Opusc. Zool. Budapest, 2014, 45(2): 109–118

Contribution to the Macrochelidae Vitzthum, 1930 fauna of the Carpathian Basin and the Balkan Peninsula (Acari: Mesostigmata)

A. ÁCS & J. KONTSCHÁN

Anita Ács & Jenő Kontschán, Plant Protection Institute, Centre for Agricultural Research, Hungarian Academy of Sciences, Department of Zoology and Animal Ecology, H-1525 Budapest, P.O. Box 102, Hungary. E-mail: acs.anita@agrar.mta.hu

Abstract. From different localities of the Balkan Peninsula and the Carpathian Basin altogether 19 macrochelid mite species are listed belonging to the genera *Geholaspis* Berlese, 1918 (three species), *Glyptholaspis* Filipponi et Pegazzano, 1960 (one species), *Longicheles* Valle, 1953 (four species), *Macrholaspis* Oudemans, 1931 (one species), *Macrocheles* Latreille, 1829 (five species), *Neopodocinum* Oudemans, 1902 (two species) and *Nothrholaspis* Berlese, 1918 (three species). New country occurrences are also given for Croatia (three species), Hungary (three species), Macedonia (five species) Romania (five species) and Serbia (seven species).

Keywords. Acari, Mesostigmata, Macrochelidae, first record, Balkan Peninsula, Carpathian Basin.

INTRODUCTION

Macrochelid mites are usually predators of nematodes, eggs and larvae of insects or weakly sclerotized mite species. They are inhabiting soil substrates, litter and decomposing organic matter (Mašán 2003).

The family is relatively well known in Europe, but information on their occurrences in the Balkan Peninsula and the Carpathian Basin is insufficient. We have more data on the macrochelid mites from Italy (Berlese 1918, Filipponi & Pegazzano 1962), the former U.S.S.R. (Bregetova & Koroleva 1960), the British Isles (Evans & Browning 1956, Hyatt & Emberson 1988), Germany (Karg 1993), Austria (Johnston 1970), Slovakia (Mašán 2003) and Hungary (Erőss & Mahunka 1971; Kandil 1983, Kontschán 2005).

From taxonomical point of view the family Macrochelidae is also underresearched however, an important revisionary work of the family was recently published by Emberson (2010).

Here, we report on several new occurrences from different countries of the Carpathian Basin and the Balkan Peninsula (e.g. Romania, Croatia, Bulgaria, Macedonia and Serbia) increasing substantially our knowledge on the Macrochelidae fauna of the region.

MATERIAL AND METHODS

During numerous collecting trips to Europe and other parts of the World many soil samples were taken which were deposited in the Soil Zoology Collection of Hungarian Natural History Museum. Examining the samples from the Carpathian Basin and the Balkan Peninsula, the macrochelid specimens were sorted out and prepared by using lactid acid. The specimens examined are stored in ethanol and deposited in the Soil Zoology Collection of the Hungarian Natural History Museum. The classification of Macrochelidae Vitzthum, 1930 follows Emberson (2010). The species' ecological characteristics are based on Mašán (2003). Figures are added to the species new to the Hungarian fauna. The collectors' abbreviations are as follows: AM: Andrej Mock, CSCS: Csaba Csuzdi, DL: László Dányi, HA: Attila Haltrich**,** HE: Edit Horváth, KJ: Jenő Kontschán, LK: Lubomir Kovač, MD: Dávid

urn:lsid:zoobank.org:pub:AC8E68D9-A7C2-448F-B938-0E7F7EE2F42A
HU ISSN 2063-1588 (online), HU ISSN 0237-5419 (print)

Murányi, MS: Sándor Mahunka, OA: András Orosz, OK: Kirill Márk Orci, PL: Peter L'uptáčik, PT: Tamás Pócs, SZGY: György Sziráki, SZT: Tamás Szűts.

RESULTS

Family Macrochelidae Vitzthum, 1930

Genus *Geholaspis* Berlese, 1918

Geholaspis berlesei Valle, 1953

Material examined. Carpathian Basin: Slovakia, „Klastromka fent" 02.VII.1991 MS. Slovakia, Hrabusice-Podlesok, Sucha Bela from beech litter 02.VII.1991 MS. Romania, Rimetea, from detritus 20.IX.2000 SZT. Romania, Cluj-Napoca, Negreni, beech litter and moss 06.X.2006 MD. *Balkan Peninsula*: Serbia, Đerdap Planine, Golubinje from litter 13.X.2006 DL, KJ, MD.

Published records. Austria (Johnston 1970), Slovakia (Mašán 2003), Hungary (Kontschán 2006a), Slovenia (Ujvári 2009).

Diagnosis. Majority of dorsal setae pilose. Seven pairs of dorsal setae smooth (z1, j5, j6, J2, J5, z5 and z6). Dorsal shield with dotted surface. Ventrianal shield with net-like structure. Three pairs of ventrianal setae (Zv1, Jv2, Jv3) prolonged.

Distribution. Central and South Europe (Poland, Slovakia, Austria, Italy) (Mašán 2003).

Remarks. Edaphic detriticole, inhabiting leaf litter, most abundant in beech forests. This species is firstly recorded here from Serbia and Romania.

Geholaspis longispinosus (Kramer, 1876)

Material examined. Carpathian Basin: Croatia, Kutjevo streamside 20.IV.2004 KJ. Croatia, Novo Zvecevo streamside 22.IV.2004 KJ. Hungary, Aggtelek, Baradla cave, leaf litter and humus 21.III.2013 AM, PL. Romania, Munţii Rodnei, litter 27.VI.2005 − 01.VII.2005 OK, MD, KJ. Romania, Rimetea, moss of rock 20.IX.2000 SZT. Romania, Pasul Vlăhiţa moss 01.VIII.1999 OA. Romania, Lacul Sfânta Ana from sphagnum 01.VIII.1999 OA. Romania, Cheile Turzii moss from rock 08.VII.1998 HE. Romania, Arieş vale moss 11.VII.1998 HE. Austria, Altenmarkt an der Triesting, moss from soil 11.X.2003 SZGY. Slovakia, Rakovecz, litter 03.VII.1991 MS. *Balkan Peninsula*: Serbia, Krajište Planine, Surdulica beech forest litter 20.X.2006 DL, KJ, MD. Macedonia, Maleševski Planina, Berovo beech forest litter 18.X.2006 DL, KJ, MD.

Published records. Austria (Johnston 1970), Hungary (Erőss & Mahunka 1971), Slovakia (Mašán 2003), Romania (Kontschán 2006b), Slovenia (Ujvári 2009).

Diagnosis. Shape of idiosoma rounded, most of dorsal setae slightly pilose except j2, j5, j6, J2, J5, z1 and z5. Surface of dorsal shield with network pattern on posteromedial part. Ventrianal shield wider than long with large and smooth network structure.

Distribution. Europe (British Isles, Holland, Belgium, France, Switzerland, Germany, Austria, Poland, Czech Republic, Slovakia, Hungary, Romania, Slovenia, Italy, Bulgaria, Lithuania, Ukraine, Russia) and New Zealand (Mašán 2003).

Remarks. Widely distributed in Europe, very common in humus and litter with a wide ecological tolerance. This is the first record from Serbia, Croatia and Macedonia.

Geholaspis pauperior (Berlese, 1918)

Material examined. Carpathian Basin: Slovakia, „Klastromka fent" 02.VII.1991 MS. Slovakia, Hrabusice-Podlesok, Sucha Bela beech litter 02.VII.1991 MS. *Balkan Peninsula.* Macedonia, Belasica Planinite, waterfall of Kolešino Stream, platan-beech forest above the village, from litter 18.X.2006 DL, KJ, MD.

Published records. Austria (Johnston 1970), Slovakia (Mašán 2003).

Diagnosis. Shape of idiosoma oblong, most of dorsal setae brush-like, j5, j6, J2, J5, z5, z6 smooth, z1, j2 serrate. Ventrianal shield with micropuncture pattern and with net-like structure. 5 pairs of ventrianal setae smooth, blade-like.

Distribution. Central and South Europe (Switzerland, Germany, Poland, Czech Republic, Austria, Slovakia, Italy) (Mašán 2003).

Remarks. It is an edaphic detriticole montane species distributed also in higher altitudes. This is the first record from Macedonia.

Genus *Glyptholaspis* Filipponi et Pegazzano, 1960

***Glyptholaspis saprophila* Mašán, 2003**

Material examined. Carpathian Basin: Romania, Cluj-Napoca, Negreni, beech forest along the left streamside of Crisul Repede River, litter and moss 06.X.2006 MD.

Published records. Slovakia (Mašán 2003), Hungary (Kontschán *et al.* 2014).

Diagnosis. Shape of dorsal shield oval with dentate posterior margin. Most of dorsal setae relatively long, plumose, j5, j6, J2, z5 and z6 smooth and needle-like. Ventrianal shield wider than long, preanal setae long and plumose.

Distribution. Hungary (Kontschán *et al.* 2014), Romania, Slovakia and Turkey (Özbek *et al.* 2014).

Remarks. The single Hungarian data is from litter of bamboo. This species is new to the fauna of Romania.

Genus *Longicheles* Valle, 1953

***Longicheles bulgaricus* Balogh, 1958**

Material examined. Carpathian Basin: Romania, Rimetea, detritus 20.IX.2000 SZT. Romania, Rimetea, moss of rock 07.VII.1998 HE. Romania, Rimetea, moss from a meadow 21.IX.2001 SZT. *Balkan Peninsula*: Serbia, Krajište Planine, Surdulica beech litter 20.X.2006 DL, KJ, MD. Macedonia, Belasica Planinite Kolešino platan-beech forest litter 18.X.2006 DL, KJ, MD. Macedonia, Šar Planina, Gorno Jelovce from beech forest, moss of soil 15.X.2006 DL, KJ, MD.

Published records. Bulgaria (Balogh 1958), Austria (Johnston 1970).

Diagnosis. Shape of idiosoma oblong, most of dorsal setae pilose, j2, j3, j6, J2, J3, J5, z1 and z5 blade-like. Setae j2 reach the bases of j3, z1 longer than j2. Ventrianal shield with 5 pairs of short setae.

Distribution. South East Europe. (Karg 1993)

Remarks. The original description by Balogh (1958) is based on type specimens collected in montane beech and coniferous forests in Bulgaria. Later, Johnston (1970) found this species in Austria and here we report it from Serbia, Romania, and Macedonia.

***Longicheles hortorum* (Berlese, 1904)**

Material examined. Carpathian Basin: Romania, Cheile Turzii, moss 20.IX.2000 HE. Romania, three km from Corneşti 11.VII.1998 moss HE. Slovakia, „Klastromka fent" 02.VII. 1991 MS. *Balkan Peninsula*: Serbia, Đerdap Planine, Majdanpek from beech forest litter 13.X.2006 DL, KJ, MD.

Published records. Austria (Valle 1953), Slovakia (Mašán 2003).

Diagnosis. Surface of dorsal shield granulate with small microspicules. Dorsal setae brush-like, except j5, j6, J2, J5 and z6 which are smooth. Dorsal surface with net-like pattern posteriorly.

Distribution. Europe (Iceland, British Isles, Belgium, Germany, Switzerland, Poland, Lithuania, Austria, Slovakia, Italy, Turkey and Caucasus) (Mašán 2003).

Remarks. This is a rare edaphic detriticole species distributed in all over Europe. This is the first record from Serbia and Romania.

***Longicheles longulus* (Berlese, 1887)**

(Figure 1)

Material examined. Carpathian Basin: Hungary, Aggtelek, Baradla cave, leaf litter and humus 21.III.2013 AM, PL.

Published record. Slovakia (Mašán 2003).

Diagnosis. Shape of idiosoma oblong with micropuncture surface, its length 600 μm. All dorsal setae short, most of them densely plumose, except j5, j6, J2, J5, z1, z5, z6, these needle-like. Sternal shield with micropuncture pattern, genital and ventrianal shield with reticulate structure. All ventral setae short and needle-like. Ventrianal shield longer than wide.

Distribution. Belgium, Switzerland, Slovakia, France, Holland Ireland, Italy, Sicily, Armenia (Mašán 2003).

Remarks. This is the first record from Hungary.

***Longicheles mandibularis* (Berlese, 1904)**

Material examined. Carpathian Basin: Romania, Munții Bihorului, Boga vale beech forest litter 25.VII.2003 PT. Romania, Rimetea, Piatra Secuiului, detritus 20.IX.2000 SZT. Slovakia, Hrabusice-Podlesok, Sucha Bela beech litter 02.VII.1991 MS.

Published records. Austria (Johnston 1970), Slovakia (Mašán 2003), Hungary (Kontschán 2006a), Slovenia (Ujvári 2009), Romania (Manu 2010).

Diagnosis. Most of dorsal setae short, brush-like, j6, J2, J5, z5, z6 smooth, often blade-like. Bases of setae j1 close to each other. Ventrianal shield with micropuncture-reticulate pattern.

Distribution. Europe (Iceland, British Isles, Spain, Belgium, Switzerland, Germany, Poland, Czech Republic, Austria, Slovakia, Hungary, Lithuania, Ukraine, Bulgaria, Italy, Russia), Turkey and Australia (Mašán 2003).

Remarks. This species is widely distributed in Europe, very common in soil, litter and nests of birds and mammals.

Genus *Macrholaspis* Oudemans, 1931

***Macrholaspis similiopacus* Mašán, 2003**

(Figure 2)

Material examined. Carpathian Basin: Hungary, Aggtelek, Baradla cave, leaf litter and humus 21.III.2013 AM.

Published records. Slovakia (Mašán 2003).

Diagnosis. Idiosoma expanded behind shoulders and tapered posteriorly with arranged microspicules on it, length of idiosoma 720 μm. All dorsal setae conifer-shaped and pilose, j1 enlarged. Ventral shields densely dotted, on ventrianal shield arranged to net-like pattern. Sternal shield micropunctate-reticulate. Metasternal platelets present.

Distribution. Slovakia (Mašán 2003).

Remarks. This edaphic detriticole species was previously known only from a few places in Slovakia and this is the first record from Hungary.

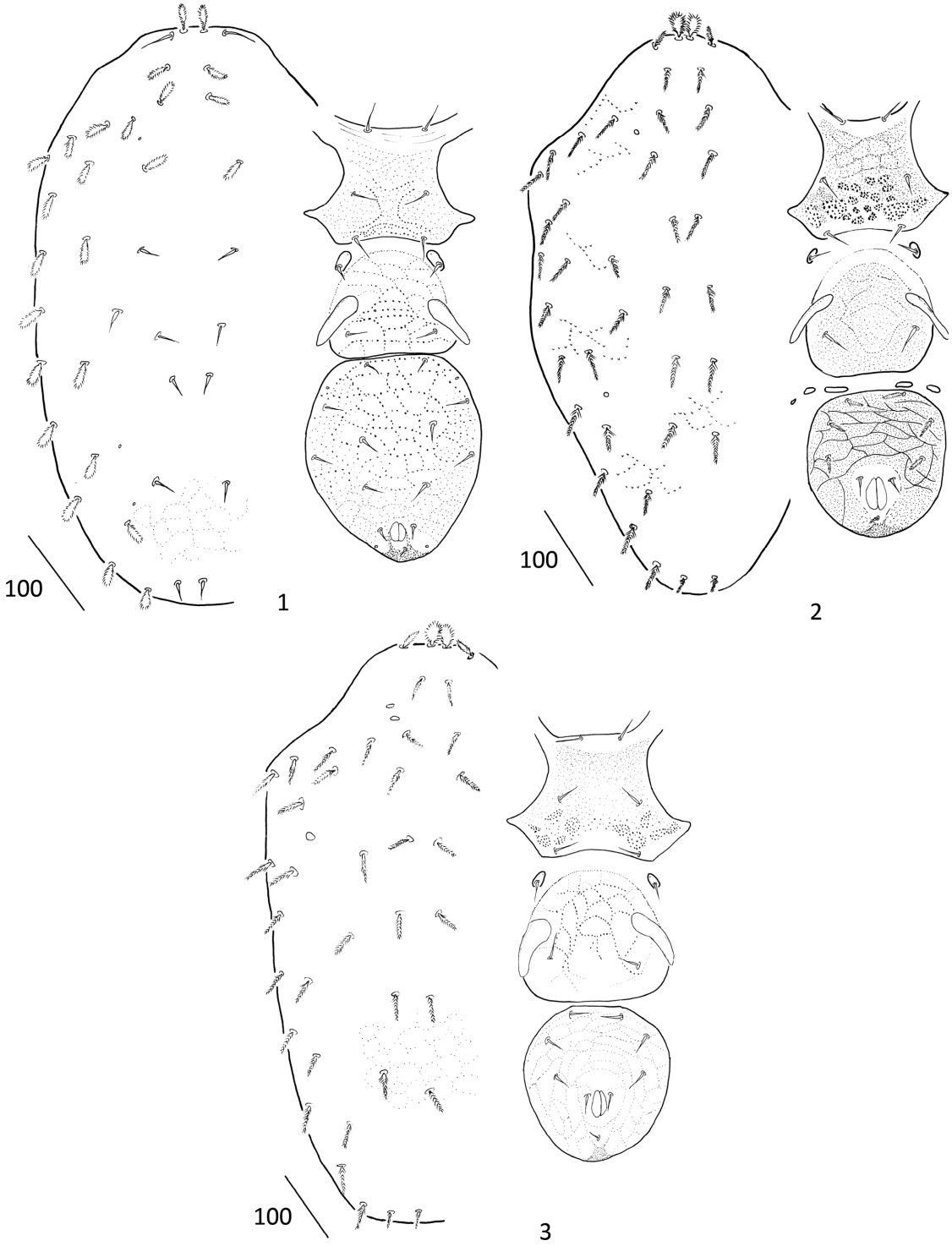
Genus *Macrocheles* Latreille, 1829

***Macrocheles disneyi* Fain et Greenwood, 1991**

Material examined. *Carpathian Basin*: Romania, Cheile Turzii moss and litter 23.VII.2002 CSCS.

Published records. Slovakia (Mašán 2003).

Diagnosis. Shape of dorsum oblong, surface dotted. Most of dorsal setae smooth and needle-



Figures 1-3. 1 = *Longicheles longulus* dorsal and ventral view. 2 = *Macrholaspis similiopacus* dorsal and ventral view. 3 = *Macrocheles punctatissimus* dorsal and ventral view. Scale bar = 100 μm

like, j1 brush-like and J5, S5, Z5 slightly pilose. Linea media transvers, weekly appeared. Sternal shield with strongly reticulate and punctuate pattern.

Distribution. British Isles, Slovakia (Mašán 2003).

Remarks. The species is phoretic on flies and was also found in nests of birds and mammals in Slovakia. This is the first record from Romania.

***Macrocheles glaber* (J. Müller, 1860)**

Material examined. Carpathian Basin: Hungary, Gyöngyös, Sár-hegy from *Cetonia aurata* (Linnaeus, 1758) 07.VI.2014 KJ.

Published records. Bulgaria (Balogh 1958), Austria (Johnston 1970), Hungary (Erőss, Mahunka 1971), Slovakia (Mašán 2003), Romania (Kontschán 2006b), Slovenia (Ujvári 2009).

Diagnosis. Dorsal shield oval with net-like pattern. Most of dorsal setae smooth, needle-like, j1 and J5 pilose. Ventrianal shield with weekly punctuate-reticulate pattern. Ventral setae smooth and needle-like.

Distribution. Europe, Asia, North America, Australia (Mašán 2003).

Remarks. This species is abundant in decomposing organic substrates, mainly in fresh dung. It has phoretic activity the found species was also carried by *Cetonia aurata* (Linnaeus, 1758) which represents the first record of association between this host and *M. glaber*.

***Macrocheles insignitus* Berlese, 1918**

Material examined. Balkan Peninsula: Serbia, Golubac, Danube shore 12.X.2006 DL, KJ, MD. Serbia, Đerdap Planine, Moşna from oak forest litter 12.X.2006 DL, KJ, MD. Macedonia, Peštani, karstic forest litter 16.X.2006 DL, KJ, MD.

Published records. Hungary (Kandil 1983), Slovakia (Mašán 2003), Romania (Minodora 2012).

Diagnosis. Shape of dorsum oval, most of dorsal setae relatively long and needle-like, j1 short, spine-like and J5 serrate. Surface of dorsal shield with network pattern. Ventrianal shield with micropuncture structure laterally, all ventral setae needle-like.

Distribution. Europe (British Isles, France, Poland, Slovakia, Romania, Hungary, Bulgaria, Italy, Russia, Georgia), China, Siberia, Japan, Iran, Egypt (Mašán 2003).

Remarks. This species is coprophilous detriticole, it shows also phoretic activity. This is the first record from Serbia and from Macedonia.

***Macrocheles penicilliger* (Berlese, 1904)**

Material examined. Carpathian Basin: Croatia, Novo Zvecevo 22.IV.2004 KJ.

Published records. Balkan (Willmann 1941), Croatia (Leitner 1946), Austria (Johnston 1970), Hungary (Kandil 1983), Slovakia (Mašán 2003).

Diagnosis. Shape of dorsal shield oblong, most of the dorsal setae brush-like, j6, J2, z1, z5 and z6 needle-like. Surface of dorsum dotted, but without network structure in medial part. Ventrianal shield with reticulate and strongly micropuncture pattern laterally.

Distribution. Europe (Iceland, British Isles, Spain, France, Germany, Switzerland, Czech Republic, Poland, Austria, Slovakia, Hungary, Croatia, Bulgaria, Italy, Russia), Asia (India, Japan), USA, North Africa, Australia and New Zealand (Mašán 2003).

Remarks. Mainly found in decaying organic substrates or nests of birds.

***Macrocheles punctatissimus* Berlese, 1918**

(Figure 3)

Material examined. Carpathian Basin: Hungary, Aggtelek, Baradla cave, leaf litter and humus 21.III.2013 AM, PL.

Published records. Austria, (Krauss 1970), Italy, France, Germany (Bregetova 1977), Slovakia (Mašán 2003).

Diagnosis. The length of idiosoma 700 μm, dorsal shield oblong with a conifer-shaped, densely plumose setae, it can bear an unpaired seta between j6 and J3. Sternal shield dotted with sculptural lines. Genital and ventrianal shield with a weak net-like sculpture. Ventrianal shield rounded.

Distribution. British Isles, France, Germany, Austria, Slovakia, Italy, Turkey (Mašán 2003).

Remarks. The specimens examined didn't bear single setae, but in all other characters comply with the original description. This hygrophilous species is mainly found in soil with high humus content. This is the first record from Hungary.

Genus *Neopodocinum* Oudemans, 1902

***Neopodocinum meridionalis* (Sellnick, 1931)**

Material examined. Carpathian Basin: Hungary, Visegrád, from *Geotrupes vernalis* (Linnaeus, 1758) 01.V.2014 HA.

Published records. Greece (Krantz 1965), Slovakia (Mašán 2003), Hungary (Kontschán 2006a).

Diagnosis. Dorsal shield egg-shaped and narrowed posteriorly. Most dorsal setae short, needle-like, j1 setae serrate and relatively long, s6, S2, S4, S5 setae serrate and 3 or 5 times longer than others. Sternal shield wider than long with a narrow medial part. Anal shield small and rounded.

Distribution. Germany, Poland, Czech Republic, Slovakia, Ukraine, Russia, Greece (Ionic Islands) (Mašán 2003).

Remarks. Coprophilous dertiticole, frequent on scarabeid beetles, mainly on *Geotrupes vernalis* (Linnaeus, 1758).

***Neopodocinum mrciaki* Sellnick, 1968**

Material examined. Carpathian Basin: Romania, Munții Rodnei, moss from a cliff 02.VIII. 2002 OA. Romania, Munții Rodnei, from pine forest litter 27.VI.2005- 01.VII.2005 OK, MD, KJ. Slovakia, Hrabusice-Podlesok, Sucha Bela beech litter 02.VII.1991 MS.

Published records. Hungary (Ambros 1984), Slovakia (Mašán 2003), Romania (Kontschán & Ujvári 2008).

Diagnosis. Dorsal shield oval with fine micropunctures. Dorsal setae long, needle-like, slightly pilose, j1 serrate, z1 shortened. Sternal shield almost rectangular. Anal shield relatively large and oval shaped.

Distribution. Central and South East Europe (Poland, Slovakia, Hungary, Transcarpathian Ukraine, Romania, Macedonia) and China (Mašán 2003).

Remarks. Edaphic detriticole, inhabiting mainly coniferous forest's needle litter, humus, and soil detritus.

Genus *Nothrholaspis* Berlese, 1918

***Nothrholaspis carinatus* (C. L. Koch, 1839)**

Material examined. Carpathian Basin: Romania, Cluj-Napoca, Negreni, beech forest along a left streamside of Crisul Repede River, beech litter and moss 06.X.2006 MD. *Balkan Peninsula*: Macedonia, Sveti Naum, springs and spring lake above the Ohrid Lake, from litter 16.X.2006 DL, KJ, MD.

Published records. Balkan (Szalay 1931, Willmann 1938, 1941), Bulgaria (Balogh 1958), Austria (Johnston 1970), Slovakia (Mašán 2003), Hungary (Kontschán 2006a), Romania (Manu 2010).

Diagnosis. Dorsal shield with reticulate and micropuncture pattern. Most of dorsal setae

brush-like, j6, J2, z5 smooth and relatively short, z1 shorter than others and pilose. Sternal shield with puncture-reticulate structure. Ventrianal shield dotted on lateral parts.

Distribution. Europe (Iceland, British Isles, Holland, Belgium, Germany, Switzerland, Austria, Poland, Slovakia, Herzegovina, Bulgaria, Russia) (Mašán 2003).

Remarks. The species is edaphic detriticole, distributed mainly in moist soils. The species is new to the fauna of Macedonia.

***Nothrholaspis montanus* (Willmann, 1951)**

Material examined. Carpathian Basin: Croatia, Kutjevo, streamside 20.IV.2004 KJ. Hungary, Aggtelek, Baradla cave, leaf litter and humus 21.III.2013 AM. Romania, Rimetea, Piatra Secuiului, from a cliff vegetation 07.VII.1998 HE. Slovakia, Rakovec from moss of cliff 03.VII.1991 MS. *Balkan Peninsula*: Croatia, Štrmac from litter 21.IV.2004 KJ. Serbia, Đerdap Planine, Majdanpek from beech litter 13.X.2006 DL, KJ, MD.

Published records. Hungary (Ambros 1987), Austria (Johnston 1970), Slovakia (Mašán 2003), Romania (Manu 2010).

Distribution. Europe (British Isles, Germany, Poland, Czech Republic, Austria, Slovakia, Ukraine, Hungary, Slovenia, Russia) and Asia (Russia: Taymyr Peninsula) (Mašán 2003).

Diagnosis. Dorsal shield oblong, dorsal setae brush-like, except j5, j6, J2, J3, z5 which smooth, z1 short and pilose. Ventrianal shield mostly triangular, lateral parts dotted. Sternal shield with strongly punctuate-reticulate pattern.

Remarks. Edaphic detriticole with a wide distribution, mainly in Europe, very common in soil substrates. This is the first record from Croatia and Serbia.

***Nothrholaspis tardus* (C.L. Koch, 1841)**

Material examined. Balkan Peninsula: Croatia, Drenovac streamside 21.IV.2004. KJ. Serbia, Đerdap Planine, Mosna from oak litter 12.X.2006 DL, KJ, MD.

Published records. Bulgaria (Balogh 1958), Austria (Johnston 1970), Slovakia (Mašán 2003), Hungary (Kontschán 2006a).

Diagnosis. Shape of dorsal shield oblong, bearing mostly relatively long and brush-shaped setae, j6, J2, z5 and z6 needle-like, z1 long and smooth reaching beyond bases j2. Ventrianal shield with strongly punctuate-reticulate pattern.

Distribution. Europe (Iceland, British Isles, Holland, Belgium, Switzerland, Germany, Poland, Czech Republic, Austria, Slovakia, Hungary, Ukraine, Bulgaria, Italy, Greece, Russia) (Mašán 2003).

Remarks. Edaphic detriticole, inhabiting moist and humid soils. This is the first record from Croatia and Serbia.

DISCUSSION

Three macrochelid mites from the listed 19 species (*Longicheles longulus* (Berlese, 1887), *Macrholaspis similiopacus* Mašán, 2003, *Macrocheles punctatissimus* Berlese, 1918) are new to the Hungarian fauna and interestingly, all these were collected in the Baradla cave, Hungary. Unfortunately mite faunistical investigations in caves are quite rare. From Hungary just a few studies have been published in the first half of the last Century (Szalay 1931, Dudich 1932). The species found here are all fast moving predatory mites and either they colonized the subterranean habitats because of presence of available pray species or most probably they were accidentally introduced by insects or mammals.

The number of the known Macrochelid mite species in different countries of the Balkan Peninsula and Carpathian Basin are quite different. For example the macrochelid fauna of Serbia, Macedonia and Croatia were previously absolutely unknown. Due to new records reported here the numbers of the known species are increased in

Romania from 9 to 14, in Croatia from 3 to 6, in Macedonia from 1 to 6, in Hungary from 43 to 46 and in Serbia from 0 to 7 species.

Acknowledgement – We are grateful to the Hungarian Natural History Museum (HNHM) and all of the collectors for providing the material elaborated. The present work was supported by the Hungarian Scientific Research Fund (OTKA 108663).

REFERENCES

AMBROS, M. (1984): Mite species (Acari: Mesostigmata) new to the Hungarian fauna. *Miscellanea zoologica hungarica,* 2: 43–44.

AMBROS, M. (1987): Mites (Acari: Mesostigmata) from small mammals in Hungary. *Parasitologia Hungarica,* 20: 99–107.

BALOGH, J. (1958): Macrocheliden aus Bulgarien (Acari, Mesostigmata). *Acta Entomologica Musei Nationalis Pragae*, 32: 247–256.

BERLESE, A. (1918): Centuria quarta di Acari nuovi. *Redia,* 13: 113–190.

BREGETOVA, N. G. (1977): *Family Macrochelidae Vitzthum, 1930*. In. GHILYAROV, M. S.& BREGETOVA, N. G. (Eds.) Key to the Soil–Inhabiting Mites. Mesostigmata". Nauka, Leningrad, p. 346–411

BREGETOVA, N. G. & KOROLEVA, E. V. (1960): Mites of the family Macrochelidae VITZTHUM, 1930 in the fauna of the USSR. *Parazitologicheskii Sbornik Zoologicheskogo lnstituta Akademii Nauk SSSR,* 19: 346–411.

DUDICH, E. (1932): Biologie der Aggteleker Tropfsteinhöhle „Baradla" in Ungarn. *Speleologische Monographien*, *Wien,* 13: 1–246.

EMBERSON, R. M. (2010): A reappraisal of some basal lineages of the family Macrochelidae, with the description of a new genus (Acarina: Mesostigmata). *Zootaxa*, 2501: 37–53.

ERŐSS, J. & MAHUNKA, S. (1971): Investigations on coprophilous and stercoricolous Macrochelids (Acari, Gamasina) in Hungary, as possible agents in the control of synanthropous flies. *Parasitologia Hungarica*, 4: 215–226.

EVANS, G. O. & BROWNING, E. (1956): British mites of the subfamily Macrochelinae TRÄGÅRDH (Gamasina, Macrochelidae). *Bulletin of the British Museum (Natural History) Zoology,* 4: 1–55.

FILIPPONI, A. & PEGAZZANO, F. (1962): Specie italiane del gruppo-*glaber* (Acarina, Mesostigmata, Macrochelidae, *Macrocheles*). *Redia*, 47: 211–238.

HYATT, K.H. & EMBERSON, R.M. (1988): A review of the Macrochelidae (Acari: Mesostigmata) of the British Isles. *Bulletin of the British Museum (Natural History) Zoology,* 54: 63–125.

JOHNSTON, D. (1970): Notes on a collection of Austrian Macrochelidae with the description of *Macrocheles beieri,* n. sp. *Annalen des Naturhistorischen Museums in Wien,* 74: 145–150.

KANDIL, M. M. (1983): T*he Mesostigmata fauna of the Hortobágy National Park (Acari)*. In. MAHUNKA, S. (Ed.) The fauna of the Hortobágy National Park. Akadémiai Kiadó, Budapest, p. 365–373.

KARG, W. (1993): *Acari (Acarina), Milben Parasitiformes (Anactinochaeta) Cohors Gamasina Leach. Raubmilben*. Jena, Stuttgart, New York Gustav Fischer Verlag, p. 96–114.

KONTSCHÁN, J. (2005): Contribution of the Macrochelidae fauna of Hungary (Acari: Mesostigmata). *Folia Historico Naturalia Musei Matraensis,* 29: 77–80.

KONTSCHÁN, J. (2006a): Check list of the Hungarian Mesostigmatid mites. I.–II. Zerconidae and Macrochelidae. *Folia Historico Naturalia Musei Matraensis,* 30: 129–136.

KONTSCHÁN, J. (2006b): Mesostigmatid mites from Maramureş (Romania) (Acari: Mesostigmata: Uropodina et Gamasina: Zerconidae, Macrochelidae, Epicriidae, Eviphidae et Parasitidae). *Studia Universitatis Vasile Goldis, Seria Stiintele Vietii (Life Sciences Series)*, 17: 53–57.

KONTSCHÁN, J. & UJVÁRI, ZS. (2008): Mesostigmatid mites from Maramureş (Acari: Mesostigmata) I. *Studia Universitatis Vasile Goldis, Seria Stiintele Vietii (Life Sciences Series),* 18: 347–358.

KONTSCHÁN, J., ÁCS, A. & NEMÉNYI, A. (2014): Adatok a magyarországi bambuszok atkáihoz. *Növényvédelem,* 50 (7): 339–343.

KRANTZ, G. W. (1965): A review of the genus *Neopodocinum* OUDEMANS 1902 (Acarina: Macrochelidae). *Acarologia*, 7: 139–173.

KRAUSS, W. (1970): Die europäischen Arten der Gattungen Macrocheles Latreille, 1829 und

Geholaspis Berlese, 1918. *Acarologie, Schriftenreihe für vergleichende Milbenkunde*, 14: 1–60.

LEITNER, E. (1946): Zur Kenntnis der Milbenfauna auf Düngerstätten. *Zentralblatt für das Gesamtgebiet der Entomologie*, 1(3): 75–95.

MANU, M. (2010): Structure and dynamics of predator mite populations (Acari-Mesostigmata) in shrub ecosystems in Prahova and Doftana Valleys. *Studia Universitatis Babes-Bolyai, Biologia,* 1: 17–30.

MAŠÁN, P. (2003): *Macrochelid Mites of Slovakia (Acari, Mesostigmata, Macrochelidae)*. Institute of Zoology, Slovak Academy of Sciences, Bratislava, pp. 149.

MINODORA, M. (2012): Similarities between predator mite populations (Acari: Gamasina) from natural forests in the Bucegi Massif, Romania. *Biologia*, 67(2): 390–396.

ÖZBEK, H. H., DOĞAN, S. & BAL, D. (2014): The genus *Glyptholaspis* FILIPPONI & PEGAZZANO (Acari: Macrochelidae) of Kelkit Valley (Turkey), with first description of male of the species *G. saprophila* MAŠÁN. *Turkish Journal of Zoology,* 38. doi:10.3906/zoo-1401-65

SZALAY, L. (1931): Adatok az Aggteleki barlang Arachnoidea-faunájának ismeretéhez. *Állattani Közlemények*, 29: 15–32.

UJVÁRI, ZS. (2009): Contribution to the Mesostigmata fauna of Slovenia (Acari: Mesostigmata: Zerconidae et Macrochelidae). *Acta entomologica slovenica,* 17: 115–124.

VALLE, A. (1953): Revisione di generi e sottogeneri Berlesiani di Acari (Primo contributo). *Redia*, 38: 316–360.

WILLMANN, C. (1938): Beitrag zur Kenntnis der Acarofauna des Komitates Bars. *Annales historico-naturales Musei nationalis hungarici, pars Zoologica*, 31: 144–172.

WILLMANN, C. (1941): Die Acari der Höhlen der Balkanhalbinsel nach dem Material der Biospeologica balcanica. S*tudien aus dem Gebiete der allgemeinen Karstforschung, der wissenschaftlichen Höhlenkunde, der Eiszeitforschung und den Nachbargebieten; Biologische Serie*, 14: (8): 1–80.