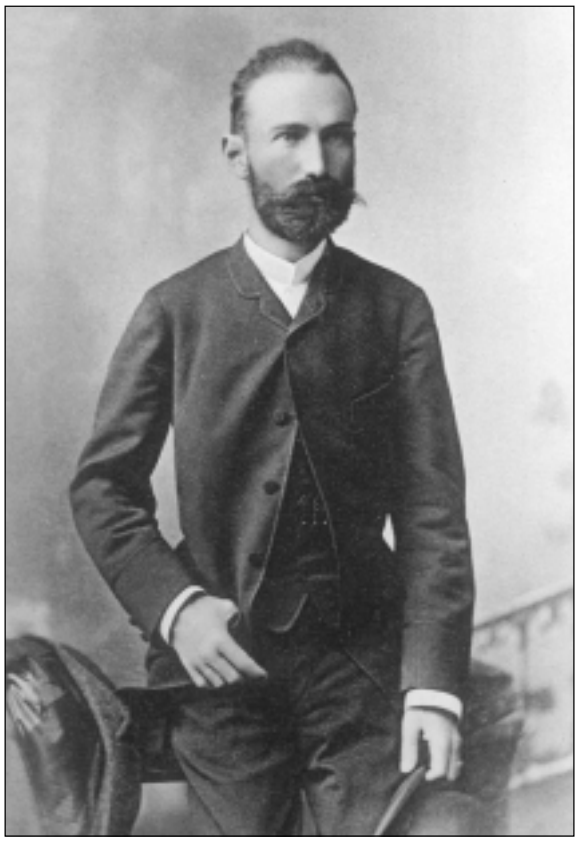

Figure 1. Ödön Tömösváry (1852-1884), and his signature (from the obituary by Herman 1885)

In Tömösváry's time, in the second half of the 19th century, myriapodologists in the world were even less in number than today. Despite the distances and technical difficulties in communication, they were in a close correspondence with each other. Tömösváry had contacts with Silvestri and others, and his decribed taxa were readily cited by later authors as Attems and Carl.

Life, even daily survival, and scientific career, nevertheless, was not easy for Ödön Tömösváry. He was born in a poor family, and without his supporter, Ottó Herman (1835-1914) he could never even have stepped into the gate of science. Herman was the greatest scientific polyhistor at that time, he had put down important monographs on the fish, bird, spider and insect fauna of Hungary. Starting as a curator in the natural history collection of the Hungarian National Museum, he was also an ethnographer, a historian, and later became a politician, being a representative in the Hungarian parliament. As a mentor, he 'discovered' and supported many young students, and forwarded them to the proper scientific directions. When Tömösváry died at age of 38 of tuberculosis, Herman blamed himself for not being able to help him into a longer, more successful life. He said at his funeral:

> "If I was the one who lighted the fire, then it was his beloved master, Dr. Géza Entz, who gave the fuel, and his faithful supporter, Dr. Géza Horváth, helped him to find a place here and there - but what have we achieved?" … "It seems that the period when talent was an efficient component is over; as if today it is almost impossible to find a suitable job, fitting to one's dreams and intentions, just by one word, one action, without the support of others, as I have managed it once."
> (Herman 1885).

A SHORT BIOGRAPHY

Ödön Tömösváry was born on the 12th of October 1852, at Magyaró (this small village is situated in the Hungarian-populated Transylvania, now belonging to Romania). After the secondary school in Kolozsvár (=Cluj), despite their poor conditions, his parents sent him for further studies to the university of Selmecbánya (now located in Slovakia). At the end of his university years he came to Budapest and visited Ottó Herman at the Hungarian National Museum, who immediately recognized his talent in analysing and describing zoological material. Tömösváry received further encouragement from Géza Horváth, director of the natural history collections at that time, and Géza Entz, zoology professor at the Budapest university. With these prominent teachers, he managed to finish his university studies in Budapest, and wrote his first papers on myriapods, then the doctoral thesis on the anatomical structure of the respiratory organ of *Scutigera coleoptera* (1881). Tömösváry was only 29 at this time, and he did not know that the rest of his life would almost become a continuous struggle for survival.

Despite Herman's support Tömösváry did not get the curatorial job in the National Museum, he first became a secondary school teacher in Budapest. In order to get more money, and also for the more interesting work, he accepted Herman's proposal to be the Hungarian '*Phylloxera* supervisor', to deal with the serious plant protection problem of that time. It was the same reason that sent him to the Lower Danube region, this time to study the situation of the Columbatch fly (a species of Simulidae) which was believed to damage the crop. He became very ill here, and got tuberculosis which could never be cured. In the last year of his life, without ever being able to get a proper zoologist job for himself, he was teacher again at Kassa (=Kosice, now in Slovakia). He was then engaged to a young lady, but shortly after died, on the 15th of August, 1884, at Déva (now in Romania), close to his home village.

In his short scientific career, altogether only 6 years (1878-1884), Tömösváry wrote 57 papers (1 published posthumously). Twenty four of them are on Myriapoda, 4 on Arachnoidea (scorpions, pseudoscorpions, spiders), 4 on apterygote insects, 3 in the field of herpetology, and 22 on other, mainly insect groups, including popular papers.

His more detailed biography and the complete list of publications can be read in Herman (1885, in Hungarian).

MYRIAPODOLOGICAL ACTIVITY OF Ö. TÖMÖSVÁRY

Of Tömösváry's 57 papers, 24 (42 %) are dealing with myriapods (they are all listed in the bibliographic part of the present paper); this adequately makes him primarily to be a myriapodologist. He was the first Hungarian to publish on that group of arthropods; but he was also the first in the world who reported on the migration of certain myriapods (Tömösváry 1878a, see also Korsós 1998). In addition to the descriptions of new taxa he, for the first time, studied and characterised the microscopic structure of some of the organs such as the stigma (Tömösváry 1880b, 1881, 1883b, 1883c), weaving organ (Tömösváry 1883g, 1883h), and sensory organs (Tömösváry 1883d, 1883e).

He put on record several species of the Carpathian basin, and raised the known species of myriapods in Hungary (at that time) from 8 to 33 (Tömösváry 1878b, 1879a, 1879b, 1880a, 1880c, 1882c, 1883a). *Paradesmus* (=*Oxidus*) *gracilis* was recorded by him for the first time in Hungary, from Budapest, Margharet Island (Tömösváry 1879b). Unfortunately, later this record was completely forgotten, and the species was only included again into the Hungarian fauna by Korsós (1994).

Tömösváry described 32 new myriapod species for science, 10 of Diplopoda, 19 of Chilopoda, two of Pauropoda, and one Symphyla species. He introduced two new genera, one in Chilopoda (*Edentistoma* Tömösváry, 1882a = *Anodontastoma* Tömösváry, 1882e) and one in Pauropoda (*Trachypauropus* Tömösváry, 1882c), the latter considered to be still valid today. The exotic species, most of them from Borneo, are published only in three papers (Tömösváry 1882a, 1882e, 1885).

LIST OF MYRIAPOD TAXA DESCRIBED BY Ö. TÖMÖSVÁRY

All the taxa by Tömösváry are listed here according to the modern system (following Hoffman 1979), although they were described according to the systematic categories of that time. *Sphaeropoeus*, for instance, was allocated to glomerids, *Spirobolus* to julids, and *Siphonophora* to polyzoniids. The changes in centipedes are less considerable, the three main orders (Lithobiomorpha, Geophilomorpha, Scolopendromorpha), though on family level, were already differentiated, and the species described by Tömösváry do still belong to those. In order to give a better overview of the list, species in their original combination have been numbered consecutively from 1 to 32. They are with their most recent available status, with the original records of type locality in quotation marks.

Material of those species (nine, altogether) marked with asterisk (*) can be found in the Myriapoda Collection of the Hungarian Natural History Museum (see also Korsós 1983). The type specimens of the other species are, unfortunately, most probably lost. In some of his papers, Tömösváry mentioned the collection of the Transylvanian Museum Association as a depository for his type specimens. This collection has been dispersed in the past fifty years, only a minor fraction being deposited in the Zoological Museum of the Babes-Bolyai University, Cluj. According to the most recent information by Dr. Endre Sárkány-Kiss, biologist at the university, there is no Tömösváry-material in the collection.

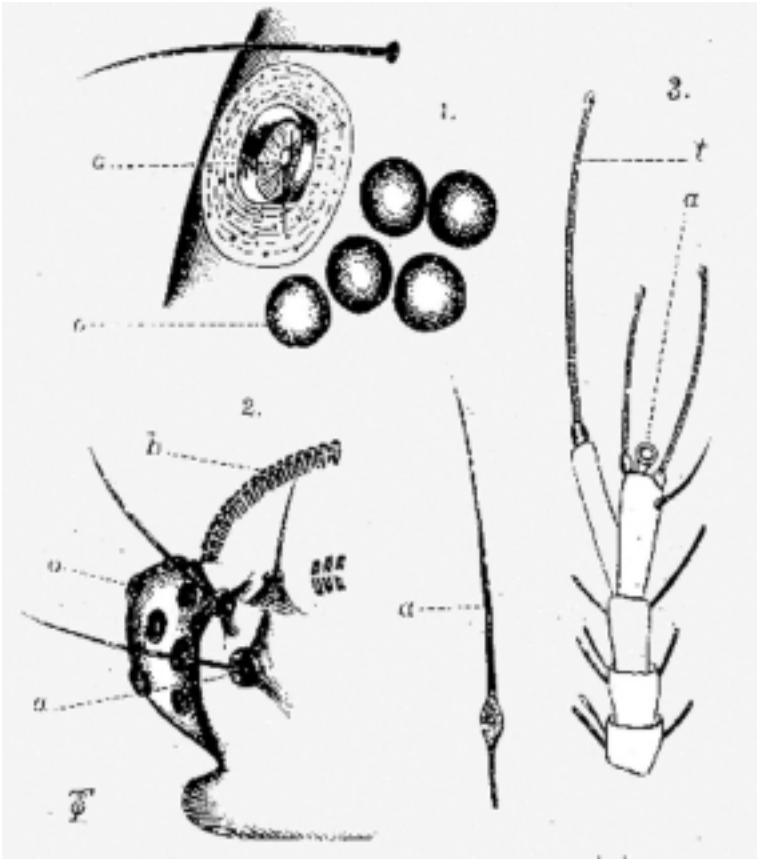

Figure 2. Original drawing by Tömösváry from his paper "Eigenthümliche Sinnesorgane der Myriopoden" (= Peculiar sensory organs of myriapods), Mathematische und naturwissenschaftliche Berichte aus Ungarn (Tömösváry 1883e). No. 1. shows an "organ of Tömösváry"; the other two are sensory hairs.

Tömösváry's original legend to the figures (translated from German):
1. *Lithobius forficatus*, a: "the organ itself", o: "eyes";
2. *Polyxenus lagurus*, a: "the organ itself", b: "follicles", o: "eyes";
3. *Pauropus huxleyi*, a: "the sensory organ", t: "tentacle"

Figure 3. Head of *Lithobius forficatus*, the arrow shows the position of Tömösváry's organ (between the group of eyes and the base of left antenna). Scanning electron micrograph from Eisenbeis & Wichard (1985)

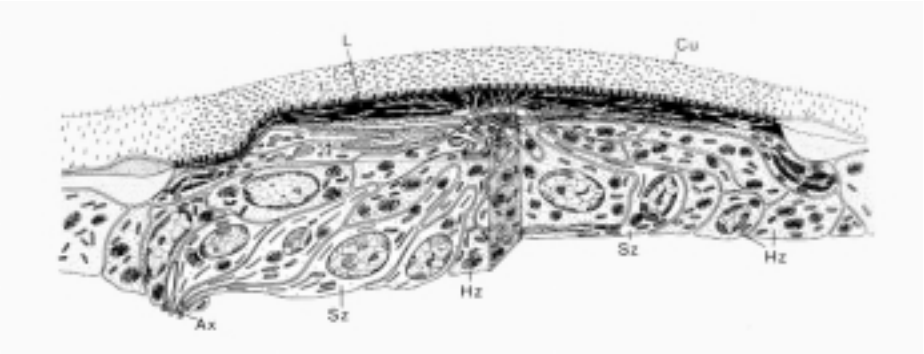

Figure 4. The structure of the Tömösváry's organ ("pseudoculus") of *Allopauropus* sp. (Pauropoda) – L: outer receptor space with dendrites, – Cu: perforated cuticule, – Ax: axon of sensory nerve cell, – Hz: epidermic cell, – Sz: sensory nerve cell (from Eisenbeis & Wichard 1985)

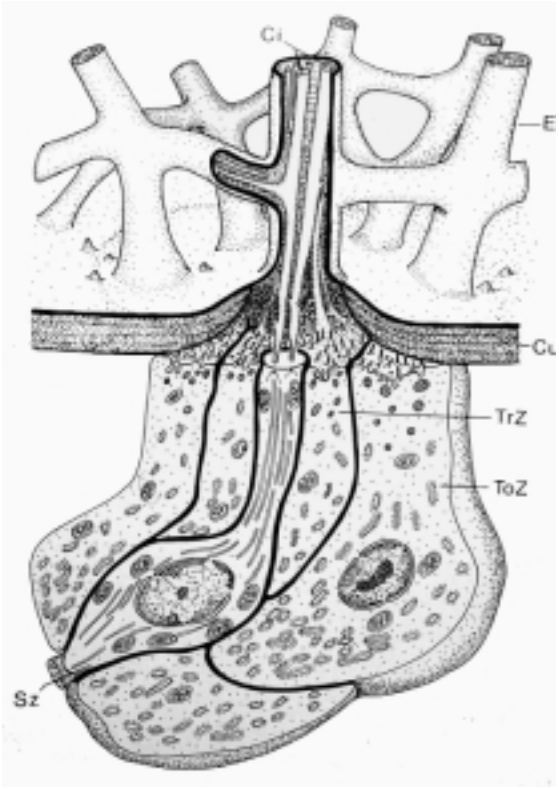

Figure 5. The structure of the Tömösváry's organ, *Scutigerella immaculata* (Symphyla). – Cu: cuticule, – Ep: epicuticule, – Ci: cilium of sensory nerve cell, – TrZ, ToZ: trichogene and tormogene epidermic cells, – Sz: sensory nerve cell (from Eisenbeis & Wichard 1985)

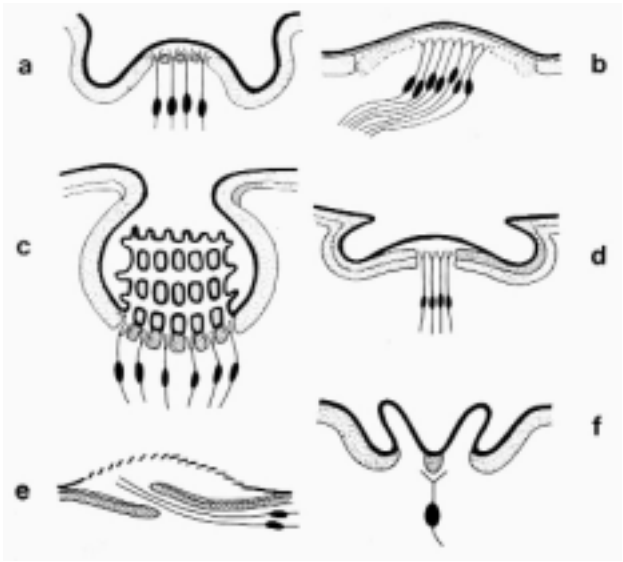

Figure 6 Tömösváry's organs of different arthropod groups.
– a: *Glomeris* (Diplopoda),
– b: *Allopauropus* (Pauropoda),
– c: *Scutigerella* (Symphyla),
– d: *Lithobius* (Chilopoda),
– e: *Fosentomon* (Collembola),
– e: *Onychiurus* (Collembola)
(from Eisenbeis & Wichard 1985, after Haupt 1979)

DIPLOPODA

Glomerida

1. *Glomeris albicans* Tömösváry, 1879a: Description given as a "yet unknown" *Glomeris* species in Tömösváry (1878b) – "Rogoszel" (Romania)

2. *Glomeris simplex* Tömösváry, 1880a = ? *Glomeris tyrolensis* Latzel, 1884: Daday (1889), Jermy (1942) – "Tránys" (Romania)

3. *Trachysphaera transylvanica* Tömösváry, 1880a = *Gervaisia costata* Waga var. *acutula* Latzel [=*Trachysphaera acutula* (Latzel, 1884)]: Daday (1889); "*species incertae sedis*": Jermy (1942) – "Oncsásza Cave" (Bihor County, Romania)

Remarks: In the absence of the type material, all these three European millipede species are presently considered as *nomina dubia*, and they are also excluded from the Fauna Europaea database (Enghoff pers. comm.).

Sphaerotheriida

4. **Sphaeropoeus falcicornis* Tömösváry, 1885 = *Castanotherium falcicorne* (Tömösváry, 1885): Silvestri (1896), Attems (1914), Jeekel (2001a) – “Borneo (Matang)”

5. **Sphaeropoeus granulatus* Tömösváry, 1885 = *Castanotherium granulatum* (Tömösváry, 1885): Silvestri (1896), Attems (1914), Attems (1936), Jeekel (2001a) – “Borneo (Matang)”

Polyzoniida

6. *Siphonophora quadrituberculata* Tömösváry, 1885 = *Pseudodesmus quadrituberculatus* (Tömösváry, 1885): Daday (1889), Silvestri (1896), Carl (1912), Attems (1914), Jeekel (2001b) – “Borneo (Matang et Sarawak)”

Spirobolida

7. *Spirobolus erythropus* Tömösváry, 1885 = *Trigoniulus erythropus* (Tömösváry, 1885): Daday (1891), Silvestri (1896), Carl (1918), Jeekel (2001c) – “Borneo (Matang et Sarawak)”

Spirostreptida

8. *Spirobolus ater* Tömösváry, 1885 – “Borneo (Matang)”

9. **Spirobolus rufo-marginatus* Tömösváry, 1885 = *Sculptulistreptus rufomarginatus* (Tömösváry, 1885): Hoffman (1982) – “Borneo (Sarawak)”

Polydesmida

10. **Oxyurus rosulans* Tömösváry, 1885 = ? *Leptodesmus rosulans* (Tömösváry, 1885): Attems (1938) – “Japonia (Nangasaki)”

Remark: According to Attems (1938), the allocation of this is quite uncertain. Dr. Richard Hoffman, during his visit to Budapest, 1981, marked the type specimens as *Riukiaria rosulans*.

CHILOPODA

Lithobiomorpha

11. *Lithobius bicolor* Tömösváry, 1879a: = *L. muticus* C. Koch, 1847: Daday (1889), Matic (1966) – “Dées, Oroszmezõ (Szolnok-Doboka megye)” (Romania)

12. *Lithobius dadayi* Tömösváry, 1880c = *L. mutabilis* L. Koch, 1862: Matic (1966) – “Transsylvania meridionalis” (Romania)

13. *Lithobius dubius* Tömösváry, 1880c – “Hungaria meridionalis” (Hungary?)

Remark: Unfortunately, the type material of all these three Hungarian species are lost, and their identity thus can only be judged by the original descriptions (Daday 1889). Hence two of them are synonymized by Matic (1966), but the third one remains “*nomen dubius*”.

Geophilomorpha

14. *Mecistocephalus hungaricus* Tömösváry, 1880c = *Dicellophilus carniolensis* C. L. Koch, 1847: Attems (1929), Daday (1889), Matic (1972) – “Hungaria orientalis” (Romania)

15. *Geophilus paradoxus* Tömösváry, 1880c = *Geophilus ferrugineus* C. Koch: Daday (1889) [= *Pachymerium ferrugineum* (C. L. Koch, 1835)] – “Hungaria orientalis” (Romania)

16. *Orya xanti* Tömösváry, 1885 = *Orphnaeus brevilabiatus* (Newport, 1845): Attems (1929) – “Siam (Bangkok), Borneo (Matang), Sumatra”

17. *Mecistocephalus sulcicollis* Tömösváry, 1885 = *Mecistocephalus punctifrons* Newport, 1842 var. *sulcicollis* Tömösváry, 1885: Attems (1929) – “Borneo (Sarawak)”

Remark: All the geophilomorph species described by Tömösváry have been synonymized with already known species; even the *varietas* status of the last one (*Mecistocephalus sulcicollis*) is questionable.

Scolopendromorpha

Anodontastoma Tömösváry, 1882e

18. *Anodontastoma octosulcatum* (Tömösváry, 1882a): corrected to **Edentistoma octosulcatum* Tömösváry, 1882a by Tömösváry (1882e) = *Arrhabdotus octosulcatus* (Tömösváry, 1882): Attems (1930) (Lewis in litt.) – “Borneo (Matang)”

19. *Scolopocryptops geophilicornis* Tömösváry, 1885 = *Otocryptops melanostomus* (Newport, 1845): Attems (1930) = *Scolopocryptops melanostomus* Newport, 1845 (Lewis in litt.) – “Java”

20. *Heterostoma albidum* Tömösváry, 1865 = *Ethmostigmus albidus* (Tömösváry, 1865): Attems (1930) (Lewis in litt.) – “Singapore”

21. **Heterostoma bisulcatum* Tömösváry, 1885 = *Ethmostigmus bisulcatus* (Tömösváry, 1865): Attems (1930) (Lewis in litt.) – “Borneo (Matang)”

22. *Branchiostoma subspinosum* Tömösváry, 1885 = *Rhysida nuda immarginata* (Porat, 1876): Attems (1930) = *Rhysida immarginata* (Porat, 1876): Koch (1985) – “Borneo (Matang)”

Remarks: Attems (1930, p. 190) gave *B. subspinosum* as a junior synonym of *Rhysida nuda immarginata* (Porat, 1876). Koch (1985, p. 22) considered that the name *immarginata* “may be applicable” to extralimital (= non-Australian) forms to which the name *nuda* had been applied, i.e. *R. nuda immarginata* should be known as *R. immarginata*. Lewis (2001, p. 46) also discussed this matter.

23. **Branchiostoma punctiventre* Tömösváry, 1885 = *Otostigmus punctiventer* (Tömösváry, 1885): Attems (1930) (Lewis in litt.) – “Borneo (Matang et Sarawak)”

24. *Branchiotrema nitidulum* Tömösváry, 1885 = *Otostigmus spinosus* Porat, 1876: Attems (1930) (Lewis in litt.) – “Borneo (Matang)”

25. *Branchiotrema longicorne* Tömösváry, 1885 = *Ototstigmus longicornis* (Tömösváry, 1885) (Lewis in litt.) – “Borneo (Matang)”

26. **Scolopendra flavicornis* Tömösváry, 1885 = *Scolopendra subspinipes subspinipes* Leach, 1815: Attems (1930) (Lewis in litt.) – ”Borneo (Matang)”

27. **Scolopendra varii-spinosa* Tömösváry, 1885 = *Scolopendra subspinipes subspinipes* Leach, 1815: Attems (1930) (Lewis in litt.) – “Borneo (Sarawak)”

28. *Scolopendra aurantipes* Tömösváry, 1885 = *Scolopendra subspinipes subspinipes* Leach, 1815: Attems (1930) (Lewis in litt.) – “Borneo (Sarawak)”

29. *Scolopendra nudipes* Tömösváry, 1885 – “Singapore”

Remark: Five of the twelve scolopendrid species described by Tömösváry are still considered as valid; one (*Scolopendra nudipes*) is “*nomen dubius*”, and possibly will remain as such, since the type material cannot be found.

PAUROPODA

Trachypauropus Tömösváry, 1882c

30. *Trachypauropus glomerioides* Tömösváry, 1882c = A valid genus and species, see e.g. Scheller (1979, 2003, and in litt.) – “Déva (Hunyad megye)” (Romania)

31. *Trachypauropus margaritaceus* Tömösváry, 1883a: = “*incertae sedis*” (Scheller in litt. 2003) – “Hungaria orientalis (Pele, com. Szilágy)” (Romania)

SYMPHYLA

32. *Scolopendrella anacantha* Tömösváry, 1883f = “*species dubius*” (Scheller in litt. 2003) – “Hungaria septemtrionalis et orientalis”

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