

New and rare species in the isopod fauna of Hungary (Crustacea, Isopoda, Oniscidea): results of field surveys and revisions

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ABSTRACT: New and rare isopod species for the Hungarian fauna have been found during the last two years in different regions of Hungary. The following species are new to the Hungarian fauna: *Trichoniscus bosnien-sis*, *T. crassipes*, *Cordioniscus stebbingi*, *Chaetophiloscia cellaria*, *Agabiformius lentus* and *Paraschizidium coeculum*. New records are given for the following species: *Trichoniscus steinboecki*, *Tachysoniscus austriacus*, *Buddelundiella cataractae*, *Lepidoniscus minutus* and *Platyarthrus schoblii*. Re-examination of isopod material held in the Crustacea Collection of the Natural History Museum of Hungary (*Haplophthalmus hungaricus*, *Trichoniscus noricus*, *T. plitvicensis* and *Philoscia muscorum*) has produced new data for species *H. danicus*, *T. steinboecki*, *T. austriacus*, *Porcellium sp.* and *L. minutus*. *Philoscia muscorum* is formally removed from the Hungarian list.

Introduction

The number of the known oniscid species of Hungary has been increased from 42 (FORRÓ & FARKAS 1998) to 50 (KONTSCHÁN 2004) during a very short period. Six species out of eight were recorded in synanthropic habitats, and this fact drew our attention to the isopods of the urban environment, while natural habitats have also remained in our focus of interest.

We consider a species to be rare when its published data does not exceed five grid squares in the Hungarian 10 km x 10 km UTM grid system. Using this approach rare isopods comprise almost 50% of the oniscidean fauna of Hungary (HORNUNG *et al.* in press), but in several cases it is apparent that the lack of species data is the result of under recording.

Furthermore, inappropriate sampling methods, misidentification of specimens and unusual habitat preferences of certain isopod species may account for the apparent rarity of some woodlice in Hungary. Although the known distribution of the species *Lepidoniscus minutus* (C. Koch, 1838) exceeds five UTM grids (29 respectively, including the result of the revisions), this species is still considered as rare woodlouse in Hungary (e.g. KONTSCHÁN *et al.* 2006). In this paper I would like to provide new data to prove that this species is widely distributed in Hungary.

Field surveys were carried out between the years 2003 and 2005, covering eight geographical regions of Hungary as well as the capital Budapest and other settlements of various size to boost distribution data and knowledge of oniscids.

Although field work has yielded over 40 species, here I would like to concentrate on those six terrestrial isopods that have been found to be new to the Hungarian fauna, and to give new distribution data of five species that are considered to be rare. Some new data of the rare species resulted by our field survey (*Oniscus asellus* Linnaeus, 1758 and *Haplophthalmus montivagus*, Verhoeff 1941) have already been published in FARKAS & VILISICS (2006).

As an additional data source, revisions were carried out on several specimens catalogued as *Trichoniscus noricus* Verhoeff, 1917, *Trichoniscus plitvicensis* Verhoeff, 1930 (= *T. noricus*), *Haplophthalmus hungaricus* Kesselyák, 1930 and *Philoscia muscorum* (Scopoli, 1763) in the Crustacea Collection of the Hungarian Natural History Museum.

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Materials and methods

Field surveys

Hand sorting were undertaken at 82 sampling sites between the years 2003 and 2005 in seven regions of Hungary (Bakony, Budai, Kőszegi, Pilis, Mecsek, Soproni and Visegrádi Mts.), and in settlements of various size (e.g. Balatonberény, Székesfehérvár, Budapest). The regions with new records of rare or new species are given in Table 1. The figures and identification keys of SCHMÖLZER (1965), GRUNER (1966), RADU (1977), SCHMALFUSS (1990), MANICASTRI & TAITI (1994) and BERG & WIJNHOFEN (1998) were used for species identification. Nomenclature follows that of SCHMALFUSS (2003).

Identified specimens are stored in vials with 70% ethyl-alcohol at the Department of Ecology, Szent István University, Faculty of Veterinary Science (SZIU); Crustacea Collection of the Hungarian Natural History Museum (NHMUS); Isopoda collection of Dr. Sándor Farkas at the University of Kaposvár (KE) and in the Isopod Collection of the Natural History Museum of Stuttgart (NHMS).

Revisions

Revisions were not the initial goal of my observations in NHMUS, but the recognition of several misidentified samples made the re-examinations necessary. The observed samples of family Trichoniscidae belonged to the material catalogued as *H. hungaricus*, *T. noricus* and *T. plitvicensis* and were mainly collected and identified by Lajos Méhely and Adorján Kesselyák between 1926 and 1936. The results of the revisions are indicated in Table 2.

Results

Field surveys

As a result of the field surveys six species new to Hungary and five rare species were recorded. The new species are: *Trichoniscus bosniensis* Verhoeff 1901, *T. crassipes* Verhoeff 1939, *Cordioniscus stebbingi* (Patience, 1907), *Chaetophiloscia cellaria* (Dollfus, 1884), *Agabiformius lentus* (Budde-Lund, 1885) and *Paraschizidium coeculum* Silvestri, 1897).

Two species (*T. bosniensis*, *T. crassipes*.) were found in natural habitats; three (*C. cellaria*, *A. lentus*, *P. coeculum*) in urban environments while the isopod *C. stebbingi* was captured in a tropical greenhouse. Species considered as rare were collected in settlements (*Buddelundiella cataractae* Verhoeff, 1930, *Platyarthrus schoblii* Budde-Lund, 1885, *Protracheoniscus major* (Dollfus, 1903), and in natural habitats (*Tachysoniscus austriacus* (Verhoeff, 1908), *Trichoniscus steinboeckii* Verhoeff, 1931, *Lepidoniscus minutus*) as well (Table 1). I present data that prove the occurrence of the tiny *B. cataractae* at outdoor sites in Hungary for the first time.

Table 1. List of rare isopod species and their new sites of occurrence

Species	Sampling site	Date
<i>Tachysoniscus austriacus</i>	Soproni Mts., Hidegvíz valley	26.08.2004
<i>Trichoniscus steinboeckii</i>	Kőszegi Mts: Hétvezér-creek ravine	06.11.2004
	Bakony Mts.: Kab Hill, creek near „Nagy-Köves” Cave, and „Fenyves” swallet	15.05.2005
	Visegrádi Mts.: ravine between Pilisszentlászló and Visegrád	02.04.2006
<i>Buddelundiella cataractae</i>	Balatonberény	14.08.2004
	Budapest, Castle District	11.06.2004
<i>Lepidoniscus minutus</i>	Kőszegi Mts., Hétvezér creek	06.11.2004
	Soproni Mts, Asztalfő	25.08.2004
	Bakony, Nagy-Köves cave	15.05.2005
	Pilis Mts., Holdvilág ravine	28.08.2004
	Pilis Mts., Kakas Hill	04.09.2004
	Pilis Mts., Ördöglyuk cave	04.09.2004
	Pilis Mts., Vaskapu valley	04.09.2004
	Pilis Mts., Nagy Szoplák hill	04.09.2004
Visegrádi Mts., Magda creek	16.06.2004	
<i>Platyarthus schoblii</i>	Esztergom, Sissay street	24.07.2005

Table 2. Revisions on specimens catalogued as *Philoscia muscorum*, *P. germanicus*, *P. sp.*, *Trichoniscus noricus* and *T. plitvicensis* in the Natural History Museum of Hungary, Crustacea Collection

No.+	Date	Sampling site	Species name as catalogued	Species name after revision
351	1927	Budapest, Csillaghegy	<i>Haplophthalmus hungaricus</i>	<i>Haplophthalmus danicus</i>
872	25.09.1927	Valley of Kövecses and Ezerjő	<i>Philoscia</i>	<i>Lepidoniscus minutus</i>
873	09.08.1933.	Tahi, 7. springwell	<i>Philoscia</i>	<i>Lepidoniscus minutus</i>
876	-	Kőszeg, Szola garden	<i>Philoscia</i>	<i>Lepidoniscus minutus</i>
2500	09.08.2001	Bakonybél, Tisztavíz creek	<i>Philoscia muscorum</i>	<i>Lepidoniscus minutus</i>
2501	19.09.2001	Zirc-Akli, Szarvas kút	<i>Philoscia muscorum</i>	<i>Lepidoniscus minutus</i>
2502	08.08.2001	Ménészjárás, Hódos creek	<i>Philoscia muscorum</i>	<i>Lepidoniscus minutus</i>
2503	12.09.1930	Velem	<i>Philoscia muscorum</i>	<i>Lepidoniscus minutus</i>
2504	26.05.2001	Tardos, Bicol creek	<i>Philoscia muscorum</i>	<i>Lepidoniscus minutus</i>
2505	15.06.2000	Ivánc, beech woods	<i>Philoscia muscorum</i>	<i>Lepidoniscus minutus</i>
2506	07.04.2001	Vérteskozma	<i>Philoscia muscorum</i>	<i>Lepidoniscus minutus</i>
2507	16.03.2001	Tardos, Bicol creek	<i>Philoscia muscorum</i>	<i>Lepidoniscus minutus</i>
2508	27.02.2001	Vérteskozma, Nagy-Vásár hill	<i>Philoscia muscorum</i>	<i>Lepidoniscus minutus</i>
2509	24.08.1937	Kőszeg, Ciklámen creek	<i>Philoscia muscorum</i>	<i>Lepidoniscus minutus</i>
2510	20.06.2001	Bakonybél, Tisztavíz creek	<i>Philoscia muscorum</i>	<i>Lepidoniscus minutus</i>
5348	20-23.05.1936	Kőszegi Mts.	<i>Philoscia germanicus</i> var: <i>pannonicus</i>	<i>Lepidoniscus minutus</i>
5349	15.05.1934	Velem	<i>Philoscia sp.</i>	<i>Lepidoniscus minutus</i>
1528	02.09.19??	Kőszegi Mts., Stájer creek	<i>Trichoniscus noricus</i>	<i>Tachysoniscus austriacus</i>
1533	28.07.1937	Hosszúhuta	<i>Trichoniscus noricus</i>	<i>Trichoniscus sp.</i> <i>Porcellium sp.</i>
1534	25.08.19??	Kercsalkút creek	<i>Trichoniscus noricus</i>	<i>Tachysoniscus austriacus</i> <i>Porcellium sp.</i>
1545	28.09.1936	Kőszegi Mts.. Ciklámen creek	<i>Trichoniscus plitvicensis</i>	<i>Trichoniscus steinboeckii</i>
5416	26.04.1936	Gösssbach-valley, Kőszegi Mts.	<i>Trichoniscus plitvicensis</i>	<i>Trichoniscus steinboeckii</i>

+ Catalogue number of NHMUS Crustacea Collection

Revisions

Specimens of *Trichoniscus noricus* and *T. plitvicensis* catalogued in the NHMUS Crustacea Collection were found upon re-examination to be *T. noricus*, *T. steinboecki*, *Tachysoniscus austriacus* and *Porcellium* sp. All specimens accessioned as *Philoscia muscorum* were found to belong to the species *L. minutus* (Table 2). Re-examination of the sample collected in Budapest and catalogued as *H. hungaricus* proved that the specimens belong to the species *Haplophthalmus danicus* Budde-Lund, 1880.

On the basis of these revised identifications several new species have been added to the fauna of Kőszegi Mts. (KESSELYÁK 1937), and I suggest the exclusion of *H. hungaricus* from the species known from Budapest (STROUHAL 1965, KONTSCHÁN ET AL. 2006). I also proved that according to the given samples *Philoscia muscorum* is not a part of the Hungarian fauna.

Details of new species records

Cordioniscus stebbingi (Patience, 1907)

Syn.: *Nesiotoniscus valentiae*, *Trichoniscus* s.
Family Styloniscidae

The genus *Cordioniscus*, and the family Styloniscidae are both new to the Hungarian fauna. The species *C. stebbingi* is originated from Eastern-Spain and has a wide distribution in European greenhouses (SCHMALFUSS 2003). In Hungary it occurred in and under rotten logs in a greenhouse of Budapest. Figures: BERG & WIJNHOFEN 1998.

Examined material: Budapest, ELTE Fűvész kert greenhouse, 19.04.2005. (leg. et det. F. Vilisics, 2005)

Trichoniscus bosniensis Verhoeff, 1901

Syn.: *T. fagorum*
Family Trichoniscidae

Records of this Trichoniscid species are known from the Dinarid mountains of Croatia, Bosnia and Herzegovina, the Fruska Gora Mts. in Serbia (KARAMAN 1966), and the Danube valley in South-Western Romania (RADU 1977). It was found in waterlogged rotten logs in a humid ravine of the Mecsek Mts, Hungary. These records define the known northernmost edge of this species' range. Figures: SCHMÖLZER 1965, RADU 1977.

Examined material: Mecsek Mts., Hideg-valley, 19.06.2004 (KE, leg. et det. F. Vilisics, rev. H. Schmalfluss, 2005); 27.06.2004 (NHMS, SZIU, leg. et det. F. Vilisics, rev. H. Schmalfluss, 2005)

Trichoniscus crassipes Verhoeff, 1939

Syn.: *T. ostarrichius*
Family Trichoniscidae

Prior to the Hungarian records this species' known distribution was restricted exclusively to South-Eastern Austria (SCHMALFUSS 2003). There are similarities in morphology and known distribution with the rare isopod *T. steinboecki*, but the morphology of the exopodite of the 1st male pleopodite certainly helps in the identification. Figures: STROUHAL 1947a, 1947b, 1953.

Examined material: Mecsek Mts., Hideg-árok, 27.06.2004 (NHMS) (leg. et det. F. Vilisics, rev. H. Schmalfluss, 2005)

Chaetophiloscia cellaria (Dollfus, 1884)

Syn.: *C. italica*, *magnopunctata*, *pallida*, *piliger*, *pseudocellaria*, *solerii*, *Neophiloscia magnopunctata*, *Philoscia c.*, *italica*, *pseudocellaria*, *solerii*

Family Philoscidae

This lively species is common on the northern coast of the Mediterranean Sea, especially in Greece (SCHMALFUSS 1986), the Appennine Peninsula (TAITI & FERRARA 1996) and Slovenia (POTOČNIK 1979, VILISICS & LAPANJE 2005), but occurrences are recorded from Lebanon as well (SCHMALFUSS 1986).

The Hungarian specimens were collected in the cellar of a house in the medieval town center of Székesfehérvár. Figures: SCHMALFUSS, 1986.

Examined materials: Székesfehérvár, Megyeház str., cellar, 11.04. and 15.04.2004 (SZIU, leg. F. Vilisics, det. H. Schmalfuss, 2004)

Agabiformius lentus (Budde-Lund, 1885)

Syn.: *A. corcyraeus*, *hirtus*, *pseudopullus*, *Angara hirta*, *l.*, *Leptotrichus chobihige*, *granulatus*, *Lucasius hirtus*, *Lyprobius l.*, *Metoponorthus hidalguensis*, *Porcellio gertschi*, *hirtus*, *l.*, *pseudopullus*, *pulchellus*, *vestitus*, *Porcellionides davisii*, *hidalguensis*

Family Trachelipodidae

This isopod is considered to be common within the Mediterranean Basin, but the species has been introduced in many regions of the New World, including Haiti, Mexico and Venezuela (SCHMALFUSS 2003, SCHULTZ 1972). We collected specimens on a grassy rooftop in the Castle District of Budapest.

Examined material: Budapest, Castle District, Lovas str., 26.03.2004 (NHMUS, SZIU, leg. F. Vilisics, det. H. Schmalfuss, 2004)

Paraschizidium coeculum (Silvestri, 1897)

Syn.: *Armadillidium c.*, *olearum*, *Illyricosphaera subterranea*, *P. lianae*, *menozzii*, *olearum*, *sbordonii*, *vignai*, *Titanosphaera myrmicidarum*, *Troglarmadillidium subterraneum*

Family Armadillidiidae

This unpigmented and blind isopod originates from Southern France, Menorca, the Appennines and Northern Croatia (SCHMALFUSS 2003). An occurrence of the species was recorded from a garden in Prague (MANICASTRI & TAITI 1994). Similarly to the Czech record, the Hungarian samples were collected also from a private garden in the capital city (i.e. Budapest); their microhabitats were old timbers and wooden boxes in the humid, shady part of the garden. Figures: MANICASTRI & TAITI, 1994.

Examined material: Budapest: II. Distr. Csalán str., 10.05.2004, (SZIU, leg. F. Vilisics, det. S. Taiti, 2004)

Discussion

As a result of surveys between 2003–2005 six Isopoda species were found new to the Hungarian fauna expanding the Hungarian isopod fauna to 56. In addition, these species include four genera (*Agabiformius*, *Chaetophiloscia*, *Cordioniscus*, *Paraschizidium*) and one family (Styloniscidae) new to Hungary.

My results of the revision of museum specimens indicate that the Hungarian terrestrial isopod fauna list needs to be modified, because all examined specimens catalogued as *P. muscorum* were finally identified as *Lepidoniscus minutus*. Therefore, in contrast to the published data (KONTSCHÁN 2001), the examined specimens prove that the isopod *P. muscorum* is not a member of the Hungarian fauna.

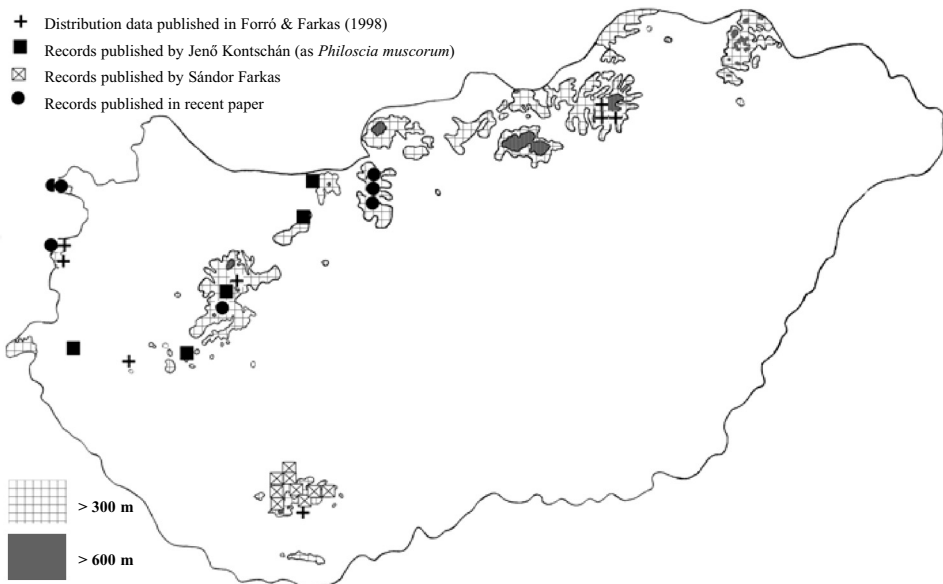


Fig. 1. The known distribution of *Lepidoniscus minutus* on a simplified geographical map of Hungary, showing the regions with elevations higher than 300 and 600 metres.

Similarly to *P. muscorum*, the European sow bug *Oniscus asellus* is widely distributed across Europe north and west of the Alps (e.g. GRUNER 1966, MEINERTZ 1964) and introduced to North America, but the few Hungarian records of this isopod are very sporadic, therefore the species is considered as rare in Hungary. Since all the records published in the past 65 years have originated from disturbed habitats (e.g. DUDICH 1942, ILOSVAY 1985, KONTSCHÁN & BERCIK 2004, CSORDÁS *et al.* 2005) we suggest that *O. asellus* cannot be considered as part of the Hungarian native fauna.

The pigmy *B. cataractae* is originated from the Adriatic Sea (SCHMALFUSS 2003). It is known as a common species in European greenhouses and apart from its original location it is seldom seen at outdoor sites (GRUNER 1966). Our records, however, prove that human activity can lead to the introduction of species to new sites, but establishment is not guaranteed: *B. cataractae* of Balatonberény had disappeared from the sampling site in the next year.

Although most of the woodlice discussed here were captured in synanthropic sites, my results show that there are many unknown aspects of isopod species assemblages in natural habitats as well.

Among the woodlice considered as rare, the species *L. minutus* proves that rarity often comes from inadequate sampling efforts. Figure 1, created by using data of FORRÓ & FARKAS (1998), FARKAS (2004), KONTSCHÁN (2001) and my own samples, shows this species to be widely distributed across the hilly regions of Hungary.

The small bodied *T. steinboeckii* is another species that's occurrence draws our attention to the adequate sampling methods and identification efforts. The species is formerly known exclusively from Eastern Austria (SCHMÖLZER 1974) and has been unknown until 2004 in Hungary. As a result of the samplings in the past few years, the increasing number of new records indicate a wide distribution of *T. steinboeckii* within Transdanubia. New records have resulted from

field surveys in Tolna county (FARKAS 2006), the Mecsek Mts. (FARKAS & VILISICS 2006), Bakony Mts., Pilis and Visegrádi Mts., Kőszegi Mts., and also from the revision of *T. noricus* and *T. plitvicensis* material held in the NHMUS Crustacea Collection. The most recent records of this species are made by GREGORY ET AL (in prep) who undertook field surveys in Hungary in 1994. We suppose that it might be a common oniscid, thus we expect further occurrences of this species from humid ravines within rural deciduous forests in Transdanubia.

In addition, revisions of male specimens catalogued as *T. noricus* and *T. plitvicensis* in the NHMUS provided additional data to the fauna list of Kőszegi Mts. (KESSELYÁK 1937) with the revised records of *T. steinboeckii*, *T. noricus* and *Tachysoniscus austriacus*.

Prior to revisions the rare species *H. hungaricus* has had a known distribution restricted to the North-Eastern hills of Hungary, with a single record from Budapest, Csillaghegy (STROUHAL 1965). Since the samples of Budapest proved to belong to the common *H. danicus*, the known distribution of *H. hungaricus* can be located to the north-western ranges of Hungary and according to its data it does not occur elsewhere in the country.

Although the checklist of FORRÓ & FARKAS (1998) provides essential data on the distribution of isopod species in Hungary, we suggest modifications to be done for the following reasons: (a) several data were recorded more than 50 years ago (e.g. *Porcellio dilatatus*, *Androniscus dentiger*), thus their recent status is uncertain (HORNUNG *et al.*, in press), (b) there are several taxonomical uncertainties (e.g. *Trichoniscus*, *Haplophthalmus* genus) concerning the species found in Hungary.

The appearance of exotic species in synanthropic habitats, in particular botanical gardens, greenhouses and public parks (e.g. KORSÓS *et al.* 2002) draws our attention to the effects of human impact on urban biodiversity. Further faunistic and ecological investigations are needed to detect the progress of dispersal of several tropical, Mediterranean or Pontic species, that occupy new niches formed by urbanization.

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**Új fajok és ritkaságok a hazai aszkafaunában (Isopoda: Oniscidea: Crustacea),
terepi gyűjtések és revíziók eredményei**

VILISICS FERENC

Az elmúlt évek terepi gyűjtéseinek köszönhetően hat új szárazföldi aszkarák is előkerül hazánk területéről. Ezek közül a többség (*Cordioniscus stebbingi*, *Chaetophiloscia cellaria*, *Agabiformius lentus*, *Paraschizidium coeculum*) lakott területekről, míg két faj (*Trichoniscus bosniensis* és *T. crassipes*) természetközeli élőhelyről. Öt ritkának tekinthető aszkafaj esetében is új elterjedési adatok regisztrálhatók: *Trichoniscus steinboeckii*, *Tachyoniscus austriacus*, *Buddelundiella cataractae*, *Lepidoniscus minutus* and *Platyarthrus schoblii*, melyek közül a *L. minutus* és a *T. steinboeckii* esetében több jel is a fajok szélesebb hazai elterjedtségére utal.

A Magyar Természettudományi Múzeumban (MTM) őrzött *Haplophthalmus hungaricus*, *Trichoniscus noricus* és *T. plitvicensis* egyedek újrahatórozása során új adatokat találtunk a *H. danicus*, *Trichoniscus steinboeckii*, *Tachyoniscus austriacus* és *Porcellium sp.* hazai elterjedéséhez. Emellett az MTM-ben őrzött minták revíziójával bizonyítottuk, hogy a korábban Magyarországon új fajként leírt *Philoscia muscorum* egyedei a *L. minutus* fajhoz tartoznak.

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