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Holecová M., Némethová D., Kúdela M.: **Štruktúra a funkcia spoločenstiev nosáčikov** (Coleoptera, Curculionoidea) **v epigeóne dubovo-hrabových lesov JZ Slovenska.**

V rokoch 1999–2002 sme študovali štruktúru a dynamiku taxocenóz nosáčikov (Coleoptera, Curculionoidea) v epigeóne dubovo-hrabových lesov. Výskum sme uskutočnili na 10 študijných plochách, v lesných porastoch veku 40–100 rokov patriacich do zväzov *Carpinion betuli, Quercion confertae-cerris, Q. pubescentis-petrae.* Študované lesné porasty sa nachádzajú v orografických celkoch Malé Karpaty a Trnavská pahorkatina. Pôdnu makrofaunu sme zbierali metódou presevov v mesačných intervaloch. Materiál sme extrahovali v xereklektoroch Moczarskeho typu. Celkove sme zozbierali 4 090 jedincov, ktoré patrili do 78 druhov, 43 rodov a 4 čeľadí. Na jednotlivých študijných plochách sme zistili od 22 do 31 druhov. Priemerná abundancia nosáčikov dosahovala hodnoty od 2.1 do 49.7 ex.m^{-2} Charakteristické druhové spektrum bolo zastúpené 3 skupinami druhov: (1) druhmi s vysokou hodnotou dominancie a konštantnosti – *Acalles fallax, Barypeithes mollicomus, Trachodes hispidus, Ceutorhynchus pallidactylus, C. obstrictus, Sitona macularius;* (2) druhmi s vysokou konštantnosťou, ktoré nedominujú – *Acalles camelus, Ruteria hypocrita, Ceutorhynchus alliariae, C. scrobicollis, Coeliodes trifasciatus, Curculio glandium, Furcipus rectirostris, Phyllobius argentatus*; (3) diferenčnými druhmi – *Acalles echinatus, Acallocrates colonnellii, Barypeithes albinae, Brachysomus dispar, B. setiger, Coeliodes proximus, C. rana, C. transverseoalbofasciatus.* RDA ordinácia ukázala, že z vybraných 13 gradientových a 2 kategoriálnych premenných má na štruktúru spoločenstiev Curculionoidea priamy a signifikantný vplyv zápoj stromovej etáže a obsah výmenných báz (Ca^{2+}, Mg^{2+}, K^{+}, Na^{+}) v pôde. Fragmentácia porastov mala za následok vzrast početnosti herbikolných, euryhygrických, ubikvistických druhov. Nestabilné a kvantitatívne chudobné bolo spoločenstvo porastu zaprášeného vápenatým prachom z blízkeho lomu.

BIODIVERSITY OF SELECTED INVERTEBRATE GROUPS IN OAK-HORNBEAM FOREST ECOSYSTEM IN SW SLOVAKIA

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Abstract

Holecová M., Krumpál M., Országh I., Krumpálová Z., Fedor P.: Biodiversity of selected invertebrate groups in oak-hornbeam forest ecosystem in SW Slovakia. Ekológia (Bratislava), Vol. 24, Supplement 2/2005, p. 205–222.

The paper summarizes analyses of 4–year long coenological research on micro- and macrofauna in oak-hornbeam forest ecosystems in SW Slovakia. The studied forest ecosystems, 40–100 years of age, are situated in the orographic units of the Malé Karpaty Mts. and Trnavská pahorkatina hills and may be classified into 3 vegetation types: *Carpinion betuli*, *Quercion confertae-cerris* and *Quercion pubescentis-petraeae*. In total we determined 39,987 invertebrates (except for Protozoa) and thus recorded 575 species of 4 phyla (Ciliophora, Rhizopoda, Tardigrada, Arthropoda). Twelve taxocoenoses of ciliates, naked amoebae, water bears, pseudoscorpions, spiders, mesostigmatid mites, terrestrial isopods, centipedes, millipedes, earwigs, bugs, weevils were analysed more in detail. Apart from forest epigeon we were focused on some other microhabitats, such as decaying wood mater, mosses and dendrotelmae. Of the studied microfauna just the community from decaying wood possessed affinity to soil. In the other microhabitats (dendrotelmae and mosses) species are predominantly interacted with aquatic environment. There are stronger bonds onto soil at arthropods, represented particularly by epigeic, partially by typically edaphic species. Of the 15 analysed variables just age of a stand, depth of leaf litter, undergrowth coverness of canopy and sporadically pollution (dust from the quarry) appeared as significantly influencing the studied arthropod communities.

Key words: invertebrates, coenoses, oak-hornbeam forest, epigeon, mosses, decaying wood, tree-holes, SW Slovakia tree-holes, SW Slovakia

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Protracheoniscus politus and *Porcellium collicola* may be classified as indicative species. The communities were influenced by age of a stand, soil type, content of Ca and pH of soil (Tuf, Tufová, 2005).

Of ten recorded pseudoscorpion species just *Neobisium muscorum* was recorded at all the study sites. Four communities being classified for the study area were not significantly impacted by 15 measured environmental variables. The highest stability refers to the assemblage in 80–100 year old oak-hornbeam forest stands, the lowest values hints at more arid and younger forest (60–80 years) with markedly reduced leaf horizon (Christophoryová, Krumpál, 2005).

One hundred and fifty-eight species and 24 families of spiders were recorded in the study area. Their communities in oak-hornbeam forests were considerably diverse with the indication species of *Trochosa terricola*, *Pardosa lugubris* and *Tenuiphantes mengei*. Of the measured environmental variables the undergrowth appears as the only factor significantly influencing the communities. The other variables seem to be with no important impact on taxocoenoses of spiders (Krumpálová, 2005).

The studied microhabitats were inhabited by 75 mesostigmatid mites. *Holoparasitus calcaratus*, *Veigaia nemorensis, Vulgarogamasus kraepelini* and *Zercon peltatus* var. *peltatus* were the eudominant species in forest soil. Temperature, air humidity, soil type, pH and vegetation may be classified as the most significant factors influencing structure and frequency in the communities of mites (Fend'a, Ciceková, 2005).

The centipede (Chilopoda) communities were formed by 10–17 species of the total richness of 24 species recorded in the study area. *Schendyla nemorensis* and *Lithobius muticus* belonged to the category of eudominant species at all the sites. The typical centipede community in the oak-hornbeam forests of the Malé Karpaty Mts consists of the following species: *Schendyla nemorensis*, *Strigamia acuminata*, *Lithobius agilis*, *L. borealis*, *L. lapidicola*, *L. mutabilis*, *L. muticus*, *L. austriacus*; in more southern drier parts of the Malé Karpaty Mts *Henia illyrica* as well. The highest diversity (17 species) refers to the 80–100 year old oak-hornbeam forest, the lowest one to the more arid and younger (60–80 years old) stand with minimal leaf litter. Most species occurred during the whole year, what was actually proved by additional samples from January 2000–2002 being excluded from the paper (Országh, Országhová, 2005).

Eighteen millipede species were recorded in the studied oak-hornbeam forests. Individual communities were formed by 8–14 species. *Cylindroiulus boleti*, *Strongylosoma stigmatosum* and *Ommatoiulus sabulosus* may be classified as indication species. The results of cluster analysis of the similarity of localities showed possible influence of the height of forest growth and also values of pH and sorption complex in leaf litter on the structure of the millipede communities. The tree height could have an indirect effect in the terms of higher litter production (bigger amount of suitable food source for saprophages) by taller trees (Stašiov, 2005).

Fourty-six species of Heteroptera were recorded in the oak-hornbeam forests. The communities at the study sites were formed by 21–28 species, including eudominant *Legnotus limbosus* and *Eurygaster maura*. The following species may be considered as the typical elements: *Drymus brunneus, D. ryeii, Scolopostethus affinis, S. thomsoni, Rhyparochromus alboacuminatus*, *Legnotus limbosus*. The geoxenous species such as *Aelia acuminata* or *Eurygaster maura* are common as well. The research has proved the

impact of canopy coverness (E_3) on structure of bug communities. *Tropistethus holosericeus, Legnotus limbosus, Plinthisus brevipennis, Raglius alboacuminatus, Trapezonotus arenarius* or *Microporus nigritus* may be classified as more heliophilous species with preference to scarce cover. Moreover the nearby quarry is supposed to negatively influencing (air pollution) the community of epigeic Heteroptera in oak-hornbeam forests of the Malé Karpaty Mts (Hradil, 2005).

In epigeon of oak-hornbeam forests we recorded 78 species of weevils. Their communities were usually formed by 22–31 species. *Acalles fallax, Barypeithes mollicomus, Trachodes hispidus*, *Ceutorhynchus pallidactylus, C. obstrictus* and *Sitona macularius* may be classified as species with high value of dominance and frequency. Of 13 gradient and 2 categorial variables being analysed in the research there are just several: coverness of canopy and content of exchangeable bases (Ca^{2+}, Mg^{2+}, K^{+}, Na^{+}) in soil with a significant impact on communities of weevils. Fragmentation of stands leaded to increase in abundance of herbicolous, euryhygric and ubiquitous species. The community at the site being influenced by calcareous dust from the nearby quarry may appear as unstable and quantitatively poor (Holecová et al., 2005).

Apart from the groups studied and mentioned above we include notes on thrip communities (Thysanoptera), which undisputedly form an important part of forest ecosystem and may indicate character and dynamics of ecological conditions. However the thrips being sampled from epigeon predominantly have arboricolous origin and many of them possess strong interactions with soil in some ontogenetical stage. The taxocoenoses consist of approximatelly 15 species and are significantly equitable in older, more stable forests. For instance in Cajla (site 1) *Hoplandrothrips williamsianus* P r i e s n e r, 1923 may be considered as an indication species of vital oak-hornbeam forests, followed by zoophagous *Aeolothrips versicolor* U z e l, 1895. In more opened forest stands with a real possibility for infiltration of thrips from the nearby ecosystems, such as Horný háj grove, the communities are enriched in several more heliophilous species such as *Limothrips denticornis* H a l i d a y, 1836 and *Frankliniella tenuicornis* (U z e l, 1895).

Of the studied Protozoa and Tardigrada there was only one group in decaying wood matter with affinity towards soil. The other communities possessed interactions to aquatic environment. The observed arthropods were more significantly interacted with soil. The communities were predominantly represented by epigeic species, partially by typical edaphic species. Of the 15 analysed variables just age of a stand, depth of leaf litter, coverness of herbage undergrowth, canopy architecture and sporadically pollution (dust from the quarry) appeared as significantly influencing the studied arthropod communities.

Translated by P. J. Fedor

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Introduction

Oak-hornbeam forests used to be the most frequent forest climatically zone formation at lower altitudes in Slovakia. In past they continually covered large areas particularly in lowlands from the altitude of 100 m a.s.l. In hills they spread up to 600 m a.s.l. and occurred in all Carpathian basins. For a long time these forest stands have been under intensive anthropogenous impact in Slovakia as well as in other European regions. Nowadays they have survived in fragments attacked and impacted by humans. However in cultural land they provide refugium for many animal species.

Animals in such the forest type have not yet been intensively studied. Relevant papers dealing with fauna of oak-hornbeam forests are usually focused on pests (e.g. Patočka et al., 1999), or are limited by partial taxocoenoses of certain invertebrates (for example naked amoebae: Mrva, Matis, 2000; Mrva, 2003; ciliates: Tirjaková, 2002; Tirjaková et al., 2002; water bears: Nelson et al., 1979; Guoth, 1986; Dastych, 1988; Degma et al., 2004, 2005a; terrestrial isopods: Gulička, 1960; Krumpál, 1973, 1976; Flasarová, 1980, 1986; Flasar, Flasarová, 1989; millipedes: Gulička, 1986; Branquart et al., 1995; Korsós, 1997; David et al., 1999; centipedes: Wytwer, 1990; Tajovský, 2001; spiders: Žitňanská, 1981; Gajdoš, 1992; Gajdoš, Krumpál, 1986, 1988; Jedličková, 1988; Noflatscher, 1991; Esjunin et al., 1994; Krumpálová, Bartoš, 2002; Krumpálová, Szabová, 2003, 2005; mites: Kalúz, 1981, 2005; Ambros, Kalúz, 1985, 1987; Mašán et al., 1994; Kalúz, Fenďa, 2005; bugs: Štepanovičová, Kovačovský, 1971; Bianchi, 1991; Rédei, Hufnagel, 2003a, b; Bakonyi et al., 2002; beetles: Korbel, 1966, 1973; Drdul, 1973; Czechowski, 1989; Majzlan, 1986, 1991; Majzlan, Hošták, 1996; Majzlan et al., 2000; Holecová, Sukupová, 2002; Holecová et al., 2002 etc.).

General and complex view on arthropod fauna in Central-European oak-hornbeam forest has been included in just a few of papers (e.g. Balogh, Loksa, 1948; Verner, 1959; Loksa, 1966, 1968; partially Nosek, 1986).

This study has been focused to analyse the structure and biodiversity of soil micro- and macrofauna in oak-hornbeam forest ecosystem more complexly. The research hinted at stands of different age and anthropogenous impact. Impacts of forest fragmentation as well as some ecological and environmental factors have been taken into account.

The research was realised during 4 vegetation seasons (1999–2002) at 10 regularly studied sites in central and northern part of the Malé Karpaty Mts and nearby Trnavská pahorkatina hills. Apart from intensive analyses of soil fauna we were focused on some other microhabitats, such as mosses, decayed wood mater (in various decay degree) and dendrotelmae, which have not been intensively studied yet, particularly from the microfauna point of view.

Material and methods

To study epigeic and soil macrofauna we applied almost all the available collecting methods, such as sieving the leaf litter and upper part of soil, direct sampling of soil (leaf litter, soil) as well as formaldehyde ground traps. From samples of mosses, wood and tree-holes the microfauna was studied by direct analyses of sampled material and modifications of non-flooded Petri-dish method. Material was collected in regular monthly intervals at the same study plots and periods.

Results and discussion

General characterization of oak-hornbeam invertebrate assemblages seems to be very disputable due to the rich material of various systematic groups, often from many types of microhabitats. However this paper will project a certain synthesis.

In total we determined 39,987 invertebrates (except for Protozoa) of 575 species from 4 phyla (Ciliophora, Rhizopoda, Tardigrada, Arthropoda). Generally the study presents detailed ecological analysis of 12 systematic groups (ciliates, naked amoebae, water bears, pseudoscorpions, spiders, mesostigmatid mites, terrestrial isopods, centipedes, millipedes, earwigs, bugs, weevils) being provided by the authors. In this part we summarize the obtained data, analyse epigeic and soil animal communities from oak-hornbeam forests in the Malé Karpaty Mts. Moreover environmental impact on the studied animals was taken into account.

Protozoa were studied in decaying wood matter dendrotelmae and mosses – in markedly different microhabitats in some degree interacted with soil.

Decaying wood matter often represents refugium for various soil animals and is inhabited by specific communities. The structure of ciliate assemblages with a majority of soil species has proved this fact. Interactions towards a certain tree or shrub species do not appear as significant (Bartošová, Tirjaková, 2005).

In contradiction to decaying wood matter tree-holes represent specific habitats being isolated from soil, what has been actually proved by the communities of Ciliophora. Four indication communities have been established. They are particularly affected by tree and shrub diversity, size and age of a telma as well as by presence of Rotifera and other Metazoa. Moreover time as an important factor has to be taken into account. The communities were represented by aquatic, terrestric, limnetic and eurypotent species in diverse proportion and were influenced by many factors mentioned above. Low frequency in occurrence of species may hint at diversity and significant impact of environment. Interactions with soil have not been proved (Tirjaková, Vďačný, 2005).

However mosses possess stronger interactions to soil than dendrotelmae do. Therefore the fact that 32 recorded taxa (23 species) of naked amoebae with significant bonds to aquatic environment appears as very disputable. The community of naked amoebae seems to be very similar to aquatic assemblages (Mrva, 2005).

Twenty-one species of Tardigrada obtained from mosses have not shown any significant interactions to soil. Some expressive differences in species diversity refer to individual sites with high mutual similarity at the least-diverse communities. Mostly the differences correspond with accidental records of various species. Distribution and dispersal process at Tardigrada in various strata is supposed to be passive and accidental with insignificant interactions with specificity of environment (Degma et al., 2005b).

In the study area we recorded 7 epigeic terrestrial isopod species. Specific communities were usually formed by 1–6 of them with relatively low average abundance.

Protracheoniscus politus and *Porcellium collicola* may be classified as indicative species. The communities were influenced by age of a stand, soil type, content of Ca and pH of soil (Tuf, Tufová, 2005).

Of ten recorded pseudoscorpion species just *Neobisium muscorum* was recorded at all the study sites. Four communities being classified for the study area were not significantly impacted by 15 measured environmental variables. The highest stability refers to the assemblage in 80–100 year old oak-hornbeam forest stands, the lowest values hints at more arid and younger forest (60–80 years) with markedly reduced leaf horizon (Christophoryová, Krumpál, 2005).

One hundred and fifty-eight species and 24 families of spiders were recorded in the study area. Their communities in oak-hornbeam forests were considerably diverse with the indication species of *Trochosa terricola*, *Pardosa lugubris* and *Tenuiphantes mengei*. Of the measured environmental variables the undergrowth appears as the only factor significantly influencing the communities. The other variables seem to be with no important impact on taxocoenoses of spiders (Krumpálová, 2005).

The studied microhabitats were inhabited by 75 mesostigmatid mites. *Holoparasitus calcaratus*, *Veigaia nemorensis, Vulgarogamasus kraepelini* and *Zercon peltatus* var. *peltatus* were the eudominant species in forest soil. Temperature, air humidity, soil type, pH and vegetation may be classified as the most significant factors influencing structure and frequency in the communities of mites (Fend'a, Ciceková, 2005).

The centipede (Chilopoda) communities were formed by 10–17 species of the total richness of 24 species recorded in the study area. *Schendyla nemorensis* and *Lithobius muticus* belonged to the category of eudominant species at all the sites. The typical centipede community in the oak-hornbeam forests of the Malé Karpaty Mts consists of the following species: *Schendyla nemorensis*, *Strigamia acuminata*, *Lithobius agilis*, *L. borealis*, *L. lapidicola*, *L. mutabilis*, *L. muticus*, *L. austriacus*; in more southern drier parts of the Malé Karpaty Mts *Henia illyrica* as well. The highest diversity (17 species) refers to the 80–100 year old oak-hornbeam forest, the lowest one to the more arid and younger (60–80 years old) stand with minimal leaf litter. Most species occurred during the whole year, what was actually proved by additional samples from January 2000–2002 being excluded from the paper (Országh, Országhová, 2005).

Eighteen millipede species were recorded in the studied oak-hornbeam forests. Individual communities were formed by 8–14 species. *Cylindroiulus boleti*, *Strongylosoma stigmatosum* and *Ommatoiulus sabulosus* may be classified as indication species. The results of cluster analysis of the similarity of localities showed possible influence of the height of forest growth and also values of pH and sorption complex in leaf litter on the structure of the millipede communities. The tree height could have an indirect effect in the terms of higher litter production (bigger amount of suitable food source for saprophages) by taller trees (Stašiov, 2005).

Fourty-six species of Heteroptera were recorded in the oak-hornbeam forests. The communities at the study sites were formed by 21–28 species, including eudominant *Legnotus limbosus* and *Eurygaster maura*. The following species may be considered as the typical elements: *Drymus brunneus, D. ryeii, Scolopostethus affinis, S. thomsoni, Rhyparochromus alboacuminatus*, *Legnotus limbosus*. The geoxenous species such as *Aelia acuminata* or *Eurygaster maura* are common as well. The research has proved the

impact of canopy coverness (E_3) on structure of bug communities. *Tropistethus holosericeus, Legnotus limbosus, Plinthisus brevipennis, Raglius alboacuminatus, Trapezonotus arenarius* or *Microporus nigritus* may be classified as more heliophilous species with preference to scarce cover. Moreover the nearby quarry is supposed to negatively influencing (air pollution) the community of epigeic Heteroptera in oak-hornbeam forests of the Malé Karpaty Mts (Hradil, 2005).

In epigeon of oak-hornbeam forests we recorded 78 species of weevils. Their communities were usually formed by 22–31 species. *Acalles fallax, Barypeithes mollicomus, Trachodes hispidus*, *Ceutorhynchus pallidactylus, C. obstrictus* and *Sitona macularius* may be classified as species with high value of dominance and frequency. Of 13 gradient and 2 categorial variables being analysed in the research there are just several: coverness of canopy and content of exchangeable bases (Ca^{2+}, Mg^{2+}, K^{+}, Na^{+}) in soil with a significant impact on communities of weevils. Fragmentation of stands leaded to increase in abundance of herbicolous, euryhygric and ubiquitous species. The community at the site being influenced by calcareous dust from the nearby quarry may appear as unstable and quantitatively poor (Holecová et al., 2005).

Apart from the groups studied and mentioned above we include notes on thrip communities (Thysanoptera), which undisputedly form an important part of forest ecosystem and may indicate character and dynamics of ecological conditions. However the thrips being sampled from epigeon predominantly have arboricolous origin and many of them possess strong interactions with soil in some ontogenetical stage. The taxocoenoses consist of approximatelly 15 species and are significantly equitable in older, more stable forests. For instance in Cajla (site 1) *Hoplandrothrips williamsianus* P r i e s n e r, 1923 may be considered as an indication species of vital oak-hornbeam forests, followed by zoophagous *Aeolothrips versicolor* U z e l, 1895. In more opened forest stands with a real possibility for infiltration of thrips from the nearby ecosystems, such as Horný háj grove, the communities are enriched in several more heliophilous species such as *Limothrips denticornis* H a l i d a y, 1836 and *Frankliniella tenuicornis* (U z e l, 1895).

Of the studied Protozoa and Tardigrada there was only one group in decaying wood matter with affinity towards soil. The other communities possessed interactions to aquatic environment. The observed arthropods were more significantly interacted with soil. The communities were predominantly represented by epigeic species, partially by typical edaphic species. Of the 15 analysed variables just age of a stand, depth of leaf litter, coverness of herbage undergrowth, canopy architecture and sporadically pollution (dust from the quarry) appeared as significantly influencing the studied arthropod communities.

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Holecová M., Krumpál M., Országh I., Krumpálová Z., Stašiov S., Fedor P.: **Biodiverzita vybraných skupín bezstavovcov v ekosystéme dubovo-hrabového lesa v oblasti JZ Slovenska.**

Práca sumarizuje výsledky štvorročného cenologického výskumu mikro- a makrofauny lesného ekosystému dubovo-hrabového vegetačného stupňa v oblasti JZ Slovenska. Študované lesné porasty veku 40–100 rokov sa nachádzajú v orografických celkoch Malé Karpaty a Trnavská pahorkatina. Jedná sa o 3 typy dubovo-hrabových (*Carpinion betuli*), dubovo-cerových (*Quercion confertae-cerris*) a xerotermofilných dubových lesov (*Quercion pubescentis-petraeae*). Za celé obdobie výskumu bolo spolu determinovaných 39 987 exemplárov bezstavovcov (s výnimkou Protozoa). Zistili sme 575 živočíšnych druhov, patriacich do 4 kmeňov (Ciliophora, Rhizopoda, Tardigrada, Arthropoda). Celkove boli spracované synúzie 12 systematických skupín (nálevníky, nahé meňavky, pomalky, štúriky, pavúky, mesostigmátne roztoče, suchozemské rovnakonôžky, stonôžky, mnohonôžky, ucholaky, bzdochy, nosáčiky). Okrem lesného epigeónu, sme venovali pozornosť štúdiu ďalších mikrohabitatov, akými sú rozkladajúca sa drevná hmota, machy a dendrotelmy. Z mikrofauny javila afinitu k lesnej pôde iba skupina študovaná v odumretej drevnej hmote. Pre ostatné mikrohabitaty (dendrotelmy a machy) je charakteristický výskyt druhov viazaných tiež na vodné prostredie. U študovaných skupín Arthropoda je už väzba na pôdu oveľa výraznejšia. Prevládali epigeické druhy a len menej boli zastúpené typicky edafické druhy. Z 15 sledovaných environmentálnych premenných javili vplyv na niektoré spoločenstvá článkonožcov iba vek porastu, hrúbka vrstvy hrabanky, pokryvnosť bylinnej etáže a korunový zápoj, u niektorých skupín tiež znečistenie vápenatým prachom z lomu.

APPENDIX 1.

Review of taxa found in studied oak-hornbeam forest of SW Slovakia in 1999–2002

Phylum: RHIZOPODA
Class: LOBOSEA
Subclass: GYMNAMOEBIA
Order: EUAMOEBIDA
Family: Amoebidae
Deuteramoeba algonquinensis (Baldock, Rogerson et Berger, 1983)
Family: Hartmannellidae
Hartmannella cantabrigiensis Page, 1974
Hartmannella vermiformis Page, 1967
Saccamoeba limax (Dujardin, 1841)
Saccamoeba stagnicola Page, 1974
Family: Thecamoebidae
Dermamoeba granifera (Greeff, 1866) Page et Blakey, 1979
Dermamoeba minor (Pussard, Alabouvette et Pons, 1979)
Paradermamoeba levis Smirnov et Goodkov, 1994
Paradermamoeba valamo Smirnov et Goodkov, 1993
Sappinia diploidea (Hartmann et Nägler, 1908)
Thecamoeba quadrilineata (Carter, 1856)
Thecamoeba sphaeronucleolus (Greeff, 1891)
Thecamoeba striata (Penard, 1890)
Thecamoeba terricola (Greeff, 1866)
Family: Vannellidae
Platyamoeba stenopodia Page, 1969
Vannella sp.
Vannella lata Page, 1988
Vannella platypodia (Gläser, 1912)
Family: Paramoebidae
Korotnevella bulla (Schaeffer, 1926)
Korotnevella diskophora Smirnov, 1999
Korotnevella stella (Schaeffer, 1926)
Mayorella penardi Page, 1972
Mayorella vespertilioides Page, 1983
Order: LEPTOMYXIDA
Family: Flabellulidae
Flamella sp. 1
Flamella sp. 2
Family: Leptomyxidae
Leptomyxa reticulata Goodey, 1914
Rhizamoeba sp.
Unidentified leptomyxid amoeba

Class: ACANTHOPODIDA
Family: Acanthamoebidae
Acanthamoeba sp.1
Acanthamoeba sp.2
Acanthamoeba sp.3
INCERTAE SEDIS
Stygamoeba sp.

Phylum: CILIOPHORA
Class: HETEROTRICHEA
Order: HETEROTRICHIDA
Family: Blepharismidae
Blepharisma hyalinum Perty, 1849
Blepharisma sp.
Order: ARMOPHORIDA
Family: Metopidae
Metopus hasei Sondheim, 1929
Metopus minor Kahl, 1927
Class: SPIROTRICHEA
Subclass: OLIGOTRICHIA
Order: HALTERIIDA
Family: Halteriidae
Halteria grandinella (O. F. Mueller, 1773)
Subclass: HYPOTRICHIA
Order: EUPLOTIDA
Family: Euplotidae
Euplotes affinis (Dujardin, 1841)
Euplotes muscicola Kahl, 1932
Order: UROSTYLIDA
Family: Urostylidae
Bakuella pampinaria Eigner et Foissner, 1992
Hemicycliostyla sphagni Stokes, 1886
Hemisincirra gellerti (Foissner, 1982)
Hemisincirra interrupta (Foissner, 1982)
Holosticha muscorum (Kahl, 1932)
Holosticha sp.
Holosticha tetracirrata Buitkamp et Wilbert, 1974
Paraurostyla macrostoma Foissner, 1982
Order: SPORADOTRICHIDA
Family: Oxytrichidae
Cyrtohymena candens Kahl, 1932
Cyrtohymena muscorum (Kahl, 1932)
Cyrtohymena quadrinucleata (Dragesco et Njiné, 1971)
Gastrostyla steini Engelmann, 1862

Gonostomum affine (Stein, 1859)
Gonostomum kuehnelti Foissner, 1987
Histriculus vorax (Stokes, 1891)
Oxytricha granulifera quadricirrata Blatterer et Foissner, 1988
Oxytricha setigera Stokes, 1891
Oxytricha similis Engelmann, 1862
Oxytricha sp.
Steinia platystoma (Ehrenberg, 1831)
Sterkiella histriomuscorum (Foissner, Blatterer, Berger et Kohmann, 1991)
Stylonychia pustulata (O. F. Mueller, 1786)
Tachysoma pellionellum (O. F. Mueller, 1773)
Urosomoida agiliformis Foissner, 1982
Class: PROSTOMATEA
Order: PRORODONTIDA
Family: Plagiocampidae
Plagiocampa metabolica (Kahl, 1926)
Family: Urotrichidae
Urotricha globosa Schewiakoff, 1892
Family: Colepidae
Coleps hirtus (O. F. Mueller, 1786)
Class: LITOSTOMATEA
Subclass: HAPTORIA
Order: HAPTORIDA
Family: Enchelyidae
Enchelys gasterosteus Kahl 1926
Enchelys polynucleata (Foissner, 1984)
Family: Acropisthiidae
Acropisthium mutabile Perty, 1852
Family: Tracheliidae
Dileptus breviproboscis Foissner, 1981
Order: SPATHIDIIDA
Family: Spathidiidae
Apospathidium atypicum (Buitkamp et Wilbert, 1974)
Arcuospathidium australe Foissner, 1988
Arcuospathidium japonicum Foissner, 1988
Epispathidium amphoriforme (Greeff, 1888)
Epispathidium sp.
Protospathidium vermiforme Foissner, Agatha et Berger, 2002
Spathidium bavariense Kahl, 1930
Spathidium muscicola Kahl, 1930
Spathidium spathula (Müller, 1773)
Spathidium turgitorum Foissner, Agatha et Berger, 2002
Order: PSEDOHOLOPHRYIDA
Family: Pseudoholophryidae
Pseudoholophrya terricola Berger, Foissner et Adam, 1984

Order: PLEUROSTOMATIDA
Family: Litonotidae
Acineria uncinata Tucolesco, 1962
Litonotus muscorum (Kahl, 1931)
Class: PHYLLOPHARYNGEA
Subclass: PHYLLOPHARYNGIA
Order: CHLAMYDODONTIDA
Family: Chilodonellidae
Chilodonella uncinata (Ehrenberg, 1838)
Odontochlamys gouraudi Certes, 1891
Pseudochilodonopsis mutabilis Foissner, 1981
Pseudochilodonopsis sp.
Subclass: SUCTORIA
Order: EXOGENIDA
Family: Podophryidae
Sphaerophrya terricola Foissner, 1986
Class: NASSOPHOREA
Order: SYNHYMENIIDA
Family: Scaphiodontidae
Chilodontopsis muscorum Kahl, 1931
Order: MICROTHORACIDA
Family: Microthoracidae
Drepanomonas dentate Fresenius, 1858
Drepanomonas exigua Penard, 1922
Drepanomonas obtusa Penard, 1922
Drepanomonas pauciciliata Foissner, 1987
Drepanomonas revoluta Penard, 1922
Drepanomonas sphagni Kahl, 1931
Leptopharynx costatus Mermod, 1914
Leptopharynx eurystomus (Kahl, 1931)
Family: Pseudomicrothoracidae
Pseudomicrothorax agilis Mermod, 1914
Class: OLIGOHYMENOPHOREA
Subclass: PENICULIA
Order: PENICULIDA
Family: Frontoniidae
Frontonia angusta Kahl, 1931
Frontonia depressa (Stokes, 1886)
Frontonia leucas (Ehrenberg, 1833)
Family: Parameciidae
Paramecium caudatum Ehrenberg, 1833
Subclass: SCUTICOLITIA
Order: PHILASTERIDA
Family: Philasteridae
Philasterides armatus (Kahl, 1926)
Family: Cinetochilidae
Cinetochilum margaritaceum (Ehrenberg, 1831)
Sathrophilus mobilis (Kahl, 1926)
Sathrophilus muscorum (Kahl, 1931)
Family: Cohnilembidae
Kahlilembus attenuatus (Smith, 1897)

Family: Pseudocohnilembidae
Pseudocohnilembus pusillus (Quennerstedt, 1869)
Family: Uronematidae
Homalogastra setosa Kahl, 1926
Order: PLEURONEMATIDA
Family: Cyclidiidae
Cyclidium elongatum (Schewiakoff, 1889)
Cyclidium glaucoma O. F. Mueller, 1773
Cyclidium muscicola Kahl, 1931
Subclass: HYMENOSTOMATIA
Order: HYMENOSTOMATIDA
Family Glaucomidae
Glaucoma scintillans Ehrenberg, 1830
Pseudoglaucoma muscorum Kahl, 1931
Family Ophryoglenidae
Ophryoglena flava Ehrenberg, 1833
Ophryoglena oblonga Gajevskaja, 1927
Ophryoglena sp.
Family Tetrahymenidae
Tetrahymena edaphoni Foissner, 1986
Tetrahymena pyriformis complex
Tetrahymena rostrata (Kahl, 1926)
Family Turaniellidae
Colpidium colpoda (Losana, 1829)
Dexiostoma campylum (Stokes, 1886)
INCERTAE SEDIS
Dexiotrichides centralis (Stokes, 1885)
Hexotricha caudata Lackey, 1925
Pithothorax processus Kahl, 1926
Subclass: PERITRICHEA
Order: SESSILIDA
Family: Opisthonectidae
Opisthonecta henneguyi Faure-Fremiet, 1906
Telotrochidium cylindricum Foissner, 1978
Telotrochidium sp.
Family: Operculariidae
Opercularia arboricolum (Biegel, 1954)
Propyxidium spp.
Family: Scyphidiidae
Scyphidia spp.
Family: Epistylidae
Epistylis entzii Stiller, 1935
Epistylis sp.
Rhabdostyla pyriformis Perty, 1852
Family: Vorticellidae
Vorticella aquadulcis complex
Vorticella astyliformis Foissner, 1981
Vorticella infusionum Dujardin, 1841
Vorticella microstoma Ehrenberg, 1830
Vorticella spp.
Peritrichia gen. sp.

Class: COLPODEA
Order: COLPODIDA
Family: Colpodidae
Bresslaua vorax Kahl, 1931
Colpoda aspera Kahl, 1926
Colpoda cavicola Kahl, 1935
Colpoda cucullus (O. F. Mueller, 1773)
Colpoda edaphoni Foissner, 1980
Colpoda henneguyi Fabre-Domergue, 1889
Colpoda inflata (Stokes, 1884)
Colpoda lucida Greeff, 1888
Colpoda maupasi Enriquez, 1908
Colpoda reniformis Kahl, 1931
Colpoda steinii Maupas, 1883
Family: Hausmanniellidae
Anictostoma terricola Foissner, 1993
Hausmanniella patella (Kahl, 1931)
Family: Marynidae
Ilsiella elegans Foissner, Agatha et Berger, 2002
Order: CYRTOLOPHOSIDIDA
Family: Cyrtolophidae
Cyrtolophosis acuta Kahl, 1926
Cyrtolophosis elongata (Schewiakoff, 1892)
Cyrtolophosis mucicola Stokes, 1885
Plesiocaryon elongatum (Schewiakoff, 1892)
Family: Platyophryidae
Platyophrya macrostoma Foissner, 1980
Platyophrya spumacola Kahl, 1927
Platyophrya vorax Kahl, 1926

Phylum: TARDIGRADA
Class: EUTARDIGRADA
Family: Hypsibiidae
Hypsibius convergens (Urbanowicz, 1925)
Hypsibius dujardini (Doyere, 1840)
Hypsibius cf. *morikawai* Ito, 1995
Hypsibius pallidus Thulin, 1911
Isohypsibius lunulatus (Iharos, 1966)
Isohypsibius prosostomus Thulin, 1928
Diphascon (*D.*) *brevipes* (Marcus, 1936)
Diphascon (*D.*) *pingue* (Marcus, 1936)
Diphascon (*A.*) *belgicae* Richters, 1911
Diphascon (*A.*) *prorsirostre* Thulin, 1928
Diphascon (*A.*) *scoticum* Murray, 1905
Astatumen bartosi (Weglarska, 1959)
Astatumen trinacriae (Arcidiacono, 1962)
Family: Macrobiotidae
Macrobiotus cf. *harmsworthi* Murray, 1907
Macrobiotus hufelandi C.A.S. Schultze, 1834
Macrobiotus pallarii Maucci, 1954

Macrobiotus cf. *seychellensis* Biserov, 1994
Macrobiotus cf. *vanescens* Pilato et al., 1991
Macrobiotus sp.1
Minibiotus intermedius (Plate, 1889)
Minibiotus sp. 1

Phylum: ARTHROPODA
Subphylum: CHELICERATA
Order: PSEUDOSCORPIONES
Family: Chthoniidae
Chthonius (Ephippiochthonius) boldorii Beier, 1934
Chthonius (Ephippiochthonius) fuscimanus Simon, 1900
Chthonius (Ephippiochthonius) sp. 1
Chthonius (Ephippiochthonius) sp. 2
Family: Neobisiidae
Neobisium (Neobisium) erythrodactylum (C. L. Koch, 1873)
Neobisium (Neobisium) muscorum (Leach, 1817)
Roncus lubricus C. L. Koch, 1873
Family: Chernetidae
Chernes similis C. L. Koch, 1873
Pselaphochernes scorpioides (Hermann, 1804)
Chernetidae gen. sp.
Order: ARANEAE
Family: Atypidae
Atypus piceus (Schulzer,1776)
Family: Segestriidae
Segestria senoculata (Linnaeus, 1758)
Family: Dysderidae
Dysdera erythrina (Walckenaer, 1802)
Harpactea rubicunda (C. L. Koch, 1838)
Family: Mimetidae
Ero furcata (Villers, 1789)
Family: Theridiidae
Enoplognatha oelandica (Thorell, 1875)
Enoplognatha ovata (Clerck, 1757)
Enoplognatha thoracica (Hahn, 1833)
Enoplognatha sp.
Episinus angulatus (Blackwall, 1836)
Euryopis flavomaculata (C. L. Koch, 1836)
Robertus lividus (Blackwall, 1836)
Robertus sp.
Steatoda albomaculata (De Geer, 1778)
Steatoda bipunctata (Linnaeus, 1758)
Steatoda phalerata (Panzer, 1801)
Steatoda sp.
Theridion tinctum (Walckenaer, 1802)
Family: Linyphiidae
Abacoproeces saltuum (L. Koch, 1872)
Anguliphantes angulipalpis (Westring, 1851)
Asthenargus paganus (Simon, 1884)
Bathyphantes nigrinus (Westring, 1851)
Centromerus arcanus (O. P. Cambridge, 1873)
Centromerus brevivulvatus Dahl, 1912
Centromerus incilium (L. Koch, 1881)
Centromerus sellarius (Simon, 1884)
Centromerus sylvaticus (Blackwall, 1841)
Centromerus sp.
Ceratinella brevis (Wider, 1834)
Ceratinella major Kulczyński, 1894
Ceratinela scabrosa (O. P. Cambridge, 1871)
Diplocephalus latifrons (O. P. Cambridge, 1863)
Diplocephalus picinus (Blackwall, 1841)
Diplostyla concolor (Wider, 1834)
Drapetisca socialis (Sundevall, 1833)
Moebelia penicillata (Westring, 1851)
Lasiargus hirsutus (Menge, 1869)
Lepthyphantes minutus (Blackwall, 1833)
Linyphia hortensis Sundevall, 1830
Linyphia triangularis (Clerck, 1757)
Linyphia sp.
Macrargus rufus (Wider, 1834)
Megalepthyphantes collinus (L. Koch, 1872)
Meioneta affinis (Kulczynski, 1898)
Micrargus herbigradus (Blackwall, 1854)
Micrargus sp.
Microlinyphia pussila (Sundevall, 1830)
Microneta varia (Blackwall, 1841)
Minicia marginella (Wider, 1834)
Neriene clatrata (Sundevall, 1830)
Oedothorax retusus (Westring, 1851)
Palliduphantes alutacius (Simon, 1884)
Palliduphantes pallidus (O. P. Cambridge, 1871)
Panamomops fagei Miller et Kratochvíl, 1939
Pocadicnemis juncea Locket et Millidge, 1953
Pocadicnemis pumila (Blackwall, 1841)
Sintula corniger (Blackwall, 1856)
Tapinocyba biscissa (O. P. Cambridge, 1872)
Tapinocyba insecta (L. Koch, 1869)
Tenuiphantes mengei (Kulczyński, 1887)
Tenuiphantes tenbricola (Wider, 1834)
Tenuiphantes flavipes (Blackwall, 1854)
Tenuiphantes tenuis (Blackwall, 1852)
Tenuiphantes zimmermani (Bertkau, 1890)
Tenuiphantes sp.
Tapinopa longidens (Wider, 1834)
Thyreostenius biovatus (O. P. Cambridge, 1875)

Trichoncus affinis Kulczynski, 1894
Walckenaeria antica (Wider, 1834)
Walckenaeria atrotibialis (O. P. Cambridge, 1878)
Walckenaeria corniculans (O. P. Cambridge, 1875)
Walckenaeria cucullata (C. L. Koch, 1836)
Walckenaeria cuspidata Blackwall, 1833
Walckenaeria dysderoides (Wider, 1834)
Walckenaeria furcillata (Menge, 1869)
Walckenaeria incisa (O. P. Cambridge, 1871)
Walckenaeria mitrata (Menge, 1868)
Walckenaeria monoceros (Wider, 1834)
Walckenaeria nudipalpis (Westring, 1851)
Walckenaeria obtusa Blackwall, 1836
Walckenaeria vigilax (Blackwall, 1853)
Walckenaeria sp.
Family: Tetragnathidae
Pachygnatha degeeri Sundevall, 1830
Pachygnatha listeri Sundevall, 1830
Family: Araneidae
Araneus diadematus Clerck, 1757
Araneus quadratus Clerck, 1757
Araneus sp.
Cercidia prominens (Westring, 1851)
Family: Lycosidae
Alopecosa aculeata (Clerck, 1757)
Alopecosa pulverulenta (Clerck, 1757)
Arctosa lutetiana (Simon, 1876)
Pardosa agrestis (Westring, 1861)
Pardosa amentata (Clerck, 1757)
Pardosa hortensis (Thorell, 1872)
Pardosa lugubris (Walckenaer, 1802)
Pardosa monticola (Clerck, 1757)
Pardosa sp.
Trochosa ruricola (De Geer, 1778)
Trochosa terricola Thorell, 1856
Trochosa sp.
Family: Pisauridae
Pisaura mirabilis (Clerck, 1757)
Family: Zoridae
Zora nemoralis (Blackwall, 1861)
Zora silvestris Kulczyński, 1897
Zora spinimana (Sundevall, 1833)
Family: Agelenidae
Agelena gracilens C. L. Koch, 1841
Agelena sp.
Histopona torpida (C. L. Koch, 1837)
Tegenaria campestris C. L. Koch, 1834
Tegenaria ferruginea (Panzer, 1804)
Tegenaria silvestris L. Koch, 1872
Tegenaria sp.
Textrix denticulata (Olivier, 1789)
Family: Cybaeidae
Cybaeus angustiarum L. Koch, 1868
Family: Hahnidae
Hahnia helveola Simon, 1875
Hahnia ononidum Simon, 1875
Family: Dictynidae
Cicurina cicur (Fabricius, 1793)
Dictyna uncinata Thorell, 1856
Family: Amaurobiidae
Coelotes inermis (L. Koch, 1855)
Coelotes terrestris (Wider, 1834)
Coelotes sp.
Family: Liocranidae
Agroeca brunnea (Blackwall, 1833)
Apostenus fuscus Westring, 1851
Scotina celans (Blackwall, 1841)
Family: Corinnidae
Cetona laticeps (Canestrini, 1868)
Phrurolithus festivus (C. L. Koch, 1835)
Family: Zodariidae
Zodarion germanicum (C. L. Koch, 1837)
Family: Clubionidae
Clubiona caerulescens L. Koch, 1867
Clubiona corticalis (Walckenaer, 1802)
Clubiona comta C. L. Koch, 1839
Clubiona terrestris Westring, 1851
Clubiona sp.
Family: Gnaphosidae
Drassyllus praeficus (L. Koch, 1866)
Drassyllus villicus (Thorell, 1875)
Haplodrassus silvestris (Blackwall, 1833)
Micaria dives (Lucas, 1846)
Trachyzelotes pedestris (C. L. Koch, 1837)
Zelotes apricorum (L. Koch, 1876)
Zelotes aurantiacus Miller, 1967
Zelotes erebeus (Thorell, 1871)
Zelotes subterraneus (C. L. Koch, 1833)
Zelotes sp.
Family: Philodromidae
Philodromus dispar Walckenaer, 1826
Philodromus sp.
Thanatus formicinus (Clerck, 1757)
Family: Thomisidae
Diaea dorsata (Fabricius, 1777)
Ozyptila praticola (C. L. Koch, 1837)
Ozyptila simplex (O. P. Cambridge, 1862)
Xysticus cristatus (Clerck, 1757)
Xysticus lanio C. L. Koch, 1835
Xysticus luctator C. L. Koch, 1870
Xysticus sp.

Family: Salticidae
Ballus chalybeius (Walckenaer, 1802)
Carrhotus xanthogramma (Latreille, 1819)
Euophrys frontalis (Walckenaer, 1802)
Euophrys sp.
Evarcha falcata (Clerck, 1757)
Marpisa sp.
Neon reticulatus (Blackwall, 1853)
Order: ACARINA
Family: Celaenopsidae
Celaenopsis badius (C. L. Koch, 1841)
Family: Ascidae
Aceoseius muricatus (C. L. Koch, 1839)
Arctoseius eremitus (Berlese, 1918)
Arctoseius venustulus (Berlese, 1916)
Leioseius bicolor (Berlese, 1918)
Leioseius minusculus (Berlese, 1905)
Zerconopsis remiger (Kramer, 1876)
Family: Eviphididae
Eviphis ostrinus (C. L. Koch, 1836)
Family: Laelapidae
Eulaelaps stabularis (C. L. Koch, 1836)
Haemogamasus nidi Michael, 1892
Hypoaspis aculeifer G. Canestrini, 1884
Hypoaspis brevipilis Hirschmann, 1969
Hypoaspis imitata Reitblat, 1963
Hypoaspis oblonga (Halbert, 1915)
Hypoaspis praesternalis Willmann, 1949
Hypoaspis vacua (Michael, 1891)
Hypoaspis spp.
Family: Macrochelidae
Geholaspis longispinosus (Kramer, 1876)
Geholaspis mandibularis (Berlese, 1904)
Macrocheles glaber (J. Müller, 1859)
Macrocheles montanus Willmann, 1951
Family: Macronyssidae
Ornithonyssus sylviarum (Canestrini et Fanzago, 1877)
Family: Pachylaelapidae
Olopachys suecicus Sellnick, 1950
Pachylaelaps magnus (Halbert, 1915)
Pachylaelaps resinae Karg, 1971
Pachylaelaps spp.
Pachyseius humeralis Berlese, 1910
Family: Parasitidae
Amblygamasus sp.
Eugamasus monticolus Berlese, 1905
Holoparasitus calcaratus (C. L. Koch, 1839)
Holoparasitus sp.
Leptogamasus succineus Witaliński, 1973
Leptogamasus spp.
Parasitus fimetorum (Berlese, 1903)
Pergamasus barbarus Berlese, 1904
Pergamasus brevicornis (Berlese, 1903)
Pergamasus canestrinii (Berlese, 1884)
Pergamasus crassipes (Linnaeus, 1758) sensu Berlese, 1906
Pergamasus mediocris (Berlese, 1904)
Pergamasus ruhmi Willmann, 1938
Poecilochirus carabi G.et R.Canestrini, 1882
Porrhostaspis lunulata J. Müller, 1869
Vulgarogamasus kraepelini (Berlese, 1904)
Vulgarogamasus remberti (Oudemans, 1912)
Family: Rhodacaridae
Cyrtolaelaps chiropterae Karg, 1971
Cyrtolaelaps mucronatus (G. et R. Canestrini, 1881)
Rhodacarus spp.
Sessiluncus hungaricus Karg, 1964
Stylochirus fimetarius (J. Müller, 1859) sensu Mašán et Kalúz, 2001
Family: Veigaiaidae
Veigaia cerva (Kramer, 1876)
Veigaia exigua (Berlese, 1917)
Veigaia kochi (Trägårdh, 1901)
Veigaia nemorensis (C. L. Koch, 1839)
Veigaia transisalae (Oudemans, 1902)
Family: Zerconidae
Prozercon carpathofimbriatus Mašán et Fend'a, 2004
Prozercon tragardhi (Halbert, 1923)
Zercon curiosus Trägårdh, 1910
Zercon hungaricus Sellnick, 1958
Zercon peltatus var. *peltatus* C. L. Koch, 1836
Zercon vacuus C. L. Koch, 1839
Family: Sejidae
Sejus togatus C. L. Koch, 1836
Family: Uropodellidae
Asternolaelaps sp.
Family: Polyaspidae
Polyaspinus schweizeri (Huţu, 1976)
Polyaspis patavinus Berlese, 1881
Family: Trachytidae
Trachytes aegrota (C. L. Koch, 1841)
Trachytes baloghi Hirschmann et Zirngiebl-Nicol, 1969
Family: Trematuridae
Trichouropoda elegans (Kramer, 1882)
Trichouropoda karawaiewi (Berlese, 1904)
Trichouropoda obscurasimilis Hirschmann et Zirngiebl-Nicol, 1961
Trichouropoda orbicularis (C. L. Koch, 1839)
Trichouropoda ovalis (C. L. Koch, 1839)

Trichouropoda penicillata Hirschmann et Zirngiebl-Nicol, 1961
Family: Urodinychidae
Dinychus bincheaecarinatus Hirschmann, Wagrowska-Adamczyk et Zirngiebl-Nicol, 1984
Dinychus perforatus Kramer, 1886
Urodiaspis tecta (Kramer, 1876)
Uroobovella pulchella (Berlese, 1904)
Family: Uropodidae
Uropoda misella (Berlese, 1916)
Uropoda orbicularis (O. F. Müller, 1776)
Uropoda splendida Kramer, 1882
Subphylum: BRANCHIATA
Order: ISOPODA
Suborder: Oniscidea
Family: Ligiidae
Ligidium hypnorum (Cuvier, 1792)
Family: Trichoniscidae
Hyloniscus riparius (C. L. Koch, 1838)
Family: Philosciidae
Lepidoniscus minutus (C. L. Koch, 1838)
Family: Agnaridae
Orthometopon planum (Budde-Lund, 1885)
Protracheoniscus politus (C. L. Koch, 1841)
Family: Trachelipodidae
Trachelipus ratzeburgii (Brandt, 1833)
Porcellium collicola (Verhoeff, 1907)
Subphylum: MYRIAPODA
Class: CHILOPODA
Order: SCOLOPENDROMORPHA
Family: Cryptopidae
Cryptops anomalans Newport, 1844
Order: GEOPHILOMORPHA
Family: Dignathodontidae
Henia illyrica (Meinert, 1870)
Family: Geophilidae
Clinopodes flavidus C. L. Koch, 1847
Geophilus flavus (De Geer, 1778)
Family: Linotaeniidae
Strigamia acuminata (Leach, 1814)
Strigamia transsilvanica (Verhoeff, 1928
Family: Schendylidae
Schendyla nemorensis (C. L. Koch, 1836)
Order: LITHOBIOMORPHA
Family: Lithobiidae
Lithobius agilis C. L. Koch, 1847
Lithobius borealis Meinert, 1868
Lithobius dentatus C. L. Koch, 1844
Lithobius erythrocephalus C. L. Koch, 1847
Lithobius forficatus (Linnaeus, 1758)
Lithobius lapidicola Meinert, 1872
Lithobius latro Meinert, 1872
Lithobius lucifugus L. Koch, 1862
Lithobius melanops Newport, 1845
Lithobius mutabilis L. Koch, 1862
Lithobius muticus C. L. Koch, 1847
Lithobius pelidnus Haase, 1880
Lithobius piceus L. Koch, 1862
Lithobius aeruginosus L. Koch, 1862
Lithobius austriacus (Verhoeff, 1937)
Lithobius crassipes L. Koch, 1862
Lithobius microps Meinert, 1868
Class: DIPLOPODA
Order: GLOMERIDA
Family: Glomeridae
Glomeris connexa C. L. Koch, 1847
Glomeris hexasticha Brandt, 1833
Family: Trachysphaeridae
Trachysphaera costata (Waga, 1857)
Order: POLYZONIIDA
Family: 48)zoniidae
Polyzonium germanicum Brandt, 1837
Order: JULIDA
Family: Julidae
Cylindroiulus boleti (C. L. Koch, 1847)
Enantiulus nanus (Latzel, 1884)
Julus curvicornis Verhoeff, 1899
Kryphioiulus occultus (C. L. Koch, 1847)
Leptoiulus proximus (Nemec, 1896)
Megaphyllum projectum (Verhoeff, 1894)
Megaphyllum unilineatum (C. L. Koch, 1838)
Ommatoiulus sabulosus (Linnaeus, 1758)
Unciger foetidus (C. L. Koch, 1838)
Unciger transsilvanicus (Verhoeff, 1899)
Order: CHORDEUMATIDA
Family: Mastigophorophyllidae
Haploporatia eremita (Verhoeff, 1909)
Family: Craspedosomatidae
Craspedosoma rawlinsii Leach, 1815
Order: POLYDESMIDA
Family: Paradoxosomatidae
Strongylosoma stigmatosum (Eichwald, 1830)
Family: Polydesmidae
Polydesmus complanatus (Linnaeus, 1761)
Subphylum: HEXAPODA
Class: INSECTA
Order: DERMAPTERA
Family : Forficulidae
Chelidurella acanthopygia (Géné, 1832)
Order: HEMIPTERA
Suborder: HETEROPTERA
Family: Tingidae
Acalypta musci (Schrank, 1871)

Acalypta spp. nymphae
Campylosteira verna (Fallén, 1826)
Family: Microphysidae
Loricula exilis (Fallén, 1807)
Family: Miridae
Lygus rugulipennis Poppius, 1911
Deraeocoris lutescens (Schilling, 1837)
Family: Nabidae
Nabis b. brevis Scholz, 1847
Nabis p. pseudoferus Remane, 1949
Nabis rugosus (Linnaeus, 1758)
Family: Anthocoridae
Orius sp.
Family: Aradidae
Aneurus l. laevis (Fabricius, 1775)
Family: Oxycarenidae
Metopoplax origani (Kolenati, 1845)
Family: Rhyparochromidae
Drymus b. brunneus (R. F. Sahlberg, 1848)
Drymus sylvaticus (Fabricius, 1775)
Emblethis verbasci (Fabricius, 1803)
Eremocoris plebejus (Fallén, 1807)
Eremocoris podagricus (Fabricius, 1775)
Megalonotus chiragra (Fabricius, 1794)
Megalonotus sabulicola (Thomson, 1870)
Peritrechus gracilicornis Puton, 1877
Peritrechus nubilus (Fallén, 1807)
Plinthisus brevipennis (Latreille, 1807)
Raglius alboacuminatus (Goeze, 1778)
Taphropeltus hamulatus (Thomson, 1870)
Trapezonotus a. arenarius (Linnaeus, 1758)
Tropistethus holosericus (Scholz, 1846)
Tropistethus sp.
Family: Piesmatidae
Piesma capitatum (Wolff, 1804)
Piesma maculatum (Laporte, 1833)
Family: Pyrrhocoridae
Pyrrhocoris apterus (Linnaeus, 1758)
Family: Coreidae
Ceraleptus gracilicornis (Herrich-Schaeffer, 1835)
Family: Rhopalidae
Rhopalus parumpunctatus (Schilling, 1829)
Family: Cydnidae
Legnotus limbosus (Geoffroy, 1785)
Microporus nigritus (Fabricius, 1794)
Tritomegas bicolor (Linnaeus, 1758)
Tritomegas sexmaculatus (Rambur, 1839)
Order: COLEOPTERA
Suprafamily: CURCULIONOIDEA
Family: Anthribidae
Anthribus albinus (Linnaeus, 1758)
Family: Apionidae
Catapion seniculus (Kirby, 1808)
Ceratapion gibbirostre (Gyllenhal, 1813)
Cyanapion columbinum (Germar, 1817)
Diplapion confluens (Kirby, 1808)
Eutrichapion punctigerum (Paykull, 1792)
Holotrichapion aestimatum (Faust, 1890)
Holotrichapion pisi (Fabricius, 1801)
Ischnopterapion virens (Herbst, 1797)
Kalcapion pallipes (Kirby, 1808)
Omphalapion hookerorum (Kirby, 1808)
Protapion apricans (Herbst, 1797)
Protapion fulvipes (Geoffroy, 1785)
Protapion trifolii (Linnaeus, 1768)
Protapion nigritarse (Kirby, 1898)
Pseudapion rufirostre (Fabricius, 1775)
Synapion ebeninum (Kirby, 1808)
Trichopterapion holosericeum (Gyllenhal, 1833)
Family: Erirhinidae
Tanysphyrus lemnae (Paykull, 1792)
Family: Curculionidae
Acalles camelus (Fabricius, 1782)
Acalles fallax Boheman 1844
Acalles echinatus (Germar, 1824)
Acallocrates colonnellii (Bahr, 2003)
Barypeithes albinae Formanek, 1903
Barypeithes chevrolati (Boheman, 1843)
Barypeithes mollicomus (Ahrens, 1812)
Bradybatus creutzeri Germar, 1824
Bradybatus fallax Gerstaecker, 1860
Bradybatus kellneri Bach, 1854
Brachysomus echinatus (Bonsdorff, 1785)
Brachysomus dispar Penecke, 1910
Brachysomus hirtus (Boheman, 1845)
Brachysomus setiger (Gyllenhal, 1840)
Calosirus apicalis (Gyllenhal, 1727)
Ceutorhynchus alliariae Ch. Brisout, 1860
Ceutorhynchus chalibeus Germar, 1824
Ceutorhynchus erysimi (Fabricius, 1787)
Ceutorhynchus minutus (Reich, 1797)
Ceutorhynchus obstrictus (Marsham, 1802)
Ceutorhynchus pallidactylus (Marsham, 1802)
Ceutorhynchus rhenanus Schultze, 1895
Ceutorhynchus scrobicollis Neresheimer et Wagner, 1924
Ceutorhynchus typhae (Herbst, 1795)
Coeliodes proximus Schultze, 1895
Coeliodes rana (Fabricius, 1787)
Coeliodes transverseoalbofasciatus Goeze, 1777
Coeliodes trifasciatus Bach, 1854
Curculio glandium (Marsham, 1802)

Appendix 1. (Continued)

Curculio pellitus (B o h e m a n, 1843)
Curculio venosus (G r a v e n h o r s t, 1807)
Furcipus rectirostris (L i n n a e u s, 1758)
Hypera nigrirostris (F a b r i c i u s, 1775)
Hypera postica (G y l l e n h a l, 1813)
Kyklioacalles suturatus (D i e c k m a n n, 1983)
Leiosoma cribrum (G y l l e n h a l, 1834)
Microplontus campestris (G y l l e n h a l, 1837)
Nedyus quadrimaculatus (L i n n a e u s, 1758)
Ophrohinus suturalis (F a b r i c i u s, 1775)
Otiorhynchus ovatus (L i n n a e u s, 1758)
Otiorhynchus raucus (F a b r i c i u s, 1777)
Phyllobius argentatus (L i n n a e u s, 1758)
Phyllobius maculicornis G e r m a r, 1824
Polydrusus marginatus S t e p h e n s, 1831
Polydrusus viridicinctus G y l l e n h a l, 1834
Rhinoncus bruchoides (H e r b s t, 1784)
Rhinoncus perpendicularis (R e i c h, 1797)
Rhynchaenus pilosus (F a b r i c i u s, 1781)
Ruteria hypocrita (B o h e m a n, 1837)
Sciaphilus asperatus (B o n s d o r f f, 1785)
Simo variegatus (B o h e m a n, 1843)
Sitona humeralis S t e p h e n s, 1831
Sitona lineatus (L i n n a e u s, 1758)
Sitona macularius (M a r s h a m, 1802)
Stenocarus cardui (H e r b s t, 1784)
Strophosoma melanogrammum (F o r s t e r, 1771)
Trachodes hispidus (L i n n a e u s, 1758)
Trachyphloeus bifoveolatus (B e c k, 1817)
Tychius picirostris (F a b r i c i u s, 1787)

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