

MILLIPEDES (DIPLOPODA) OF MARAMUREȘ (ROMANIA)

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ABSTRACT. Here we present data of 21 diplopod species from 71 sampling sites of Maramureș, Romania, which belongs to the Eastern Carpathian Mountains. The species list can not be regarded complete since a systematic diplopod-summary of whole Romania is still lacking, but anyway it represents 12% of the presently known diplopod fauna of the country. The most abundant species was *Polydesmus complanatus* which is common in whole Eastern Europe, but characteristic montane species occurred in remarkable proportion, too, such as: *P. polonicus*, *P. tatranus rodnaensis*, *P. dadayi*, *Glomeris tetrasticha* and *Trachysphaera acutula*.

Keywords: Myriapoda, millipedes, Romania, Maramureș, faunistical data, montane elements

INTRODUCTION

The myriapod fauna of Maramureș County has until now only been investigated for centipedes (Chilopoda) (Dányi, 2006, 2008). The number of millipede species in Romania is approximately 162 (Fauna Europaea 2004). Unfortunately, there is no comprehensive faunal book available on the Romanian millipede fauna, although an unpublished work prepared by the lake Traian Ceuca (1921-2003) exists. This is now waiting for redaction and publication in Paris (*Mauriès* pers. comm.).

Species identification is complicated by dubious identity of old Hungarian records without available material (such as those by *Daday*, 1889 and *Tömösváry*, 1879, 1880, see also *Loksa*, 1957), and distribution data are far from complete, especially concerning certain parts of the Carpathian Mountains. Maramureș, unfortunately, belongs to these less than well-documented regions.

Although the results presented in this paper cannot be considered as a total faunal list, we believe that every opportunity to publish records on the scarcely known millipedes of Romania should be taken.

Altogether we identified 21 species of millipedes from 71 localities. Here we provide the enumeration of the species in systematic order, with localities and remarks on their identity or recent taxonomical and geographical situation.

MATERIAL AND METHODS

Material was collected in the framework of the collaboration between the University Vasile Goldiș and the Hungarian Natural History Museum, Budapest, in 2004–2007. Most of the specimens were singled by non-specialists, and no explicit milliped collecting methods were applied. All the collected Diplopoda specimens were preserved in 70 % ethanol, and are deposited in the Myriapoda Collection of the HNHM. A complete list of collecting localities and collectors can be found in *Murányi* (2008).

RESULTS

GLOMERIDA

Glomeridae

Glomeris hexasticha Brandt, 1833

Localities: 77: Lăpuș (Lápos) Mts, Văleni (Mikolapatak), Secătura, pasture, beech forest and forest brooks at Canton Silvic, N47°43'46.4" E24°01'52.5", 754 m; singled, 23.05.2006; 83: Țibleș (Cibles) Mts, Dragomirești (Dragomérfalva), Baicu Stream in alder gallery, beech forest, N47°34'43.5" E24°14'11.8", 718 m; singled, soil samples (beech litter, decaying wood and moss), 24.05.2006; 156: Maramureșului (Máramarosi) Basin, Rona de Sus (Felsőróna), Hera Pass, mountain pasture and beech forest, N47°50.703' E24°09.817', 566 m; singled, 24.05.2007.

Remarks: The widespread European taxon formerly considered as *Glomeris hexasticha* was divided by *Hoess et al.* (1997) into two separate forms: *G. intermedia* (Latzel, 1884) in the west (Spain, France, Italy, Switzerland, Germany) and *G. hexasticha* in the east, including the Carpathian Mts.

Glomeris tetrasticha Brandt, 1833 (= *connexa* C. L. Koch, 1847 partim)

Localities: 46: Piatra (Kőhát) Mts, Săpânța (Szaplónca), Săpânța (Szaplónca) Stream in a beech forest, ~500 m; singled, 30.06.2005; 58: Piatra (Kőhát) Mts, Sighetu Marmației – Șugău (Máramarossziget – Ségó), Agriș (Egres), spring pond and puddles in the Bábalázi forest, ~650 m; 20.09.2005; 60: Piatra (Kőhát) Mts, Sighetu Marmației – Șugău (Máramarossziget – Ségó), Agriș (Egres), Asupra Sorompolui area, stream in a pine forest, ~850 m; singled, soil samples (pine litter and moss), 21.09.2005; 65: Rodna (Radnai) Mts, Săcel (Izaszacsal), Iza Gorge, Iza River and the shore vegetation, limestone rocks, ~800 m; singled, 22.09.2005; 67: Gutâi (Gutin) Mts, Budești (Budfalva), stream in a beech forest along the road towards the Mt.

Creastă Cocoşului (Kakastarěj), puddles on the road, ~900 m; singled, 23.09.2005; 69: Gutâi (Gutin) Mts, Breb (Bréb), mountain grassland and forest pond under the Mt. Creastă Cocoşului (Kakastarěj), ~980 m; 23.09.2005; 77: Lăpuş (Lápos) Mts, Văleni (Mikolapatak), Secătura, pasture, beech forest and forest brooks at Canton Silvic, N47°43'46.4" E24°01'52.5", 754 m; singled, 23.05.2006; 79: Lăpuş (Lápos) Mts, Văleni (Mikolapatak), peat bog, its inflow and outflow brooks in a beech forest, pasture, pine forest edge, N47°42'43.2" E24°01'48.7", 987m; singled, 23.05.2006; 81: Lăpuş (Lápos) Mts, Văleni (Mikolapatak), Mori (Malom) Stream and its mineral water sidesprings in a beech forest, N47°43'59.8" E24°02'34.7", 620 m; singled, 24.05.2006; 84: Țibleş (Cibles) Mts, Dragomireşti (Dragomérfalva), Poienii (Réti) valley, stream in a beech forest, N47°32'57.9" E24°16'29.1", 901 m; singled, 24.05.2006; 86: Maramureş (Máramarosi) Mts, Petrova, Frumuseana, sidebrook of the Tomnatic Stream in its gorge, pine-beech mixed forest, N47°52'38.1" E24°19'19.4", 681 m; singled, 25.05.2006; 88: Maramureş (Máramarosi) Mts, Petrova, sidestream of the Tomnatic Stream in pine-beech mixed forest, ~950 m; singled, 25.05.2006; 92: Gutâi (Gutin) Mts, Baia Sprie (Felsőbánya), brook in a beech forest along the road 18, N47°41'36.4" E23°46'31.9", 909 m; singled, 26.05.2006; 96: Piatra (Kőhát) Mts, Sighetu Marmaţiei – Şugău (Máramarossziget – Sűgő), Şorămpău (Sorompó), beech forest, 1000 m; singled, 14.06.2006; 98: Piatra (Kőhát) Mts, Sighetu Marmaţiei (Máramarossziget), Strunga Țiganului (Cigány-öldal), beech forest, 1000–1100 m; singled (from horse dung), 14.06.2006; 102: Piatra (Kőhát) Mts, Săpânța (Szaplónca), Mireş (Nyíres), stream valley, 500 m; singled, 15.06.2006; 103: Piatra (Kőhát) Mts, Săpânța (Szaplónca), Mireş (Nyíres), beech forest, 800m; singled, 15.06.2006; 117: Rodna (Radnai) Mts, Săcel (Izaszacsal), Iza Spring in pine forest, ~900 m; singled, 19.09.2006; 122: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), valley of the Rica Stream, 700 m; singled, 21.09.2006; 130: Rodna (Radnai) Mts, Borşa - Staţiunea Borşa (Borsa – Borsafüred), stream along the road towards Prislop Pass, N47°37'34.0" E24°49'13.0", 1014 m; singled, 26.09.2006; 145: Maramureş (Máramarosi) Mts, Borşa – Băile Borşa (Borsa – Borsabánya), Țisla valley, Bălasina Stream in mixed forest, N47°41.506' E24°51.699', 1360 m; singled, 22.05.2007; 151: Rodna (Radnai) Mts, Săcel (Izaszacsal), Iza Gorge, Iza River and the shore vegetation, limestone rocks, N47°36.058' E24°31.812', 946 m; singled, 23.05.2007; 152: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Budescu valley, brook in mixed forest, N47°52.254' E24°36.192', 821 m; singled, 24.05.2007; 157: Igriş (Rozsály) Mts, Deseşti – Staţiunea Izvoare (Desze – Forrásliget), brook in beech forest on the Valhani Plateau, N47°43.619' E23°44.704', 967 m; singled, 25.05.2007.

Remarks: The species *Glomeris connexa* C. L. Koch, 1847 *sensu* Latzel (1884) and *sensu* Schubart

(1934) was for a long time considered as distributed in Central Europe and in the Carpathians as well. However, *Hoess & Scholl* (2001) based on allozyme data showed that there exist several distinct species with the colour pattern of four light spot series on their back: *G. guttata* Risso, 1826, endemic to South France and the valley of river Var; *G. valesiaca* Rothenbühler, 1899, from western Switzerland to Provence; and *G. connexa* C. L. Koch, 1847 from the southern Alps to the Appennines. In eastern Central Europe (bordering to Germany and Switzerland in the west) the species *G. tetrasticha* Brandt, 1833 occurs, which resembles in morphology to *G. valesiaca*, but differs genetically. In Hungary, all the former records of *G. connexa* (e.g. *Verhoeff*, 1927; *Korsós*, 1991) should be referred as *G. tetrasticha* Brandt, 1833, too. *Jermy* (1942) in his review of Glomerida in the Carpathian Mountains criticized the 10 varieties and 4 aberrations of the earlier literature: they did not seem to show any diagnostic differences. The species' main range is in the Carpathian Mts, it occurs almost in all mountains of Romania (*Ceuca*, 1989).

Trachysphaeridae

Trachysphaera acutula (Latzel, 1884)

Localities: 65: Rodna (Radnai) Mts, Săcel (Izaszacsal), Iza Gorge, Iza River and the shore vegetation, limestone rocks, ~800 m; singled, 22.09.2005; 126: Rodna (Radnai) Mts, Borşa – Staţiunea Borşa (Borsa – Borsafüred), Cimpoius Stream under the ski course, N47°36'17.1" E24°46'47.9", 946 m; singled, 26.09.2006; 156: Maramureşului (Máramarosi) Basin, Rona de Sus (Felsőrona), Hera Pass, mountain pasture and beech forest, N47°50.703' E24°09.817', 566 m; singled, 24.05.2007.

Remarks: The species is recognisable by the line of the single series of knobs on each tergite, forming a continuous transversal ridge. On tergites 4–7, there is an extra series of individual knobs in front of the ridge. *Verhoeff* (1906) described the subspecies *transsylvanica* based on specimens from Valea Vinului, and this subspecies is accepted by *Jermy* (1942), too. He considered two valid forms, the nominal one, *T. a. acutula*, in the Tatra Mountains (Slovakia and Poland), and the subspecies *T. a. transsylvanica* (Romanian Carpathians). However, the differences they emphasized are only significant in the extreme populations; already *Jermy* mentioned that specimens from localities inbetween show intermediate characters. Our specimens (both males and females) do not show the diagnostic divergence in the relative height of the ridge on the last (11th) tergite.

Another Transylvanian trachysphaerid species was described by *Tömösváry* (1880), *T. transsylvanica*, from Bihar County. According to *Daday* (1889) this falls into the synonymy of „*Gervaisia costata* var. *acutula* Latz.” thus *T. acutula* (Latzel, 1884). *Jermy* (1942) could not share this standpoint, because the specimens seemed to be lost during the 50 years.

POLYZONIIDA

Polyzoniidae

Polyzonium transsilvanicum Verhoeff, 1898

Localities: 68: Gutâi (Gutin) Mts, Breb (Bréb), slow, open stream in a spring fen, wet meadow and degraded beech forest along the road towards the Mt. Creastă Cocoşului (Kakastaréj), ~950 m; singled, 23.09.2005; 77: Lăpuş (Lápos) Mts, Văleni (Mikolapatak), Secătura, pasture, beech forest and forest brooks at Canton Silvic, N47°43'46.4" E24°01'52.5", 754 m; singled, 23.05.2006; 92: Gutâi (Gutin) Mts, Baia Sprie (Felsőbánya), brook in a beech forest along the road 18, N47°41'36.4" E23°46'31.9", 909 m; singled, 26.05.2006; 131: Maramureş (Máramarosi) Mts, Borşa – Băile Borşa (Borsa – Borsabánya), stream over the village, N47°41'20.9" E24°49'52.6", 981 m; singled, 26.09.2006; 155: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Socolău valley, stream and its sidebrook in mixed forest, N47°53.456' E24°31.089', 825 m; singled, 24.05.2007.

Remarks: There are three European species of *Polyzonium* (*eburneum*, *germanicum*, *transsilvanicum*), of which *P. germanicum* Brandt, 1837 is widespread, *P. eburneum* Verhoeff, 1907 occurs only in Italy, Switzerland, Slovakia, and Poland; and *P. transsilvanicum* is an Eastern Carpathian species (Verhoeff, 1898b) with its range occupying mountainous parts of Slovakia, Romania, and the Ukraine.

JULIDA

Julidae

Cylindroiulus burzenlandicus Verhoeff, 1907

Localities: 45: Piatra (Kőhát) Mts, Săpânţa (Szaplonca), mineral water springs and their outflows in a beech forest in the lower valley of the Săpânţa (Szaplonca) Stream, N47°56'05.5" E23°40'41.2", 408 m; singled, 30.06.2005; 46: Piatra (Kőhát) Mts, Săpânţa (Szaplonca), Săpânţa (Szaplonca) Stream in a beech forest, ~500 m; singled, 30.06.2005; 79: Lăpuş (Lápos) Mts, Văleni (Mikolapatak), peat bog, its inflow and outflow brooks in a beech forest, pasture, pine forest edge, N47°42'43.2" E24°01'48.7", 987m; singled, 23.05.2006; 83: Țibleş (Cibles) Mts, Dragomireşti (Dragomérfalva), Baicu Stream in alder gallery, beech forest, N47°34'43.5" E24°14'11.8", 718 m; singled, soil samples (beech litter, decaying wood and moss), 24.05.2006; 84: Țibleş (Cibles) Mts, Dragomireşti (Dragomérfalva), Poienii (Réti) valley, stream in a beech forest, N47°32'57.9" E24°16'29.1", 901 m; singled, 24.05.2006; 86: Maramureş (Máramarosi) Mts, Petrova, Frumuseana, sidebrook of the Tomnatic Stream in its gorge, pine-beech mixed forest, N47°52'38.1" E24°19'19.4", 681 m; singled, 25.05.2006; 122: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), valley of the Rica Stream, 700 m; singled, 21.09.2006; 123: Maramureş

(Máramarosi) Mts, Poienile de sub Munte (Havasmező), Rebiaca Mare, beech forest, 1000 m; singled, 21.09.2006; 129: Rodna (Radnai) Mts, Borşa – Staţiunea Borşa (Borsa – Borsafüred), limestone rocks over the ski course, N47°35'13.9" E24°48'05.1", 1521 m; singled, 26.09.2006; 131: Maramureş (Máramarosi) Mts, Borşa – Băile Borşa (Borsa – Borsabánya), stream over the village, N47°41'20.9" E24°49'52.6", 981 m; singled, 26.09.2006; 146: Rodna (Radnai) Mts, Borşa – Staţiunea Borşa (Borsa – Borsafüred), Cimpoiş valley, beech forest, N47°36.187' E24°46.494', 1007 m; singled, 23.05.2007; 152: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Budescu valley, brook in mixed forest, N47°52.254' E24°36.192', 821 m; singled, 24.05.2007; 154: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Lutoasa valley, brook in mixed forest, N47°51.241' E24°33.544', 868 m; singled, 24.05.2007; 155: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Socolău valley, stream and its sidebrook in mixed forest, N47°53.456' E24°31.089', 825 m; singled, 24.05.2007; 192: Depresiunea Maramureşului (Máramarosi-medence), Ocna Şugatag (Aknasugatag), Crăiasca, oak forest, 520m; singled from trunks, 05.06.2008.

Remarks: It differs from the very similar and closely related *C. luridus* (C. L. Koch, 1847) by colouration, the shape of the epiproct, and mainly in gonopod formation. However, the differences are not always convincing for a separate specific status; *Attems* (1926) also treated *burzenlandicus* only as a subspecies of *C. luridus*. The occurrence of *burzenlandicus*, nevertheless, is well outlined: records are all from the Carpathian region of Slovakia, Poland, Ukraine and Romania.

Enantiulus transsilvanicus (Verhoeff, 1899)

Localities: 79: Lăpuş (Lápos) Mts, Văleni (Mikolapatak), peat bog, its inflow and outflow brooks in a beech forest, pasture, pine forest edge, N47°42'43.2" E24°01'48.7", 987m; singled, 23.05.2006; 86: Maramureş (Máramarosi) Mts, Petrova, Frumuseana, sidebrook of the Tomnatic Stream in its gorge, pine-beech mixed forest, N47°52'38.1" E24°19'19.4", 681 m; singled, 25.05.2006; 102: Piatra (Kőhát) Mts, Săpânţa (Szaplonca), Mireş (Nyíres), stream valley, 500 m; singled, 15.06.2006; 151: Rodna (Radnai) Mts, Săcel (Izaszacsal), Iza Gorge, Iza River and the shore vegetation, limestone rocks, N47°36.058' E24°31.812', 946 m; singled, 23.05.2007.

Remarks: *E. transsilvanicus* differs from its congener, *E. nanus* by the conformation of the posterior gonopods. The specimens of Maramureş agree well with the general description, except for they have one more small spine between the two hairy processes on the anterior edge of the opisthomerite (Fig. 1). The species is eastern European, occurs in Poland, Ukraine and Romania.



Fig. 1. *Enantiulus transsilvanicus* (Verhoeff, 1899), left gonopods, mesal view. Scale bar: 0.1 mm.

Leptoiulus baconyensis (Verhoeff, 1899)

Locality: 67: Gutâi (Gutin) Mts, Budești (Budfalva), stream in a beech forest along the road towards the Mt. Creastă Cocoșului (Kakastaréj), puddles on the road, ~900 m; singled, 23.09.2005.

Remarks: Our single male specimen agrees well with the drawing by *Jawłowski* (1931; Fig. 7) on his subspecies, *L. b. pruticus*. We think, nevertheless, that to stabilize subspecific categories within the whole *Leptoiulus* complex is not justified without a thorough revision of extensive material. This opinion seems to be supported also by *Stojalowska* (1961, Figs 235-237), who presented a quite considerable variation in the gonopod conformation of *L. baconyensis*.

Leptoiulus trilobatus (Verhoeff, 1894)

Locality: 91: Gutâi (Gutin) Mts, Mara (Krácsfalva), left sidestream of the Mara (Mára) River in a beech forest, N47°43'45.7" E23°47'50.0", 622 m; singled, 26.05.2006; 108: Rodna (Radnai) Mts Săcel (Izaszacsal), Iza Spring in pine forest, ~900 m, singled beneath spruce logs; 16.06.2006; 123: Maramureș (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Rebiaca Mare, beech forest, 1000 m; singled, 21.09.2006.

Remarks: A widespread forest species, occurring in and outside the Carpathian Mountains as well.

Megaphyllum projectum (Verhoeff, 1894)

Localities: 77: Lăpuș (Lápos) Mts, Văleni (Mikolapatak), Secătura, pasture, beech forest and forest brooks at Canton Silvic, N47°43'46.4" E24°01'52.5", 754 m; singled, 23.05.2006; 80: Lăpuș (Lápos) Mts, Bârsana (Barcánfalva), Mori (Malom) Stream in alder gallery, streamshore meadow with cotton grass, N47°45'19.0" E24°03'00.9", 465 m; singled, 23.05.2006; 84: Țibleș (Cibles) Mts, Dragomirești (Dragomérfalva), Poienii (Réti) valley, stream in a beech forest, N47°32'57.9" E24°16'29.1", 901 m; singled, 24.05.2006; 98: Piatra (Kőhát) Mts,

Sighetu Marmației (Máramarossziget), Strunga Țiganului (Cigány-oldal), beech forest, 1000–1100 m; singled (from horse dung), 14.06.2006; 102: Piatra (Kőhát) Mts, Săpânta (Szaplónca), Mireș (Nyíres), stream valley, 500 m; singled, 15.06.2006; 108: Rodna (Radnai) Mts Săcel (Izaszacsal), Iza Spring in pine forest, ~900 m, singled beneath spruce logs; 16.06.2006; 113: Maramureșului (Máramarosi) Basin, Sighetu Marmației (Máramarossziget), in the town; sweeping net, 18.09.2006; 117: Rodna (Radnai) Mts, Săcel (Izaszacsal), Iza Spring in pine forest, ~900 m; singled, 19.09.2006; 130: Rodna (Radnai) Mts, Borșa - Stațiunea Borșa (Borsa – Borsafüred), stream along the road towards Prislop Pass, N47°37'34.0" E24°49'13.0", 1014 m; singled, 26.09.2006; 140: Maramureș (Máramarosi) Mts, Borșa – Băile Borșa (Borsa – Borsabánya), Vinișor valley middle section, spring in a beech forest, N47°40.160' E24°47.253', 988 m; singled, 22.05.2007; 166: Maramureș (Máramarosi) Mts, Borșa – Băile Borșa (Borsa – Borsabánya), valley of the Cislei Stream, 1320 m; singled from vegetation, 20, 27.07.2007.

Remarks: One of the most widespread forest-dweller millipede; and at the same time, responsible for the mass transformation of decaying litter with its large abundance.

Megaphyllum silvaticum (Verhoeff, 1898)

Locality: 129: Rodna (Radnai) Mts, Borșa – Stațiunea Borșa (Borsa – Borsafüred), limestone rocks over the ski course, N47°35'13.9" E24°48'05.1", 1521 m; singled, 26.09.2006.

Remarks: According to *Verhoeff* (1898a), this species is quite similar to *M. projectum*, but has no sexual colour dimorphism: both genders are dark with a thin black dorsal line. Also the male gonopods of both species have similar appearance, except an additional characteristic thick projection pointing caudad on the posterior side of the opisthomerite (Fig. 26 in *Verhoeff*, 1898a).

Ophiulus pilosus (Newport, 1842)

Localities: 1: Piatra (Kőhát) Mts, Săpânța (Szaplonca), Runcul (Runki) Stream, pine forest and meadow at the Cabana Colibi, N47°52.457' E23°43.397', 832 m; singled, 31.08.2004; 77: Lăpuș (Lápos) Mts, Văleni (Mikolapatak), Secătura, pasture, beech forest and forest brooks at Canton Silvic, N47°43'46.4" E24°01'52.5", 754 m; singled, 23.05.2006; 79: Lăpuș (Lápos) Mts, Văleni (Mikolapatak), peat bog, its inflow and outflow brooks in a beech forest, pasture, pine forest edge, N47°42'43.2" E24°01'48.7", 987m; singled, 23.05.2006; 83: Țibleș (Cibles) Mts, Dragomirești (Dragomérfalva), Baicu Stream in alder gallery, beech forest, N47°34'43.5" E24°14'11.8", 718 m; singled, soil samples (beech litter, decaying wood and moss), 24.05.2006; 84: Țibleș (Cibles) Mts, Dragomirești (Dragomérfalva), Poienii (Réti) valley, stream in a beech forest, N47°32'57.9" E24°16'29.1", 901 m; singled, 24.05.2006; 92: Gutâi (Gutin) Mts, Baia Sprie (Felsőbánya), brook in a beech forest along the road 18, N47°41'36.4" E23°46'31.9", 909 m; singled, 26.05.2006; 96: Piatra (Kőhát) Mts, Sighetu Marmației – Șugău (Máramarossziget – Ségó), Șorămpău (Sorompó), beech forest, 1000 m; singled, 14.06.2006; 98: Piatra (Kőhát) Mts, Sighetu Marmației (Máramarossziget), Strunga Țiganului (Cigány-oldal), beech forest, 1000–1100 m; singled (from horse dung), 14.06.2006; 102: Piatra (Kőhát) Mts, Săpânța (Szaplonca), Mireș (Nyíres), stream valley, 500 m; singled, 15.06.2006; 127: Rodna (Radnai) Mts, Borșa – Stațiunea Borșa (Borsa – Borsafüred), Cimpoiș valley, beech forest, wet grassland and brooks in the vicinity of the mineral water spring, N47°36'11.2" E24°46'30.0", 1023 m; singled, 26.09.2006; 130: Rodna (Radnai) Mts, Borșa - Stațiunea Borșa (Borsa – Borsafüred), stream along the road towards Prislop Pass, N47°37'34.0" E24°49'13.0", 1014 m; singled, 26.09.2006; 138: Maramureș (Máramarosi) Mts, Borșa – Băile Borșa (Borsa – Borsabánya), Vinișor valley, mixed forest and stream at Canton Silvic, N47°41.081' E24°47.416', 870 m; singled, 22–24.05.2007; 139: Maramureș (Máramarosi) Mts, Borșa – Băile Borșa (Borsa – Borsabánya), Vinișor valley upper section, mixed forest and stream, N47°39.834' E24°47.707', 1032 m; singled, 22.05.2007; 140: Maramureș (Máramarosi) Mts, Borșa – Băile Borșa (Borsa – Borsabánya), Vinișor valley middle section, spring in a beech forest, N47°40.160' E24°47.253', 988 m; singled, 22.05.2007; 152: Maramureș (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Budescu valley, brook in mixed forest, N47°52.254' E24°36.192', 821 m; singled, 24.05.2007; 154: Maramureș (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Lutoasa valley, brook in mixed forest, N47°51.241' E24°33.544', 868 m; singled, 24.05.2007; 155: Maramureș (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Socolău valley, stream and its sidebrook in mixed forest, N47°53.456' E24°31.089', 825 m; singled, 24.05.2007; 162: Gutâi (Gutin) Mts, La Secătura, beech forest, 900 m; singled (from dry branches), 25.07.2007.

Remarks: A common Palaearctic species, also introduced to many other regions of the world. It has a tendency for anthropochory in Western Europe, whereas in the east it confines more-or-less to the undisturbed broad-leaved forests.

Unciger foetidus (C. L. Koch, 1838)

Localities: 1: Piatra (Kőhát) Mts, Săpânța (Szaplonca), Runcul (Runki) Stream, pine forest and meadow at the Cabana Colibi, N47°52.457' E23°43.397', 832 m; singled, 31.08.2004; 5: Igriș (Rozsály) Mts, Ocna Șugatag (Aknasugatag), Brazilor (Fenyő) bog, peat bog with pine scrub, ~800 m; singled, 31.08.2004; 46: Piatra (Kőhát) Mts, Săpânța (Szaplonca), Săpânța (Szaplonca) Stream in a beech forest, ~500 m; singled, 30.06.2005; 58: Piatra (Kőhát) Mts, Sighetu Marmației – Șugău (Máramarossziget – Ségó), Agriș (Egres), spring pond and puddles in the Băbalăzi forest, ~650 m; 20.09.2005; 65: Rodna (Radnai) Mts, Săcel (Izszacsals), Iza Gorge, Iza River and the shore vegetation, limestone rocks, ~800 m; singled, 22.09.2005; 66: Gutâi (Gutin) Mts, Breb (Bréb), stream in alder gallery at the sulphidous spring, meadow, 625 m; singled, 23.09.2005; 77: Lăpuș (Lápos) Mts, Văleni (Mikolapatak), Secătura, pasture, beech forest and forest brooks at Canton Silvic, N47°43'46.4" E24°01'52.5", 754 m; singled, 23.05.2006; 79: Lăpuș (Lápos) Mts, Văleni (Mikolapatak), peat bog, its inflow and outflow brooks in a beech forest, pasture, pine forest edge, N47°42'43.2" E24°01'48.7", 987m; singled, 23.05.2006; 80: Lăpuș (Lápos) Mts, Bârsana (Barcánfalva), Mori (Malom) Stream in alder gallery, streamshore meadow with cotton grass, N47°45'19.0" E24°03'00.9", 465 m; singled, 23.05.2006; 81: Lăpuș (Lápos) Mts, Văleni (Mikolapatak), Mori (Malom) Stream and its mineral water sidesprings in a beech forest, N47°43'59.8" E24°02'34.7", 620 m; singled, 24.05.2006; 83: Țibleș (Cibles) Mts, Dragomirești (Dragomérfalva), Baicu Stream in alder gallery, beech forest, N47°34'43.5" E24°14'11.8", 718 m; singled, soil samples (beech litter, decaying wood and moss), 24.05.2006; 84: Țibleș (Cibles) Mts, Dragomirești (Dragomérfalva), Poienii (Réti) valley, stream in a beech forest, N47°32'57.9" E24°16'29.1", 901 m; singled, 24.05.2006; 91: Gutâi (Gutin) Mts, Mara (Krácsfalva), left sidestream of the Mara (Mára) River in a beech forest, N47°43'45.7" E23°47'50.0", 622 m; singled, 26.05.2006; 92: Gutâi (Gutin) Mts, Baia Sprie (Felsőbánya), brook in a beech forest along the road 18, N47°41'36.4" E23°46'31.9", 909 m; singled, 26.05.2006; 108: Rodna (Radnai) Mts, Săcel (Izszacsals), Iza Spring in pine forest, ~900 m, singled beneath spruce logs; 16.06.2006; 126: Rodna (Radnai) Mts, Borșa – Stațiunea Borșa (Borsa – Borsafüred), Cimpoiș Stream under the ski course, N47°36'17.1" E24°46'47.9", 946 m; singled, 26.09.2006; 129: Rodna (Radnai) Mts, Borșa – Stațiunea Borșa (Borsa – Borsafüred), limestone rocks over the ski course, N47°35'13.9" E24°48'05.1", 1521 m; singled, 26.09.2006; 131: Maramureș (Máramarosi) Mts, Borșa – Băile Borșa (Borsa – Borsabánya), stream over the village, N47°41'20.9" E24°49'52.6", 981 m; singled,

26.09.2006; 139: Maramureş (Máramarosi) Mts, Borşa – Băile Borşa (Borsa – Borsabánya), Vinişor valley upper section, mixed forest and stream, N47°39.834' E24°47.707', 1032 m; singled, 22.05.2007; 152: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Budescu valley, brook in mixed forest, N47°52.254' E24°36.192', 821 m; singled, 24.05.2007; 155: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Socolău valley, stream and its sidebrook in mixed forest, N47°53.456' E24°31.089', 825 m; singled, 24.05.2007.

Remarks: With 21 localities it was the third most abundant species in the samples from Maramureş (Fig. 2).

Xestoiulus imbecillus (Latzel, 1884)

Locality: 83: Țibleş (Cibles) Mts, Dragomireşti (Dragomérfalva), Baicu Stream in alder gallery, beech forest, N47°34'43.5" E24°14'11.8", 718 m; singled,

soil samples (beech litter, decaying wood and moss), 24.05.2006.

Remarks: *Xestoiulus* (formerly *Microiulus*, and even *Styrioiulus* by some authors) *imbecillus* is a rare, small species with eastern European distribution. One male and three females were found on a single locality. Male gonopods are exactly the same as in the drawing by Loksa (1957) on his *X. i. beszkidensis* (Loksa, 1957) from the Eastern Carpathians. Loksa described this new subspecies when revising *Daday's* material under the name „*Julus montivagus* Latzel” which actually consisted of at least four different species. We have seen samples of *X. imbecillus* from Hungary, South Transdanubia (Korsós, 1998, Fig. 3; Korsós et al., 2006, Figs 3-4), but differences for subspecific status could not be found. The two distribution areas, on the other hand, would be disjunct enough for two different subspecies if, on the basis of variation ranges of more numerous specimens, morphology supported it.

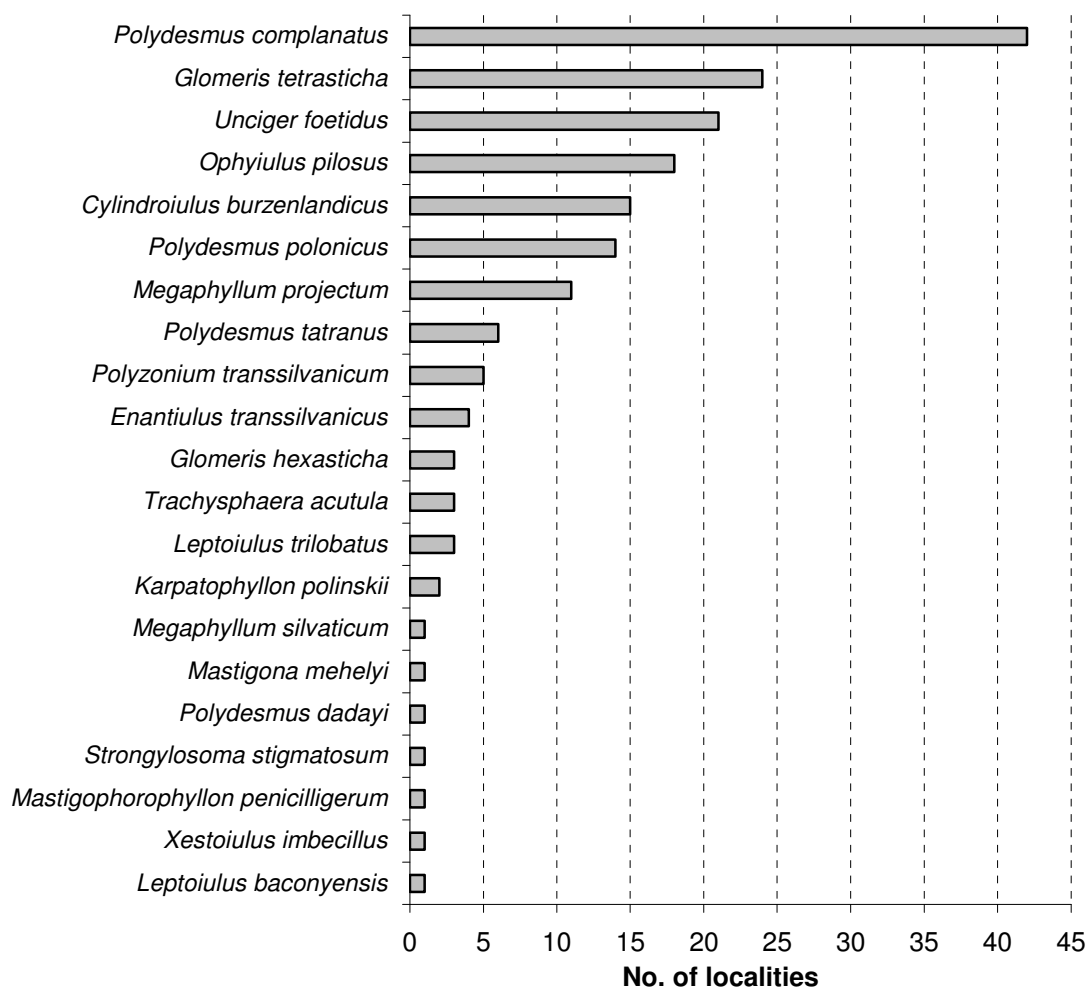


Fig. 2. Abundance of the millipede species found in Maramureş county, according to the number of collecting

CHORDEUMATIDA

Mastigophorophyllidae

Mastigona mehelyi Verhoeff, 1897

Locality: 115: Țibleş (Cibles) Mts, Dragomireşti (Dragomérfalva), valley of the Baicu Stream, singled, 19.09.2006.

Remarks: From the five European species of *Mastigona* Cook, 1895 (= *Heteroporatia* Verhoeff, 1897) – *Mastigona bosniensis* (Verhoeff, 1897), *M. mehelyi* (Verhoeff, 1897), *M. mutabilis* (Latzel, 1885), *M. transsylvanica* (Verhoeff, 1897), and *M. vihorlatica* (Attems, 1899) – *M. mutabilis* only occurs west and southwest of Hungary (Schubart, 1934; Korsós, 1998;

Fauna Europaea 2004). *M. transsylvanica* was described (without gonopod illustration) from the South Carpathians, and there is also a record from Northeast Hungary, Jósvalő, by Matic & Ceuca (1969). Two other species, *M. bosniensis* and *M. vihorlatica* differ from our single male specimen by the denticulated end of the spear-shaped lamella (= „Stachelblatt”) located mesally on the anterior gonopods (in *bosniensis* it has 1-4, in *vihorlatica* with 6-8 teeth). The whole species group is definitely in need of a thorough revision to establish the range of individual variation, but at present it seems that – based on the smooth shape of the lamella (cf. Figs 16-17 in Verhoeff, 1897, and also the discussion in Verhoeff, 1941) – our sample can be assigned to *M. mehelyi*. This species was described from Hungary, close to Budapest (Verhoeff, 1897), later reported from the Mecsek Hills, and from Slovakia (Verhoeff, 1941; Korsós, 1998; Mock, 2001).

Karpatophyllon polinskii Jawlowski, 1928

Localities: 24: Maramureşului (Máramarosi) Basin, Ruscova (Visóoroszi), Ruscova Stream and the streamshore trees above the confluence with the Vişeu (Visó) River, ~400 m; singled; 122: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), valley of the Rica Stream, 700 m; singled, 21.09.2006.

Remarks: The two mastigophorophyllid genera *Karpatophyllon* Jawlowski, 1928 and the following *Mastigophorophyllon* Verhoeff, 1897 are very closely related, they differ only in the microstructure of the posterior gonopods (*Karpatophyllon* having a pair of large, slender mesal coxal processes, Jawlowski, 1928: Figs 2-8; Ceuca, 1964: Figs III-IV). Their ecological requirements seem to differ, too (Ceuca, 1996): *Karpatophyllon* is a genus of broad-leaved forests at lower altitude, while *Mastigophorophyllon* is a real high-mountain genus distributed in the coniferous forest zone, usually higher than 900 meters. Our two samples containing *Karpatophyllon polinskii* were from the altitudes 400-700 m.

Mastigophorophyllon penicilligerum Verhoeff, 1899

Locality: 129: Rodna (Radnai) Mts, Borşa – Staţiunea Borşa (Borsa – Borsafüred), limestone rocks over the ski course, N47°35'13.9" E24°48'05.1", 1521 m; singled, 26.09.2006.

Remarks: From the eight species listed by Ceuca (1996) with featherlike process on the anterior gonopods, we identified our species as *M. penicilligerum*, based on Verhoeff's distinctive drawings (Verhoeff, 1899: Figs 52-53). One more species was described later, *M. parapenicilligerum* Crişan et Ceuca, 1998, but the lateral process on its posterior gonopod is long and bends medial, plus densely pilose at the end; all this characters are contradictory to our species. The single male specimen originates from the altitude of 1521 m, which supports Ceuca's ecological distinction of the two genera (see *Karpatophyllon*).

From eastern Slovakia, only *Mastigophorophyllon* females were recorded up to now (Mock, 2001), and

with this species at hand now, it is possible that they belonged to *M. penicilligerum*.

POLYDESMIDA

Polydesmidae

Polydesmus complanatus (Linnaeus, 1761)

Localities: 1: Piatra (Köhát) Mts, Săpânţa (Szaplonca), Runcul (Runki) Stream, pine forest and meadow at the Cabana Colibi, N47°52.457' E23°43.397', 832 m; singled, 31.08.2004; 5: Igriş (Rozsály) Mts, Ocna Şugatag (Aknasugatag), Brazilor (Fenyő) bog, peat bog with pine scrub, ~800 m; singled, 31.08.2004; 39: Rodna (Radnai) Mts, Borşa – Staţiunea Borşa (Borsa – Borsafüred), pine forest and mountain grassland on the ridge between the Mt. Ştoil and Prislop (Borsai) Pass, N47°36'06.8" E24°50'11.7", 1544 m; singled, 29.06.2005; 45: Piatra (Köhát) Mts, Săpânţa (Szaplonca), mineral water springs and their outflows in a beech forest in the lower valley of the Săpânţa (Szaplonca) Stream, N47°56'05.5" E23°40'41.2", 408 m; singled, 30.06.2005; 46: Piatra (Köhát) Mts, Săpânţa (Szaplonca), Săpânţa (Szaplonca) Stream in a beech forest, ~500 m; singled, 30.06.2005; 54: Maramureşului (Máramarosi) Basin, Sighetu Marmaţiei (Máramarossziget), Mocsár area, orchard, N47°55'07.1" E23°56'43.5", 369 m; singled, 19, 22-25.09.2005; 60: Piatra (Köhát) Mts, Sighetu Marmaţiei – Şugău (Máramarossziget – Ségó), Agriş (Egres), Asupra Sorompului area, stream in a pine forest, ~850 m; singled, soil samples (pine litter and moss), 21.09.2005; 61: Piatra (Köhát) Mts, Sighetu Marmaţiei (Máramarossziget), meadow with springs under the Mt. Ţiganului (Cigány), ~1200 m; singled, 21.09.2005; 68: Gutâi (Gutin) Mts, Breb (Bréb), slow, open stream in a spring fen, wet meadow and degraded beech forest along the road towards the Mt. Creastă Cocoşului (Kakastaréj), ~950 m; singled, 23.09.2005; 72: Igriş (Rozsály) Mts, Igriş (Rozsály) Mts, Deseşti – Staţiunea Izvoare (Desze – Forrásliget), stream in a meadow on the Valhani Plateau, beech forest and wet grassland with willow bush, N47°43'01.0" E23°44'32.1", 1020m; singled, 24.09.2005; 73: Igriş (Rozsály) Mts, Deseşti – Staţiunea Izvoare (Desze – Forrásliget), open stream, turf holes and pine forest on the edge of the volcanic plateau, ~1000 m; singled, 24.09.2005; 76: Maramureşului (Máramarosi) Basin, Sighetu Marmaţiei (Máramarossziget), Mocsár area, orchard, N47°55'07.1" E23°56'43.5", 369 m; singled, 22-26.05.2006; 77: Lăpuş (Lápos) Mts, Văleni (Mikolapatak), Secătura, pasture, beech forest and forest brooks at Canton Silvic, N47°43'46.4" E24°01'52.5", 754 m; singled, 23.05.2006; 79: Lăpuş (Lápos) Mts, Văleni (Mikolapatak), peat bog, its inflow and outflow brooks in a beech forest, pasture, pine forest edge, N47°42'43.2" E24°01'48.7", 987m; singled, 23.05.2006; 81: Lăpuş (Lápos) Mts, Văleni (Mikolapatak), Mori (Malom) Stream and its mineral water sidesprings in a beech forest, N47°43'59.8" E24°02'34.7", 620 m; singled, 24.05.2006; 84: Ţibleş (Cibles) Mts, Dragomireşti (Dragomérfalva), Poienii (Réti) valley, stream in a beech forest, N47°32'57.9" E24°16'29.1", 901 m; singled, 24.05.2006; 86:

Maramureş (Máramarosi) Mts, Petrova, Frumuseana, sidebrook of the Tomnatic Stream in its gorge, pine-beech mixed forest, N47°52'38.1" E24°19'19.4", 681 m; singled, 25.05.2006; 88: Maramureş (Máramarosi) Mts, Petrova, sidestream of the Tomnatic Stream in pine-beech mixed forest, ~950 m; singled, 25.05.2006; 91: Gutâi (Gutin) Mts, Mara (Krácsfalva), left sidestream of the Mara (Mára) River in a beech forest, N47°43'45.7" E23°47'50.0", 622 m; singled, 26.05.2006; 96: Piatra (Kőhát) Mts, Sighetu Marmaţiei – Şugău (Máramarossziget – Sűgő), Şorămpău (Sorompó), beech forest, 1000 m; singled, 14.06.2006; 98: Piatra (Kőhát) Mts, Sighetu Marmaţiei (Máramarossziget), Strunga Ţiganului (Cigány-oldal), beech forest, 1000–1100 m; singled (from horse dung), 14.06.2006; 102: Piatra (Kőhát) Mts, Săpânţa (Szaplónca), Mireş (Nyíres), stream valley, 500 m; singled, 15.06.2006; 113: Maramureşului (Máramarosi) Basin, Sighetu Marmaţiei (Máramarossziget), in the town; sweeping net, 18.09.2006; 115: Ţibleş (Cibles) Mts, Dragomireşti (Dragomérfalva), valley of the Baicu Stream, singled, 19.09.2006; 122: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), valley of the Rica Stream, 700 m; singled, 21.09.2006; 123: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Rebiaca Mare, beech forest, 1000 m; singled, 21.09.2006; 126: Rodna (Radnai) Mts, Borşa – Staţiunea Borşa (Borsa – Borsafüred), Cimpoiş Stream under the ski course, N47°36'17.1" E24°46'47.9", 946 m; singled, 26.09.2006; 130: Rodna (Radnai) Mts, Borşa – Staţiunea Borşa (Borsa – Borsafüred), stream along the road towards Prislop Pass, N47°37'34.0" E24°49'13.0", 1014 m; singled, 26.09.2006; 138: Maramureş (Máramarosi) Mts, Borşa – Băile Borşa (Borsa – Borsabánya), Vinişor valley, mixed forest and stream at Canton Silvic, N47°41.081' E24°47.416', 870 m; singled, 22–24.05.2007; 140: Maramureş (Máramarosi) Mts, Borşa – Băile Borşa (Borsa – Borsabánya), Vinişor valley middle section, spring in a beech forest, N47°40.160' E24°47.253', 988 m; singled, 22.05.2007; 146: Rodna (Radnai) Mts, Borşa – Staţiunea Borşa (Borsa – Borsafüred), Cimpoiş valley, beech forest, N47°36.187' E24°46.494', 1007 m; singled, 23.05.2007; 150: Rodna (Radnai) Mts, Săcel (Izaszacsal), Iza Spring in pine forest, N47°35.587' E24°32.121', 1037 m; singled, bitten, 23.05.2007; 152: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Budescu valley, brook in mixed forest, N47°52.254' E24°36.192', 821 m; singled, 24.05.2007; 153: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Rica valley, artificial ponds, N47°52.474' E24°34.871', 763 m; singled, 24.05.2007; 154: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Lutoasa valley, brook in mixed forest, N47°51.241' E24°33.544', 868 m; singled, 24.05.2007; 155: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Socolău valley, stream and its sidebrook in mixed forest, N47°53.456' E24°31.089', 825 m; singled, 24.05.2007; 162: Gutâi (Gutin) Mts, La Secatura, beech forest, 900 m; singled (from dry branches), 25.07.2007; 175: Munţii Maramureş (Máramarosi-havasok), Vişeu de Sus

(Felsővisó), Şuligu de Sus Stream and pine forest at the mineral water spring, N47°48.310' E24°41.143', 862m; 21.05.2008; 178: Munţii Maramureş (Máramarosi-havasok), Vişeu de Sus (Felsővisó), Vaser River and the vicinity of the forester house at Făina, N47°47.422' E24°41.784', 668m; 21–22.05.2008; 179: Munţii Maramureş (Máramarosi-havasok), Vişeu de Sus (Felsővisó), Mihoaia Stream and pine forest at the mineral water spring, N47°46.884' E24°42.018', 719m; 22.05.2008; 183: Depresiunea Maramureşului (Máramarosi-medence), Rona de Sus (Felsőrona), Hera, beech forest and a brook below the pass of the road 18, N47°51.266' E24°08.384', 601m; 22.05.2008; 192: Depresiunea Maramureşului (Máramarosi-medence), Ocna Şugatag (Aknasugatag), Crăiasca, oak forest, 520m; singled from trunks, 05.06.2008.

Remarks: By far the most widespread millipede species in the Maramureş samples, appearing in 37 localities (Fig. 2). A common eastern European forest-dweller, especially in microhabitats with plenty of decaying wood.

Polydesmus dadayi Silvestri, 1895

Localities: 146: Rodna (Radnai) Mts, Borşa – Staţiunea Borşa (Borsa – Borsafüred), Cimpoiş valley, beech forest, N47°36.187' E24°46.494', 1007 m; singled, 23.05.2007.

Remarks: A small-sized *Polydesmus*, length less than 9 mm, width less than 1 mm. Described from Maramureş by *Silvestri* (1895), so it is apparently endemic to the Eastern Carpathians (*Loksa*, 1954; *Ceuca*, 1961).

Polydesmus polonicus Latzel, 1884

Localities: 1: Piatra (Kőhát) Mts, Săpânţa (Szaplónca), Runcul (Runki) Stream, pine forest and meadow at the Cabana Colibi, N47°52.457' E23°43.397', 832 m; singled, 31.08.2004; 58: Piatra (Kőhát) Mts, Sighetu Marmaţiei – Şugău (Máramarossziget – Sűgő), Agriş (Egres), spring pond and puddles in the Băbalăzi forest, ~650 m; 20.09.2005; 63: Rodna (Radnai) Mts, Săcel (Izaszacsal), Iza Spring in pine forest, ~900 m; singled, 22.09.2005; 79: Lăpuş (Lápos) Mts, Văleni (Mikolapatak), peat bog, its inflow and outflow brooks in a beech forest, pasture, pine forest edge, N47°42'43.2" E24°01'48.7", 987m; singled, 23.05.2006; 80: Lăpuş (Lápos) Mts, Bârsana (Barcănfalva), Mori (Malom) Stream in alder gallery, streamshore meadow with cotton grass, N47°45'19.0" E24°03'00.9", 465 m; singled, 23.05.2006; 84: Ţibleş (Cibles) Mts, Dragomireşti (Dragomérfalva), Poienii (Réti) valley, stream in a beech forest, N47°32'57.9" E24°16'29.1", 901 m; singled, 24.05.2006; 86: Maramureş (Máramarosi) Mts, Petrova, Frumuseana, sidebrook of the Tomnatic Stream in its gorge, pine-beech mixed forest, N47°52'38.1" E24°19'19.4", 681 m; singled, 25.05.2006; 91: Gutâi (Gutin) Mts, Mara (Krácsfalva), left sidestream of the Mara (Mára) River in a beech forest, N47°43'45.7" E23°47'50.0", 622 m; singled, 26.05.2006; 117: Rodna (Radnai) Mts, Săcel (Izaszacsal), Iza Spring in pine forest, ~900 m; singled,

19.09.2006; 122: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), valley of the Rica Stream, 700 m; singled, 21.09.2006; 130: Rodna (Radnai) Mts, Borşa - Staţiunea Borşa (Borsa – Borsafüred), stream along the road towards Prislop Pass, N47°37'34.0" E24°49'13.0", 1014 m; singled, 26.09.2006; 150: Rodna (Radnai) Mts, Săcel (Izaszacsal), Iza Spring in pine forest, N47°35.587' E24°32.121', 1037 m; singled, 23.05.2007; 162: Gutâi (Gutin) Mts, La Secatura, beech forest, 900 m; singled (from dry branches), 25.07.2007; 47: Piatra (Köhát) Mts, Săpânţa (Szaplonca), Săpânţa (Szaplonca) Stream in a beech forest at the Sipot waterfall and a sidespring in a meadow, N47°55'55.0" E23°38'12.3", 663m; singled, 30.06.2005

Remarks: This is an eastern European species, its core range is in the Carpathian Mountains (Korsós, 1989). The occurrence in the Eastern Carpathians fits well into the distribution pattern (East Slovakia, South Poland, West Ukraine).

Polydesmus tatranus Latzel, 1884 ssp. *rodnaensis* Verhoeff, 1898

Localities: 56: Piatra (Köhát) Mts, Sighetu Marmaţiei – Şugău (Máramarossziget – Ségó), valley of the Bârlan (Birlan) Stream above the Gyertyános forester house, beech forest and the stream, ~550 m; singled, 20.09.2005; 106: Rodna (Radnai) Mts, Borşa – Staţiunea Borşa (Borsa – Borsafüred), spring area of the Bistriţa Aurie (Aranyos Beszterce), river under the Gărgălău (Gargaló) Peak, spring brooks and torrents, tarn, peat bog, pine scrub and alpine grassland, N47°34.380' E24°48.575', 1688-1711 m; singled, 16.06.2006; 122: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), valley of the Rica Stream, 700 m; singled, 21.09.2006; 129: Rodna (Radnai) Mts, Borşa – Staţiunea Borşa (Borsa – Borsafüred), limestone rocks over the ski course, N47°35'13.9" E24°48'05.1", 1521 m; singled, 26.09.2006; 143: Maramureş (Máramarosi) Mts, Borşa – Băile Borşa (Borsa – Borsabánya), alpine grassland between Stanchii hut and Mt. Cearcănul, N47°39.569' E24°52.834', 1685 m; singled, 22.05.2007; 170: Munţii Rodnei (Radnai-havasok), Săcel (Izaszacsal), Iza Gorge, Iza River and the shore vegetation, mixed forest and limestone rocks, N47°36.058' E24°31.812', 946m; 20.05.2008.

Remarks: A relatively small species, body length is under 20 mm, usually around 15 mm. Our specimens also show the characteristic tergite coloration: with lateral wings of 2, 3, 4, 6, 8, 11, and 14 being lighter, yellowish, whereas the others are dark reddish brown. This is typical for a number of *Polydesmus* species from the East Carpathians.

Latzel's *P. tatranus* from the Slovakian Tatra Mountains and Verhoeff's ssp. *rodnaensis* from Rodna Mountains show clear differences in the gonopod structure: the telopodite of the former one being much more compact and with less obvious apical processes, whereas those from Rodna have a slender tibiotarsus with three clearly visible apical spines (Verhoeff, 1898b). However, both forms have the unique long lateral projection on the coxite, although the length and

shape of it can also be different according to localities. One can wonder about why these two taxa were never considered as different species by previous authors?

Paradoxosomatidae

Strongylosoma stigmatosum (Eichwald, 1830)

Locality: 152: Maramureş (Máramarosi) Mts, Poienile de sub Munte (Havasmező), Budescu valley, brook in mixed forest, N47°52.254' E24°36.192', 821 m; singled, 24.05.2007; 190: Munţii Pietrii (Köhát), Săpânţa (Szaplonca), Mireş (Nyíres), stream valley, 500m; singled from logs, from beneath stones and sifted, 04.06.2008.

Remarks: This otherwise common forest-dwelling species was surprisingly found only in two localities of the Maramureş samples.

DISCUSSION

The only former comprehensive list of myriapods of the region was prepared by Daday (1889), but his identifications were later question-marked many times, and in some cases proved to be clearly erroneous (e.g. Loksa, 1957). Daday compiled a table of the myriapod species according to the different regions (counties) of Great Hungary at that time; in this table under the name „Máramaros” we can find only 9 „species”: *Julus austriacus* Latz., *Julus austriacus* var. *nigrescens* Latz., *Julus montivagus* Latz., *Craspedosoma mutabile* Latz., *Polydesmus tatranus* Latz., *Polydesmus complanatus* L., *Polydesmus denticulatus* C. K., *Glomeris connexa* C. K. and *Glomeris connexa* var. *hungarica* Dad. They originated only from three localities from Maramureş: „Kabolapolyána”, „Máramaros”, and „Pietross”. Due to Daday's misleading interpretations of the different species, we neglected here his data, and in the lack of a synthesis of the millipede fauna of Romania, we were left to rely on the scattered species accounts found in the literature.

Altogether, we identified 21 species of millipedes from 71 localities, visited by our colleagues in the last 3 years. The list reflects the collected methods restricted only to the usual terrestrial entomological activity; specialist species, such as those living under bark or deep in the soil were not found in the material at our disposal. The faunal composition presented here cannot be thus considered as complete; however, we believe that our records still possess a valuable contribution to the knowledge of the millipedes of the mountainous part of Romania.

When evaluating the species records, we compiled an abundance list according to the number of localities (Fig. 2). We found that *Polydesmus complanatus* was by far the most frequently found millipede species in the forest; and it is followed by two other common forest-dwellers. One of them, *Glomeris tetrasticha* is, at the same time, a characteristic Eastern European montane element, hence presenting a good indication for the virgin quality of the huge forested areas in the county of Maramureş. Several other species and subspecies, like *Polydesmus dadayi*, *P. tatranus rodnaensis*, *Leptoiulus baconyensis* (*pruticus*), *Xestoiulus imbecillus* (*beszkidensis*), and *Trachysphaera acutula* (*transsylvanica*) may represent endemic values to the

North Carpathians, too; but their taxonomical status needs, in some cases, further confirmation. *Polyzonium transsilvanicum*, *Cylindroiulus burzenlandicus*, *Enantiulus transsilvanicus*, and *Polydesmus polonicus* are distributed in the bordering areas of Poland, Slovakia, Ukraine and Romania, composing together also a characteristic fauna for the Carpathian Mts.

According to *Tabacaru* (1970), most of these species are the result of a North Carpathian lineage, originated from the eastern Alps, then slowly colonising the high mountains eastwards, following the Carpathian Chain through the Tatras in Slovakia and Poland, reaching the Rodnei, the Maramureş, the Lăpuşului etc. Mts in Northwest Romania. Further expansion with different millipede genera and species might have followed two dividing routes: one to the south to Transylvania and the Apuseni Mts, and the other to the east along the main chain of the Carpathians, reaching ultimately its southernmost area in the South Carpathians, and meeting here in the contact zone of the fauna recolonised from the Balkan Peninsula.

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