

DATA ON THE TERRESTRIAL ISOPODA FAUNA OF THE ALSÓ-HEGY, AGGTELEK NATIONAL PARK, HUNGARY

FERENC VILISICS¹, ANTAL NAGY², PÉTER SÓLYMOS¹, ROLAND FARKAS⁴, ZITA KEMENCEI¹, BARNA PÁLL-GERGELY⁵, MÁTÉ KISFALI³ & ELISABETH HORNING¹

¹ Szent István University, Faculty of Veterinary Science, Institute for Biology, Budapest, Hungary

² University of Debrecen, Faculty of Agricultural Science, Department of Plant Protection, Debrecen, Hungary

³ University of Debrecen, Faculty of Technologies and Sciences, Department of Evolutionary Zoology and Human Biology, Debrecen, Hungary

⁴ Aggtelek National Park Directorate, Jósvaló, Hungary

⁵ University of Pécs, Faculty of Sciences, Department of General and Applied Ecology, Pécs, Hungary

Corresponding author: Ferenc Vilisics, H-1077 Budapest, Rottenbiller str. 50, Hungary [vilisics.ferenc@aotk.szie.hu]

Abstract: Field surveys in dolines of Alsó-hegy, Aggtelek Karst (Hungary) yielded 10 terrestrial isopod species. Despite of the relatively low species richness, we would like to emphasize the high naturalness of the area indicated by the presence of endemic and rare species.

Key words: Isopoda, karst, doline, endemism, Aggtelek.

INTRODUCTION

The locality of the first faunistic data on Hungarian terrestrial isopods were published from the Aggtelek Karst. Dated back to 1856 and 1875, Schmidl and Frivaldszky described *Titanethes graniger*, recently known as *Mesoniscus graniger* (Frivaldszky, 1875) from the cave systems of the Aggtelek Karst. Over hundred years later KONTSCHÁN (2004) has compiled data collected by several non-isopodologist researchers and listed six widely distributed European species (*Ligidium hypnorum* (Cuvier, 1792), *Haplophthalmus danicus* Budde-Lund, 1880, *Haplophthalmus mengii* Zaddach, 1844, *Hyloniscus riparius* (C. Koch, 1838), *Orthometopon planum* (Budde-Lund, 1885), *Porcellium collicola* (Verhoeff, 1907), *Protracheoniscus politus* (C. Koch, 1841). Our present sampling was the first designed faunistic research on surface active oniscids in the Aggtelek Karst area. Moreover, MLEJNEK et al. (2001) reported occurrences of *M. graniger* from caves of Aggtelek area.

The Hungarian Northern Ranges (Északi-középhegység), probably owing to its extension and high variety of geomorphological and geological traits, has unique isopod assemblages as it is proven by ALLSPACH (1996), KONTSCHÁN (2002, 2003) and KONTSCHÁN et al. (2006). Here we find Carpathian

species (*Ligidium intermedium* Radu, 1950, *Hyloniscus transsilvanicus* (Verhoeff, 1901), *Trachelipus difficilis* (Radu, 1950) together with Atlantic-Alpine (*Porcellium conspersum* (C. Koch, 1841), *Armadillidium opacum* (C. Koch, 1841) isopods while the typical Central and Eastern European faunal elements (e.g. *P. collicola*, *P. politus* or *Lepidoniscus minutus* (C. Koch, 1838) can also be found. Moreover, the area harbours troglobitic isopods and one endemic species (*Haplophthalmus hungaricus* Kesselyák, 1930) that is considered (KESSELYÁK 1928) as an ancient form of other *Haplophthalmus* species.

Our research named “Dolina 2007 Expedition” aimed to discover and observe the soil and litter dwelling macroinvertebrates (Mollusca, Isopoda) in and around the dolines of the plateau of Alsó-hegy with special respect to microhabitat characteristics. The primary results of the research are stated in the recent paper.

MATERIALS AND METHODS

Sampling area

The Alsó-hegy (UTM: DU78) is the eastern extension of the Aggtelek Karst area that is geologically connected to the Slovak Karst and is a part of the Aggtelek National Park. The sampling area is

Table 1. Sites, localities and date of field surveys in 16 dolines in Alsó-hegy of the Aggtelek karst.

Doline	Settlement	EOV X	EOV Y	Date
1.	Bódvaszilas	773216	358520	16.08.2007
2.	Bódvaszilas	773116	358579	16.08.2007
3.	Bódvaszilas	772964	358643	16.08.2007
4.	Bódvaszilas	772891	358743	16.08.2007
5.	Bódvaszilas	773505	359347	17.08.2007
6.	Bódvaszilas	773445	359423	17.08.2007
7.	Bódvaszilas	773325	359320	17.08.2007
8.	Bódvaszilas	773228	359345	17.08.2007
9.	Komjáti	774101	358952	17.08.2007
10.	Bódvaszilas	773983	358927	17.08.2007
11.	Komjáti	774079	359070	18.08.2007
12.	Komjáti	774202	358950	18.08.2007
13.	Komjáti	774455	359408	18.08.2007
14.	Komjáti	774595	359407	18.08.2007
15.	Komjáti	774583	359330	18.08.2007
16.	Komjáti	774719	359332	18.08.2007

characterized by numerous depressions (sinkholes and dolines) in Triassic limestone formed in shallow seas approximately 210–240 million years ago. The area is covered with deciduous forests with dominating species of oak, hornbeam, beech, ash and maple. Table 1 contains data of each doline including locality and the EOV (Egységes Országos Vetület or Unified National Projection System) coordinates.

Sampling methods

Manual samplings have taken place between 16th and 18th August, 2007. We have chosen 16 dolines of similar traits (Table 1). During time sampling, two persons (F. V. and A. N.) have collected isopods for 20 minutes in each site, spending 120 minutes with sampling altogether in each doline. Time sampling provides data eligible in respect of quantitative data analyses.

We used the keys of KESSELYÁK (1928), SCHMÖLZER (1965), GRUNER (1966) and SCHMIDT (1997) for identification of woodlice specimens. Species names are used according to SCHMALFUSS (2003). Samples are stored in alcohol (70 %) in the reference collection of the Institute for Biology at the Szent István University, Faculty of Veterinary Science.

Data were handled by the 'mefa' package (Sólymos 2008) in the R environment (R Development Core Team 2007).

RESULTS

Altogether 10 isopod species were captured in the dolines studied. All the species found are considered as natives, including several rare ones with small local distribution range (HORNUNG et al. 2007).

The pigmy, rare *H. hungaricus* is the only Hungarian endemic isopod with a distribution restricted to the Hungarian Northern Ranges (FORRÓ & FARKAS 1998, VILISICS 2007). The troglotic *M. graniger* is common in the cave systems of Aggtelek karst and the surrounding countries (e.g. Slovakia, Romania, Serbia), but its occurrence on the surface is a new data for the species' Hungarian distribution.

The Central- and Eastern European species *P. politus*, *L. minutus*, *O. planum* and *Trachelipus ratzeburgii* (Brandt, 1833) are inhabitants of natural deciduous forests in Hungary and Central Europe. These isopods along with less frequent species indicate a quasi natural area under low human disturbance. The Carpathian element *T. difficilis* (occurring in N-Romania, NE-Hungary and S-Poland) is among the rarest species in Hungary, with only two published data from the past 80 years (ALLSPACH & SZLÁVECH 1990, ALLSPACH 1996).

The Atlantic-Alpine *P. conspersum* (e.g. Holland, NE-France, Germany, Switzerland, Czechia, Slovakia) is also a rare isopod for Hungary that occurs in higher elevations (above 500 m) in the Northern Ranges, like the Bükk (FORRÓ & FARKAS 1998) and

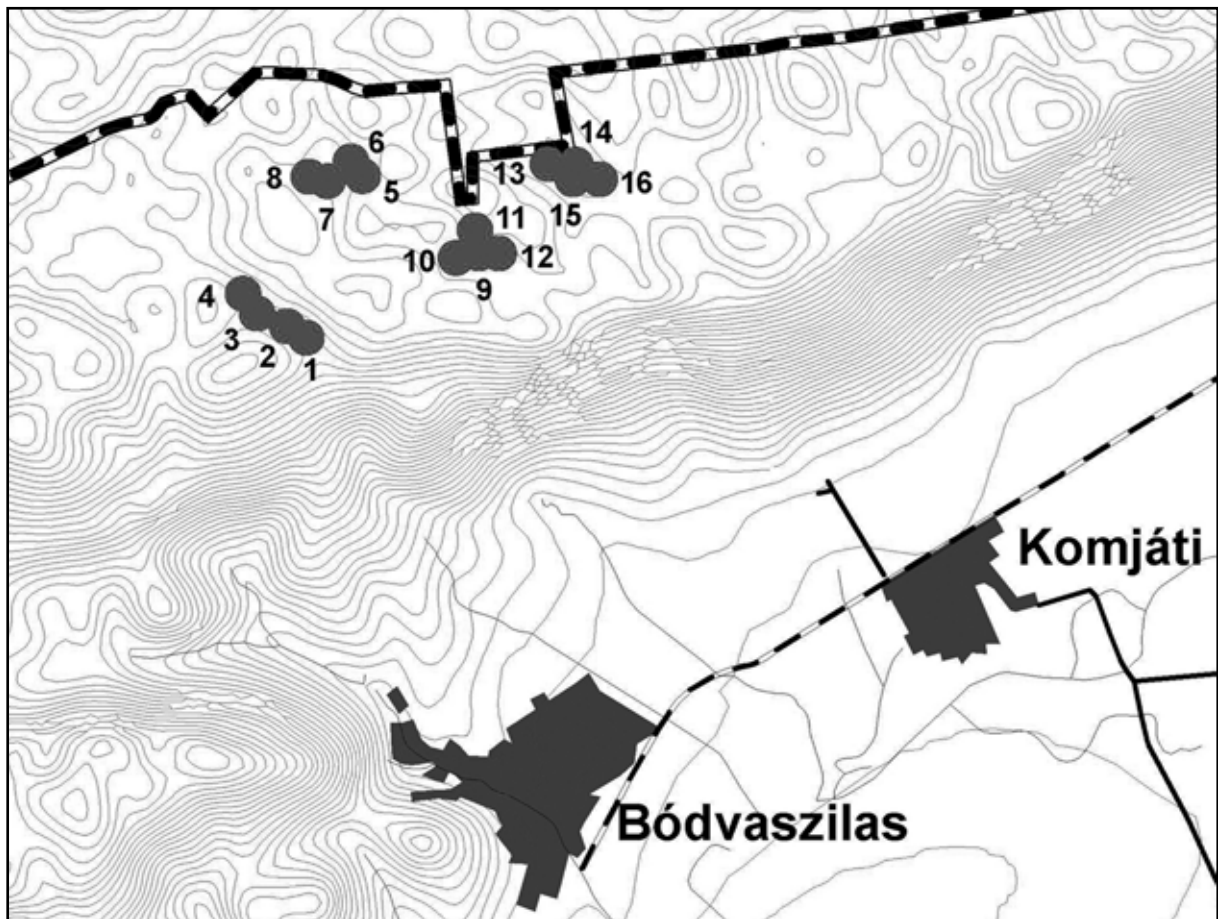


Figure 1. Map of location and numbering of the surveyed dolines.

the Zemplén Mts. (ELEK et al. 2004, KONTSCHÁN et al. 2006).

Common European species (*T. provisorius*, *T. ratzeburgii* and *L. hypnorum*) possess a wide distribution area in Europe inhabiting sites of high natural quality in Hungary (HORNUNG et al. in press).

Species occurrences in dolines of Alsó-hegy

The first number indicates the number of doline, the number in brackets refers to the number of collected individuals.

Ligiidae

Ligidium hypnorum (Cuvier, 1792) (9 dolines): 1 (1); 2 (1); 3 (3); 4 (1); 5 (5); 6 (1); 7 (3); 8 (4); 15 (1)

Trichoniscidae

Haplophthalmus hungaricus Kesselyák, 1930 (10 dolines): 1 (2); 4 (4); 6 (2); 7 (1); 8 (9); 9 (1); 11 (1); 12 (4); 13 (2); 14 (5).

Mesoniscus graniger (Frivaldszky, 1875) (1 doline): 15 (1)

Trichoniscus provisorius Racovitza, 1908 (7 dolines): 2 (2); 4 (2); 6 (1); 7 (1); 8 (7); 9 (3); 14 (5)

Philoscidae

Lepidoniscus minutus (C. Koch, 1838) (15 dolines): 1 (3); 2 (7); 3 (7); 5 (3); 6 (3); 7 (3); 8 (1); 9 (5); 10 (2); 11 (3); 12 (3); 13 (2); 14 (8); 15 (11); 16 (2)

Agnaridae

Orthometopon planum (Budde-Lund, 1885) (8 dolines): 1 (2); 2 (3); 3 (3); 8 (3); 11 (2); 12 (3); 13 (2); 15 (1)

Protracheoniscus politus (C. Koch, 1841) (15 dolines): 1 (6); 2 (2); 3 (3); 4 (1); 5 (7); 6 (16); 7 (11); 8 (10); 9 (16); 10 (7); 11 (16); 12 (10); 13 (7); 14 (5); 15 (18); 16 (4)

Trachelipidae

Porcellium conspersum (C. Koch, 1841) (6 dolines): 4 (2); 5 (1); 6 (1); 8 (10); 14 (6); 15 (1)

Trachelipus difficilis (Radu, 1950) (12 dolines): 5 (12); 6 (11); 7 (11); 8 (1); 9 (8); 10 (26); 11 (10); 12 (30); 13 (18); 14 (24); 15 (15); 16 (7).

Trachelipus ratzeburgii (Brandt, 1833) (5 dolines): 1 (1); 2 (3); 6 (1); 8 (2); 14 (3)

CONCLUSIONS

Here we present faunistic data on surface dwelling isopods from the Aggtelek Karst region. The lack of introduced, cosmopolitan or native generalist isopods might indicate a relatively high nature conservancy value of the area. Moreover, we believe that the presence of rare and sensitive species indicates naturally formed isopod assemblages with a species composition undisturbed from

human activity. However, the prevalence of such unique assemblage is no longer guaranteed under the given anthropogenic impacts (e.g. illegal logging) increasing in the area.

ACKNOWLEDGEMENTS

Our research was funded by the ÁOTK-NKB 15714, and National Research Fund (OTKA T 43508) grants. We thank to Jana Štrichelová and Dr. Ivan H. Tuf from the Palacky University, Olomouc for their help in the Slovak translation. This is paper No. 1 in „Dolina 2007 Project”.

REFERENCES

- ALLSPACH A & SZLÁVE CZ K, 1990: The terrestrial Isopod (Isopoda: Oniscidea) fauna of the Bátorliget Nature Reserves, In: MAHUNKA S (ed.): The Bátorliget Nature Reserves – after forty years, 250–257. Hungarian Natural History Museum, Budapest.
- ALLSPACH A, 1996: The terrestrial Isopods of the Bükk National Park (Crustacea; Isopoda; Oniscidea). In: Mahunka S (ed): The fauna of the Bükk National Park, II., Hungarian Natural History Museum, Budapest, 1996, pp. 71–74.
- ELEK Z, VILISICS F, HORNING E, MAGURA T & TÓTHMÉRÉ SZ B, 2004: Természetes erdőszegélyek hatása két ízeltlábú csoport térbeli mintázatára egy gyep-erdő transekt mentén (Coleoptera: Carabidae; Crustacea: Isopoda). Conference abstract, Szegedi Ökológus Napok.
- FORRÓ L & FARKAS S, 1998: Checklist, preliminary distribution maps and bibliography of woodlice in Hungary (Isopoda: Oniscidea). *Miscnea. Zool. Hung.*, 12: 21–44.
- FRIVALDSZKY I, 1865: Adatok a magyarhoni barlangok faunájához. *Matematikai és Természettudományi Közlemények*. 3: 17–53.
- GRUNER HE, 1966: Krebstiere oder Crustacea V. Isopoda 2. In: *Die Tierwelt Deutschlands und der angrenzenden Meeresteile* 53: 151–380.
- HORNING E, VILISICS F & SÓLYMOS P (in press): Low alpha and high beta diversity in terrestrial isopod assemblages in the Transdanubian region of Hungary. In: ZIMMER M et al. (eds): *Proceedings of the International Symposium on Terrestrial Isopod Biology: ISTIB-7*, Shaker Verlag: Aachen, Germany.
- HORNING E, VILISICS F & SZLÁVE CZ K, 2007: Categorization of terrestrial isopods (Isopoda, Oniscidea) of Hungary based on the comparison of Budapest and Baltimore (in Hungarian with English Summary). *Természetvédelmi Közlemények* 13: 47–58.
- KESSELYÁK A, 1928: Miként fejlődött a Haplophthalmusok páرزószerve? Bölcsészettudományi értekezés, pp. 1–19.
- KONTSCHÁN J, 2002: Ligidium fajok újabb adatai hazánkból és egy Magyarország faunájára új ászkarák, a Ligidium intermedium Radu, 1950 előkerülése a Zempléni hegységéből. (*Crustacea: Isopoda: Oniscidea*). *Folia Entomologica Hungarica* 63: 183–186.
- KONTSCHÁN J, 2003: Néhány ritka ászkarák (*Crustacea: Isopoda: Oniscidea*) újabb előfordulási adatai Magyarországról. *Folia Historico Naturalia Musei Matraensis* 27: 43–48.
- KONTSCHÁN J, 2004: Néhány adat az Északi-középhegység ászkarák faunájához (*Crustacea: Isopoda: Oniscidea*). *Folia Historico Naturalia Musei Matraensis* 28: 91–93.
- KONTSCHÁN J, HEGYESSY G & CSORDÁS B, 2006: Abaúji és Zempléni tájainak makroszkopikus rákjai (*Crustacea*). *Információk Északkelet-Magyarország természeti értékeiről V.*, Sátoraljaújhely. p. 89.
- MLEJNEK R & DUCHÁČ V, 2001: Rozšíření Mesoniscus graniger (*Crustacea: Isopoda: Oniscidea*) v západních Karpatech. *Natura Carpatica* 62: 75–88.
- R DEVELOPMENT CORE TEAM, 2007: R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0, URL: <http://www.R-project.org>.
- SCHMALFUSS H, 2003: World catalog of terrestrial isopods (Isopoda: Oniscidea). *Stuttgarter Beitr. Naturk. Ser. A. Nr.* 654: 341 pp.
- SCHMIDL C, 1856: Die Baradla-Höhle bei Aggtelek und die Lednice-Eishöhle bei Szilitze im Gömörer Komitate Ungarns. *Sitz.-ber. Akad. Wiss. Wien, Math.-naturwiss. Kl.*, 22: 579–621.
- SCHMÖLZER K, 1965: Bestimmungsbücher zur Bodenfauna Europas. *Ordnung Isopoda (Landasseln)*. Lieferung 4 and 5: 468 pp. Akademie Verlag, Berlin.
- SCHMIDT C, 1997: Revision of the European species of the genus *Trachelipus* Budde-Lund, 1908 (*Crustacea: Isopoda: Oniscidea*). *Zoological Journal of the Linnean Society*, 121: 129–244.
- SÓLYMOS P, 2008: mefa: Faunistic count data handling and reporting. R package version 1.0-4. URL: <http://mefa.r-forge.r-project.org>. Retrieved on 11.02.2008.
- VILISICS F, 2007: New and rare species in the isopod fauna of Hungary (*Crustacea, Isopoda, Oniscidea*): results of field surveys and revisions. *Folia Historico Musei Matraensis* 31: 115–123.

Submitted: 26.2.2008

Accepted: 18.4.2008

Published online: 24.4.2008