CHRÁNENÁ KRAJINNÁ OBLASŤ LATORICA

Invertebrates

of the Latorica Protected Landscape Area

INVERTEBRATES OF THE LATORICA PROTECTED LANDSCAPE AREA

BEZSTAVOVCE CHRÁNENEJ KRAJINNEJ OBLASTI LATORICA

Editors:
Ľubomír Panigaj, Karel Tajovský, Andrej Mock

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Preface

The landscape in the Slovak part of the Latorica River Basin has changed rapidly and significantly over the last few decades. From marshy, regularly flooded areas, unsuitable for intensive agricultural use, through heavily drained agriculturally exploited land, to the current, still relatively habitat-diverse, but at the same time drying up area, with permanent water shortages. Despite frequent large-scale interventions, however, this south-eastern part of Slovakia retains an interesting and attractive landscape-ecological character, where many important species of plants and animals still survive. The most valuable localities are located in the belt of various widths along the Latorice, from the inflow of this river into the Slovak territory from Ukraine situated to the east of the area of interest, to the confluence of the Latorice with the Laborec river, resulting in the Bodrog River at the border with Hungary at the south-western edge of our territory.

This most valuable part of the territory was declared the Latorica Protected Landscape Area (PLA) thirty years ago – on June 25, 1990. It currently covers an area of 23,198 ha. The basic task of the Latorica PLA Administration is the protection and rescue of the most valuable habitats and their organisms. These are floodplain forests, aquatic and marsh communities of plants and animals, basically the entire inundation area of the river Latorica, abounding in a tangle of river branches. The environment of sand dunes or extremely attractive limestone localities is also remarkable. All this creates a mosaic of the peculiar and unique landscape of the southernmost part of the East Slovakian plain.

There are 19 Special Areas of Conservation, 2 Ramsar sites – wetland sites designated to be of international importance under the Ramsar Convention, 2 Special Protection Areas, 12 nature reserves, 5 national nature reserves and 5 protected areas in and around the Latorica PLA, which falls within the territorial scope of the Latorica PLA Administration.

One of the important tasks of the Latorica PLA Administration is research and exploration of individual biota components in the managed area. It is either performed by the employees of the administration themselves or, more often, we use the activities of employees of natural-history museums, institutes of the Slovak Academy of Sciences and universities in Slovakia, but also from abroad. The Latorica PLA Administration welcomes the field activities of experts and create the best possible conditions for their work. The results of research in the form of reports or various publications are then used in the practical habitat or species protection.

In recent years, we have been pleased with the initiative of a group of specialists who have been researching invertebrates for many years. Invertebrates are in generally less conspicuous group of animals. Quite large group of Slovak and Czech zoologists have collected a lot of data on the occurrence of mainly terrestrial invertebrates. A detailed faunal overview of these groups and their species, including an evaluation of the specificity of the fauna and proposals for its protection, is provided by this publication, which is relatively unique in the Slovak nature conservation literature. The creation of the publication was accompanied by several unfavourable circumstances and it was time consuming, but finally the difficulties were overcome. We trust the publication will find its readers, not only in the professional public, but also among government officials, persons of the private sector, as well as among other nature enthusiasts, and will significantly help both the protection of biota and entire unique ecosystems in the Latorica Protected Landscape Area.

Kristína Voralová
Director of the Latorica PLA Administration

Predslov

Krajina v povodí rieky Latorica sa na slovenskom území za posledných niekoľko desiatok rokov značne menila a zmenila. Od močaristých, pravidelne zaplavovaných plôch, nevhodných na poľnohospodárske využitie, cez silne meliorániami odvodnenú aktívne poľnohospodársky exploatovanú krajinu, až po súčasnú, ešte pomerne biotopovo pestrú, ale zároveň vysychajúcu oblasť, s nedostatkom vody. Napriek častým veľkoplošným zásahom si táto juhovýchodná časť Slovenska uchováva zaujímavý a atraktívny krajinno-ekologický ráz, kde prežívajú mnohé významné druhy rastlín a živočíchov. Najcennejšie lokality sa nachádzajú práve v rôzne širokom páse pozdĺž Latorice, od jej vstupu na slovenské územie z Ukrajiny, až po sútok s riekou Laborec, za vzniku Bodrogu, pri hraniciach s Maďarskom.

Práve táto časť bola pred tridsiatimi rokmi – 25.6.1990 vyhlásená za Chránenú krajinnú oblasť. Rozprestiera sa v súčasnosti na ploche 23 198 ha. Základnou úlohou Správy CHKO Latorica je ochrana a záchrana najcennejších porastov lužných lesov, vodných a močiarnych spoločenstiev rastlín a živočíchov, v podstate celého inundačného územia Latorice, so spleťou ramien, ale aj pieskových dún, či mimoriadne atraktívnych vápencových lokalít, pretože to všetko vytvára svojrázny a neopakovateľný charakter tejto časti Východoslovenskej roviny.

Na území CHKO Latorica, ale aj v jej okolí, ktoré patrí do územnej pôsobnosti Správy CHKO Latorica sa nachádza 19 území európskeho významu, 2 ramsarské lokality, 2 chránené vtáčie územia, 12 prírodných rezervácií, 5 národných prírodných rezervácií a 5 chránených areálov.

Jednou z dôležitých úloh Správy CHKO Latorica je výskum a prieskum jednotlivých zložiek bioty na spravovanom území. Buď ho vykonávajú samotní zamestnanci, alebo, čo je častejšie, využívame aktivity zamestnancov múzeí, ústavov SAV a univerzít Slovenska, ale aj zo zahraničia. Správa CHKO Latorica sa snaží týmto odborníkom vychádzať v ústrety a vytvárať čo najlepšie podmienky pre ich prácu. Výsledky výskumov vo forme správ, alebo rôznych publikácií sú potom využívané v praktickej ochrane prírody jednotlivých živočíšnych alebo rastlinných druhov, prípadne celých spoločenstiev. V posledných rokoch nás potešila iniciatíva skupiny špecialistov, ktorá sa dlhé roky venovala výskumu bezstavovcov, teda menej nápadných skupín živočíchov. Podarilo sa zhromaždiť množstvo údajov o výskyte hlavne suchozemských bezstavovcov. Prehľad týchto skupín a ich druhov prináša práve táto publikácia, ktorá je v slovenskej ochranárskej literatúre pomerne ojedinelá. Vznik a tvorba publikácie boli sprevádzané viacerými nepriaznivými okolnosťami, boli zdĺhavé, ale nakoniec sa ich podarilo prekonať. Chceli by sme veriť, že publikácia si nájde svojich čitateľov, nielen medzi odbornou verejnosťou, ale aj medzi pracovníkmi štátnej správy, či súkromnej sféry, a významne napomôže k ochrane živočíchov v CHKO Latorica.

Kristína Voralová
Director of the Latorica PLA Administration

Foreword of editors

Dear reader,

You get a publication whose origin has a history of several years. At its beginning in 2008, several research activities were carried out in the area of the Latorica Protected Landscape Area (PLA) by specialists from the Department of Zoology, Pavol Jozef Šafárik University in Košice, Faculty of Science and the Institute of Soil Biology of the Biology Centre Czech Academy of Sciences in České Budejovice. It should be noted right now that the area of lowland floodplains and floodplain forests, dry slopes of andesite peaks and dunes of windswept sands attracted the attention of zoologists as early as at the end of the 19th century. The first surveys in this area conducted thanks to several eminent zoologists at athat time, brought a lot of information documenting the richness and uniqueness of this area. By searching in literary sources and through personal contacts with other specialists, we found out that a sufficient amount of knowledge has been collected about a group of invertebrates, which would be appropriate to publish together. It is known from practice that mainly floristic data and results of vertebratological research are published from protected areas more frequently. Information on seemingly unattractive and unjustly overlooked groups of invertebrates is sporadically limited to butterflies, beetles, dragonflies, and possibly molluscs. Some administrations of protected areas irregularly started to publish specialized monographs on groups of invertebrates, both in Slovakia (eg. Poloniny NP, Muránska planina NP) and in the Czech Republic (eg. Pálava PLA, Křivoklátsko PLA, Kokořínsko PLA, Brdy PLA, etc.). In the case of the Latorica PLA, the possibility of bringing together several scientific departments studying invertebrates suddenly became apparent. The Latorica PLA Administration accepted with understanding our offer to compose and publish such a publication sometime in 2016. Paradoxically, it was not until 2020, in the unfavourable coronavirus period, that brought a significant progress. Almost twenty specialists were reached to finalize their contributions as you can see it in this publication. The first contribution is general, informing about the natural conditions of the Latorica PLA. Next fifteen articles map 15 different groups of invertebrates - from molluscs to butterflies and moths. Unfortunately, it was not possible to obtain contributions from several other zoological disciplines, which were realized, but the results were not processed, e.g., most of the crustaceans, aquatic groups of insects, and also a species-rich group of beetles or flies are missing.
This shortcoming we present here as a challenge for the near future and a possible sequel of this book! The scope of this publication is quite considerable, even though limited figure attachments and the text reduced basically to basic data.

We are convinced that the set of information in this publication already has a strong enough potential and it could certainly serve as an appropriate source for compiling management intentions and measures that would indicate how to ensure further survival of the monitored species in the area. Biodiversity within the Latorica PLA and the surrounding area is rich andimportant for the fauna of Slovakia in all aspects, whether in terms of habitat links, indication of the state of the environment or zoogeographic composition.

The monograph is mainly devoted to the territory of the Latorica PLA, but since it is located a bit on the side of public interest in the southeast of Slovakia - in the orographic unit Eastern Slovak Plain and a small part of the Zemplínské vrchy Mts., the authors of individual chapters included areas adjacent to the PLA. The results in tabular form show the high potential of this area - so far, it has been identified and, in this publication, documented almost 3,000 species, of which 29 are new for the fauna of Slovakia. There is a reasonable assumption of the occurrence of even more, two and a half to three thousand species of invertebrates (regarding unprocessed groups like most aquatic invertebrates, some mites, important orders of insects: beetles, flies, etc.). It was gratifying that the staff of the Latorica PLA also actively participated in the process of creating this monograph. The input of reviewers of individual papers, who contributed to their improvement, was important, too, for which we thank them warmly.

Perhaps immodestly, but sincerely, we hope that the publication will find its readers to provide them with answers to various questions, and especially to contribute not only to a better knowledge of this undeniably interesting corner of Slovakia, but also to its protection.

Košice and České Budějovice, May/June 2021

Príhovor editorov

Vážený čitateľ,

dostáva sa Ti do rúk publikácia, ktorej vznik má niekoľkoročnú históriu. Na jej začiatku bolo niekoľko výskumných aktivít, ktoré v oblasti CHKO Latorica od roku 2008 realizovali špecialisti z Katedry zoológie Prírodovedeckej fakulty Univerzity Pavla Jozefa Šafárika v Košiciach a Ústavu pôdnej biologie Biologického centra Akadémie vied Českej republiky v Českých Budejoviciach. Je potrebné už na tomto mieste pripomenúť, že oblasť údolných nív a lužných lesov, suché stráne andezitových vŕškov a duny viatych pieskov priťahovali pozornosť zoológov už na konci 19. storočia. Zásluhou radu vtedajších významných zoológov došlo v tomto území k prvým prieskumom, ktoré priniesli mnoho informácií, dokumentujúcich bohatstvo a jedinečnosť tejto oblasti. Pátraním v literárnych prameňoch a osobnými kontaktami s ďalšími špecialistami sme zistili, že zo skupiny bezstavovcov je v súčasnosti zhromaždený dostatočne veľký počet poznatkov, ktoré by bolo vhodné spoločne publikovať. Z praxe je známy stav, že z chránených oblastí sú publikované hlavne floristické údaje a výsledky vertebratologických výskumov. Informácie o na pohľad neatraktívnych a neprávom prehliadaných skupinách bezstavovcov sú sporadicky obmedzované maximálne na motýle, chrobáky, vážky, možno mäkkýše. Niektoré správy chránených území začali s nepravidelným vydávaním špecializovaných monografií zo skupín bezstavovcov a to ako na Slovensku (napr. NP Poloniny, NP Muránska planina), tak v Česku (napr. CHKO Pálava, CHKO Křivoklátsko, CHKO Kokořínsko, CHKO Brdy a pod). V prípade CHKO Latorica sa odrazu ukázala možnosť dať spolu viacero vedných odborov zaoberajúcich sa bezstavovcami. Naše ponuka na spracovanie a vydanie takejto publikácie bola na Správe CHKO Latorica niekedy v roku 2016 prijatá s porozumením. Až v roku 2020, paradoxne v nie príliš prajnej

dobe koronavírusovej, nastal výrazný posun. Podarilo sa osloviť takmer dvadsať špecialistov, ktorí sa pustili do finalizácie svojich príspevkov. Výsledok máte možnosť preveriť v tejto publikácii. Jeden príspevok je všeobecný, informuje o prírodných pomeroch CHKO Latorica. Ďalších pätnásť príspevkov mapuje 15 rôznych skupín bezstavovcov – od mäkkýšov po motýle. Žiaľ, nepodarilo sa získať príspevky z viacerých ďalších zoologických disciplín, ktoré síce skúmané boli, ale výsledky sa nespracovali, napr. väčšina radov kôrovcov, vodné skupiny hmyzu, absentuje aj druhovo bohatá skupina chrobákov, či dvojkrídlovcov. To tu uvádzame ako výzvu do blízkej budúcnosti pro možné druhé pokračovanie! Už rozsah tejto publikácie je značný, a to sú obmedzené obrazové prílohy a textová časť je v zásade redukovaná na základné údaje.

Sme presvedčení, že súbor informácií v tejto publikácií má už teraz dostatočne silný potenciál a určite by bolo vhodné kompilovať na základe týchto údajov manažmentové zámery a opatrenia, ktoré by naznačili, ako zabezpečiť ďalšie prežívanie sledovaných druhov v danej oblasti. Biodiverzita je v rámci CHKO Latorica a blízkom okolí vysoká, pre faunu Slovenska významná po všetkých stránkach, či už z hľadiska biotopových väzieb, indikácie stavu životného prostredia alebo zoogeografickej skladby.

Monografia je venovaná hlavne územiu vlastnej CHKO Latorica, ale keďže tá leží tak trochu bokom záujmu verejnosti na juhovýchode Slovenska – v orografickom celku Východoslovenská rovina a malá časť v Zemplínskych vrchoch, autori jednotlivých kapitol zahrnuli do výsledkov aj plochy susediace s CHKO. Výsledky v tabuľkovej forme ukazujú na vysoký potenciál tejto oblasti – zatiaľ bolo zistených a v tejto publikácii je doložených takmer 3000 druhov, z toho 29 nových pre faunu Slovenska. Pritom je odôvodnený predpoklad výskytu ešte ďalších, dva a pol až tritisíc druhov bezstavovcov (s ohľadom na nespracované skupiny ako väčšina vodných bezstavovcov, časť roztočov, významné rady hmyzu: chrobáky, dvojkrídlovce a iné).

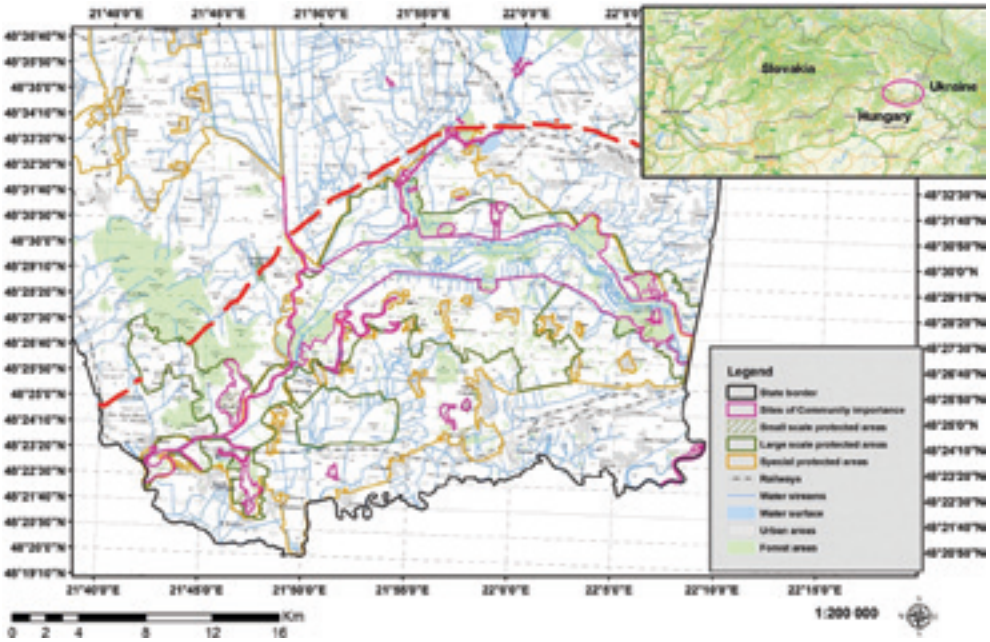
Potešujúce bolo, že do procesu tvorby monografie sa aktívne zapojili aj pracovníci CHKO Latorica. Dôležitý bol tiež vklad recenzentov jednotlivých príspevkov, ktorí prispeli k ich skvalitneniu, za čo im srdečne ďakujeme.

Možno neskromne, ale úprimne si prajeme, aby si publikácia našla svojich čitateľov, aby si v nej našli odpovede na rôzne otázky, a hlavne, aby prispela nielen k záujmu a lepšiemu poznaniu tohto nesporne zaujímavého kúta Slovenska, ale prispela aj k jeho ochrane.

Košice a České Budějovice, máj/jún 2021.

Overview of taxonomical units and numbers of so far documented species, including new species for the territory of Slovakia.

Taxonomic unit	Numbers of listed species	New species for Slovakia
Mollusca	82	-
Lumbricidae (Annelida)	17	1
Pseudoscorpiones	15	-
Opiliones	12	-
Araneae	431	-
Ixodida	6	-
Oribatida	171	17
Oniscidea, Asellota (Isopoda)	21	1
Chilopoda	31	1
Diplopoda	27	1
Collembola	147	1
Orthoptera and Mantodea	77	-
Heteroptera	240	-
Formicidae (Hymenoptera)	72	1
Lepidoptera	1,593	7
All	**2,942**	**30**



Location of the study area within Slovakia (the red dashed line represents the extended area monitored within some of the studied groups of invertebrates).

Natural conditions of the territory of the Latorica Protected Landscape Area (SE Slovakia)

Andrea Šimková[1] & Slávka Miňová[2]

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Abstract

The territory of interest includes the most naturally valuable localities of two adjacent, contrasting areas: the southern part of the Eastern Slovak Plain along the rivers Latorica and Bodrog with lowland character and the southern foothills of the Zemplínske vrchy Mts., a small but geologically very diverse mountain range. The varied mosaic of habitats in such a small area is unique; marshlands are adjacent to dry habitats of sand dunes and rocky steppes, and forest complexes lining riverbanks and covering mountainous territories are surrounded by deforested agrocoenoses. The biogeographical location of the area between the Western and Eastern Carpathians and the Pannonian bioregion is also exceptional. Frequently flooded rivers and their banks belong to the crucial natural biocorridors. The area also lies on an important migratory route of birds, which could be the important vectors of some invertebrates. The chapter outlines the character of inanimate nature, vegetation, and vertebrate fauna and creates a context for other chapters presenting in detail faunistic data on selected groups of invertebrates.

Keywords: Latorica PLA, landscape, flora, fauna, nature conservation, overview

Natural conditions

Definition of territory

The Latorica Protected Landscape Area (hereinafter referred to as the Latorica PLA) is located in the south-eastern part of Slovakia, in the Trebišov and partly in the Michalovce districts. It is a part of the historical Zemplín region. It occupies the central and southern parts of the Eastern Slovak Plain and some adjacent territories of the Zemplínske vrchy Mountains (Šimková & Porhinčáková 2003).

Geological conditions

The Eastern Slovak Plain (Východoslovenská rovina) is an orographic unit formed by uneven tectonic declines of the Earth's crust inside the Carpathian bow during the Neogene and the Quaternary eras. At the beginning of the Quaternary one, it represented a significant depression, into which some rivers flowed from a large area of the Eastern Slovakia and the Ukrainian and Romanian Carpathians and gradually deposited volcanic and flysch material. The bedrock consists mainly of alluvial sedimentary rocks (clays, claystones, sands, sandstones, gravels, conglomerates, etc.) from the Holocene (Mazúr & Lukniš 1986). Neighbouring unit, the Zemplínske vrchy Mts., is formed mainly by Palaeozoic-Mesozoic, partly neovolcanic rocks (Fusán 1972). Aeolian sands belong to the most widespread Quaternary sediments of Eastern Slovakia (lower course of the Ondava River (from Trebišov to Brehov settlements), south of the Latorica River (Streda nad Bodrogom, Kráľovský Chlmec, Boľ, Leles, Poľany, Soľnička, Svinice) (Pelíšek 1963). The aeolian sands form smaller ridges in the terrain (so-called molves). There are some clayey sediments in their bedrock, under what there are liquid sands.

In terms of geological structure, the Tertiary rocks of the Upper Miocene to Pliocene are represented here. The upper Tortonian is represented by greenish-grey fine sandy marlaceous clays (SE of the Brehov village). The younger formation is the early Sarmat in the brackish development, which is represented by gray-green mica clays. This unit is located in the area of Kamenná Moľva and Pustá Eseňka at Brehov village. The Later Sarmat is already in freshwater development with a tufitic lignite series, which contains gray-green sandy clays. It stretches in the northwest - southeast strip and covers the surroundings of the villages Svinice, Zatín, Vojka, Boľ, Poľany to Leles. Pont and Levant are represented by colourful clays that occur in the Čierny les and near the village of Poľany. Further development occurred in the Pleistocene and Holocene by river accumulation and Eolithic activity - deposition of loess and aeolian sands (Cibuľa 1992).

The western part of the PLA extends to the Zemplínske vrchy Mts. represented by Mesozoic rocks of the Middle Triassic, which are formed by medium dolomites with limestone (Upper Anise) and massive limestones of the Middle Anise between the villages Ladmovce and Viničky. Further to the west, the geological bedrock is very diverse, consisting of Tertiary volcanic rocks and tuff sediments, but also Paleozoic rocks (Baňacký & Vass 1988).

Geomorphological conditions

According to the geomorphological division of Slovakia (Kočický & Ivanič 2011), the area belongs to the Alpine-Himalayan system, the Pannonian Basin subsystem, the East Pannonian Basin province, the Great Danube Basin subprovince and the Eastern Slovak Lowland, the Eastern Slovak Plain entirety and the subunits Medzibodrocké pláňavy (with parts of Chlmecké kopce and Tarbucka hills), Bodrocká rovina and southern part of the Latorická rovina plains, and a part of the territory in the Zemplínske vrchy Mts. belongs to the Carpathian subsystem, Western Carpathians province, Inner Carpathians subprovince and Matra-Slaná region.

The predominant part of the Protected Landscape Area is formed by the Latorická rovina as a subunit of the Eastern Slovak Lowland, which extends along the Latorica River. It is bordered on the south by the Medzibodrocké pláňavy, on the northwest by the Trebišovská

tabuľa and Ondavská rovina, on the north by the Malčická tabuľa and the Kapušianske pláňavy plains, and on the east by the border with Ukraine. The southwestern part of the PLA occupies the plain Medzibodrocké pláňavy, and the southern part of the Zemplínske vrchy Mts.

The area of the plain Latorická rovina is formed by a lowland with a very small elevation. In the southern part of the Leles and Vojka areas, it has the character of a slightly undulating landscape with an elevation of about 10 m. The area has the character of a typical transverse zone with slight denivelations of the terrain, with a network of living and dead beams and artificial drainage channels. In today's relief, it is possible to distinguish aggregation ramparts 1 to 2.5 m high, which are separated by interwalled depressions. A characteristic feature of this area is the occurrence of aeolian relief, which is represented by loess cover and sand dunes 6 to 10 m high. Shallow depressions have a special position, the occurrence of which is also conditioned by the current decline of 1 to 2 mm per year (Cibuľa 1992; Košťálik 1999).

The western part of the protected area passes into the Zemplínske vrchy Mts. It is the easternmost core mountain range in Slovakia, stretching in a northwest-southeast direction between the villages of Veľaty and Ladmovce. The hilly terrain of this small (101 km^2) and low mountain range, with the highest elevation at Rozhladňa Hill (469 m a.s.l.) has a very diverse geological history and is built of rocks of the Carboniferous to Tertiary ages. Neovolcanic sediments on the southern and southwestern slopes have created suitable conditions for the development of vineyards. Unique in the central to southern parts of Zemplín region is the occurrence of dolomite and limestone, which in the south-eastern part of the mountain range have created special conditions for calcicolous flora and fauna.

Soil conditions

Soil conditions in the Eastern Slovak Plain correspond to complex geological conditions, which cause great soil heterogeneity, both in terms of species and typology (Bedrna et al. 1989). From the species point of view, there is the occurrence of sandy, loamy, clayey soils and clays, while it is characteristic that individual soil species alternate at very short distances (Bedrna et al. 1968).

As a result of the long-term action of groundwater and surface water, gleyic fluvisols and mollic gleysols blacks with unfavourable properties were formed, especially on very heavy alluvial sediments. Gleyed and ungleyed fluvisols originated in relatively elevated localities and on agglomeration ramparts. These are mostly clayey to clayey-clay soils with favourable to very good properties. A topographic series of chernozems, haplic luvisols and albic luvisols was created on clayey to loamy-clayey sediments of non-calcaric loesses, loess and slope loams. The significant diversity of habitats and soil conditions in the lowlands is also evidenced by the share of regosols and cambisols. Regosols were formed on aeolian sands and have a shallow humus horizon with a low humus content. Cambisols are built on solid rocks and deluvias of neo-volcanic rocks in the marginal part of the lowlands (Bedrna 1966; Košťálik & Suvák 2010).

In general, we can say that clayey soils, clayey-aluminous soils, up to clays, were formed in the river basin, sandy soils were formed mostly on the Chlmecké kopce and Tarbucka hills and near the Viničky village (Pelíšek 1963).

Cambisols are the most frequent soils in the Zemplínske vrchy Mts., where eutric to dystric or dystric to cambic cambisols were distinguished. Haplic luvisols and or mollic gleysols can also be found in the foothills on alluvial sediments. Clay loam soils derived from volcanic ryolitic tuff are typical of the southwestern part of the mountain range used to grow Tokaj wine. Loess clays and arenosols are present here only slightly along the edges of the mountains (Šály & Šurina in Miklós 2002).

Hydrological conditions

The river system of the Eastern Slovak Lowland is a typical example of a river fan-shaped network in which rivers of approximately the same characteristics and values converge in a relatively small area, which is dependent by the neotectonic disturbances of the area and declines of the Eastern Slovak Lowland. Plain relief and low total precipitation (up to 600 mm per year) have a direct impact on the size of the specific runoff from the area, which here reaches a value below 1.5 l /s per km^2 (Šútor 1995).

The axis of the territory is the Latorica River (Латориця = Latorytsia in Ukrainian, Latorca in Hungarian), which springs in the Eastern Carpathians in Ukraine. It has a total length of 188 km, but it flows through our territory only in the length of 31.4 km. After about the twentieth kilometer, a large right-hand tributary Laborec is added, then it merges with the Ondava River and together they form Bodrog River, which flows through Slovak territory in the length of 15 km, while its total length is 67 km. The right-hand tributary of Bodrog, the Roňava River, springs in the Slanské vrchy Mts., has a total length of 51 km, of which 40.5 km is in Slovak territory, while 13.5 km of the stream forms the Slovak-Hungarian border. The Laborec River has a catchment area in the Slovak part of the Eastern Carpathians and takes water from the Ukrainian Carpathians in the Uh River.The Ondava River collects water mainly in the northeastern part of Slovakia, from the border of the Eastern and Western Carpathians. The Roňava River drains mainly the southern part of the Slanské vrchy Mts. and Eastern Slovak Upland, which represent the eastern edge of the West Carpathian province.

The accompanying phenomenon of the entire Latorica stream is a network of dead branches, which remained as remnants of the meandering riverbed by straightening the stream in the years 1953-1965 (Seszták et al. 1996). The main riverbed and the network of disconnected segments are surrounded on both sides by antiflood dykes. The material for the construction of these dykes was extracted almost exclusively from the current interdyke area in the immediate vicinity of the dyke. In place of excavated soil, "material pits" (so-called cubes) have been preserved, which are filled during periods of high gauge state (Bogoly 1996). In the left-bank part of the Latorica River, an important axis of the Leles canal passes through the entire territory of the PLA, into which a number of other drainage and reclamation canals open on the right-bank and left-bank channels. On the right bank of the Latorica River, in the left-bank part of the Laborec River, is the main internal water collector Udoč (former Uh riverbed), into which the Ptrukšiansky and Maťovský canals flow from the eastern side, as well as several less important drainage canals (Bogoly 1996; Stano 2014).

In the southeastern tip of Slovakia there flows the River Tisa/Tisza, which springs in Ukraine in the Eastern Carpathians, receiving tributaries also from Romanian Carpathians. It has a total length of 966 km, but in the Slovak territory it flows only in the length of 5.2 km and the whole section forms the Slovak-Magyar border (Stano 2012).

The rivers and their banks represent a significant dynamic element of the nature of the Latorica PLA and at the same time they are important biocorridors that create a specific "crossroads" from this area, influenced by spatially very distant landscapes: mountain massifs from the Romanian and Ukrainian Carpathians in the east to the eastern edge. The Carpathians in Slovakia and forests lining rivers allow the spread of plants and animals upstream from the central parts of the Pannonian Lowland. They also affect the migration routes of birds, which are also vectors of the spread of plants and animals. Diverse communities of organisms, where mountain and lowland, Pannonian and Carpathian species often live together, are the result of these circumstances.

Most of the territory belongs to the Bodrog River basin. Bodrog drains most of the area of interest using a network of drainage canals and two repumping stations with the main canals: Somotorský, Leleský and Pavlovský.

The runoff regime of streams is characterized as rain-snowy, which is manifested by a significant onset of spring water in March and April. Autumn depressions are typical in late summer and autumn, when flows in August and September fall to half the average annual flow (Miklós 2002).

The area of Zemplínske vrchy Mts. are poor in waterbodies, especially their southern and western parts. Smaller streams, like Ošva, Hrčeľský, Mlynský, Barský potok are part of the Ondava, Bodrog, and Roňava River basins. Two small water reservoirs are built on small streams near the villages Malá Bara, and Hrčeľ. In the past, mineral water springs were used in small spas near the villages of Viničky, Veľká Tŕňa, Cejkov, and Veľaty (Šútor 1995).

Climatic conditions

According to Lapin et al. (in: Miklós 2002), in terms of climatic zoning of the Slovak Republic the area of Trebišov district belongs to the area with a predominantly warm lowland climate and a warm lowland climate with an average annual temperature of about 8˚C.

The Eastern Slovak Lowland, the central part of which is occupied by the Latorica PLA, is one of the warmest and at the same time driest areas in Slovakia. According to the average annual value of the climatic irrigation indicators (i.e. the climatic characteristics of the soil water balance in measurable units), they range from 100 to 150 mm, which means a lack of precipitation (Miklós 2002).

Hot summers, cold winters, and relatively sudden transitions between seasons give this area the character of an area with a subcontinental climate. The area belongs to a warm area, slightly dry sub-area, slightly dry district with a cold winter, with a temperature in January above -3 to -5˚C, with a number of summer days above 50 and a type with a warm lowland climate, with an average temperature in July 19.5 to 20.5C and an annual amplitude of average monthly air temperatures of 22 to 24˚C and an annual total precipitation of 530 to 650 mm (Cibuľa 1992).

Water management reconstructions and their impact on the landscape

Water management reconstruction

The Eastern Slovak Lowland underwent a significant transformation of the landscape structure due to anthropogenic activity. Whereas in the past most of the area was covered by floodplain, oak-hornbeam, and thermophilic oak forests, moist meadows, and swamps,

today it can be characterized as a **deforested cultural steppe** with remnants of floodplain fragments. The original floodplain forests and oak groves were removed in large areas and replaced by plowlands, grasslands, orchards, and vineyards. The remnants of the floodplain forest have been preserved only on the bottom lands of Latorica, Uh, and Bodrog rivers. Aquatic and swamp vegetation is preserved especially near larger lowland rivers, in dead branches, in old meanders, in drainage canals, in inter-dune depressions and the like. The last major changes in the landscape were caused by water management interventions in the area.

A specific problem of the Eastern Slovak Lowland was the occurrence of frequent floods. The flood waters of the Tisa/Tizsa, Bodrog, Latorica, Ondava, and Topľa rivers formed a floodplain in the first half of the 19th century. Adjustments to runoff conditions began in the 19th century. Significant flood defenses occurred in Potisie in 1845 and 1846, after extraordinary floods in 1844. These floods caused the formation of several regional regulatory associations in the Tisa/Tisza River basin, including the Association for the Regulation of the Tisa/Tisza in Medzibodrožie (Bodrogköz in Hugarian) – a historic name for the territory framed by the rivers of Latorica, Bodrog and Tisa/Tisza – which was founded in 1846 and based in Leles as the first organized water management institution in the region. Its aim was to protect Medzibodrožie from floods and drainage of swamps, thus enabling the management of the area. Until the beginning of the 1990s, fencing and straightening of the main streams and construction of drainage canals occurred.

The great flood at the beginning of the 20th century raised the demand to categorically solve the problem by building pumping stations, dikes, and regulating rivers. In the 50s and 60s of the 20th centuries, water management reconstruction continued aimed at **protecting** the area **from external waters** (fencing and straightening of rivers), **drainage of internal waters** (construction of drainage canals and pumping stations), **land drainage** (construction of surface pipe drainage) and implementation of land **reclamation interventions** (adjustment of water and air regime, irrigation, regulatory drainage). Their aim was to improve the conditions for growing crops and making the land accessible. A total of 316 km of watercourses were regulated and modified and 453 km of protective dykes were built (Seszták et al. 1996).

Impact of water management reconstruction on the landscape

By directing and fencing individual watercourses and building drainage systems, the flow and level regime was changed. The dead branches of the main riverbed were cut off and there was hindered watering with the spring floods of the surrounding terrain depressions, dead branches, wet meadows, and floodplain forests being cut off from the main riverbed by the dyke. The rapid outflow of water from the landscape through a straight trough results in undercut of the bottom of the main riverbed. The bottom of the main riverbed cut in this way is lower compared to the surrounding dead branches, and during smaller spring floods, water from the main riverbed does not get into them in sufficient quantities, which leads to their more pronounced drying in the hot summer months. At the same time, both the straight riverbed and the lack of sufficient interdyke space to hold water increase the risk of flash floods during torrential storm rainfall. In the hot summer, the originally wet terrain depressions, dead branches, wet meadows, and floodplain forests (wetlands) in

Physical-geographical map of the Latorica Protected Landscape Area (the map was prepared by M. Lukáňová).

the outside-dyke area dry out. The loss of water in wetlands thus drains the landscape, as wetlands, like the natural reservoirs of water in the landscape, do not have enough water and are dependent only on precipitation activity. This results in the reduction of suitable habitats and the reduction of aquatic and moisture-loving species of plants and animals, the occurrence of which depends on alternating floods and dry summers, on alternating water levels in wetlands, groundwater levels or regular mowing of wet meadows. However, this desiccation also affects the surrounding agricultural landscape and so the plowlands and grasslands, paradoxically due to water management modifications, are without enough water at the time of the lack of spring floods and lack of rainfall activity (Derka 2014).

Phytogeographical and floristic conditions

Phytogeographical region

This area of interest is a part of the Central European Pannonicum region of Eastern Slovakia. It includes the West Carpathian Mountains to the north and the Eastern Slovak Lowland and Slanské vrchy Mts. to the east, and contains Eupannonicum, Carpaticum occidentale, and Praecarpaticum floral subregions (Futák 1984).

Flora of the monitored area

The natural vegetation of the Eastern Slovak plain has been altered by anthropogenic activities and is very poorly preserved. Only small areas of natural forest communities on the lower reaches of the Bodrog, Ondava, and Latorica rivers have been retained, and to a lesser extent on the elevated riverbanks and hills (Berta 1970). Swamps and aquatic vegetation are found in old river meanders and riverbeds and sediments (Oťaheľova et al. 1985).

The flora of this area is linked to forest and non-forest habitats determined by geological, geomorphological, soil, hydrological, and climatic conditions. Most of the original habitats have been transformed into a cultural landscape by human activity, which has included the deforestation of the lowland floodplain forests and slopes of the Zemplínske vrchy Mts., and the deforestation of isolated areas such as Tarbucka hill and Chlmecké kopce hills. Part of this area includes vineyards and black locust (*Robinia pseudoacacia*) forest monocultures (Bogoly 1998; Ščepka 1982; Zlacká & Sádovský 2005) with a larger part occupied by fields and orchards. Most of the existing native xerothermic and floodplain forest habitats are now managed forests, though fragments of the original native forest and non-forest habitats remain scattered throughout the Eastern Slovak Plain.

Characteristics of habitats and their location in the monitored area

This chapter provides a brief description of habitats and their location in the monitored area. Habitats are classified in accordance with the Catalogue of Habitats of Slovakia (Stanová & Valachovič 2002) and habitat names are provided in parentheses.

Floodplain forests

Nearthe lowland rivers, the remains of the original extensive floodplain forests have been preserved and include stands of ash and oak (*Querceto-Fraxinetum*), ash and elm (*Ulneto-Fraxinetum*), and alder and willow (*Saliceto-Alnetum*) which are sensitive to groundwater levels and surface flooding during the year (Berta 1970; Oťaheľova et al. 1985). According to the predominant trees in each area, these forests can be described as either "hard" or "soft" floodplain forests (Berta 1986).

Willow-poplar forests (Ls1.2) (91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae*)) are in places characterized by long-term and high-level foods. As the level of ground water rises, the soil becomes inundated with a high concentration of nutrients and nitrogen. Species such as willows (*Salix alba, Salix fargilis*) and poplars (*Populus alba, Populus nigra*) are common and rarer species like Summer Snowflake (*Leucojum aestivum*) and Eurasian wild grapevine (*Vitis sylvestris*) are also present in this habitat (Berta 1970; Oťaheľova et al. 1985).

Oak-elm-ash forests (Ls1.2) (91F0 Riparian mixed forests of *Quercus robur, Ulmus laevis* and *Ulmus minor, Fraxinus excelsior* or *Fraxinus angustifolius,* along the great rivers (*Ulmenion minoris*)) are situated on the upper elevated terraces of rivers and dryer places out of reach of regular floods. These include hard woods such as Pedunculate oak (*Quercus robur*), European field elm (*Ulmus minor),* and common ash (*Fraxinus excelsior*) or narrow-leaved ash (*Fraxinus angustifolius*) as well as rare species like Shining spurge (*Tithymalus lucidus*), giant-daisy (*Leucanthemella serotina*), Fen ragwort (*Senecio paludosus*),

tall violet (*Viola eletior*), giant fescue (*Festuca gigantea*), etc. (Berta 1970; Oťaheľová et al. 1985; Bogoly 1996). *Leucojum vernum subsp. carpaticum*, an East Pannonian subendemic species, is found on the floodplain as well as the riparian zone (Dostál et al. 1999; Šimková et al. 2014).

Willow shrub wetlands (Kr8 Mire willow scrub) and fen alder forests (Ls7.4 Alder swamp woods) are typically located in the former meanders of the lowland of the Tisa/Tizsa and Udoč rivers (Bogoly 1996). These areas are sustained by groundwater and floods which occur for 6 – 8 months each year. Characteristic species such as black alder (*Alnus glutinosa*), grey sallow (*Salix cinerea*), bay willow (*Salix pentadra*), the eared willow (*Salix aurita*), glossy buckthorn (*Frangula alnus*), eastern marsh fern (*Thelypteris palustris)*, purple small-reed (*Calamagrostis canescens*), crested wood fern (*Dryopteris cristata*), milk-parsley (*Peucedanum palustre*), Elongated sedge (*Carex elongate*), the greater pond sedge (*Carex riparia*) are all found here (Berta 1970; Oťaheľova et al. 1985). However, various moss species, such as Blunt-leaved Bog-moss, recurved sphagnum, Spiky Bog-moss (*Sphagnum palustre, S. recurvum, S. squarrosum*) have disappeared due to the arid climate in the 1960s (Bogoly 1998).

Forests in the Zemplínske vrchy Mts.

The Carpathian oak-hornbeam forests (Ls2.1) with xeric and thermophilic plant species are the most predominant, however the ash and black locust forests represented in a minority are also present. On drier, warmer slopes, oak-hornbeam forests merge into oak groves with downy oak (*Quercus pubescens*) and Tatar maple (*Acer tataricum*) or into *Quercetum petraeae-cerris* or *Corno-Quercetum*. **Acidophilous oak forests (Ls3.5.1)** with Sessile oak (*Quercus petraea* agg.), European beech (*Fagus sylvatica*) are less represented. These forests are predominate on mountain tops. Forests are grassy with sticky catchfly (*Steris viscaria*) and wood bluegrass (*Poa nemoralis*).

Watercourses are lined with alluvial associations with common alder (*Alnus glutinosa*). Abandoned pastures and vineyard edges are overgrown with shrubs with a predominance of black locust (*Robinia pseudoacacia*), blackthorn (*Prunus spinosa*), Common dogwood (*Cornus sanguinea*), hawthorns (*Crataegus* spp.) and wild roses (*Rosa* spp.) (Miklós 2002; Mártonfi 2014). The results of detailed mapping of vascular plants were reported here by Mártonfi et al. (2014) and a rich lichen flora was recently documented here by Goga & Dudáš (2019).

Aquatic vegetation

Aquatic vegetation (floating, submerged and unattached vegetation) is typically found in the wetlands of theEastern Slovak Lowland. These can be found in stagnant ponds, oxbow and shallow lakes, slow-flowing rivers, and canals, as well as artificial ditches and pits.

Communities in exposed riverbeds (3130 Oligotrophic to mesotrophic standing waters with vegetation of *Littorelletea uniflorae* and/or *Isoëto-Nanojuncetea*) appear in places where dramatic changes in the water level have occurred. In spring, and occasionally during winter, these areas are flooded. European water clover (*Marsilea quadrifolia*) which is unique to the Eastern Slovak Lowland, and needle spikerush (*Eleocharis acicularis*) (Oťaheľová et al. 1985) are found here. European water clover (*Marsilea quadrifolia*) is

disappearing from its original habitats due to anthropogenic activities, but the species is invading secondary habitats in the riparian zone where there is limited competition with other species (Ruščančinová 2001).

It was interesting to confirm the presence of marsh seedbox (*Ludwigia palustris*) in 2015 in two Eastern Slovak Plain localities after an absence of more than 60 years. Since 1952, this species was considered to be extinct in Slovakia (Dítě et al. 2017).

We have found forty communities of **aquatic vegetation (Vo2) (3150 Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* – type vegetation)** in old meanders of the Latorica River (Oťaheľova et al., 1985). These grow in water with a maximum depth of two meters which fluctuates during the year. Communities with water soldiers (*Stratiotes aloides*) represent the largest and best-preserved areas of aquatic vegetation in the Eastern Slovak Lowland (Hejný 1960; Šomšák 1963; Hejný & Berta 1972; Oťaheľova & Husák 1982a). These diverse communities include European white water lily (*Nymphaea alba*), Yellow water lily (*Nuphar lutea*), coontail (*Ceratophyllum demersum*), common duckweed (*Lemna minor*), Star Duckweed (*Lemna trisulca*), common duckmeat (*Spirodela polyrhiza*), and arrowhead (*Sagittaria sagittifolia*). Slovakia's smallest flowering plant, least duckweed (*Wolffia arrhiza*), is rare (Husák & Oťaheľova 1982b) but has been confirmed here in recent years (**Šimková** unpubl.).

Wet meadows

Many wet meadows and pastures are the result of anthropogenic activity where the most important factors influencing growth are floods, groundwater levels, and the frequency of mowing. There are various types of habitat, such as **(Lk7) Eutrophic humid grasslands, (Lk8) 6440 Alluvial meadows of river valleys of the *Cnidion dubii* alliance,** and **(Lk4) 6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*),** with 26 plant communities found in wet meadows and pastures (Špániková 1982; Oťaheľova et al. 1985). Rare and legally protected species are found here, including hedgehyssop (*Gratiola officinalis*), *Orchis elegans*, Marsh gentian (*Gentiana pneumonanthe*), Common Meadow-rue (*Thalictrum flavum*), rushes (*Juncus atratus*), tall violet (*Viola eletior*), meadow violet (*Viola pumila*), marsh pea (*Lathyrus palustris*) etc. (Bogoly 1994, 1996, 1998; Šimková et al. 2014).

Some meadows and pastures of the Eastern Slovak Lowland are characterized by very alkaline and saline soils. They are found in the floodplain Latorica Riverand in other smaller areas which are characterized by high ground water levels in the summer and include **the salt steppe and salt marsh habitat (Sl1) (1340* Inland salt meadows)**. These communities include species such as fescue (*Festuca pseudovina*), strawberry clover (*Trifolium bonannii),* and saltmarsh rush (*Juncus gerardii*) and can be found in pastures near Strážne village and some species grow near wet pits of the Latorica River. *Galatella punctata* is a decorative species growing in low-salinity soils near Strážne and Leles villages (Šimková unpubl.; Dítě et al. 2016).

The **Pannonic saline meadow (Sl4)** habitat is found only in fragments in the Eastern Slovak Lowland. They are characterized by structurally simple communities where the ground water level fluctuates and low-salinity soils flood in spring and harden and crack in winter. Species such as creeping bent (*Agrostis stolonifera*), water foxtail (*Alopecurus*

geniculatus), keek (*Rorippa sylvestris),* and rare and protected species such as mousetail (*Myosurus minimus*), small-flowered bitter-cress (*Cardamine parviflora*), Lateral-flowered Buttercup (*Ranunculus lateriflorus*) are found here. The European slough grass (*Beckmannia eruciformis*) occurs only in this habitat in Slovakia (Soó 1964; Holub 1999; Dítě et al. 2011).

Xerothermic vegetation

Sand dunes represent isolated islands within the Eastern Slovak Lowland. They are not flooded even during the highest floods and their species composition is rich and similar to meadows and pastures in the Zemplínske vrchy Mts. and on volcanic islands of the Medzibodrožie area, such as Chlmecké kopce and Tarbucka hills. Species such as sweet vernal grass (*Anthoxanthum odoratum*), meadow fescue (*Festuca pratensis*), common bent (*Agrostis capillaris*), Diffuse wallflower (*Erysimum diffisum*), yarrow (*Achillea millefolium*), Pacific wormwood (*Artemisia campestris*), downy brome (*Bromus tectorum*), Rush Skeletonweed (*Chondrilla juncea*), Bermuda grass (*Cynodon dactylon*), and sheepbit (*Jasione Montana*) predominate in these dunes (Maglocký 1982; Bogoly 1998).

The Tarbucka and Chlmecké kopce hills have a different type of vegetation than that found in the Eastern Slovak Lowland (Futák 1972) and have played an important role in the spread of xerothermic vegetation. These hills include pioneer communities on wind-blown sand deposits, especially on the steep walls of abandoned sandpits, and provide several types of habitats, such as **Xeric sand calcareous grassland (Pi2, 6120*), Sub-Pannonic steppic grassland (Tr2, 6240*), Pannonic sand steppes (Tr4, 6260*)**. Communities include species such as baby's breath (*Gypsophila paniculata*), *Festuca vaginata*, quackgrass (*Elytrigia repens*), plains eryngo (*Eryngium planum*), *Silene otitis* subsp. *hungarica*, cypress spurge (*Tithymalus cyparissias*), *Dianthus pontederae*, late pink (*Dianthus serotinus*), etc. (Maglocký 1982; Bogoly 1998; Kalivodová et al. 2008; Košťálik et al. 2014; Šimková et al. 2014). The protected species *Pulsatilla pratensis* subsp. *hungarica* and Zimmermann's pasqueflower (*Pulsatilla zimmermannii*) are only found in Eastern Slovak Lowland (Vágeknecht & Čeřovský 1999a, b; Ruščančinová & Mrázová 2001).

The Kašvár hill is a representative "island hill" in the Eastern Slovak Lowland. The calcareous substrata (Triassic dolomites and limestones) support **a xerothermic calcium-loving flora**. Most of the hills are covered by grass-herbaceous biotopes found on shallow soils of limestone slopes. There are several types of habitats including **Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (Tr1, 6210)** and **Sub-Pannonic steppic grasslands (Tr2, 6240*)** that form a mosaic with **Continental deciduous thickets (Kr6, 40A0*)**. Communities in these habitats are represented by several rare or protected species, such as oxeye (*Adonis vernalis*), the greater pasque flower (*Pulsatilla grandis*, lady orchid (*Orchis purpurea*), Golden Feather Grass (*Stipa pulcherrima*), flax (*Linum hirsutum*) and many others. Xerothermic scrubs include the Tatarian maple (*Acer tataricum*), European Spindle Tree (*Euonymus europaea*), Wartybark-like Euonymus (*Euonymus verrucosa*) and Cornelian cherry (*Cornus mas*) (Kolarčik & Mártonfi 2006; Šimková et al. 2014).

Fauna

In terms of the zoogeographical division of the terrestrial biocycle (Jedlička & Kalivodová in Miklós 2002), the area belongs to the Palaearctic region, the Eurosibirian subregion, the steppe province and the Pannonian section. From the point of view of the zoogeographical division of the limnic biocycle (Hensel & Krno in Miklós 2002), the territory belongs to the pontocaspian province, the Potisie district, and the Latorica part.

The current state and species composition of the fauna of the Latorica PLA as well as Medzibodrožie is the result of natural factors (biotic and abiotic) and human activities (deforestation, expansion of pastures and arable land, land reclamation such as water flow regulation, drainage, etc.). Despite long-term antropogenetic interventions, various types of habitats have been preserved in the area, from floodplain forests, through aquatic and wetland habitats to dry xerotherms. This diversity is a prerequisite for the occurrence of a large number of species of fauna. Many of them belong to protected and endangered species.

The animals of the area of interest are mainly among the representatives of floodplain forest communities, meadows and pastures, watercourses and water areas, sand dunes and xerothermic habitats, and arable lands. Given the focus of the publication, we present here only a brief overview of vertebrate species typical for some important habitats using a rich bibliography (cf. Vostal et al. 1982; Koščo et al. 1999, 2006; Krištofík & Danko 2013; Kalivodová et al. 2008; Anonymus 2015; Danko et al. 2017; Uhrin et al. 2019) and original unpublished observations of the State Nature Conservancy of the Slovak Republic employees and others.

Floodplain forest communities are located in the floodplains of the Latorica, Bodrog, and lower section of Laborec and Ondava rivers. In these communities, there occur some species adapted to life in shaded forest habitats, with a higher degree of humidity. Among the protected species of vertebrates, **amphibians** such as the Danube newt (*Triturus dobrogicus*), European tree frog (*Hyla arborea*), common frog (*Rana temporaria*), the moor frog (*Rana arvalis*), and the agile frog (*Rana dalmatina*) occur here. The grass snake (*Natrix natrix*) from **reptiles** and from the mammals, hazel dormouse (*Muscardinus avellanarius*), common shrew (*Sorex araneus*), yellow-necked mouse (*Apodemus flavicollis*), and red squirrel (*Sciurus vulgaris*) live there, or bats such as common pippistrelle (*Pipistrellus pipistrellus*), cond bat (*Myotis dasycneme*), common noctule (*Nyctalus noctula*), Brandt´s bat (*Myotis brandtii*) and others. Among the **birds**, the black-eared kite (*Milvus migrans*), European honey buzzard (*Pernis apivorus*), white-tailed eagle (*Haliaeetus albicilla*) or black stork (*Ciconia nigra*) nest here. Other bird species include the middle-spotted woodpecker (*Dendrocopos medius*), the black woodpecker (*Dryocopus martius*), the gray-headed woodpecker (*Picus canus*), and the collared flycatcher (*Ficedula albicollis*).

Communities of **meadows and pastures** occur in the floodplains of rivers and on the slopes of the Zemplínske vrchy Mts. PLA is characterized by habitats of wet meadows, which depend on the length of floods and the height of the groundwater level and usually dry up in summer. Pastures are formed on intensively grazed meadows, which are species-poorer than meadows. In meadows and pastures, various species of **frogs**, such as the common toad (*Bufo bufo*) or common frogs (*Rana* spp., *Pelophylax* spp.) look for food. Suitable conditions for living here are **reptiles**, of which the sand lizard (*Lacerta agilis*) and the viviparous lizard (*Zootoca vivipara*) live here. Meadows are also a food habitat for several species of mammals,

such as the least weasel (*Mustela nivalis*), the white-chested hedgehog (*Erinaceus concolor*), harvest mouse (*Micromys minutus*), roe deer (*Capreolus capreolus*), and red deer (*Cervus elaphus*). You can also see the European wild cat (*Felis silvestris*) there. Among the **birds** we can find species such as corncrake (*Crex crex*), spotted crace (*Porzana porzana*), yellow wagtail (*Motacilla flava*), common stonechat (*Saxicola torquata*), corn bunting (*Emberiza calandra*), yellowhammer (*Emberiza citrinella*), European turtle-dow (*Streptopelia turtur*), and northern lapwing (*Vanellus vanellus*).

Communities of **watercourses and expanses of water** are the most typical for the Latorica PLA. In addition to watercourses, they can also be found in dead branches, wet terrain depressions, reclamation canals, and material pits. They are characterized by a high species diversity of both invertebrates and vertebrates. Many of them are linked to these habitats by their development, others come here for food. Of the vertebrates, **fish** are typical representatives here. Almost all of the lowland species occur here. Among the protected and rare species, these are the weatherfish (*Misgurnus fossilis*), the Balon´s ruffe (*Gymnocephalus baloni*), the striped ruffe (*Gymnocephalus schraetser*), the sabrefish (*Pelecus cultratus*), the common zingel (*Zingel zingel*), Danube strebel (*Zingel streber*), the Kessler´sgudgeon (*Gobio kessleri*), Danubian gudgeon (*Gobio uranoscopus*), Amur bitterling (*Rhodeus amarus*) and others. Of the non-native species, the goldfish (*Carassius auratus*), the stone moroko (*Pseudorasbora parva*), the black bullhead (*Ameiurus melas*), the Chinese sleeper (*Perccottus glenii*), the western tubenose goby (*Proterorhinus semilunaris*) and the pumpkinseed (*Lepomis gibbosus*) are spread here. For **amphibians**, the aquatic habitats are mainly reproductive localities. Of these, the European fire-bellied toad (*Bombina bombina*), the edible frog (*Pelophylax kl. esculentus*), marsh frog (*Pelophylax ridibundus*) and the pool frog (*Pelophylax lessonae*) stay close to the water all year round. Of **reptiles**, the rare European pond turtle (*Emys orbicularis*) inhabiting stagnant or slightly flowing waters with muddy bottoms has adapted to the aquatic environment. Among **mammals**, water shrew (*Neomys fodiens*), European water vole (*Arvicola amphibius*), European otter (*Lutra lutra*), Eurasian beaver (*Castor fiber*) and Daubeton´s bat (*Myotis daubentonii*) hunting numerous insects above the water are occurring here. A number of **bird species** such as common kingfisher (*Alcedo atthis*), ferruginous duck (*Aythya nyroca*), whiskered tern (*Chlidonias hybrida)*, black-crowned night heron (*Nycticorax nycticorax*), little egret (*Egretta garzetta*), great egret (*Egretta alba*), gray heron (*Ardea cinerea*), purple heron (*Ardea purpurea*), great bittern (*Botaurus stellaris*), little bittern (*Ixobrychus minutus*), black stork (*Ciconia nigra*), common redshank (*Tringa totanus*), spotted crake (*Porzana porzana*) and little crake (*Porzana parva*), water rail (*Rallus aquaticus*), marsh harrier (*Circus aeruginosus*) and others.

Communities of **sand dunes and xerothermic habitats** are tied to dry and warm habitats on aeolic sands mostly in the Medzibodrocké pláňavy and the Latorická plains, further on the southern slopes of the Zemplínske vrchy Mts. and on the slopes of solitary Neovolcanic bodies of Tarbucka and Chlmecké kopce hills, or Somotor hill. The animals here had to adapt to extreme conditions such as high temperatures and the intensity of sunlight, or lack of water. Among vertebrates, **amphibians** can be found in these habitats, namely, the European green toad (*Bufotes viridis*), which best tolerates heat and drought of our frogs and the common spadefoot (*Pelobates fuscus*). Of the **reptiles**, there live in xerotherms the

typical European green lizard (*Lacerta viridis*), Aesculapian snake (*Zamenis longissima),* and smooth snake (*Coronella austriaca*). From the **mammals** there are grazing European suslik (*Spermophillus citellus*) or some species of small terrestrial mammals such as lesser white-toothed shrew (*Crocidura suaveolens*). The red-backed shrike (*Lanius collurio*) and the barred warbler (*Sylvia nisoria*) are the typical **birds** nesting in the bushes, the eagle owl (*Bubo bubo*) on the rock walls of the quarries and the nesting holes of the European bee-eater (*Merops apiaster*) and the sand martin (*Riparia riparia*) dig in the sand walls. Other species include common stonechat (*Saxicola torquata*), woodlark (*Lullula arborea*), and Eurasian hoopoe (*Upupa epops*) also can be monitored here.

Arable land communities can be found mainly south of the Latorica interdyke area and in the vicinity of the Zemplínske vrchy Mts. Their expansion reduces the biodiversity of the area.

These communities are very poor in species, but some species are very abundant. The composition of these communities also depends on the type of agriculture, because each agricultural culture binds certain species. Common vertebrates include the common mole (*Talpa europaea*), the European brown hare (*Lepus europaeus*), the European hamster (*Cricetus cricetus*), the common vole (*Microtus arvalis*), and the roe deer (*Capreolus capreolus*) and the wild boar (*Sus scrofa*) or red fox (*Vulpes vulpes*) arelooking for food there. The occurrence of the golden jackal (*Canis aureus*) was also recorded here. **Birds** include common quail (*Coturnix coturnix*), Eurasian skylark (*Alauda arvensis*), crested lark (*Galerida cristata*), common raven (*Corvus corax*), common pheasant (*Phasianus colchicus*), common buzzard (*Buteo buteo*), common kestrel *(Falco tinnunculus*), or lesser spotted eagle (*Clanga pomarina*) find there hunting grounds. The territory of Medzibodrožie lies on an important migration route of common cranes (*Grus grus*). More numerous resting or foraging flocks have also been observed there, which have stopped in fields with corn or winter crops.

Nature protection

The Latorica PLA was established by the Decree of the Slovak Commission for the Environment No. 278/1990 to ensure the protection and optimal use of the landscape in the Eastern Slovak Lowland with emphasis on the preservation of wetland and aquatic habitats, as well as currently rare remnants of the original floodplain forests in the Latorica and Laborec river basins. In 2004, the territory of the PLA was extended by the Decree of the Ministry of the Environment of the Slovak Republic No. 122/2004 Coll. At present, the Latorica PLA covers an area of 23,198 ha and occupies the central part of the Eastern Slovak Plain from the border with Ukraine to the border with the Magyar Republic.

There are currently twelve small protected areas (national nature reserves and nature reserves) in the Latorica PLA - four **national nature reserves** (Latorický luh, Botiansky luh, Kašvár, Tajba) and eight **nature reserves** (Oborínsky luh, Zatínsky luh, Dlhé Tice, Krátke Tice, Boľské rašelinisko peat bog, Veľké jazero lake, Tarbucka, and Biele jazero lake). These are also parts of the **territory of European importance**. Outside the Latorica PLA own territory, there are seven small protected areas - three **nature reserves** (Horešské lúky, Poniklecová lúčka and Zemplínska jelšina) and four **protected areas** that have been declared sites of the European importance (Boršiansky les (SKUEV0034), Bešiansky polder (SKUEV0012), Oborínske jamy (SKUEV0038) and Veľký kopec (SKUEV0029)).

The river Latorica and its alluvium is also a **territory of European importance** (hereinafter "TEI") **The Latorica River** (SKUEV0006). The PLA also includes the following TEIs: Tarbucka (SKUEV0019), Horešské lúky (SKUEV000030), Ladmovské vápence (SKUEV0032), Kováčske lúky (SKUEV0329), Čičarovský les (SKUEV0007), Oborínsky les (SKUEV0037) and Bodrog (SKUEV0236). Supplemented to TEI are Tisa (SKUEV0846), Dolný tok Ondavy (SKUEV0843), Dolný tok Laborca (SKUEV0844).

The **Ramsar Site Latorica**, a wetland of international importance, declared in 1993, which is of supraregional importance for migrating organisms, is also a part of the PLA. Based on international criteria, the central part of the PLA from the border with Ukraine to the confluence of Latorica and Laborec rivers was entered in the List of Internationally Important Wetlands (16.5.1993) with an area of 4,358 ha (adjusted to 4,044.7 ha) as the Ramsar site of Latorica. The area was after modifications. Wetlands include the main stream of Latorica River with wetland and aquatic ecosystems of floodplain forests, alluvial meadows, blind arms, swamps, etc.

In 2004, a section of the Tisa/Tisza River in Slovakia and its alluvium at the border position with Ukraine and Hungary as the **Ramsar Site of the Tisa Alluvium** with an area of 734,6 ha were also included among the wetlands of international importance.

A large part of the Latorica PLA is covered by the **Medzibodrožie Protected Bird Area**, which was established in 2008 to protect nesting and migratory bird species of European importance. The total area of the Medzibodrožie Protected Bird Area (SPA) is 33 753.7 ha. The area is broken down by type of land, district, and by cadastral area (processed in the SPA care program).

Today, many protected areas are under threat and require renewal management. The development of protected areas and their rare biota is negatively affected by their fragmentation, i.e. they often represent isolated fragments in intensively farmed land. Extensive water management modifications, such as straightening large watercourses, building dams, drainage and reclamation canals, and drying wetlands, have a significant negative impact from the past. Water runoff from the landscape accelerates and dries out the landscape, which has an adverse effect on aquatic and swamp species of fauna and flora, as well as on their habitats. Progressive climate change is currently adding to this. The outplanting of poplar and black locust monocultures, which impoverished the original biodiversity in the landscape, also played a negative role. Recently, large-scale excavations in floodplain forests have spread, which in combination with the unfavourable hydrological situation (lack of water) has resulted in the fragmentation of the original floodplain forests, their more difficult restoration and retreat of rare species of fauna and flora associated with floodplain forests. At present, there are other negative changes related to the change in land management, the absence of traditional farming (mowing or grazing), resulting in the overgrowth of meadow or xerothermic habitats with invasive trees and subsequently the decline of rare species of fauna and flora associated with meadows, or xerothermic habitats, to the decline of rare meadow and xerothermic habitats and to the reduction of biodiversity. Due to the absence of traditional management, there is also an expansive spread of invasive species as well as a significant reduction in biodiversity, while many of the invasive plant species have negative effects on humans (cause pollen or contact allergies, burns).

The priority intention of nature protection is the preservation of declared protected areas,

as well as the preservation or restoration of rare, often critically endangered plant and animal species and habitats that are subject to protection in individual protected areas, whether of national or European importance. Extensive monitoring of rare species of fauna, flora, and habitats has been ongoing for a long time, and their management is ensured for the maintenance or even the improvement of the favourable condition. The spread of invasive species is also being monitored, as well as their gradual eradication, which, however, is not easy. These are species that are not native to our nature, so they do not have natural enemies and have very effective methods of distribution. Perhaps the biggest and most difficult challenge is the restoration of aquatic and wetland habitats and subsequently species of fauna and flora associated with aquatic and wetland habitats.

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Súhrn

Prírodné pomery územia Chránenej krajinnej oblasti Latorica (juhovýchodné Slovensko)

Kapitola podáva súhrn informácii o prírodných pomeroch skúmaného územia, ktoré zaberá južnú časť Zemplína v juhovýchodnej časti Slovenska. Zameraná je najmä na oblasť Chránenej krajinnej oblasti Latorica. Charakter územia je prevažne rovinatý, okrajovo zasahuje do Zemplínskych vrchov a zahrňuje aj osamelé neovulkanické telesá Tarbucku, Somotorskú horu, Veľký vrch a Chlmecké pahorky. Z hľadiska geologickej stavby sú tu zastúpené horniny z konca prvohôr (paleozoikum) a z obdobia druhohôr (mezozoikum) nachádzajúce sa v Zemplínskych vrchoch. Ďalej horniny z mladších treťohôr (neogén)

tvorené sedimentárnymi horninami ako aj vulkanickými horninami z neovulkanických telies. Najrozšírenejšie sú štvrtohorné (kvartérne) sedimentárne horniny, z ktorých väčšinu tvoria nespevnené riečne (fluviálne) sedimenty a eolické sedimenty, z nich prevažne viate piesky. Na vulkanitoch, vápencových substrátoch a pieskoch sa vytvorili vzácne xerotermné biotopy. Osou územia je rieka Latorica, ktorá vytvára veľké množstvo riečnych meandrov, mŕtvych ramien a riečnych ostrovov. Pri obci Zemplín sa zlieva s Ondavou a spolu vytvárajú rieku Bodrog. V juhovýchodnom cípe Slovenska preteká rieka Tisa. V alúviu týchto riek sa vyskytujú vzácne vodné a mokraďové biotopy so zvyškami pôvodných lužných lesov.

Časť o flóre stručne sumarizuje údaje o biotopoch, ich typických zástupcoch rastlín, ako aj údaje o vzácnych a chránených druhoch rastlín skúmaného územia. Flóra je viazaná na viaceré typy biotopov, v závislosti od geologických, geomorfologických, pôdnych, hydrologických a klimatických pomerov. Prevažná časť pôvodných biotopov bola ľudskou činnosťou pretvorená na kultúrnu krajinu. Z pôvodných lesných a nelesných biotopov ostali fragmenty, roztrúsené po celej oblasti Východoslovenskej nížiny. Opisované biotopy územia sme klasifikovali podľa Katalógu biotopov Slovenska (Stanová & Valachovič (eds.) 2002). Pri sumarizácii flóry sme vychádzali z dostupných literárnych zdrojov, ako aj z výsledkov pravidelného monitoringu pracovníkov Správy CHKO Latorica. Biotopy lužných lesov sa vyznačujú dnes už ojedinelým výskytom druhu vinič lesný, či bleduľa jarná karpatská. Najvýznamnejším predstaviteľom vodných a močiarnych biotopov je marsilea štvorlistá, ktorá tu má jedinečný výskyt v rámci Slovenska. Zaujímavým nálezom bolo opätovné potvrdenie výskytu druhu ludvigia močiarna v roku 2015 na dvoch lokalitách Východoslovenskej nížiny po viac ako šesťdesiatich rokoch. Medzi vzácnych predstaviteľov lúčnych biotopov patrí vstavač úhľadný, či horec pľúcny. Ozdobným druhom slabo zasolených pôd v oblasti Strážneho a Lelesa je hviezdovec bodkovaný. Jedinečnými predstaviteľmi xerotermných biotopov sú poniklec lúčny maďarský a poniklec Zimmermannov, ktorých výskyt sa na našom území viaže iba na oblasť Východoslovenskej nížiny.

Časť o faune stručne sumarizuje údaje o stavovcoch na skúmanom území patriacich predovšetkým medzi zástupcov spoločenstiev lužných lesov, lúk a pasienkov, vodných tokov a vodných plôch, pieskových dún a xerotermných biotopov a orných pôd z dostupných literárnych zdrojov a výsledkov pravidelného monitoringu pracovníkov Správy CHKO Latorica. Vzhľadom na charakter územia sú tu typické najmä druhy viažuce sa na vodné a mokraďové biotopy. Vyskytujú sa tu takmer všetky nížinné druhy rýb, početné populácie obojživelníkov, z plazov je tu pozoruhodný výskyt korytnačky močiarnej, ktorá je jediným pôvodným druhom korytnačky vyskytujúcej sa na Slovensku, ďalšími zaujímavými druhmi sú vydra riečna, bobor vodný, syseľ pasienkový, či mačka divá. Územie je významne aj z pohľadu výskytu vtáctva. Hniezdia tu početné populácie brodivcov a ďalších druhov a pre mnohé druhy je významnou migračnou trasou.

Význam skúmaného územia potvrdzuje aj skutočnosť, že jeho podstatná časť je od roku 1990 súčasťou Chránenej krajinnej oblasti Latorica vyhlásenej za účelom zabezpečenia ochrany a optimálneho využívania častí zachovaného riečneho systému Latorice, prostredia aluviálnych rastlinných a živočíšnych spoločenstiev a ukážkových častí krajiny Latorickej roviny. V roku 2004 bolo územie CHKO rozšírené o časť Zemplínskych vrchov a vrch Tarbucka. Jej centrálna časť bola v roku 1993 zapísaná medzi mokrade medzinárodného významu ako Ramsarská lokalita Latorica. Veľkú časť CHKO prekrýva Chránené vtáčie

územie Medzibodrožie. Negatívny vplyv na územie majú v minulosti realizované rozsiahle vodohospodárske úpravy, vplyvom ktorých dochádza k zrýchleniu odtoku vody z krajiny a k jej vysušovaniu, čo má nepriaznivý vplyv na vodné a močiarne druhy fauny a flóry, ako aj na biotopy. V súčasnosti sa k tomu pridávajú postupujúce klimatické zmeny, pričom územie zároveň patrí k najteplejším a zároveň najsuchším územiam Slovenska. Ďalšie negatívne zmeny súvisia so zmenou v obhospodarovaní krajiny a absenciou tradičného obhospodarovania, v dôsledku čoho dochádza k zarastaniu lúčnych, či xerotermných biotopov a následne k ústupu na ne viazaných vzácnych druhov fauny a flóry, a tým k znižovaniu biodiverzity. V dôsledku absencie tradičného obhospodarovania tiež dochádza k expanzívnemu šíreniu inváznych druhov a rovnako k výraznému znižovaniu biodiverzity, pričom mnohé z inváznych druhov rastlín majú negatívne účinky na človeka (spôsobujú peľové, či kontaktné alergie, popáleniny...). Prioritným zámerom ochrany prírody je preto zachovanie resp. obnova vzácnych, často kriticky ohrozených rastlinných a živočíšnych druhov a biotopov, z ktorých mnohé sú národného alebo európskeho významu.

Molluscs (Mollusca) of the Latorica Protected Landscape Area (Eastern Slovakia)

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Abstract

A total of 82 mollusc species (46 freshwater, 36 terrestrial) have been recorded at 78 sites in the Latorica Protected Landscape Area (PLA) and surrounding areas, which represents 32 % of the total species number of the Slovak molluscan fauna. The most frequent freshwater species (presence at more than 60 % of the sites) were stagnicolous species (e.g. *Planorbarius corneus*, *Planorbis planorbis*, *Viviparus contectus* and *Segmentina nitida*), the most frequent terrestrial gastropods were *Caucasotachea vindobonensis*, *Chondrula tridens*, *Fruticicola fruticum*, *Vallonia pulchella* and *Zonitoides nitidus*; 14 species (17 % of the total species pool) are listed in red list as one of the IUCN categories. The number of non-native mollusc species is lower in the Eastern Slovak Lowland, compared to the Danubian and Borská nížina lowlands. In the last 40 years, only four non-native species have been recorded in the Latorica PLA (*Ferrissia californica*, *Physa acuta*, *Sinanodonta woodiana* and *Dreissena polymorpha*). Proposals for aquatic and terrestrial habitat management are also discussed in this work.

Key words: snails, gastropods, lowland river, faunistic survey, conservation biology

Introduction

In general, the terrestrial molluscan fauna of the Latorica PLA is relatively unexplored. Data on slugs are completely missing, except for the slug *Deroceras laeve*.

The first records of molluscs from specific sites published Ložek (1953, 1954a, 1954b) in the first half of the 1950s. Then there was a twenty-year break in the surveys of molluscan fauna.

Šteffek (1979) summarized the historical data on the occurrence of molluscan fauna in the Eastern Slovakian Plain until the end of the 1970s. Aquatic molluscs have been slightly better documented in the past, however there are gaps in knowledge also, especially regarding the genus *Stagnicola* and the whole family of Sphaeriidae. In the first half of the 1980s, Šteffek (1984a, b, 1989) conducted a faunistic survey of several terrestrial sites. In the mid 1980s, Šteffek (1986) mapped the molluscan fauna of aquatic habitats and their surroundings during regular nature conservation camps. More data on molluscs in the Latorica PLA can be found in Lisický (1991) monograph on Mollusca of Slovakia, including distribution data from the period of 1945–1982. Part of the work is formed by classic faunistic grid-based maps, so, unfortunately, it is not possible to trace particular sites. In the 1990s, Čerman & Šteffek (2006) focused on the distribution of terrestrial snails in eastern Slovakia and Vostal et al. (1993), later on surveyed the wider surroundings of the Tisa/Tisza River. Thanks to Vavrová (2009), who digitized a large part of the index of finding cards (files) from the surveys of J. Šteffek, it was possible to process the historical data in a more comprehensive and effective way. Šteffek's data for the area of Latorica is published in this particular form for the first time. Šteffek's files also contained several pieces of data collected by P. Deván, which is also included in this work. Additional data source was the database (KIMS) of the State Nature Conservancy of the Slovak Republic. Lužbeťáková (2018) dealt with the distribution, ecology and conchological features of the genus *Helix* in eastern Slovakia. In 2019 (Čejka et al. 2020) and 2020 there was a survey conducted by Čejka, Černecký and Ďuricová in the Latorica River area dedicated to confirmation of *Anisus vorticulus* occurrence, where data on other molluscs species were collected as well (ca. 20 sites). From a nature protection point of view there are Sites of Community Importance (SCI) in the Latorica region, which are established for protection of certain molluscs. Particularly SCI SKUEV0006 Latorica (SKUEV = area of European importance), where subjects of the protection are *Anisus vorticulus*, *Unio crassus* and *Vertigo angustior*. In SCI SKUEV0034 Boršiansky les *Unio crassus* is subject of protection as well. In SCI SKUEV0208 Senianske rybníky *Anisus vorticulus* is the aim of protection and in SKUEV0236 Bodrog and SKUEV0329 Kováčske lúky *Unio crassus* is one of the selected protected species. More of these subjects of protection however lack the recent data or completely lack the data, especially *Unio crassus* and *Vertigo angustior* and therefore there is a need for confirmation of the validity of these species in particular SCIs in the near future. In fact it is not clear on which data some of the subjects of the protection were selected and the list needs to be verified and possibly updated based on new findings. Recently, all molluscan subjects of protection actually confirmed is *Anisus vorticulus* in SKUEV0006 Latorica, which was added as a subject of protection in the year 2019 based on actual mapping, is the only species with actual data and confirmed presence. All remaining molluscan subjects of protection in Latorica and surrounding areas need to be verified as there is no recent or historical data existing for them.

Material and methods

Aquatic molluscan fauna

For freshwater molluscs, a 20-m stretch of waterbody bank was surveyed and molluscs collected at four randomly located sampling points along the littoral and ripal zones. The

sample locations within each waterbody were randomly selected from distances between 0.5 and 1.0 m from the bank. A sample consisted of a vigorous sweep over 1 meter, parallel to the bank and including the sediment, vegetation and water surface, using a sieve net with 0.20 m diameter and 1 mm mesh (Watson & Ormerod 2004). The samples were preserved on site in 70 % ethanol. In the laboratory, the samples were washed through a 0.5 mm mesh sieve and molluscs removed and identified by eye and under a light microscope (10×) using determination keys by Glöer (2017) and Horsák et al. (2013). In the following text we use the typology of waterbodies according to Ward et al. (2002) and Biggs et al. (2005).

Eupotamal – the major channel of the river or its flow branches; *plesiopotamal*: relatively deep (up to 3 m), isolated abandoned channels or floodplain lakes, which in the context of the current study area are flooded only when levels in the old/main river channel are high. Connectivity with the old/main river channel is gradually weakening as floods decline in frequency. Groundwater saturation levels are a function of bottom permeability and variable colmatation rates. *Paleopotamal*: The shallow (2 m), isolated relict channels that form floodplain lakes in intra-levee spaces. Here, full connectivity to the old/main river bed requires exceptionally high water levels. For the most part, the hydrological connectivity is via groundwater only.

We call the term *pond* all waterbodies between 1 m^2 and 2 ha in an area which may be permanent or seasonal, including both man-made and natural waterbodies (Biggs et al. 2005).

Terrestrial molluscan fauna

Each sampling site was an area of c. 400 m^2, chosen to represent a typical part of the surrounding vegetation. Macro-snails and slugs (>5 mm) were collected using visual searches of 30-60 person minutes per plot, depending on the area and heterogeneity of the site. Snails were also sampled from leaf litter collected from patches within each site which allowed quantification of microscopical species. We collected these samples by filling a three-litre cloth bag with sieved leaf litter (mesh size 10×10 mm) and detritus from throughout the plot. Litter was air-dried and then sorted using 1×1 and 4×4 mm soil sieves. All shells extracted were identified and counted, excluding only very old or unidentifiable remains. Identification was based on morphology using taxonomic keys developed by Ložek (1956), Wiktor (2008), Horsák et al. (2013) and Rowson et al. (2014). Taxonomy and nomenclature follow MolluscaBase eds. (2020).

List of localities

The description of the site has the following structure: Number of the site, municipality (possibly also local site name) – geographic coordinates (°N, °E – according to the WGS84 standard, in decimal system) – habitat type – a name of the collector, date of the record (or citation of published data). For an explanation of the terms used to describe particular habitats, see chapter Methods above.

Aquatic sites

1 – Beša – 48.5308, 21.9505 – Protected area Bešiansky polder (paleopotamal) – J. Černecký, Sept 2019.

2 – Beša – 48.5106, 21.9510 – abandoned meander (paleopotamal) south of the village – J. Černecký, Sept 2019.

3 – Beša – 48.5080, 21.9656 – abandoned meander (paleopotamal) south of the village – J. Šteffek, 30 May 1979.
4 – Boľ – 48.4680, 21.9438 – paleopotamal – J. Šteffek, 17 Sept 1979.
5 – Brehov, dead riverbed of the Latorica River – 48.4799, 21.8437 – eupotamal – J. Šteffek, 7 Jun 1979.
6 – Brehov – 48.4903, 21.8624 – paleopotamal – J. Černecký, Sept 2019.
7 – Čičarovce, Udoč – 48.5176, 22.0289 – connecting channel in the floodplain area – J. Šteffek, 8 Jun 1979.
8 – Drahňov – 48.5738, 21.9792 – plesiopotamal – J. Šteffek, 25 Apr 1979.
9 – Ižkovce – 48.5367, 21.9010 – eupotamal, Laborec river – J. Šteffek, 30 May 1979.
10 – Kapušianske Kľačany – 48.5149, 22.0531 – drainage ditch – J. Šteffek, 25 Apr 1979.
11 – Kapušianske Kľačany – 48.5157, 22.0350 – plesiopotamal – J. Šteffek, 25 Apr 1979.
12 – Kučany – 48.5319, 21.8701 – paleopotamal – J. Šteffek, 25 Apr 1979.
13 – Zemplín – 48.4541, 21.8192 – eupotamal (Latorica River) (P. Deván, 26 May 1995).
14 – Leles – 48.4813, 22.0768 – plesiopotamal – J. Šteffek, 25 Apr 1994.
15 – Leles, Borzva – 48.4921, 22.0354 – paleopotamal – J. Šteffek, 8 Jun 1979.
16 – Leles, the Latorica River down the bridge – 48.4998, 22.0524 – eupotamal (P. Deván, 23 Jun 1995, E. Elexová, 2015).
17 – Leles, Esterhánske – 48.4615, 22.0044 – paleopotamal – J. Šteffek, 17 Sept 1979.
18 – Petrikovce – 48.5333, 21.8766 – plesiopotamal – J. Šteffek, 3 Jun 1979.
19 – Petrikovce – 48.5451, 21.8540 – drainage ditch at the western edge of the village – J. Černecký, Sept 2019.
20 – Ptrukša, Lieština (Stredný les) – 48.4804, 22.1131, abandoned river branch – J. Šteffek, 17 Sept 1979.
21 – Ptrukša, Klinky – 48.4760, 22.1278 – paleopotamal – J. Šteffek, 17 Sept 1979.
22 – Ptrukša, Klinky – 48.4737, 22.1207 – eupotamal (Latorica river) (P. Deván, 26 May 1995).
23 – Ptrukša, Sirín – 48.4854, 22.1369 – paleopotamal in the village – J. Šteffek, 8 Jun 1979.
24 – Rad, Dlhé Tice – 48.4667, 21.8633 – paleopotamal – J. Šteffek, 7 Jun 1979.
25 – Rad, Radský kanál ditch – 48.4618, 21.8557 – drainage ditch – J. Černecký, Sept 2019.
26 – Rad, Tice – 48.4580, 21.8593 – paleopotamal – J. Šteffek, 8 Sept 1979.
27 – Soľnička, Kobylí chrbát – 48.4938, 21.9597 – paleopotamal – J. Šteffek, 17 Sept 1979.
28 – Soľnička, Piesočné konopiská – 48.4791, 21.9629 – drainage ditch – J. Šteffek, 7 Jun 1979.
29 – Somotor, Mŕtvy Bodrog – 48.4148, 21.8042 – paleopotamal – J. Šteffek, 15 Sept 1979.
30 – Boľ, Stará Latorica – 48.4939, 21.9319 – abandoned river channel, plesiopotamal type (P. Deván, 26 May 1995.
31 – Svinice, Dlhé Tice – 48.4551, 21.8764 – paleopotamal – J. Šteffek, 8 Sept 1979.
32 – Streda nad Bodrogom, Tajba – 48.3869, 21.7663 – paleopotamal – J. Černecký, 9 July 2020.
33 – Veľké Kapušany, Latorica – 48.4979, 22.05603 – plesiopotamal – J. Šteffek, 7 Sept 1994.
34 – Veľké Kapušany, 260 m SE from the bridge (Road 555) – 48.4998, 22.0557 – plesiopotamal – J. Černecký, Sept 2019.

35 – Veľké Raškovce, Močiarny kanál ditch – 48.5685, 21.9125 – drainage ditch – J. Šteffek, 3 Jun 1994).
36 – Čičarovce, Malá Moľva – 48.5392, 22.0364 – shallow swamp on the Udoč stream – J. Černecký, Sept 2019.
37 – Čičarovce, Udoč stream – 48.5395, 22.0384 – shallow swamp on the canalised stream – J. Černecký, Sept 2019.
38 – Svinice, behind the village – 48.4655, 21.8879 – paleopotamal (abandoned channel of the Latorica River) – J. Černecký, 10 July 2020.
39 – Boľ, Východný Leleský kanál ditch – 48.4887, 21.9419 – drainage ditch, J. Černecký, July 2020.
40 – Kapušianske Kľačany, Maťovský kanál ditch – 48.5297, 22.1143 – drainage canal in a built-up area of the village – J. Černecký, July 2020.
41 – Somotor, abandoned river channel – 48.4010, 21.8071 – paleopotamal densely overgrown by aquatic macrophytes – J. Černecký, July 2020.
42 – Somotor, Somotorský kanál ditch – 48.3965, 21.8050 – drainage ditch – J. Černecký, July 2020.
43 – Svätuše, Severný svätušský kanál ditch – 48.4315, 21.9136 – J. Černecký, July 2020.
44 – Dolné Raškovce, Dolná Duša brook – 48.5629, 21.9235 – channelised stream – Šteffek et al. (2006, 2008).
45 – Ižkovce, Laborec River in the built-up area – 48.5616, 21.9567 – eupotamal – J. Šteffek (1996, Maťašová leg.).
46 – Boľ – 48.4911, 21.9387 – secondary pits filled with water, overgrown by willows – Šteffek (1986).
47 – Zatín – 48.4983, 21.9077 – terrestrialised river channel richly overgrown by macrophytes – Šteffek (1986).
48 – Soľnička, Stará Latorica – 48.5008, 21.9486 – eupotamal, former meandering section of the river – Šteffek (1986).
49 – Soľnička, Latorica – 48.5040, 21.9522 – eupotamal, paved bank of the channelised main channel of the river – Šteffek (1986).
50 – Ptrukša, Kapušianske pastviny – 48.5150, 22.0355 – abandoned river channel in the floodplain area (plesiopotamal) – Šteffek (1986).

Terrestrial sites

51 – Bara, Brezinka – 48.4231, 21.7253 south-facing slope with xeric low-stem vegetation near the vineyards – Šteffek (1984).
52 – Bara, Pleš – 48.4266, 21.7079 – xeric low-stem vegetation on the southern slope – Šteffek (1984).
53 – Boľ – 48.4704, 21.9432 – xeric lawns along the road in the village – Šteffek (1984).
54 – Borsuk – 48.4134, 21.7526 – east-facing xeric slope on limestone – Šteffek (1984).
55 – Boťany, Dravčí sek (= Dravý klin, Latorický luh) – 48.4662, 22.1034 – willow-alder and elm-ash floodplain forest stands in the floodplain of the Latorica River – Šteffek (1984).
56 – Brehov, Kamenná Moľva – 48.4913, 21.83995 – xeric slope of the drainage ditch – Šteffek (1984).

57 – Čičarovce, Udoč stream – 48.5181, 22.0294 – floodplain forest next to Udoč stream – Šteffek (1984).
58 – Kapušianske Kľačany, Maťovský kanál drainage ditch – 48.5297, 22.1143 – J. Černecký, July 2020.
59 – Kapušianske Kľačany, Dĺžiny – 48.5245, 22.0885 – wet mowed meadow – Šteffek (1984).
60 – Kucany, moľva – 48.5310, 21.8608 – xeric low-stem vegetation on the blown-sand dune – Šteffek (1984).
61 – Ladmovce, Ladmovské vápence limestones – 48.41997, 21.7749 – east-facing xeric slope on limestone – Šteffek (1984), J. Černecký, July 2020.
62 – Ladmovce, Baba hill (= Babský vrch hill) – 48.4082, 21.7609 – abandoned limestone quarry, SE facing xeric slope – Ložek (1953).
63 – Ladmovce, Myšiak – 48.3990, 21.7613 – fen at the site of the former riverbed of the Bodrog River – Ložek (1953).
64 – Leles, Gotthardov most bridge – 48.4674, 22.0165 – young poplar ligniculture along terrain depression – J. Černecký, July 2020.
65 – Leles, Esterhánske – 48.4586, 22.0066 – soft-wood floodplain forest – Šteffek (1984).
66 – Malé Trakany, Remete – 48.3936, 22.1115 – soft-wood floodplain forest – Šteffek (1984).
67 – Malý Kamenec, Tarbucka – 48.3570, 21.7845 – sparse shrubland on the xeric SW-facing slope – Šteffek (1984).
68 – Poľany, Čierny les – 48.4975, 21.9905 – the edge of a hard-wood floodplain forest adjacent to a flooded meadow – Šteffek (1986).
69 – Ptrukša, Lieština – 48.4809, 22.1166 – oak forest within the wetland – Šteffek (1986).
70 – Ptrukša, Klinky-1 – 48.4754, 22.1266 – floodplain forest along the Latorica River – Šteffek (1984).
71 – Ptrukša, Klinky-2 – 48.4769, 22.12716 – floodplain forest at the abandoned meander of the Latorica River – Šteffek (1984).
72 – Ptrukša – 48.4772, 22.1142 – poplar stand (*Populus alba*) next to the Latorica River – J. Šteffek, 17 Sept 1979.
73 – Soľnička, Kobylí chrbát – 48.4938, 21.9597 – riparian vegetation along the abandoned channel (paleopotamal) – J. Šteffek, 17 Sept 1979.
74 – Somotor, abandoned river channel – 48.4010, 21.8071 – riparian vegetation along the abandoned channel (paleopotamal) – J. Černecký, July 2020.
75 – Somotor, Somotorský kanál channel – 48.3965, 21.8050 – riparian vegetation along the drainage ditch – J. Černecký, July 2020.
76 – Svätuše, Northern Svätušský kanál ditch – 48.4315, 21.9136 – riparian vegetation along the drainage ditch – J. Černecký, July 2020.
77 – Svinice, behind the village – 48.4645, 21.8887 – floodplain forest – J. Černecký, July 2020.
78 – Veľký Kamenec, castle ruin – 48.3587, 21.8080 – the ruins of the Hečka (= Hečke, Bašta) castle and the adjacent xerothermic slope – J. Šteffek, 17 Sept 1979.

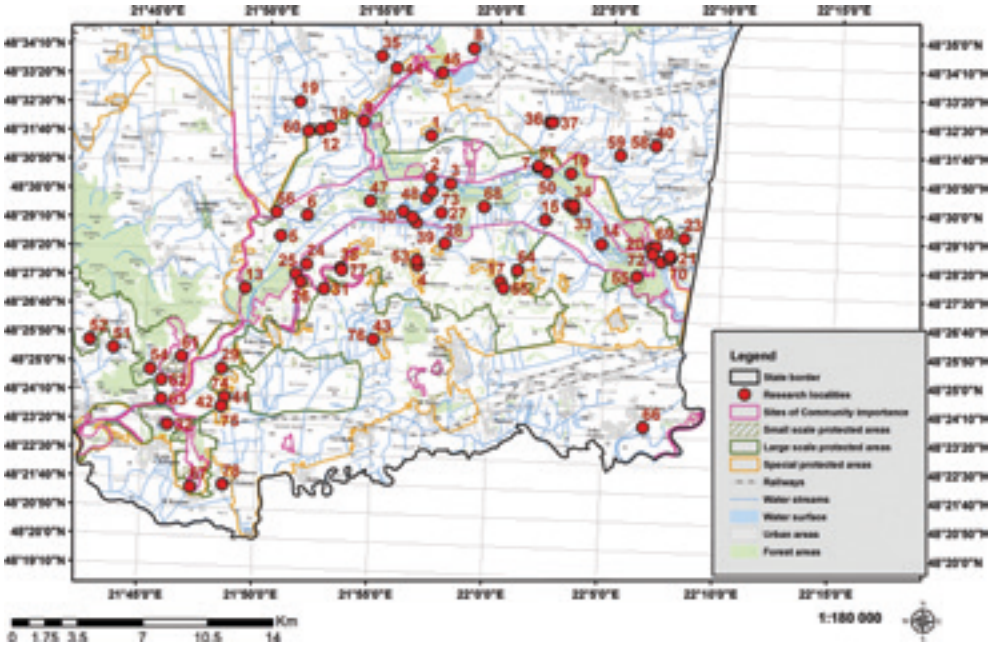

Fig. 1 *Distribution of the sampling sites within the malacological survey of the Latorica Protected Landscape Area. (J. Černecký del.).*

Fig. 2 *Bešiansky polder Nature Reserve (site No. 1) (photo: J. Černecký).*

Fig. 3 *Wetlands near the main branch of the Latorica River near the village of Bol' (site No. 30) (photo: J. Černecký).*

Fig. 4 *The Somotor Drainage ditch (site No. 42) is an artificial waterbody, but it is a valuable refuge for rare molluscs. In 2020, the population of the European important species – the Little Whirlpool Ramshorn Snail (Anisus vorticulus) was confirmed here (photo: J. Černecký).*

Fig. 5 *Seasonally flooded meadows and old solitary trees near the village of Beša (photo: J. Černecký).*

Fig. 6 *The Little Whirlpool Ramshorn Snail (Anisus vorticulus) is a species of European importance (photo: T. Čejka).*

Fig. 7 *The Udoč stream near the village of Čičarovce (site No. 37) is the site with presence of a rare Little Whirlpool Ramshorn Snail (Anisus vorticulus) (photo: J. Černecký).*

Fig. 8 *Human intervention in xerothermophilous habitats in the form of quarries near the village of Ladmovce (photo: J. Černecký).*

Results

A total of 82 species were recorded on 78 sampling sites in Latorica PLA and surrounding areas (47 freshwater and 35 terrestrial species). This species number represents 32 % of the total species number of the Slovak molluscan fauna. Species richness varied from 2 to 28 in freshwater species with a median value of 8.0 species and 2 to 12 in terrestrial gastropod fauna with a median value of 6.5 species per site. The most frequent freshwater species (more than 60 % of sites) were *Planorbarius corneus*, *Planorbis planorbis*, *Viviparus contectus* and *Segmentina nitida.*

The most frequent terrestrial species were *Caucasotachea vindobonensis*, *Chondrula tridens*, *Fruticicola fruticum*, *Vallonia pulchella* and *Zonitoides nitidus*.

Notable species from the nature conservation point of view

14 species (17 % of the total species pool) are listed in the red list (Šteffek & Vavrová 2006) under one of the following IUCN (2001) categories: critically endangered (CR) – 4 species (*Anisus vorticulus*, *Planorbis carinatus*, *Odhneripisidium moitessierianum, Vallonia enniensis*), endangered (EN) – one species (*Pisidium amnicum*) and vulnerable (VU) – 7 species (*Bithynia leachii*, *Viviparus acerosus*, *Anisus semptemgyratus*, *Pseudanodonta complanata*, *Unio crassus, Sphaerium nucleus* and *Sphaerium rivicola*).

The subspecies of the land snail *Chondrula tridens eximia*, which is not yet included in any red list category at the regional level, however it is also important for nature conservation due to rare observations.

The species of European importance and protected by European and national law occurring in the Latorica region are *Anisus vorticulus, Unio crassus* and *Helix pomatia.* Strictly nationally protected species are *Anisus septemgyratus* and *Helix lutescens*.

Non-indigenous species

Historical (1970s–1990s), but also scarce current data show that the number of non-native mollusc species is lower in the Eastern Slovak Lowlands, compared to the Danubian and Borská nížina lowlands. In the last 40 years, only four non-native species have been recorded in the Latorica PLA (*Ferrissia californica*, *Physa acuta*, *Sinanodonta woodiana* and *Dreissena polymorpha*).

Annotated checklist

GASTROPODA

Viviparidae

Viviparus acerosus Bourguignat, 1862 – 3, 4, 9, 11, 13, 14, 20, 21, 23, 24, 28, 29, 30, 33, 42, 46, 47, 48, 50 – largest aquatic snail species in Slovakia (shell up to 55 mm large). Endemic to the Danube river basin, living in fine muddy sediments in standing and slowly flowing lowland waters (Horsák et al. 2013). Common also in the Danube Lowland and Tisa/Tisza River Lowland.

Viviparus contectus (Millet, 1813) – 1, 2, 3, 4, 6, 7, 9, 10, 11, 12, 13, 14, 16, 19, 20, 21, 24, 25, 26, 27, 28, 29, 32, 33, 34 – the widespread stagnicolous species in the surveyed area,

found in littoral areas of standing waters only. The populations are declining in recent years due to eutrophication of standing waters and more intensive aquaculture (Horsák et al. 2013).

Bithyniidae

Bithynia leachii (Sheppard, 1823) – 10, 11, 13, 14, 17, 20, 25, 29, 33, 34 – predominantly stagnicolous species that inhabits periodic and semi-permanent shallow waters and wetlands in lowlands, with preference for habitats rich in organic detritus (Horsák et al. 2013). In Slovakia, more common in the Danube Lowland, especially in the Veľký Žitný Ostrov river island area, and in the in eastern Slovakia in Tisa/Tisza Basin.

Bithynia tentaculata (Linnaeus, 1758) – 2, 3, 7, 10, 11, 12, 13, 14, 16, 18, 19, 24, 25, 27, 29, 30, 33, 34 – eurytopic species that lives in various waters ranging from periodic pools to slowly flowing water and can tolerate higher levels of organic pollution. Common in Slovakia in the lowlands (Horsák et al. 2013).

Hydrobiidae

Lithoglyphus naticoides (C. Pfeiffer, 1828) – 5, 7, 13, 16, 22, 28, 30 – the species is associated with fine muddy sediments in slowly flowing lowland waters. Its preference for soft unstable substrate leads to a particular reproductive behaviour, as individuals lay eggs on the shells of their neighbours (Horsák et al. 2013). In Slovakia common in the Danube Lowland and the Tisa/Tisza river basin.

Valvatidae

Valvata cristata O. F. Müller, 1774 – 8 – the species is associated with shallow, standing and densely vegetated waters in lowland wetlands but also found by the edges of larger streams. Widespread in lowlands, often present in large numbers in suitable habitats (Horsák et al. 2013).

Valvata piscinalis (O. F. Müller, 1774) – 3, 13, 14, 22, 24, 30 – fairly tolerant species living in various slowly flowing and standing lowland waters. It is found near the shoreline, mostly on muddy or muddy-sandy bottoms, and can occur in large numbers. Common in lowlands (Horsák et al. 2013).

Acroloxidae

Acroloxus lacustris (Linnaeus, 1758) – 10, 11, 14 – inhabitant of standing waters, living on submerged littoral vegetation, often on reed and reed-mace; less often found on stones, sometimes even in stronger current, in larger rivers (Horsák et al. 2013). Common in lowlands.

Lymnaeidae

Galba truncatula (O. F. Müller, 1774) – 3, 7, 13, 14, 23, 27, 33 – semi-aquatic species, it lives in shallow standing waters and muddy places near the edges of slowly flowing waters, but found also in smaller and temporary habitats such as shallow pools and swamps. Common, even reaching higher altitudes owing to its modest habitat requirements. The main intermediate host of the common liver fluke (Horsák et al. 2013).

Ladislavella occulta (Jackiewicz, 1959) – it is probable that this species, which was first discovered by Horsák et al. (June 2019, unpublished) near the village of Senné occurs in the area of the Latorica PLA as well.

Lymnaea stagnalis (Linnaeus, 1758) – 1, 3, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 18, 19, 20, 21, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 42, 48, 50 – inhabitant of standing waters and nearly stagnant stretches of slowly flowing waters, with preference for the littoral zone. Common in lowlands and medium altitudes.

Radix auricularia (Linnaeus, 1758) – 3, 7, 29 – it occurs in various standing and slowly flowing waters, preferably rich in nutrients, and can even tolerate eutrophic conditions. Important intermediate host of trematodes that have waterfowl as their terminal host. A developmental stage of the trematode, called furcocercaria, can cause allergic skin reaction and other health problems in humans. Widespread, especially in lowlands, however reaching also foothills (Horsák et al. 2013).

Radix balthica (Linnaeus, 1758) – 3, 8, 11, 12, 14, 15, 24, 30, 33, 34, 37 – the species is associated mainly with smaller, densely vegetated standing or slowly flowing lowland waters, rarely found in clean medium-sized streams as well. It can be found at lower altitudes, however with mostly declining populations currently.

Radix labiata (Rossmässler, 1835) – 3, 27, 28, 48 – one of our commonest *Radix* and the only one that occurs in colder, faster-flowing streams at medium and higher altitudes. Often found also in acidic standing waters; individuals in these populations have thin shells and graze off the shell apices of others (Horsák et al. 2013). Very common, rare in lowlands only.

Stagnicola spp. (Jeffreys, 1830) – 1, 3, 6, 7, 8, 10, 11, 13, 14, 15, 19, 20, 23, 25, 26, 27, 33, 34, 36 – we do not have reliable (anatomically documented) data from the area on the distribution of species of this genus. Reliable determination is possible only on the basis of dissection and comparison of the genital morphology and, of course, on the basis of DNA analysis (see Pieńkowska et al. 2015). All species are inhabitants of shallow standing waters with rich submerged vegetation, often in periodic pools and also in littoral zones of ponds. *Stagnicola corvus* (Gmelin, 1791) is the only *Stagnicola* that lives also at higher altitudes. *Stagnicola palustris* (Müller, 1774) is often found in slowly flowing waters unlike other species of the genus, which avoid them (Horsák et al. 2013).

Physidae

Physa acuta (Draparnaud, 1805) – 3 – it seems to be rare in standing and slowly flowing waters in the Latorica basin, while in other Slovak lowlands (Danube and Morava rivers) it is an abundant species. This North American species was introduced into southern Europe probably as early as in the 18th century. In the middle of the 20th century, it reached Czech Republic and Slovakia and since then has been widespread in greenhouse pools and aquaria.

Physa fontinalis (Linnaeus, 1758) – 7, 11, 24, 29, 33 – inhabitant of vegetated pools and littoral areas of standing and slowly flowing waters. This species occurs relatively rarely in the area of large Slovak lowlands.

Planorbidae

Anisus septemgyratus (Rossmässler, 1835) – 1, 7, 8, 13, 14, 19, 20, 23, 27, 29, 34, 39, Ladmovce-Myšiak (Ložek 1954b) – inhabitant of lowland oxbows and pools, occurring on marginal vegetation and in open water. In Slovakia rare in the Danube Lowland, rather common in the Tisa/Tisza River basin. Altogether a rather rare species.

Anisus spirorbis (Linnaeus, 1758) – 3, 7, 8, 10, 11, 14, 15, 17, 18, 20, 21, 23, 27, 29, 36, 40, 43 – typical inhabitant of vernal pools in lowlands found also in other shallow, vegetated standing waters. Everywhere at lower altitudes, fairly common locally.

Anisus vortex (Linnaeus, 1758) – 7, 10, 11, 14, 25, 27, 29, 33, 36, 37, 38, 39, 42 – found in standing waters and nearly standing stretches of slowly flowing lowland waters; common in such habitats in Slovakia (Horsák et al. 2013).

Anisus vorticulus (Troschel, 1834) – 18, 25, 37, 42 – this aquatic gastropod is a threatened species at European level and endangered species in Slovakia according to IUCN red list classification. In the last twenty years, *Anisus vorticulus* has been confirmed on 23 sites in Slovakia. The most recent research shows that the species prefers small and old drainage ditches (36% out of all its sites) and plesiopotamal channels, flooded by surface water only at high water levels (25 % of sites). To a lesser extent, the species also inhabits stagnant waterbodies which are not in contact with surface floods (i.e. paleopotamal; 16 % of sites) (Čejka et al. 2020).

Ferrissia californica (Rowell, 1863) – 11, 14 – inhabitant of various standing waters (ponds, sand pits) and rarely slowly flowing lowland waters as well. Most often found on fallen leaves and vegetation. Initially seen as an introduced North American species, then for a long time described as a Mediterranean species, which started to expand its range northwards on plants for aquaria and greenhouse pools about 50 years ago. The most recent study has confirmed that the true origin of this species is in North America (Walther et al. 2006). According to current knowledge, it is not widespread in Slovakia, however the number of records is increasing.

Gyraulus albus (O. F. Müller, 1774) – 7, 11, 13, 14, 20, 21, 24, 30, 33 – our commonest ram's horn snail, shell up to 7 mm wide. It has modest habitat requirements and occurs in standing and slowly flowing waters from lowlands to higher altitudes (Horsák et al. 2013).

Gyraulus crista (Linnaeus, 1758) – 11, 14, 33 – common species in standing waters, frequently found in smaller shallow waterbodies with submerged vegetation. Common in Czech Republic, especially in lowlands. Horsák et al. (2013) state that the species lives in Slovakia in the south-west, not reaching further east. This species is so typical in shell shape that it is unlikely to be confused with another species.

Gyraulus laevis (Alder, 1838) – 11, 14, 33 – inhabitant of standing waters, found in littoral vegetation. Scattered throughout the lowlands. Recent records come from Danube Lowland. As stated by Horsák et al. (2013), the species is not reaching further east, therefore the records from the eastern Slovakia require verification, as it may be a confusion with the species *G. albus* or *G. parvus* (Say, 1817).

Hippeutis complanatus (Linnaeus, 1758) – 11, 14, 33, 34, 42 – it occurs in various standing and slowly flowing waters, often shallow and with submerged vegetation. Common in Czech Republic and Slovakia in lowlands, less common at medium altitudes.

Planorbarius corneus (Linnaeus, 1758) – 1, 3, 4, 6, 7, 8, 10, 11, 12, 14, 15, 17, 18, 19, 20, 21, 23, 24, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 36, 37, 38, 40, 42, 46, 47, 48 – our largest ram's-horn snail with robust, up to 30 mm large shell. Inhabitant of standing and slowly flowing lowland waters, mostly shallow fens and swamps and drains with muddy bottom (Horsák et al. 2013). Very common in lowlands.

Planorbis carinatus O. F. Müller, 1774 – 2, 25, 33 – it lives in well-preserved oxbow lakes and pools, extensively used ponds and littoral vegetation of slowly flowing lowland streams. In Slovakia commoner in the Danube lowland and rare in the Tisa/Tisza river basin. Its decline is related to the destruction of the floodplains of large lowland rivers.

Planorbis planorbis (Linnaeus, 1758) – 1, 3, 6, 8, 10, 11, 13, 14, 15, 17, 18, 19, 20, 23, 25, 27, 29, 31, 34, 35, 36, 38, 39, 41, 43 – inhabitant of vegetated standing lowland waters. It prefers smaller pools, in which it can have extremely dense populations. Common in Slovak lowlands.

Segmentina nitida (O. F. Müller, 1774) – 1, 3, 7, 8, 10, 11, 14, 15, 17, 20, 23, 25, 27, 29, 32, 33, 34, 36, 38, 39, 41 – inhabitant of undisturbed wetlands in lowlands, vegetated pools and littoral areas of non-eutrophic ponds (Horsák et al. 2013). Still fairly common in Slovakia, especially in lowlands, and locally present at medium altitudes as well.

Carychiidae

Carychium minimum O. F. Müller, 1774 – 55, 65, 68 – widespread polyhygrophilous (strongly hygrophilous) species of the moistest habitat types (riparian habitats, wet types of floodplain forests, wet meadows), prefers lower altitudes and warmer areas – relatively common in wetlands in the whole surveyed area.

Succineidae

Oxyloma elegans (Risso, 1826) – 57, 59, 64, 69, 73, 75, 77 – thermophilous and polyhygrophilous species inhabiting water margins in larger lowlands. It prefers sunlit vegetation and it is most often found on tall herbs (e.g. *Phragmites*, *Typha*, *Carex* and *Phalaris*). Common at the moistes places.

Succinea putris (Linnaeus, 1758) – 58, 59, 65, 66, 70, 71, 76 – widespread polyhygrophilous species of the moistest habitat types (riparian habitats, wet types of floodplain forests and wet meadows), common throughout the surveyed area. This snail is the intermediate host of flukes of the genus *Leucochloridium*. The sporocysts attract the final hosts (birds, mainly passerines) by inducing colourful and pulsating projections in the swollen tentacles of the snail.

Succinella oblonga (Draparnaud, 1801) – 55, 56, 57, 59, 63, 66, 68, 69, 76 – less hygrophilous than the two preceding species and usually can be found in moderately wet places such as meadows predominantly associated with wet habitats along the edges of water at lower and medium altitudes. Our most widespread amber snail, found in the whole Slovakia – widespread hygrophilous species in the surveyed area.

Cochlicopidae

Cochlicopa lubrica (O. F. Müller, 1774) – 55, 57, 58, 66, 68, 70, 71, 72, 76 – a eurytopic moderately hygrophilous species inhabiting a wide range of habitats, very common also

in man-made habitats such as gardens, lawns and park shrubs in urban areas. Typically found in damp places, avoiding dry spots. Common in the whole surveyed area.

Cochlicopa lubricella (Porro, 1838) – 53, 56, 67, 78 – very xero- and thermophilous species unlike the other two congeners. It can be found in steppe habitats and open dry places as well as in open xerothermic woods. Although it often lives away from calcareous places, it most frequently occurs in karst steppes. Common in suitable habitats throughout Czech Republic and Slovakia except mountain areas. The species is certainly more abundant in the area than suggested by previous research, in which the research of xerothermic habitats was underestimated.

Pupillidae

Pupilla muscorum (Linnaeus, 1758) – 56, 78 – our commonest *Pupilla*, occurring mostly in dry and open short grassland and usually in secondary habitats. Nowadays common, e.g. on lawns in urban areas, however disappearing from the countryside. This is a consequence of a shift in land use: after the pasture farming has been abandoned, most pastures become overgrown. It can be found in the whole Slovakia except forested mountain areas, however apparently in a strong decline towards the west, especially during the last 20 years – rare in the surveyed area (ruins, xeric dam slopes).

Valloniidae

Vallonia costata (O. F. Müller, 1774) – 55, 61, 78 – rather xerophilous species of open habitats that can also tolerate some shading and is therefore our only species found also in open woods.

Vallonia enniensis (Gredler, 1856) – 29, 59, 63, 73 – inhabitant of wet floodplain meadows and calcareous marshes, preferring habitats with higher salinity (Horsák et al. 2013). Nowadays, a very rare species that recently disappeared from many localities in floodplains in the lowlands due to habitat degradation (eutrophication, overgrown meadows, etc.). Scattered in lowlands in Slovakia. Record outside the Latorica PLA: Husák, moss growth in the valley behind the village (48.7028°N, 22.2919°E, Šteffek 1984).

Vallonia excentrica Sterki, 1893 – 68, 78 – shell very similar to *Vallonia pulchella,* however slightly smaller, up to 2.3 mm wide only. It can be found in Czech Republic and Slovakia in exposed lawns, mainly on humid and more acidic ground and mostly at medium altitudes. It is often found together with the very similar *V. pulchella*; their taxonomic differences are being discussed, so far without a satisfactory solution.

Vallonia pulchella (O. F. Müller, 1774) – 53, 55, 56, 57, 59, 60, 61, 65, 66, 67, 68, 78 – our commonest grass snail, occurring in fully exposed, sunlit habitats. Found in rocky steppes, open wetlands and commonly also in secondary habitats such as lawns in towns. Common in the whole Slovakia. Often found together with *Vallonia costata* (Horsák et al. 2013).

Vertiginidae

Truncatellina cylindrica (A. Férussac, 1807) – 52, 56 – inhabitant of various open xerothermic habitats, common especially in warm steppe areas and present even in man-made habitats such as dry lawns (Horsák et al. 2013). It probably has a scattered distribution in the surveyed area.

Vertigo pygmaea (Draparnaud, 1801) – 56, 57, 59, 69 – typical species of open habitats, occurring from dry steppe grassland to waterlogged, calcareous marshes. A pioneer species, which quickly colonizes new open habitats and is therefore common also in secondary, man-made habitats such as lawns in urban areas. The commonest *Vertigo*, very common in Czech Republic and Slovakia in all types of open habitats except mountains (Horsák et al. 2013). Common in the surveyed area as well.

Enidae

Chondrula tridens eximia (Rossmässler, 1835) – 52, 54, 61, 62 (Ložek 1953, 1954a; Šteffek 1986) – it can be found under shrubs in dry sunlit places, often in masses. In Slovakia it reaches the limestone area of the Zemplínske vrchy Mts. and the environs of Spišské Podhradie (Horsák et al. 2013).

Chondrula tridens tridens (O. F. Müller, 1774) – 35, 51, 53, 56, 57, 60, 67, 78 – associated with warm steppe localities with thick soil layers. Its noticeable decline during the past 50 years has been caused by changes in land use, notably the disappearance of small-scale pasture. Nowadays found chiefly in secondary habitats such as exposed, mown lawns and road embankments. Scattered in warm lowland areas (Horsák et al. 2013).

Clausiliidae

Clausilia pumila C. Pfeiffer, 1828 – 52, 54, 61, 62 – a characteristic species of floodplain forests and river floodplains at lower altitudes, living on the soil surface in damp places. Common in floodplains throughout most of Slovak territory.

Laciniaria plicata (Draparnaud, 1801) – 70, 71 – rather calciphilous species, most frequently found near calcareous rocks, especially on shaded argillite. It is also characteristic for castle ruins, even in areas where it does not occur in other habitats. It can also be found on dead wood and on trees in valleys and forest habitats, however it avoids acidic places in the mountains. In eastern Slovakia, in the larger urban areas (e.g. Košice city), it occurs even in ruderal habitats, similar to the snail *Alinda biplicata* in the western part of Slovakia (Čejka unpubl.). The species has a scattered occurrence in Slovakia.

Punctidae

Punctum pygmaeum (Draparnaud, 1801) – 55, 68 – very common species that can colonise habitats ranging from calcareous to rather acidic, from damp to highly xerothermic and from forested to open areas and often appears in places at early successional stages. It lives in a ground litter, most often on the surface of leaf litter. Very common in Slovakia, although it may be overlooked in the field (Horsák et al. 2013).

Gastrodontidae

Zonitoides nitidus (O. F. Müller, 1774) – 8, 17, 29, 35, 59, 65, 66, 68, 69, 70, 71, 72, 73, 74, 76 – typical species of waterlogged habitats such as shores, open wetlands and forest swamps; common in the surveyed area.

Euconulidae

Euconulus alderi (Gray, 1840) – 8, 57, 66 – this species is associated with very moist habitats, mostly in wetlands. It is common in alder forests at lower and medium altitudes,

in floodplains of rivers and in base-rich fens that are often considered relict. It occurs almost continuously in lowland wetlands.

Euconulus fulvus (O. F. Müller, 1774) – 68 – it can be found in a wide range of damp as well as rather dry habitats from open areas to forests. It can also tolerate lack of calcium and therefore lives even in spruce forests, most often under the bark of stumps. It avoids habitats in urban areas except those in chernozem areas (Horsák et al. 2013). Very common in Slovakia.

Zonitidae

Vitrea crystallina (O. F. Müller, 1774) – 17, 55, 66, 70, 71, 72 – very hygrophilous forest species, found in moist places in woodland and in floodplains of rivers from lowlands high up in the mountains. Fairly common in Slovakia.

Vitrea contracta (Westerlund, 1871) – 51 – it lives in the topsoil layer in drier places in woodland as well as rocky steppes, always on the rocks or rocky soil. Scattered distribution in Slovakia.

Aegopinella minor (Stabile, 1864) – 51 – our most xerophilous *Aegopinella*, inhabiting drier woodland as well woods with rather acid soils, shrubs and moderately open habitats, often also in urban areas. Common in the whole Slovakia except higher altitudes in the mountains.

Nesovitrea hammonis (Strøm, 1765) – 55, 57 – it can be found in all types of forests including spruce monoculture, on shores, in wetlands as well as in moderately exposed to open habitats, sometimes even in dried meadows. It prefers more nutrient-rich and more acidic habitats and often colonizes habitats at an early successional stage with new vegetation. Entirely common in Slovakia, less abundant in the lowlands only.

Vitrinidae

Vitrina pellucida (O. F. Müller, 1774) – 51, 52, 54, 61, 66, 78 – common species, found in a wide range of various habitat types including disturbed and secondary ones. Very common in the whole Slovakia.

Agriolimacidae

Deroceras laeve (O. F. Müller, 1774) – 65, 68, 73 – strongly hygrophilous species inhabiting water shores, wet meadows, wetlands and waterlogged places in forests. Common in Slovakia.

Bradybaenidae

Fruticicola fruticum (O. F. Müller, 1774) – 51, 57, 58, 60, 64, 65, 66, 70, 71, 72, 76 – slightly hygrophilous forest species; it lives in sparse and dry woodland and shrubland as well as in floodplain forests and floodplains of rivers at low and medium altitudes. It can be found in the whole Slovakia, locally common, however in some areas with isolated records only.

Hygromiidae

Euomphalia strigella (Draparnaud, 1801) – 51, 52, 54, 61, 62 – inhabitant of dry habitats in forest-steppe and shrubland as well as rocky steppes and other open habitats. Common in suitable places.

Monachoides vicinus (Rossmässler, 1842) – 55, 57, 65, 66, 69 – forest hygrophilous species, found in damp habitats in forests at medium and higher altitudes. A Carpathian species, rather common in Slovakia. It appears that *Monachoides vicinus* vicariates ecologically with *M. incarnatus* in the Eastern Slovak Lowland, mainly in floodplains.

Perforatella bidentata (Gmelin, 1791) – 55, 57, 65, 66, 69 – hygrophilous species, living in floodplain forests and large forested valleys. This species is missing on the Danubian Plain and Borská nížina Lowland.

Pseudotrichia rubiginosa (Rossmässler, 1838) – 8, 11, 63, 65, 66, 68, 69, 70, 71, 72 – polyhygrophilous species; inhabitant of riparian habitats and wet floodplain meadows at lower altitudes. It prefers fluctuating water levels, and the shells are thus often covered in mud (Horsák et al. 2013). Rather rare and scattered at lower altitudes (up to 400 m a.s.l.), in connection with changes in the hydropedological regime in floodplains, nowadays rapidly declining in most localities.

Helicidae

Caucasotachea vindobonensis (A. Férussac, 1821) – 51, 52, 53, 54, 55, 56, 60, 61, 62, 67, 68, 69, 70, 71, 72, 74, 77, 78 – thermophilous; found in steppe and forest-steppe-like habitats, it also inhibits various secondary habitats: xeric grasslands, slopes of dykes, vineyards, abandoned xerothermic quarries, dry ruderal habitats. Present in warm areas at lower altitudes, in limestone areas in the Carpathians up to 1000 m. *Helix lutescens* Rossmässler, 1837 – 55, 58, 77 – inhabitant of steppe or pseudo-steppe slopes with thicker soil horizon, especially on limestone and in altered habitats. It reaches only eastern Slovakia and is rather common in the Spiš region, Šariš region and the Slovak Karst. It does not avoid urban habitats either (e.g. Košice city).

Helix pomatia Linnaeus, 1758 – 51, 52, 60, 61, 75 – an inhabitant of sparse forests in warm areas. Often can be found in shrubs, forest-steppes, and drier types of floodplain forests. Also common in secondary habitats: gardens, parks, embankments, semi-ruderal to ruderal habitats. It prefers a calcareous substrate. Most occurrences are concentrated in the lowlands and uplands, scattered up to the submontane areas. Today's distribution in Europe is largely artificial, as the garden snail was once widely bred near castles, monasteries and cities, thus significantly expanding its original range. The occurrence rarely exceeds altitudes of 800 m, exceptionally it rises over 1300 m (Tlstá in Veľká Fatra Mts). It is in decline in Western Europe.

BIVALVIA

Unionidae

Anodonta anatina (Linnaeus, 1758) – 3, 4, 5, 9, 11, 12, 16, 24, 28, 29, 33, 46, 47, 48 – this bivalve lives in various standing and flowing (even rather fast flowing) waters and can tolerate organic pollution. Common at altitudes below 500 m. *Anodonta cygnea* (Linnaeus, 1758) – 9, 11, 14 – found in standing waters, sometimes in quieter reaches of slowly flowing larger rivers. It occurs in lowlands and rarely attains higher altitudes.

Pseudanodonta complanata (Rossmässler, 1835) – 9, 13, 14, 28 – found only in larger lowland rivers. Considered as rare, even in the past; absent from many former localities due to

degradation of riverine habitats, especially in the lowlands. Nowadays with scattered to very rare occurrences in Slovakia, everywhere with small populations only (Horsák et al. 2013).

Sinanodonta woodiana (Lea, 1834) – site 1: Veľké Raškovce, Duša stream, 48.5629, 21.9235 (Šteffek et al. 2006, 2008), site 2: Stretávka, Laborec river, 48.6179, 21.9798 (despite the fact that the site is relatively far from the borders of the Latorica PLA, we mention it due to the importance of the find and as a basis for monitoring of the spreading of this species in the future) – *S. woodiana* was introduced from Asia, probably as glochidia on the gills of host fish (e.g. silver carp, bighead carp and black carp) (Horsák 2013). The species was first found in Slovakia in the mid-1990s (Košel 1995). Its records have been growing rapidly, especially in the Danube river basin. It inhabits mainly standing and slowly flowing lowland waters. Further spread can be expected as its glochidia can develop on various fish hosts (Šteffek et al. 2006, 2008).

Unio crassus Philipsson, 1788 – 28 – it can be found only in flowing water ranging from small streams to large lowland rivers. About 100 years ago, it was the commonest mussel in large rivers in Slovakia, however since then it is extinct in many places due to habitat degradation and is now considered endangered and protected by international law. It has now only scattered occurrences, mainly in the lowlands, however most populations are isolated.

Unio pictorum (Linnaeus, 1758) – 3, 4, 11, 16, 20, 21, 23, 24, 28, 33, 46, 47, 48 – inhabitant of slowly flowing and standing lowland waters. It is least sensitive to lower oxygen concentration in the water. It thus tolerates even organic pollution and is our commonest *Unio*, common in the lowlands (Horsák et al. 2013).

Unio tumidus Philipsson, 1788 – 3, 5, 11, 14, 18, 26, 28, 49, 48 – this species inhabits slowly flowing and standing waters with sufficiently high oxygen content and is still fairly common in lowland areas.

Sphaeriidae

Musculium lacustre (O. F. Müller, 1774) – 3, 7, 8, 11, 14, 16, 33 – the species can be found in standing waters, in the lowlands, rarely in flowing water. Rather common, especially at lower altitudes.

Odhneripisidium moitessierianum (Paladilhe, 1866) – 13, 16, 30 – one of our smallest mussels, shells only up to 2.3 mm large. It lives near shores in quiet lower stretches of larger rivers and exceptionally also in meanders with slow water flow, preferably in a fine muddy substrate. It has probably always been a rare species in Slovakia and elsewhere. Isolated records are from Pohronská pahorkatina uplands, the Morava River near Moravský sv. Ján and from the Danubian Plain (Čierna voda River) (Čejka unpubl.).

Pisidium amnicum (O. F. Müller, 1774) – 13, 16 – found only in flowing waters, in the past almost continuously in larger lowland rivers and frequently also in smaller lowland streams. It requires rather high oxygen concentration and is therefore sensitive to organic and inorganic pollution and other adverse changes to the habitat (Horsák et al. 2013). Nowadays it is rare, extinct in many areas in Slovakia (e.g. Hron and Váh rivers). Several surviving populations are scattered in the lowlands.

Pisidium casertanum (Poli, 1791) – 11, 14 – species with a broad ecological niche, found in various standing and flowing waters from lowlands to mountains. It tolerates organic

pollution as well as high acidity beyond the limits of other molluscs. Our commonest pea mussel, very common in the whole Slovakia.

Pisidium henslowanum (Sheppard, 1823) – 16 – most frequently found in slowly flowing lowland streams, in some areas in river channels, larger pools and ponds. Rather common in the lowlands.

Pisidium obtusale (Lamarck, 1818) – 3, 8 – found only in standing waters, with strong populations in shallow sites with a high content of dissolved humic substances. Common in peat bogs. Fairly common, missing at the highest altitudes only.

Pisidium subtruncatum Malm, 1855 – 11, 13, 15, 16, 24, 30 – inhabitant of various types of flowing as well as standing waters, often in lowland streams with muddy bottoms. One of the commonest species of pea mussels in Slovakia.

Sphaerium corneum (Linnaeus, 1758) – 3, 7, 11, 12, 16, 24, 25, 30, 33 – inhabitant of standing as well as flowing waters, mostly in the lowlands. It prefers relatively nutrient-rich waters and is often abundant in waterbodies polluted with organic matter. Common in the whole Slovakia except mountains.

Sphaerium nucleus (Studer, 1820) – 25 – strictly associated with standing swampy waters with low oxygen content (sometimes almost anoxic) and shallow wetlands with dense vegetation. Its distribution is little known as the species has been long overlooked. Reliably reported in Slovakia only from a few areas. Probably more common than currently known, especially at suitable places in the lowlands (Horsák et al. 2013).

Sphaerium rivicola (Lamarck, 1818) – 16 – inhabitant of slowly flowing larger rivers in the lowlands. It has been nearly wiped out by the pollution and physical degradation of lowland streams, however it is now increasing again, probably due to improved water quality in the past decades. Actual knowledge on occurrence is in the Danube river and some of its tributaries only Dreissenidae

Dreissenidae

Dreissena polymorpha (Pallas, 1771) – Ižkovce, Laborec river, 48.5616, 21.9567 (Šteffek 1996) – the species is native to the drainage basins of the Black, Caspian and Aral Seas. During the nineteenth century its range has expanded westward to most countries of Western Europe. Dreissenids can attach to hard substrates in high densities and have a planktonic larval stage. This kind of life cycle facilitates their abilities as invaders. *D. polymorpha* is an inhabitant of slowly flowing and standing lowland waters, often with large populations in man-made water dams. It was introduced with shipping of merchant goods or it is transferred by birds in the Danube river basin, probably at the turn of the 19th and 20th centuries; nowadays it infests the river and is also common in various waterbodies (rather man-made) especially in the Danube Lowland.

Discussion

Species richness

It should be noted that the molluscan fauna of the Latorica PLA has not been fully explored, however this applies to the rest of the Eastern Slovak Lowland as well. In particular, recent and historical data on slugs and on terrestrial snails are incomplete and definitely need

further investigation. For aquatic taxa, there is incomplete knowledge related to pea clams and fingernail clams (*Sphaeriidae*) and snails of the genus *Stagnicola*. It would be desirable to better study the distribution of the species *Ladislavella occulta*, which has been recently discovered in the village of Senné (June 2019, Horsák et al. unpubl.).

In the autumn of 2014, we conducted a malacological survey at 23 freshwater bodies (thus at approx. half the number of sites in comparison with the surveys of the Latorica PLA) in the Danubian lowland, SW Slovakia (Čejka et al. 2015). We aimed to conduct a malacological inventory of semi-natural sites of high conservation value. A total of 67 species were found in the whole surveyed territory (43 gastropods, 24 bivalves), which is the complete current species richness of the aquatic mollusc fauna in the Danubian lowland. As for terrestrial molluscs, totals of 81 terrestrial gastropod species (45 % of the total number of land gastropods in Slovakia) from 27 families were found at 45 sites in the Danubian Lowland (Čejka 2020), which is 43 % more than has been found so far in the Latorica PLA. However, there is a high probability that species richness in the Latorica PLA and surrounding areas is similar to the Danube basin, which underlines the need for further investigation focused on gathering new data on the occurrence of molluscs in the eastern part of Slovakia.

Non-indigenous species

It is surprising that much less non-native species probably live in the Latorica PLA, in comparison to the Danube Plain. However, comprehensive current data is lacking and it is possible that these findings will be corrected after detailed future research. In the last 40 years, only 4 non-native species have been recorded in the Latorica PLA, all belonging to aquatic species (see Results). It is interesting that so far an invasive bivalve *Corbicula fluminea* has not been reported from Východoslovenská nížina Lowland. No non-native terrestrial species has been found in the surveyed area so far, although it is probable that the slug *Arion vulgaris* occurs here as this species is already a component of molluscan communities in eastern Slovakia (Vavrová 2009).

Species without the range in the Eastern Slovak Lowland, unconfirmed species

Among the species, which distributional range (probably) do not reach the Eastern Slovakian Lowland belong (alphabetically): *Aplexa hypnorum* (freshwater species), *Carychium tridentatum* (forest specialist avoiding Pannonian region), *Cochlodina laminata* (forest generalist), *Granaria frumentum* (xerophilous species), *Petasina bielzi, Semilimax semilimax* (both belong to forest species), *Vertigo antivertigo* and *V. moulinsiana* (both strongly hygrophilous).

An unresolved question is also the distribution of individual species of the family Sphaeriidae in the studied area, especially the genus *Pisidium*. Due to the difficult determination, no specialist has systematically dealt with them in the past.

The following freshwater species, which Lisický (1991) mentions in his monograph from the Eastern Slovak Lowland, have not yet been confirmed in the surveyed area: *Valvata macrostoma* (rare species of temporary pools), *Radix ampla* (rare limnophilic species) and *Bathyomphalus contortus* (freshwater generalist).

Of the potentially occurring terrestrial snails, *Acanthinula aculeata*, *Cecilioides acicula*, *Oxychilus glaber* and *Vitrea diaphana* have not been confirmed in the area yet. In the past, little emphasis was placed on slug mapping. It is highly probable that there are other slugs

apart from *Deroceras laeve* in the area of the Latorica river. The slugs *Arion fasciatus*, *Arion fuscus*, *A. vulgaris*, *D. reticulatum*, *Deroceras sturanyi* and *Limax maximus* are likely to occur.

It is worth mentioning that in the Latorica river floodplain forests, a Carpathian species *Monachoides vicinus* vicariates *M. incarnatus*, which is abundant e.g. in the floodplain forests in the west part of Slovakia (see Čejka 2020).

Evaluation of the molluscan fauna in relation to the study area

This paper is a summary of traceable historical faunistic data on the malacofauna of the Latorica PLA and its immediate surroundings. In the 1970s – 1990s, J. Šteffek paid special attention to the molluscan faunas of the Latorica PLA, Vojen Ložek and a few other zoologists also gathered local data. In recent years, we obtained only a few new faunistic data, especially on aquatic species, which are a kind of by-product of the mapping of the *Anisus vorticulus*, species of European importance. Thus it is not possible to draw definitive conclusions related to the species spectrum of molluscan fauna in the area of the Latorica river, which is certainly richer in species, as indicated by current faunistic surveys. Terrestrial molluscan fauna in particular is insufficiently researched, especially slugs, however there are also gaps in the data on some taxonomic groups of aquatic molluscs, mainly from the family Sphaeriidae.

In the last 70 years, 82 species of molluscs (47 aquatic and 35 terrestrial species) have been found in the Latorica PLA, which is 32 % of the total number of species in Slovakia. Up to 14 species belong to species of conservation interest. Three species belong to species of European importance (*Anisus vorticulus*, *Unio crassus* and *Helix pomatia*). Critically endangered species (CR according to IUCN) include *Anisus vorticulus*, *Planorbis carinatus*, *Odhneripisidium moitessierianum* and *Vallonia enniensis*.

From the viewpoint of species protection, the subspecies of the snail *Chondrula tridens eximia* is important, which has not yet been classified.

The number of non-native species is much lower than in the Danube and Borská nížina lowlands. In the last 40 years, only four non-native mollusc species have been identified in the Latorica PLA, all of which belong to aquatic species (*Ferrissia californica, Physa acuta, Sinanodonta woodiana* and *Dreissena polymorpha*); no non-native element was found among terrestrial species. Outside the PLA area, the non-native Spanish slug (*Arion vulgaris*) occurs in the East Slovak Lowland, especially in the cities and their surroundings.

Among aquatic species (more than 60% of localities), the most frequent species were *Planorbarius corneus*, *Planorbis planorbis*, *Viviparus contectus* and *Segmentina nitida*. Among the terrestrial species, the most common snails were *Caucasotachea vindobonensis, Chondrula tridens, Fruticicola fruticum, Vallonia pulchella* and *Zonitoides nitidus*.

As for the ecological "quality" of aquatic and terrestrial habitats, these are undoubtedly very valuable and often relatively well-preserved areas. Abandoned meanders in various stages of terrestrialization, which represent natural standing eutrophic and mesotrophic waters of the plesiopotamal and paleopotamal type (most aquatic sites), are especially valuable. Surprisingly rich in species are also drainage ditches (sites no. 10, 25, 28, 35, 39, 40, 42).

Within the terrestrial sites, the most sozologically valuable are xeric grasslands on blown sands and shallow soils (especially in the vicinity of Ladmovce, e.g. the sites Baba and Ladmovské vápence Limestone). Latorica floodplain forests are not characterized by

high alpha- and beta diversity as the Danube floodplain woodlands, for example, stenotopic polyhygrophilous species (*Vertigo antivertigo*, *V. moulinsiana*) are missing.

Proposals for aquatic habitat management

Damage to aquatic habitats occurs mainly in two main ways: increasing the amount of nutrients (eutrophication) and drying. One of the main conservation interests is to reduce the overall water load and limit the input of other nutrients. The solutions are, unfortunately, due to their nature, very complex and long-term. The controlled drying of the country by land reclamation and flow regulation seems to have largely stopped, however we still encounter the consequences of past water management activities in the landscape.

In the area of the Latorica PLA, two types of water are particularly endangered: naturally eutrophic and mesotrophic stagnant waters (paleopotamal and plesiopotamal types) and shallow stagnant waters (ponds, ephemeral pools).One of the main aims for appropriate management of aquatic habitats is to retain as much water as possible in the land and possibly revitalise old channels and tributaries to bring back the water which was present in those places in the past.

Naturally eutrophic and mesotrophic stagnant waters

The waterbodies include the vegetation of plants submerged to float on the surface, in both cases the plants can root in the bottom or flow freely. The group is bound to permanent waters drying up only in exceptional circumstances. A deeper layer of sediment at the bottom is common. This type of water occurs scattered in most of the study area. The threat arises mainly from extensive drainage of the landscape and water management modifications leading to the liquidation of waterbodies. Another risk element is inappropriate pond management associated with the removal of mud from ponds, restocking herbivorous fish, fertilization and liming, or the use of herbicides. Damage can also be caused by waterfowl, the strongest often planted half-tame wild ducks, also swans. Management mostly consists of influencing the habitat of the fish stocks (see below). One of the aims for the management of stagnant water is reducing the influence of chemical pollution from agricultural activities in surrounding areas.

Shallow stagnant waters (ponds, periodic pools)

These waterbodies include ecologically simpler and more species-poor communities than in the previous case. In this type of water, the best non-intervention management is generally the best, interventions are carried out only in cases where it is necessary to avert or direct some adverse effect. The fish stock significantly affects the overall recovery, especially of the first type of waterbodies. The goal is higher transparency of water with low presence of algae. This state can be achieved if medium and large zooplankton reproduce, which thrives especially in fry ponds and with a higher proportion of predatory fish. Stocking herbivorous fish (grass carp) is completely inappropriate. Water level manipulation should be carried out in such a way that the most valuable species of aquatic plants present are not endangered. Water lilies do not tolerate complete, and especially repeated freezing of ponds, as well as too high temperatures in the summer. The restoration of aquatic plants from the seed bank must start in early spring with a gradual and slow infusion of water to full status at the end of the

growing season in September. Limitation of chemical pollution from agriculture activities is also viable.

Grassland on sandy habitats and shallow soils

The main problem in the practical management of protected areas, the task of which is to protect grassland communities, which are mostly overgrown with unwanted vegetation, e.g. locust-tree, pine, *Ailanthus altissima* or *Calamagrostis epigejos*. The removal of these species consists of a combination of mechanical and chemical interventions. Trees should be removed during late summer or early autumn. This method is more effective if a hole is drilled in the center (core) of the freshly cut stumps, the herbicide is poured into it. Cleaning of overgrown trees must be repeated periodically at least every 3-5 years to stop the spread of non-native species and prevent spontaneous afforestation (Šefferová-Stanová et al. 2011). From a malacological viewpoint, it would be appropriate to suppress non-native tall herbs and to maintain a short-stem type steppe, which is one of the limiting habitat factors of the rare land snail *Chondrula tridens*. During a dry winter, for example in January or February, it would be worthwhile to carry out a small-scale experimental burning of a part of a locality in places with accumulated old or non-native herbs and to monitor the occupation of the burned experimental area by vegetation and soil and epigeic fauna. In the past, fires belonged to the cyclical disturbances of steppe biocoenosis, the original vegetation and animals are adapted to them, so they should not have an adverse effect on these coenoses on a small scale. In addition, at the end of winter, most edaphic and epigeic animals remain in the deeper layers of the soil, so heat is much less of concern. It is necessary to burn during the winter time or in the early spring period (January – March), and not to support spontaneous fires, which often occur from spring to autumn. Pannonian grassland on the sands can be left unmanaged if the ecological conditions allow the movement of sand dunes and wind erosion. However, over the past centuries, most sand dune systems have stabilised. Management is therefore needed to maintain them. This can be, for example, regular disturbance of the ground cover (quads, motorcycles, etc.) (Šefferová-Stanová et al. 2011).

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Súhrn

Mäkkýše (Mollusca) Chránenej krajinnej oblasti Latorica (Východné Slovensko)

Zhodnotenie fauny mäkkýšov vo vzťahu k študovanej oblasti

Tento príspevok je súhrnom dohľadateľných historických faunistických dát o malakofaune oblasti CHKO Latorica a jej blízkeho okolia. Malakofaune oblasti CHKO Latorica venoval pozornosť v 70. až 90. rokoch 20. storočia najmä J. Šteffek, niekoľko lokálnych údajov priniesol vo svojich prácach aj V. Ložek a iní zoológovia. Z posledných rokov máme len niekoľko nových faunistických dát, najmä o vodných druhoch, ktoré sú akýmsi vedľajším produktom mapovania európsky významného druhu kotúľky *Anisus vorticulus*. Zatiaľ teda nemožno robiť definitívne závery o druhovom spektre fauny mäkkýšov oblasti rieky Latorice, ktorá je dozaista druhovo bohatšia, ako naznačujú súčasné faunistické prieskumy. Nedostatočne preskúmaná je najmä terestrická malakofauna, predovšetkým nahé ulitníky, medzery sú však aj v údajoch o niektorých taxonomických skupinách vodných mäkkýšov, najmä z čeľade Sphaeriidae.

Za posledných 70 rokov bolo v oblasti CHKO Latorica zistených 82 druhov mäkkýšov (47 vodných a 35 suchozemských druhov), čo je 32 % z celkového počtu druhov na Slovensku. Až

14 druhov patrí k sozologicky významným, tri druhy patria k európsky významným druhom (*Anisus vorticulus*, *Unio crassus* a *Helix pomatia*). Medzi kriticky ohrozené druhy (CR podľa IUCN) patria *Anisus vorticulus*, *Planorbis carinatus*, *Odhneripisidium moitessierianum* a *Vallonia enniensis*.

Z hľadiska ochrany je významný poddruh chondruly trozubovej (*Chondrula tridens eximia*), ktorý nebol zatiaľ zaradený na regionálnej úrovni do žiadnej kategórie IUCN.

Počet nepôvodných druhov je oveľa nižší než na Podunajskej a Borskej nížine. Za posledných 40 rokov boli v oblasti CHKO Latorica zistené len štyri nepôvodné druhy mäkkýšov, všetky patria k vodným druhom (*Ferrissia californica*, *Physa acuta*, *Sinanodonta woodiana* a *Dreissena polymorpha*); medzi terestrickými druhmi nebol zistený žiadny nepôvodný element, mimo oblasti CHKO sa na Východoslovenskej nížine vyskytuje najmä v mestách a ich okolí nepôvodný slizovec iberský (*Arion vulgaris*).

Spomedzi vodných druhov (viac ako 60 % lokalít) boli najfrekventovanejšie druhy stojatých vôd *Planorbarius corneus, Planorbis planorbis, Viviparus contectus* a *Segmentina nitida*. Medzi suchozemskými druhmi sa najčastejšie vyskytovali ulitníky *Caucasotachea vindobonensis, Chondrula tridens, Fruticicola fruticum, Vallonia pulchella* a *Zonitoides nitidus*. Vzhľadom k nízkej preskúmanosti terestrickej malakofauny, nie je zatiaľ možné spraviť analýzu ekoelementov a regio- či areotypov.

Čo sa týka ekologickej "kvality" vodných aj suchozemských biotopov, ide nepochybne o veľmi cenné a často aj pomerne zachovalé oblasti. Cenné sú najmä odstavené meandre v rôznom stupni terestrializácie, ktoré predstavujú prírodné stojaté eutrofné a mezotrofné vody typu plesiopotamál a paleopotamál (väčšina vodných lokalít). Prekvapivo druhovo bohaté sú aj odvodňovacie kanály (lok. č. 10, 25, 28, 35, 39, 40, 42)

V rámci suchozemských lokalít patria k sozologicky najcennejším lokalitám xerické trávniky na viatych pieskoch a plytkých pôdach (najmä v okolí Ladmoviec, napr. lokality Baba a Ladmovské vápence). Latorické lužné lesy nevynikajú takou diverzitou ako podunajské luhy, chýbajú tu napríklad ekologicky náročné polyhygrofilné druhy (*Vertigo antivertigo*, *V. moulinsiana*).

Poznámky k manažmentu vybraných biotopov

K degradácii vodných biotopov dochádza predovšetkým dvoma hlavnými spôsobmi – zvyšovaním množstva živín, teda takzvanou eutrofizáciou a vysušovaním. Živiny a ich stúpajúci podiel vo vodách vplyvom rozsiahlej ľudskej činnosti, sú vážny problém. Jedným z hlavných cieľov ochranárskeho manažmentu je teda znížiť celkovú záťaž vôd a obmedziť vstup nových živín. Je to problém už aj v prípade vôd prirodzene živinami bohatých a úplne zásadná podmienka ďalšej existencie pri stanovištiach, ktoré sú na živiny chudobnejšie. Riešenia sú bohužiaľ zložité, pretože musia byť komplexné a vyžadujú dlhší čas. V oblasti CHKO Latorica sú ohrozené najmä prirodzene eutrofné a mezotrofné stojaté vody (meandre typu paleopotamál a plesiopotamál) a plytké stojaté vody (pondy a temporárne vody). Za zmienku stojí aj potreba redukcie vplyvu chemických látok používaných pri poľnohospodárskej činnosti, ktorá je veľkoplošne realizovaná v blízkom okolí Latorice. Jedným z hlavných cieľov by mala byť taktiež snaha o zadržiavanie vody v krajine a revitalizácia mŕtvych ramien a vodnej sústavy Latorice s cieľom prinavrátiť vodu do častí, v ktorých v minulosti bola.

Prirodzene eutrofné a mezotrofné stojaté vody

Tieto vody zahŕňajú ponorenú až vzplývavú makrofytnú vegetáciu a vysychajú iba výnimočne. Tento typ vôd sa vyskytuje roztrúsene po celom území CHKO. Ohrozenie týchto typov biotopov vyplýva najmä z rozsiahleho odvodňovania krajiny a vodohospodárskych úprav, ktoré vedú k likvidácii vodných plôch. Ďalším rizikovým prvkom je nevhodné rybné hospodárenie v niektorých typoch vôd, spojené s nešetrným odbahňovaním, vysadzovaním bylinožravého amura, hnojením a vápnením, prípadne aj používaním herbicídov. Manažment spočíva väčšinou v ovplyvňovaní biotopu obsádkou rýb (preferencia dravých a planktonofágnych druhov a plôdika), ktorá podporuje rozvoja stredného a veľkého zooplanktónu, výsledkom je priehľadná voda s minimálnym výskytom rias.

Spoločenstvá xerických trávnikov na viatych pieskoch a plytkých pôdach

Hlavným problémom manažmentu rezervácií, úlohou ktorých je ochrana travinno-bylinných spoločenstiev je väčšinou zarastanie nežiadúcou vegetáciou (agát, borovica, pajaseň, smlz). Odstraňovanie týchto druhov spočíva v kombinácii mechanického a chemického zásahu. Stromy treba odstraňovať počas neskorého leta alebo začiatkom jesene. Táto metóda je účinnejšia, ak sa do čerstvo odrezané pňov vyvŕta do stredu (jadra) otvor, naleje sa doň herbicíd a zvyšná plocha sa ešte natrie herbicídom. Odstraňovanie náletových drevín je potrebné periodicky opakovať najmenej každých 3–5 rokov, aby sa zastavilo rozširovanie nepôvodných druhov a zamedzilo sa spontánnemu zalesňovaniu. Z malakozoologického pohľadu by bolo vhodné aspoň na časti plochy potláčať aj stanovištne nepôvodné vysoké byliny a udržiavať krátkosteblový typ stepi, ktorý je jedným z limitujúcich stanovištných faktorov chondruly trojzubovej (*Chondrula tridens*). Stálo by za úvahu vykonať počas suchej zimy, napríklad v januári či februári, maloplošné experimentálne vypálenie časti niektorej lokality v miestach s nahromadenou starinou či nepôvodnými bylinami a sledovať obsadzovanie vypálenej experimentálnej plochy vegetáciou a pôdnou a epigeickou faunou. Požiare patrili v minulosti k cyklickým disturbanciám stepných biocenóz, pôvodná vegetácia a živočíchy sú na ne adaptované, v maloplošnom meradle by teda nemali mať na tieto cenózy nepriaznivý vplyv. Navyše, koncom zimy sa ešte väčšina edafických a epigeických živočíchov zdržiava v hlbších vrstvách pôdy, teplo ich preto ohrozuje oveľa menej. Vypaľovať treba jednoznačne v zimnom, či v skorom jarnom období (január – marec), nepodporovať spontánne požiare, ku ktorým často dochádza od jari do jesene.

Panónske travinno-bylinné porasty na pieskoch môžu byť ponechané aj bez hospodárenia, ak ekologické podmienky umožňujú pohyb pieskových dún a veternú eróziu. Počas minulých storočí však bola väčšina systémov pieskových dún stabilizovaná. Na ich zachovanie je preto potrebný manažment. Môže to byť napríklad pravidelné narúšanie pôdneho krytu (štvorkolky, motorky a pod.) (Šefferová-Stanová et al., 2011).

Earthworms (Annelida: Lumbricidae) of the Latorica Protected Landscape Area

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Abstract
Updated list of earthworm species known from the territory of the Latorica Protected Landscape Area (PLA) is presented, based on the analysis of all literature data available and on the results of earthworm collecting at 31 sites representing various types of ecosystems in 2008-2011. According to the current list, 17 species have been recorded so far. Of them, Trans-Aegean *Aporrectodea leoni*, Palaearctic *Octolasion tyrtaeum*, Central-European *Proctodrilus antipai* and widely distributed peregrine species *Allolobophora chlorotica*, *Aporrectodea caliginosa*, *Aporrectodea trapezoides*, *Eiseniella tetraedra*, *Lumbricus terrestris* and *Octolasion lacteum* proved to be new for the fauna of the studied territory. Dacian *Octodrilus compromissus* is new for the fauna of Slovakia.

Key words: Earthworms, Lumbricidae, distribution, Latorica PLA, Slovakia

Introduction

Earthworms (Annelida, Lumbricidae) belong to the most important edaphic animals in terrestrial ecosystems of Central Europe, where they play a role of ecosystem engineers. There are however scarce data available on earthworms inhabiting the territory of the Latorica Protected Landscape Area and its surroundings. The first data were published by Breza (1959a, b), who collected *Bimastos rubidus* and *Dendrobaena depressa* in the urban area of Kráľovský Chlmec. Later, Zajonc (1981) recorded *Aporrectodea rosea*, *Octodrilus gradinescui* and *Octodrilus transpadanus* and *Aporrectodea rosea*, *Lumbricus rubellus* and *Dendrobaena octaedra* from the surroundings of the Somotor and Malá Tŕňa (outside the PLA) villages, respectively. To add to our knowledge, a research was carried out at a number of sites located across the territory of the Latorica PLA and at several adjacent sites in 2008-2011. Using a set of methods, earthworms were recorded from 31 localities.

The aim of this paper is to summarise our recent knowledge and to present the updated list of the earthworms of the Latorica PLA.

Material and methods

Earthworm sampling and identification

The sampling was conducted from 2008 to 2011. Earthworms were collected by digging and hand-sorting at all localities given below. In addition, soil sampling followed by heat extraction in modified Kempson apparatus and/or pitfall trapping were used to gain earthworms at selected sites. The earthworms collected were stored in 11% formaldehyde or 70% ethanol and deposited in the collection of the Institute of Soil Biology, Biology Centre CAS, České Budějovice, Czech Republic.

All specimens were identified to species level according to Pižl (2002) and Csuzdi & Zicsi (2003). The later changes in earthworm systematics are respected, namely those resulted from the reclassification of the *Fitzingeria* species to the genus *Dendrobaena* (Szederjesi et al. 2017) and from the transfer of former *Dendrodrilus rubidus* in the revised genus *Bimastos* (Csuzdi et al. 2017). Identified earthworms were classified into three main ecological categories having different morphology, physiology and behaviour: epigeic, anecic, and endogeic (Bouché 1977; Lavelle & Spain 2001). Epigeic earthworms are rather small-sized species that live within the litter layer on the soil surface or within the uppermost part of the mineral soil and feed on surface organic matter. Anecic earthworms are large species that make vertical or near-vertical burrows into which they incorporate varying amounts of surface organic matter and feed on a mix of surface and soil organic matter. Finally, endogeic earthworms live in a network of mainly horizontal burrows in the mineral soil and feed on humified soil organic matter.

List of localities

The following list involves all localities at which the earthworms have been recorded during the current research in 2008-2011. The number and name of each locality are followed by the name of the relevant cadastral area, geographical coordinates, altitude, and the short characteristics of the locality and the bedrock. NR = Nature Reserve, NNR = National Nature Reserve.

1 – Agardské pasienky, Leles, 48°29.106’ N, 22°4.134’ E, 99 m a.s.l., wet meadows and pastures with self-seed trees, fluvial sediments.
2 – Bešiansky les, Beša, 48°30.636’ N, 21°55.935’ E, 104 m a.s.l., hard mixed floodplain forest, fluvial sediments.
3 – Bešiansky les, Beša, 48°30.643’ N, 21°56.317’ E, 105 m a.s.l., hard mixed floodplain forest, fluvial sediments.
4 – Biele jazero NR, Malý Horeš, 48°25.079’ N, 21°51.508’ E, 95 m a.s.l., wet meadow, ecotone of pasture and marshland, aeolian sands on river sediments.
5 – Boľské rašelinisko NR, Boľ and Kráľovský Chlmec, 48°26.851’ N, 21°57.128’ E, 101 m a.s.l., alder belt between peat bog and agrocenoses, fluvial sediments.
6 – Botiansky luh NNR, Boťany, 48°28.549’ N, 22°6.296’ E, 107 m a.s.l., floodplain forest between embankment and river arm, fluvial sediments.
7 – Botiansky luh NNR, Boťany, 48°28.466’ N, 22°6.399’ E, 112 m a.s.l., riparian forest near the left bank of the Latorica River, eastern part of the NNR, fluvial sediments.
8 – Cejkov – oak-hornbeam forest, Cejkov, 48°27.267’ N, 21°44.439’ E, 206 m a.s.l., bank of a stream, paleozoic ryolites and dacites.

9 – Čierny les, Poľany, 48°29.030’ N, 21°58.122’ E, 100 m a.s.l., hard floodplain forest with predominated oak, fluvial sediments.
10 – Dlhá hora, Ladmovce, 48°25.996’ N, 21°46.299’ E, 260 m a.s.l., steppe-forest, oak-dogwood, dolomites.
11 – Dlhá hora, Ladmovce, 48°26.117’ N, 21°46.123’ E, 268 m a.s.l., oak-hornbeam forest on the slopes of a hill, dolomites.
12 – Ereš, Kráľovský Chlmec, 48°26.171’ N, 21°57.197’ E, 131 m a.s.l., fragment of a lowland woodland, fluvial sediments.
13 – Horešské lúky NR, Malý Horeš, 48°24.337’ N, 21°57.388’ E, 96 m a.s.l., grassland within depression (salt marsh) in grounded riverbed, river sediments.
14 – Horný les, Oborín, 48°32.059’ N, 21°54.633’ E, 100 m a.s.l., flooded oak forest outside the dam, W of the Beša village, fluvial sediments.
15 – Hrušov – Prudký, Rad, 48°26.709’ N, 21°52.111’ E, 100 m a.s.l., dry grassland on sandy dune, eolic sand.
16 – Hrušov – Tice, Rad, Svätá Mária, 48°26.127’ N, 21°51.266’ E, 98 m a.s.l., grassland along the bank of marshland (former riverbed), fluvial sediments.
17 – Húšťava, Malý Horeš, 48°24.071’ N, 21°57.996’ E, 104 m a.s.l., fragment of lowland forest with oak close to former river arms, fluvial sediments.
18 – Kašvár NNR, Ladmovce, 48°25.172’, 21°46.543’ E, 161 m a.s.l., xerothermic grassland with bushes, dolomite and limestone.
19 – Klin nad Bodrogom, Streda nad Bodrogom, 48°22.947’, 21°42.961’ E, 97 m a.s.l., a belt of willow trees between river arm and wet meadow, fluvial sediments.
20 – Latorický luh NNR, Boťany, 48°27.641’ N, 22°6.151’ E, 111 m a.s.l., hard floodplain forest with oak and hornbeam, fluvial sediments.
21 – Poniklecová lúčka NR, Malý Horeš, 48°24.742’ N, 21°56.721’ E, 119 m a.s.l., dry grassland on sand, aeolian sands on andesite.
22 – Ptrukša – riparian forest, Ptrukša, 48°28.451’ N, 22°7.233’ E, 102 m a.s.l., riparian forest at the right bank of the Latorica River, fluvial sediments.
23 – Ptrukša – grassland, Ptrukša, 48°28.50350’ N, 22°7.57313’ E, 103 m a.s.l., floodplain grasslands and agrocenoses, fluvial sediments.
24 – Tajba NNR, Streda nad Bodrogom, 48°23.218’ N, 21°46.505’ E, 98 m a.s.l., belt of willows on the N shore of the lake, fluvial sediments.
25 – Tarbucka NR, Streda nad Bodrogom, 48°22.242’ N, 21°47.058’ E, 189 m a.s.l., dry grassland with bushes on sandy soil, aeolian sands on andesite.
26 – Veľká Tŕňa forest, Veľká Tŕňa, 48°28.844’ N, 21°41.834’ E, 257 m a.s.l., ca 800 m NW from the peak Rozhľadňa, valley of a stream in hornbeam forest.
27 – Veľké jazero NR, Vojka, 48°26.650’ N, 21°55.360’ E, 99 m a.s.l., ecotone of marshland bank and agrocenoses, aeolian sands on river sediments.
28 – Veľký kopec, Kráľovský Chlmec, 48°25.159’ N, 21°57.635’ E, 260 m a.s.l., SW slope with dry grassland, andesite.
29 – Zatínsky luh NR, Zatín, 48°29.748’ N, 21°54.905’ E, 104 m a.s.l., fragment of hard mixed floodplain forest with arms of the Latorica River, fluvial sediments.
30 – Zemplín, castle hill, Zemplín, 48°26.459’ N, 21°48.805’ E, 120 m a.s.l., ruderal dry environment (urban area), andesite.

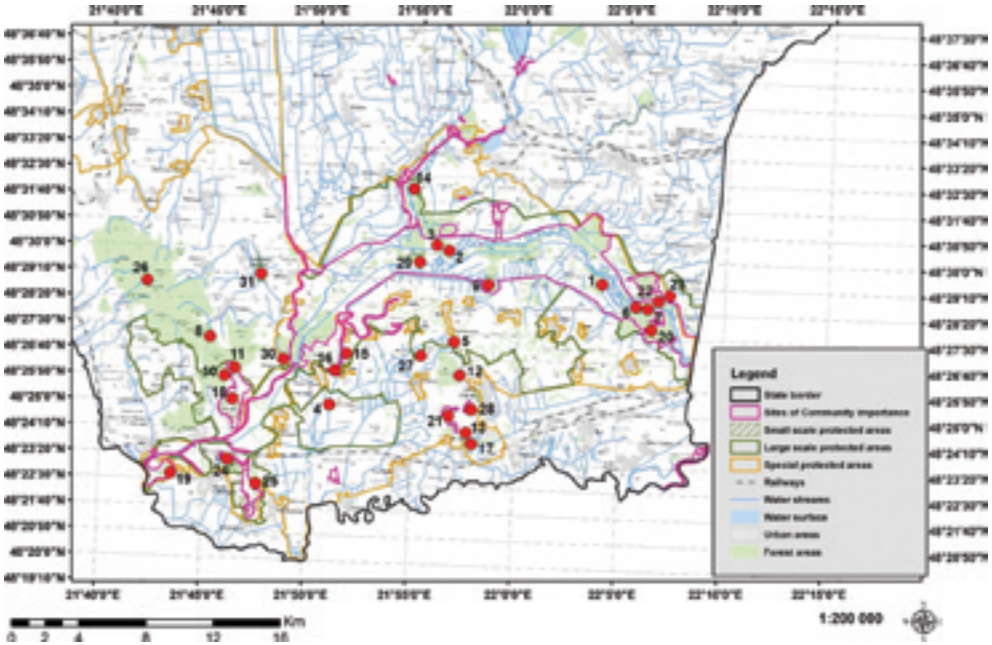

Fig. 1 *Studied localities in the Latorica Protected Landscape Area (for locality numbers see Material and methods). (J. Černecký del.).*

31 – Zemplínska jelšina NR, Zemplínske Jastrabie, 48°28.989' N, 21°47.519' E, 109 m a.s.l., fragment of riparian and bog forest, fluvial sediments.

Results

In total, 16 species were identified in the material of 1591 earthworms collected during the current research. Hence, the updated list of earthworms recorded from the territory of the Latorica Protected Landscape Area includes 17 species listed below. For each species, the numbers of localities (see Material and methods) and/or locality and citation of published records, distribution type (faunal element) according to Csuzdi & Zicsi (2003) and Csuzdi et al. (2011), ecological category and main habitat types are given.

Allolobophora chlorotica (Savigny, 1826) – 21 – Peregrine – endogeic species – recorded from moist sandy soil in a grassland.

Allolobophora leoni Michaelsen, 1891 – 5, 6, 7, 14, 31 – Trans-Aegean – endogeic species – uncommon in all types of ecosystems.

Aporrectodea caliginosa (Savigny, 1826) – 21, 25, 26, 28 – Peregrine – endogeic species – uncommon in floodplain grasslands and forests, and in agrocenoses.

Aporrectodea rosea (Savigny, 1826) – 1, 5, 6, 7, 8, 9, 11, 12, 16, 17, 18, 20, 21, 27, 30, 31 – Somotor and Malá Tŕňa (Zajonc 1981) – Peregrine – endogeic species – common in all types

of habitats.

Aporrectodea trapezoides (Dudés, 1828) – 21 – Peregrine – endogeic species – recorded from dry grassland on sandy soil.

Bimastos rubidus (Savigny, 1826) – 3, 5, 6, 8, 11, 12, 14, 15, 17, 20, 22, 23, 24, 26, 27, 29 – Kráľovský Chlmec (Breza 1959a) – Peregrine – epigeic species – common in all types of habitats.

Dendrobaena depressa (Rosa, 1893) – 5, 6, 17, 20 – Kráľovský Chlmec (Breza 1959a) – Central-European – anecic species – uncommon in moist floodplain forests.

Dendrobaena octaedra (Savigny, 1826) – 1, 2, 3, 5, 6, 7, 8, 11, 12, 14, 16, 17, 19, 20, 22, 24, 26, 27, 30, 31 – Malá Tŕňa (Zajonc 1981) – Peregrine – epigeic species – common in all types of habitats.

Eiseniella tetraedra (Savigny, 1826) – 2, 4, 5, 6, 7, 13, 14, 17, 19, 20, 22, 24, 26, 29, 31 – Peregrine – epigeic species – limicolous, common in moist soils of floodplains and close to brooks and rivers.

Lumbricus rubellus Hoffmeister, 1843 – 2, 6, 7, 8, 11, 12, 14, 15, 17, 19, 20, 22, 26, 27, 31 – Malá Tŕňa (Zajonc 1981) – Peregrine – epigeic species – common in almost all types of habitats.

Lumbricus terrestris Linnaeus, 1758 – 1, 2, 19, 20, 21, 22, 24 – Peregrine – anecic species – common in pastures and floodplain forests.

Octodrilus compromissus Zicsi et Pop, 1984 – 8, 11, 26 – Dacian – endogeic species – uncommon in oak-hornbeam forests, new for the fauna of Slovakia.

Octodrilus gradinescui (Pop, 1938) – Somotor (Zajonc 1981) – Dacian – endogeic species – rare species inhabiting hard clayed soils.

Octodrilus transpadanus (Rosa, 1884) – 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 17, 19, 20, 22, 23, 28, 31 – Somotor (Zajonc 1981) – Trans-Aegean – endogeic species – common in moist soil of swamps, riverbanks and floodplain forests.

Octolasion lacteum (Örley, 1881) – 7, 8, 11, 18, 20, 22, 26, 31 – Peregrine – endogeic species – uncommon in almost all types of habitats.

Octolasion tyrtaeum (Savigny, 1826) – 2, 6, 19, 20, 22, 31 – Palaearctic – endogeic species – common in dump habitats.

Proctodrilus antipai (Michaelsen, 1891) – 31 – Central-European – endogeic species – recorded from the riparian forest.

Conclusions

The first list of the earthworms of the Latorica PLA and its surroundings contains 17 species. Altogether 10 species (59 %) are peregrines, i.e. widely distributed species that have ranges stretching frequently across continents, and therefore have a distribution that can be connected to human activities. However, some of these species could also be members of the autochthonous fauna, but nowadays it is difficult to specify it.

The most important records are those of *Octodrilus gradinescui* from Somotor (Zajonc 1981) and *Octodrilus compromissus* from the forest at Dlhá hora hill and apart of the PLA from oak-hornbeam woodland near the villages of Veľká Tŕňa and Cejkov. Both species were described from Romania and belong to earthworms with Dacian endemism, of which the distribution centre is found in the Apuseni Mts. (Pop et al. 2010). These large-bodied

endogeic earthworms are usually lacking in the higher regions of the Carpathians, but they frequently occupy the Pannonian lowlands and the Northeast Hungarian Mountains (Csuzdi et al. 2011). The records of these species in Slovakia represent the northernmost border of their distribution areas. While *O. gradinescui* was also found in Borda, Slanské vrchy Mts. (Zajonc 1981), *O. compromissus* is new for the fauna of Slovakia.

Another interesting component of the autochthonous fauna is represented by the Trans-Aegean endogeic species *Allolobophora leoni* and *Octodrilus transpadanus,* which are distributed in Central Europe and around the southern shore or the eastern shore of the Black See (Csuzdi et al. 2011). In addition, the earthworm fauna of the Latorica PLA is enriched by widely distributed Central European species *Dendrobaena depressa* and *Proctodrilus antipai* and Palaearctic *Octolasion tyrtaeum*. *P. antipai* and *O. tyrtaeum* belong to small endogeics. *D. depressa* is large-bodied anecic earthworm and has a profound effect on the decomposition of leaf litter and on the structure of soil (Csuzdi & Zicsi 2003).

The most frequent species were *Dendrobaena octaedra* (recorded from 20 localities), *O. transpadanus* (17), *Aporrectodea rosea* (16), *Bimastos rubidus* (16), *Eiseniella tetraedra* (15) and *Lumbricus rubellus* (15). On the contrary, *Allolobophora chlorotica*, *Aporrectodea trapezoides* and *Proctodrilus antipai* were only recorded from one locality.

Similarly, the per-site number of collected earthworm species varied greatly among individual localities having been highest in floodplain forests of the Botiansky luh (11 species) and the Latorický luh (10) and in the riparian forest of the Zemplínska jelšina (9).

The Eastern Slovak Plain is represented by 16 species of earthworms, while the Zemplínske vrchy Mts. has only half of the number. However, *Octodrilus compromissus*, which enriched the list of Slovak fauna, has only been found in the hilly terrain of this mountain range.

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Súhrn

Dážďovky (Annelida: Lumbricidae) Chránenej krajinnej oblasti Latorica

Práca sumarizuje údaje o faune dážďoviek (Lumbricidae) na území CHKO Latorica, založené na analýze dostupných literárnych zdrojov a výsledkoch vlastného výskumu uskutočneného na mnohých lokalitách v rokoch 2008-2011. V rámci tohto výskumu boli získané údaje o výskyte dážďoviek na celkovo 31 lokalitách, reprezentujúcich širokú škálu ekosystémov. Aktuálny zoznam dážďoviek CHKO Latorica zahŕňa 17 druhov. Z celkového počtu druhov 10 z nich (59%) patrí k peregrinným dážďovkám, tj. široko rozšíreným druhom, ktorých areál zahŕňa viaceré kontinenty, pravdepodobne v súvislosti s ľudskou činnosťou. Niektoré z týchto druhov však môžu byť zástupcami autochtónnej fauny študovaného územia, dnes je ale veľmi ťažké to posúdiť.

K najvýznamnejším zisteným druhom patrí *Octodrilus gradinescui* uvádzaný z okolia obce Somotor (Zajonc 1981) a *Octodrilus compromissus*, ktorého výskyt bol zaznamenaný v dubovo-hrabovom lese na Dlhej hore, a mimo CHKO rovnako v lesoch v blízkosti Veľkej Tŕne a Cejkova. Oba druhy boli opísané z Rumunska a sú to dácke endemity s jadrom areálu v pohorí Apuseni. Lokality týchto druhov na Slovensku predstavujú najsevernejšiu hranicu ich areálu. Kým *O. gradinescui* bol nájdený tiež na lokalite Borda v Slanských vrchoch (Zajonc 1981), *O. compromissus* je nový pre faunu Slovenska.

Ďalšou zaujímavou zložkou autochtónnej fauny dážďoviek sú trans-egejské druhy *Allolobophora leoni* a *Octodrilus transpadanus*, ktoré sú rozšírené v strednej Európe a okolo južného alebo východného pobrežia Čierneho mora (CSUZDI et al. 2011). Fauna dážďoviek CHKO Latorica je navyše obohatená o široko rozšírené stredoeurópske druhy *Dendrobaena depressa* a *Proctodrilus antipai* a palearktický druh *Octolasion tyrtaeum*.

Najrozšírenejšími druhmi boli *Dendrobaena octaedra* (zaznamenaná na 20 lokalitách), *O. transpadanus* (17), *Aporrectodea rosea* (16), *Bimastos rubidus* (16), *Eiseniella tetraedra* (15) a *Lumbricus rubellus* (15). Naopak, *Allolobophora chlorotica*, *Aporrectodea trapezoides* a *Proctodrilus antipai* boli zistené iba na jednej lokalite.

Počty druhov dážďoviek zistené na jednotlivých lokalitách sa značne líšili, pričom najvyššie boli v lužných lesoch Botianskeho (11 druhov) a Latorického (10) luhu a v podmáčanom lese Zemplínskej jelšiny (9).

Pseudoscorpions (Arachnida: Pseudoscorpiones) of the Latorica Protected Landscape Area

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Abstract

Species richness of pseudoscorpions in Latorica Protected Landscape Area is based on newly processed material and published data and consists of 15 taxa from four families. The new material of pseudoscorpions was collected at 24 localities during the five years (2008–2012) and contained 252 specimens of 12 taxa. Almost 75 % of the studied material was represented by members of epigeic fauna. The rest of the collected material consisted of dendrophilous species. Six species are new for the studied area and simultaneously, records of all obtained species represent new localities of their distribution in Slovakia. The significance of the conservation of Latorica PLA confirms the occurrence of three vulnerable pseudoscorpion species, namely *Ephippiochthonius tuberculatus* (Hadži, 1937), *Microbisium suecicum* Lohmander, 1945, and *Allochernes peregrinus* Lohmander, 1939. As the most valuable biotopes for Latorica PLA seem to be xerothermic biotopes with the presence of two mentioned species *E. tuberculatus* and *M. suecicum*.

Key words: distribution, faunistics, Latorica, Slovakia, vulnerable species, xerothermic biotopes

Introduction

Pseudoscorpions are small arachnid order with more than 3500 species described in 25 families in the world, and represent the fourth most numerous order within arachnid class (Harvey 2013a). They inhabit almost all terrestrial biotopes and could be found in different types of habitats, such as soil, leaf litter, moss, under the stones, tree bark, tree hollows, and compost heaps. Many species live in the nests of social insects or in the bird or mammal nests. Some species are synanthropic or troglobitic (Weygoldt 1969).

The Slovak pseudoscorpion fauna is represented by 57 species from 23 genera and eight families (Červená et al. 2020a). Most of the published data are obtained from isolated random collections or from studies of specific habitat types. Systematic research of pseudoscorpion

diversity of specific mountain range was conducted only in a few areas in Slovakia: Gaderská dolina Valley (Krumpál 1980), Poloniny National Park (Krumpál & Krumpálová 2003), Cerová vrchovina Protected Landscape Area (Christophoryová 2009), Burda Nature Reserve (Christophoryová et al. 2014), Strážovské vrchy Mts., and Žilinská kotlina basin (Krajčovičová et al. 2016). The most intensive investigation of pseudoscorpions in Slovakia through the systematic long-term research was carried out in Malé Karpaty Protected Landscape Area and Trnavská pahorkatina Hills (Christophoryová & Krumpál 2005, 2007; Christophoryová & Holecová 2012; Christophoryová 2013). The attention was also paid to pseudoscorpion fauna of the smaller areas such as Ostrov Kopáč Nature Reserve (Krumpál & Christophoryová 2007) and Šúr Nature Reserve (Christophoryová & Krumpál 2010).

Tömösváry (1883) mentioned the occurrence of five pseudoscorpion species at four localities in Latorica Protected Landscape Area (Latorica PLA). The first record of *Allochernes peregrinus* Lohmander, 1939 for Slovakia was represented by two females found in leaf litter under the stones at the locality Kráľovský Chlmec (Krumpálová & Krumpál 1993). Christophoryová et al. (2011b) collected the species *Microbisium suecicum* Lohmander, 1945 from leaf litter in oak forest at the locality Tajba Nature Reserve. Krajčovičová & Christophoryová (2014) recorded the species *Allochernes wideri* (C. L. Koch, 1843) and *Pselaphochernes scorpioides* (Hermann, 1804) from tree hollows at localities Poľany, Streda nad Bodrogom, and Pribeník. Additionally, *Dinocheirus panzeri* (C. L. Koch, 1837) was found under the tree bark at the locality Cejkov (Krajčovičová & Christophoryová 2014). The results of the research in Latorica PLA are substantial for the knowledge of pseudoscorpion diversity in the studied area and complemented our knowledge about pseudoscorpion distribution in Slovakia.

Material and methods

During 2008 – 2012 the material of pseudoscorpions was collected at 24 localities in Latorica PLA (Fig. 1). Except for the new material, available published data about pseudoscorpions from ten localities from the studied area for which the approximate geographic coordinates could be found are included in the text (Tömösváry 1883, Krumpálová & Krumpál 1993, Christophoryová et al. 2011b, Krajčovičová & Christophoryová 2014) (Fig. 1). Pseudoscorpions were sampled mostly from forest fragments and other natural biotopes but also from the biotopes affected by man. To capture the highest possible species diversity, a combination of collecting methods suitable for a corresponding habitat type were used: samples of leaf litter and soil, often containing moss and tussocks, manure, and wood-mould from tree hollows were sifted or heat extracted in Tullgren funnels. Specimens from under the tree bark and found in synanthropic habitats were collected individually using forceps. Formalin pitfall traps were also used as a sampling method. Most of the specimens were processed as permanent slide mounts using Liquido de Swan medium. Some specimens were studied as temporary slide mounts using a lactic acid medium, then rinsed in water and returned to 70 % ethanol. All specimens were identified using the key in Christophoryová et al. (2011b).

Nomenclature for all taxa follows Harvey (2013b) and Zaragoza (2017). The order of families follows Harvey (2013a), while the genera and species in each family are ordered alphabetically. The year of the description of *Lamprochernes chyzeri* (Tömösváry, 1883) has been changed according to Judson (2018). The material is deposited in the zoological collections in Comenius University, Bratislava, Slovakia.

A list of studied localities is mentioned below with the following information: locality code, locality name, coordinates, biotope, vegetation type, altitude, and collector names. The list of abbreviations used in the text: a.s.l. – above sea level, E – longitude, N – latitude, NR – Nature Reserve, NNR – National Nature Reserve, PA – Protected Area, PLA – Protected Landscape Area.

List of studied localities (Fig. 1)

1 – Biel – 48°24’28” N, 22°03’17” E – 100 m a.s.l. (Tömösváry 1883)
2 – Botiansky luh NNR – 48°27’38” N, 22°06’09” E – alluvial forest – oak-elm-ash forest – 110 m a.s.l. – leg. Beňo J., Mock A., Tajovský K.
3 – Botiansky luh NNR – 48°27’51” N, 22°06’10” E – alluvial forest – oak-elm-ash forest – 100 m a.s.l. – leg. Fenďa P.
4 – Botiansky luh NNR – 48°28’23” N, 22°07’00” E – alluvial forest – oak-elm-ash forest – 98 m a.s.l. – leg. Fenďa P.
5 – Brehov, Veľký vrch Mt. – 48°29’39” N, 21°48’29” E – rocky steppe – xerothermic grassland with bushes – 191 m a.s.l. – leg. Mock A., Tajovský K.
6 – Cejkov – 48°27’26” N, 21°45’44” E – oak-hornbeam forest – 220 m a.s.l. – leg. Christophoryová J. (Krajčovičová & Christophoryová 2014)
7 – Dlhé Tice NR – 48°27’00” N, 21°52’00” E – reed wetland vegetation – 99 m a.s.l. – leg. Fenďa P.
8 – Hrušov – 48°26’00” N, 21°52’00” E – monoculture of black locust – 105 m a.s.l. – leg. Fenďa P.
9 – Kašvár NNR – 48°25’10” N, 21°46’32” E – rocky steppe – xerothermic grassland with bushes – 161 m a.s.l. – leg. Mock A., Tajovský K.
10 – Klin nad Bodrogom, Kováčske lúky – 48°22’56” N, 21°42’57” E – alluvial forest – salix-poplar-alder forest – 97 m a.s.l. – leg. Mock A., Tajovský K.
11 – Kráľovský Chlmec, Ereš cottage – 48°26’00” N, 21°56’31” E – alluvial forest – oak-elm-ash forest – 120 m a.s.l. – leg. Fenďa P.
12 – Kráľovský Chlmec, Veľký kopec PA – 48°25’06” N, 21°57’39” E – xerothermic grassland vegetation – 263 m a.s.l. – leg. Fenďa P.
13 – Kráľovský Chlmec, Vysoká – 48°25’53” N, 21°58’22” E (Krumpálová & Krumpál 1993)
14 – Ladmovce, Dlhá hora Mt. – 48°25’51” N, 21°46’32” E – xerothermic grassland vegetation – 180 m a.s.l. – leg. Fenďa P.
15 – Ladmovce, Dlhá hora Mt. – 48°26’06” N, 21°46’10” E – alluvial forest – 260 m a.s.l. – leg. Christophoryová J.
16 – Leles – 48°28’05” N, 22°00’55” E – dried river arm – ground tree hollow – 115 m a.s.l. – leg. Christophoryová J.
17 – Malý Horeš – 48°24’04” N, 21°57’59” E – alluvial forest – oak-elm-ash forest – 98 m a.s.l. – leg. Fenďa P.
18 – Malý Horeš, Húšťava – 48°24’04” N, 21°57’59” E – alluvial forest – oak-elm-ash forest – 106 m a.s.l. – Beňo J., Mock A., Tajovský K.
19 – Poľany – 48°28’00” N, 21°59’00” E – church area – 103 m a.s.l. (Krajčovičová & Christophoryová 2014)

20 – Poľany – 48°28’39” N, 21°59’00” E – farm yard – 103 m a.s.l. – leg. Fenďa P.
21 – Poľany – 48°28’59” N, 21°58’06” E – alluvial forest – oak-elm-ash forest – 100 m a.s.l. – leg. Holecová M.
22 – Pribeník – 48°23’24” N, 22°00’18” E – park by the manor house – 102 m a.s.l. – leg. Mock A. (Krajčovičová & Christophoryová 2014)
23 – Rašelinisko Bôľ NR – 48°26’51” N, 21°57’07” E – wetland shore – alder-birchen vegetation – 191 m a.s.l. – leg. Mock A.
24 – Soľnička, Čierny les – 48°28’39” N, 21°58’00” E – alluvial forest – oak-elm-ash forest – 98 m a.s.l. – leg. Christophoryová J., Fenďa P.
25 – Somotor – 48°23’58” N, 21°48’31” E – 98 m a.s.l. (Tömösváry 1883)
26 – Somotor, Somotorská hora Mt. – 48°24’00” N, 21°48’00” E – grass field – xerothermic grassland vegetation – 150 m a.s.l. – leg. Fenďa P.
27 – Streda nad Bodrogom – 48°22’13” N, 21°45’04” E – park by manor house – 101 m a.s.l. – Mock A. (Krajčovičová & Christophoryová 2014)
28 – Svätá Mária – 48°26’00” N, 21°50’00” E – rural zone of village – 99 m a.s.l. – leg. Christophoryová J.
29 – Tajba NNR – 48°23’00” N, 21°45’60” E – linden-maple forest – 99 m a.s.l. – leg. Fenďa P.
30 – Tajba NNR – 48°23’00” N, 21°46’00” E – wetland vegetation – 97 m a.s.l. – leg. Šťáhlavský F. (Christophoryová et al. 2011b)

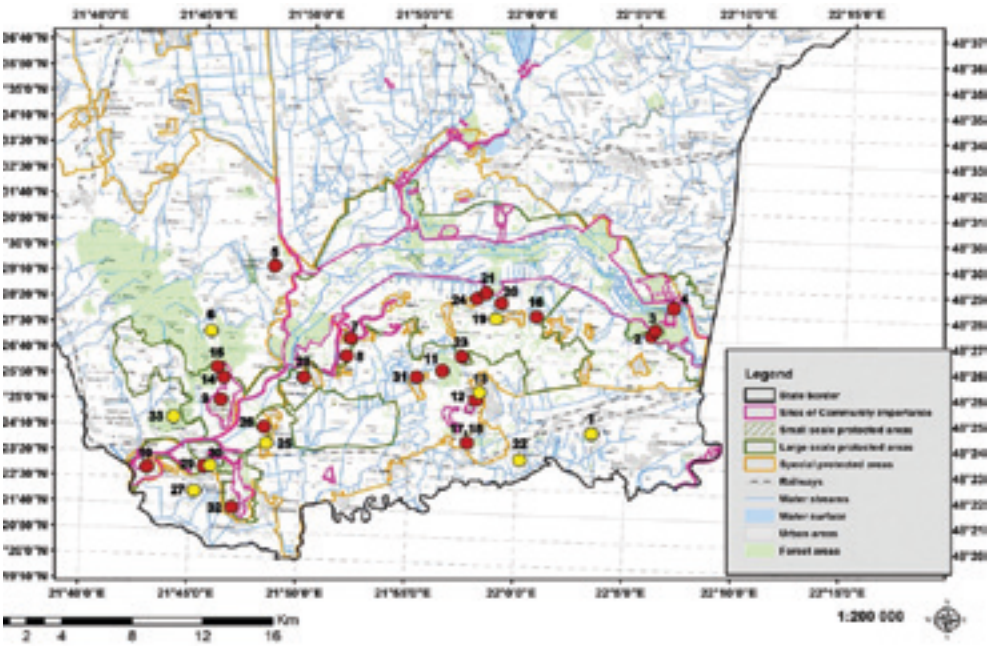

Fig. 1 *Studied localities in Latorica Protected Landscape Area. Red circles indicate new data and yellow circles indicate published data. Map data were processed by J. Černecký.*

31 – Veľké jazero NR – 48°26'00" N, 21°55'45" E – alluvial forest – willow-poplar forest – 100 m a.s.l. – leg. Fenďa P.
32 – Veľký Kamenec, Tarbucka NR – 48°21'44" N, 21°47'23" E – xerothermic grassland vegetation – 250 m a.s.l. – leg. Fenďa P.
33 – Viničky – 48°24'54" N, 21°44'36" E – 100 m a.s.l. (Tömösváry 1883)

Results

Material of pseudoscorpions, collected during the years 2008–2012, consists of 252 specimens belonging to 12 taxa and four families. *Neobisium* spp. specimens were identified only on the genus level. The most abundant species in the material were *Neobisium crassifemoratum* (Beier, 1928), *N. carcinoides* (Hermann, 1804), *Allochernes peregrinus* Lohmander, 1939 and *Ephippiochthonius tetrachelatus* (Preyssler, 1790). The most frequent species in the studied area were *N. crassifemoratum*, *N. carcinoides*, and *E. tetrachelatus*. Almost 75 % of the studied material was represented by members of epigeic fauna. The rest of the collected material consisted of dendrophilous species.

The list of the identified taxa and published records from the studied area are given below with locality codes. For new data, the season of collection, material type, collecting method, and ecological characteristics are mentioned. In addition, published data from the locality Trakany without locality code are also included in the list (Tömösváry 1883).

List of identified taxa

Chthoniidae Daday, 1889

Ephippiochthonius tetrachelatus (Preyssler, 1790) – 2; 3; 11; 17; 18; 32 – April, October – leaf litter and soil extraction. Common and eurytopic species in the whole territory, found to be epigeic in natural biotopes.

Ephippiochthonius tuberculatus (Hadži, 1937) – 14 – October – tussocks extraction. Epigeic and vulnerable species in Slovakia. Rare species in the territory with occurrence limited to xerothermic biotope.

Neobisiidae Chamberlin, 1930

Microbisium suecicum Lohmander, 1945 – 14; 30 (Christophoryová et al. 2011b) – October – tussocks extraction. Epigeic, stenotypic, and vulnerable species in Slovakia. Rare species in the territory with occurrence limited to the xerothermic biotopes.

Neobisium carcinoides (Hermann, 1804) – 2; 3; 4; 21; 24; 31 – April, May, October – leaf litter and soil extraction and sifting. This eurytopic species is common in the whole territory, found in soil habitats in natural biotopes.

Neobisium crassifemoratum (Beier, 1928) – 5; 12; 14; 17; 18; 26 – from October to April – leaf litter, soil and tussocks extraction, pitfall traps. The most common epigeic species in the whole territory, found in forests, as well as in xerothermic biotopes.

***Neobisium* spp.** – 2; 7; 9; 17; 18; 26; 29 – from October to May, from April to October – leaf litter and tussocks extraction, pitfall traps.

Cheliferidae Risso, 1827

Dactylochelifer latreillii (Leach, 1817) – 3; 7; 8; 16; 23; 33, Trakany (Tömösváry 1883) – April, May, June, October – leaf litter and moss extraction, soil and wood-mould sifting. Eurytopic species found in the territory in different types of biotopes.

Chernetidae Menge, 1855

Allochernes peregrinus Lohmander, 1939 – 13 (Krumpálová & Krumpál 1993); 17; 18 – April, October – leaf litter and soil extraction. Epigeic and vulnerable species found in the territory in natural biotopes.

Allochernes wideri (C. L. Koch, 1843) – Trakany (Tömösváry 1883); 19, 22 (Krajčovičová & Christophoryová 2014). Common dendrophilous species recorded from mould of tree hollow in the biotopes affected by man.

Chernes cimicoides (Fabricius, 1793) – 1, 25, Trakany (Tömösváry 1883). Dendrophilous species.

Chernes hahnii (C. L. Koch, 1839) – 28 – May – under tree bark, individual sampling. Common and dendrophilous species found in a rural zone in the studied territory.

Chernes vicinus (Beier, 1932) – 3 – October – extraction of detritus under tree bark. Dendrophilous species, rare in the studied territory, found in natural habitat.

Dinocheirus panzeri (C. L. Koch, 1837) – Trakany (Tömösváry 1883); 6 (Krajčovičová & Christophoryová 2014). Dendrophilous species recorded from mould of a tree hollow in natural biotope in the studied area.

Lamprochernes chyzeri (Tömösváry, 1883) – Trakany (Tömösváry 1883); 10; 20 – from May to October – manure extraction, pitfall traps. Stenotypic species with the majority of specimens found in a rural zone in the studied territory.

Pselaphochernes scorpioides (Hermann, 1804) – 3; 11; 15; 24; 27 (Krajčovičová & Christophoryová 2014) – May, October – leaf litter extraction, individual sampling from under the tree bark, wood-mould sifting. Common and eurytopic species found in natural biotopes in the studied territory.

Conclusions

Summarizing the obtained as well as the published data, 15 pseudoscorpion taxa from four families are currently known from Latorica PLA. The occurrence of species *Microbisium suecicum*, *Dactylochelifer latreillii*, *Allochernes peregrinus*, *Lamprochernes chyzeri*, and *Pselaphochernes scorpioides* was confirmed in the area during the current study (Tömösváry 1883, Krumpálová & Krumpál 1993, Christophoryová et al. 2011b, Krajčovičová & Christophoryová 2014). On the other hand, the presence of *Allochernes wideri*, *Chernes cimicoides*, and *Dinocheirus panzeri* was not newly observed (Tömösváry 1883, Krajčovičová & Christophoryová 2014). Further researches focused especially on tree microhabitats or synanthropic habitats can provide new data about the occurrence of these species in the Latorica Protected Landscape Area.

Six species are found to be new for Latorica PLA – *Ephippiochthonius tetrachelatus*, *E. tuberculatus*, *Neobisium carcinoides*, *N. crassifemoratum*, *Chernes hahnii*, and *C. vicinus*. Simultaneously, records of all studied species represent new localities of their distribution in Slovakia.

From the zoogeographical point of view, the pseudoscorpion fauna of Latorica PLA is represented by the species with Holarctic, Palearctic, and European distribution. The Palearctic and European species were the most abundant in the studied area. From the faunistic point of view, two species are significant. Pseudoscorpion *E. tuberculatus* is distributed in Germany, Greece, Hungary, Macedonia, Romania, and Slovakia (Harvey 2013b). In Slovakia, the species was collected at the locality Hradová in Čierna hora Mts. (Christophoryová et al. 2011a). New findings at the locality Ladmovce represent the second known record for Slovakia. The species *Microbisium suecicum* is restricted to Western Europe and Morocco (Harvey 2013b). In Slovakia, the species is considered vulnerable and it is known only from five localities (Červená et al. 2020b).

Pseudoscorpions are very sensitive to external environmental factors, most of the known species were found only in natural habitats (Weygoldt 1969). Particularly, the epigeic species seem to require natural habitats for their existence as a living environment (Krumpál 1980; Šťáhlavský 2001; Krumpál & Krumpálová 2003; Christophoryová 2009; Christophoryová et al. 2011a, b, 2016, 2017). In this respect, it is important to emphasize the findings of epigeic species in Latorica PLA, such as *E. tuberculatus*, *M. suecicum*, *N. crassifemoratum*, and *Allochernes peregrinus*. All the mentioned species were found in natural biotopes in the studied area.

Latorica PLA belongs to the important areas in Slovakia that provide preserved natural habitats and a suitable living environment for pseudoscorpions. The significance for the conservation of Latorica PLA confirms the occurrence of three vulnerable pseudoscorpion species, namely *E. tuberculatus*, *M. suecicum*, and *A. peregrinus*. As the most valuable biotopes for Latorica PLA seem to be xerothermic biotopes with the presence of two mentioned species *E. tuberculatus* and *M. suecicum*.

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Súhrn

Šťúriky (Arachnida: Pseudoscorpiones) Chránenej krajinnej oblasti Latorica

Vyhodnotením výsledkov výskumu a už publikovaných dát je z Chránenej krajinnej oblasti Latorica (CHKO Latorica) známych 15 taxónov šťúrikov. Vlastný výskum fauny šťúrikov potvrdil výskyt už známych druhov z danej oblasti – *Microbisium suecicum*, *Dactylochelifer latreillii*, *Allochernes peregrinus*, *Lamprochernes chyzeri* a *Pselaphochernes scorpioides* (Tömösváry 1883; Krumpálová & Krumpál 1993; Christophoryová et al. 2011b; Krajčovičová & Christophoryová 2014). Naopak prítomnosť druhov *Allochernes wideri*, *Chernes cimicoides* a *Dinocheirus panzeri*, ktoré zistili v CHKO Latorica Tömösváry (1883) a Krajčovičová & Christophoryová (2014), nebola počas tejto štúdie potvrdená. Šesť druhov šťúrikov bolo zaznamenaných po prvýkrát pre faunu CHKO Latorica – *Ephippiochthonius tetrachelatus*, *E. tuberculatus*, *Neobisium carcinoides*, *N. crassifemoratum*, *Chernes hahnii* a *C. vicinus*. Nálezy všetkých druhov šťúrikov získaných počas vlastného výskumu predstavujú nové lokality ich rozšírenia na Slovensku.

Zo zoogeografického hľadiska tvoria faunu šťúrikov skúmanej oblasti druhy s holarktickým, palearktickým a európskym rozšírením, pričom palearktické a európske druhy boli najviac početné. Z faunistického hľadiska sú významné dva druhy. Šťúrik *E. tuberculatus* je rozšírený v Grécku, Macedónsku, Maďarsku, Nemecku, Rumunsku a na Slovensku (Harvey 2013b). Na Slovensku bol doteraz zistený iba v pohorí Čierna hora na lokalite Hradová (Christophoryová et al. 2011a). Prítomnosť *E. tuberculatus* na lokalite Ladmovce predstavuje druhý nález tohoto šťúrika pre Slovensko. Druh *Microbisium suecicum* je rozšírený v západnej Európe a v Maroku (Harvey 2013b). Na Slovensku je *M. suecicum* považovaný za zraniteľný druh, jeho prítomnosť bola doteraz zistená iba na piatich lokalitách (Červená et al. 2020b).

Šťúriky patria k živočíchom, ktoré sú veľmi citlivé na zmenu vonkajších faktorov (Weygoldt 1969). Predovšetkým epigeické formy vyžadujú aspoň určitý stupeň zachovanosti prirodzeného prostredia (Krumpál 1980; Šťáhlavský 2001; Krumpál & Krumpálová 2003; Christophoryová 2009; Christophoryová et al. 2011a, b, 2016, 2017). Z tohto dôvodu treba zdôrazniť význam zistených epigeických šťúrikov *E. tuberculatus*, *M. suecicum*, *N. crassifemoratum* a *A. peregrinus* v CHKO Latorica. CHKO Latorica patrí v rámci Slovenska k dôležitým územiam, ktoré poskytujú širokú škálu prirodzených biotopov pre šťúriky. Významnosť územia z ochranárskeho hľadiska potvrdzuje prítomnosť zraniteľných druhov *E. tuberculatus*, *M. suecicum* a *A. peregrinus*. Ako najhodnotnejšie habitaty z hľadiska fauny štúrikov sa javia xerotermné biotopy s výskytom vzácnych druhov *E. tuberculatus* a *M. suecicum*.

Harvestmen (Opiliones) of the Latorica Protected Landscape Area

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Abstract

The Eastern Slovak Plain and Zemplínske vrchy Mts. were among the least explored orographic units of Slovakia in terms of knowledge of opiliofauna. From the territory of the Latorica Protected Landscape Area (PLA), covering the most valuable and vulnerable parts of nature in these orographic units, up to the present time, they were practically no data about this invertebrate group. Therefore, this present work provides not only the first data on the composition of the local opiliofauna, but also the first more comprehensive list of harvestmen for a given territory. In total, 2214 harvestmen of 12 species from 4 families were sampled and elaborated. The record of the *Carinostoma elegans* has the most significant faunistic importance. The Latorica PLA is the fourth area with a known occurrence of this species in Slovakia and represents the northernmost border of its entire area of distribution. The data from the Latorica PLA extend the known opiliofauna of the whole Eastern Slovak Plain up to 13 species, all of which were also represented in the flat part of the studied area.

Key words: harvestmen, Opiliones, Latorica PLA, faunistics

Introduction

Harvestmen (Opiliones) are terrestrial arachnids associated in their natural habitat mainly with soil surface and leaf litter and occasionally deeper soil layers (Pinto-da-Rocha et al. 2007). They also can occur on vegetation or on walls of buildings and inside of them. Harvestmen serve several functions in ecosystems. They have strong interactions with other taxa (cf. their prey or predators) and thus play an important role in ecological networks in terrestrial ecosystems (Pinto-da-Rocha et al. 2007). Although harvestmen are polyphagous, they prefer to prey on various invertebrates in different growth stages (Šilhavý 1956). This way, harvestmen

participate in the maintenance of the natural equilibrium in a wide range of habitats and they contribute considerably to limiting the abundance of insect pests. The other food sources of harvestmen are dead invertebrates and other organic remnants. Harvestmen thus contribute to the nutrition cycle and energy flow in nature (Pinto-da-Rocha et al. 2007; Šilhavý 1956).

Harvestmen are a suitable group for monitoring of environmental conditions and their changes. The community structure and diversity of harvestmen are influenced by diverse factors; however, temperature and humidity are considered as the most important (Todd 1949; Branquart et al. 1995; Almeida-Neto et al. 2006). These factors are decisively determined, either directly or indirectly by the type, structure and composition of vegetation (Merino-Sáinz & Anadón 2015; Proud et al. 2011; Stašiov et al. 2017).

Slovakia is a relatively well-researched country in terms of opiliofauna. Nevertheless, information about the local opiliofauna from some orographic units of Slovakia are still missing, or only very poor information on the species composition of harvestmen communities are available. In this context, the Eastern Slovak Plain is one of the least explored orographic units. No data on the local opiliofauna have been available so far directly from the territory of the Latorica PLA which is situated in the south-eastern part of the Eastern Slovak Plain, a flat part of Eastern Slovak Lowland. Therefore, our work provides not only the first data on the local opiliofauna, but also the first more comprehensive list. Our results also significantly extend the knowledge about the opiliofauna of the whole Eastern Slovak Lowland.

Materials and methods

Harvestmen were sampled at 23 localities situated on the territory of the Latorica PLA in the years 2008–2011. Three methods were used; individual sampling, soil sampling with subsequent heat extraction of invertebrates, and pitfall trapping.

List of localities

For each locality, there is added number, name, cadaster, coordinates, altitude, short vegetation characteristics, bedrock, date, method of sampling and names of collectors. Neither methods nor periods of trapping were used uniformly at all sampled localities. Therefore, the numbering of localities, where different methods and periods of trapping were used, were distinguished by indices "a" to "e" and in this format used in the following list of species. Localities based on the collection material from the heritage of Ján Gulička are marked with Roman numerals and are appended to the end of the list. The study sites are located in two orographic units, the Eastern Slovak Plain (part of the geomorphologic unit Eastern Slovak Lowland) – loc. 1–5, 8–13, 15–23, I–IV, and Zemplínske vrchy Mts. – loc. 6, 7, 14 (Fig. 1).

Abbreviations used: is – individual sampling, ss – soil sample, pt – pitfall traps, revid. – revised, NNR – National Nature Reserve, NR – Nature Reserve; collectors: AM – Andrej Mock, JB – Ján Beňo, JG – Ján Gulička, KT – Karel Tajovský.

1a – Beša, forest locality no. 1, Beša cadastre, 48°30’38.60” N, 21°56’19.01” E, 105 m a.s.l., hard mixed floodplain forest outside the right bank of the Latorica river, bedrock fluvial sediments, 28.5.–15.10.2009, pt, leg. AM, KT.

1b – 15.10.2009–29.4.2010, pt, leg. AM, KT.

2a – Beša, forest locality no. 2, Beša, 48°30’40.02” N, 21°56’19.82” E, 104 m a.s.l., hard floodplain forest ouside the the right bank of the Latorica river, fluvial sediments, 28.5.–15.10.2009, pt, leg. AM, KT.
2b – 15.10.2009–29.4.2010, PT, leg. AM, KT.
3 – Biele jazero Lake (NR), Malý Horeš, 48°25’04.74” N, 21°51’30.50” E, 95 m a.s.l., wet meadow, ecotone of pasture and marshland, aeolian sands on river sediments, 26.5.–13.10.2009, pt, leg. AM, KT.
4a – Boľské rašelinisko (NR), Boľ nr. Kráľovský Chlmec, 48°26'51.04" N, 21°57'07.67" E, 101 m a.s.l., hard alder belt between peat bog and agrocoenoses, fluvial sediments, 23.4.–22.10.2008, pt, leg. AM, KT.
4b – 22.10.2008–26.5.2009, pt.
5a – Botiansky luh (NNR), Boťany, 48°28’32.91” N, 22°06’17.80” E, 107 m a.s.l., floodplain forest between embankment and river arm, fluvial sediments, 27.5.–14.10.2009, pt, leg. AM, KT.
5b – 14.10.2009–27.4.2010, pt.
6a – Cejkov, alluvium of forest stream, Cejkov, 48°27’16.07” N, 21°44’26.37” E, 206 m a.s.l., bank of stream in woodland (*Caprinus*, *Alnus*, *Quercus*, *Fagus*, *Acer campestre*), fluvial sediments, 29.4.–12.10.2010, pt, leg. AM, KT.
6b – 12.10.2010–24.5.2011, pt.
7a – Cejkov, hornbeam forest, Cejkov, 48°27’15.89” N, 21°44’27.91” E, 208 m a.s.l., woodland (*Carpineto–Quercetum*), fluvial sediments on paleozoic ryolites and dacites, 29.4.–12.10.2010, pt, leg. AM, KT.
7b – 12.10.2010–24.5.2011, pt.
8a – Čierny les, Poľany, 48°29'01.84" N, 21°58'07.30" E, 100 m a.s.l., hard floodplain forest with predominated oak, fluvial sediments, 14.10.2011, ss, leg. AM, KT.
8b – 25.5.2011–14.10.2011, pt.
9a – Ereš, Kráľovský Chlmec, 48°26’11.98” N, 21°57’18.89” E, 131 m a.s.l., fragment of lowland woodland, fluvial sediments, 29.4.–12.10.2010, pt, leg. AM, KT.
9b – 12.10.2010–24.5.2011, pt.
10a – Floodplain forest at the Latorica river 2, Boťany, 48°28’27.96” N, 22°06’23.97” E, 112 m a.s.l., riparian forest near the left bank of the Latorica river, fluvial sediments, 27.5.–14.10.2009, pt, leg. AM, KT.
10b – 14.10.2009–27.4.2010, pt.
11a – Floodplain forest at the Latorica river 3, Ptrukša, 48°28’27.04” N, 22°07’13.97” E, 102 m a.s.l., riparian forest at the right bank of the Latorica river, fluvial sediments, 27.5.–14.10.2009, pt, leg. AM, KT.
11b – 14.10.2009–27.4.2010, pt.
12a – Hrušov–Tice (Dlhé Tice NNR), Svätá Mária, 48°26’07.60” N, 21°51’15.99” E, 98 m a.s.l., grassland along the bank of marshland (former riverbed), fluvial sediments, 29.5.–13.10.2009, pt, leg. AM, KT.
12b – 13.10.2009–29.4.2010, pt.
13a – Húšťava forest, Malý Horeš, 48°24'04.25" N, 21°57'59.77" E, 104 m a.s.l., fragment of lowland forest with oak, fragents of former river arms, fluvial sediments, 22.4.2008, ss, leg. KT.

13b – 22.10.2008, ss, leg.: JB, KT.
13c – 24.4.–22.10.2008, pt, leg. AM, KT.
13d – 22.10.2008–26.5.2009, pt, leg. AM, KT.
14 – Kašvár (NNR), Ladmovce, 48°25'10.35" N, 21°46'32.60" E, 161 m a.s.l., xerothermic grassland with bushes on limestone bedrock, dolomite and limestone (Triassic), 21.10.2008–28.5.2009, pt, leg. AM, KT.
15a – Klin nad Bodrogom, Streda nad Bodrogom, 48°22'56.86" N, 21°42'57.67" E, 97 m a.s.l., belt of willow trees between river arm and meadow, fluvial sediments, 27.5.–13.10.2009, pt, leg. AM, KT.
15b – 13.10.2009–27.4.2010, pt.
16a – Latorický luh (NNR), Boťany, 48°27'49.57" N, 22°07'00.01" E, 111 m a.s.l., hard floodplain forest with oak and hornbeam, fluvial sediments, 23.4.2008, ss, leg. KT.
16b – 23.4.–23.10.2008, pt, leg. AM, KT.
16c – 23.10.2008–27.5.2009, pt, leg. AM, KT.
17 – Panský les, Veľké Kapušany, 48°30'06.10" N, 22°3'07,10" E, 100 m a.s.l., riparian forest at the right bank of Latorica river near the road bridge, fluvial sediments, 25.4.2008, is, leg. AM, KT.
18 – Somotorská hora, Somotor, 48°24'29.44" N, 21°48'14.89" E, 141 m a.s.l., dry grassland with bushes on a flat top of the hill, andesite, 29.5.–13.10.2009, pt, leg. AM, KT.
19 – Tarbucka, top of the mountain, Streda nad Bodrogom, 48°21'44.91" N, 21°47'19.14" E, 265 m a.s.l., rocky dry grassland with bushes at the top of the andesite hill, andesite, 25.4.–4.6.2008, pt, leg. AM, KT.
20a – Veľké jazero (NR), Vojka, 48°26'39.03" N, 21°55'21.57" E, 113 m a.s.l., ecotone of marshland bank and agrocoenoses (field), aeolian sands on river sediments, 29.4.–12.10.2010, pt, leg. AM, KT.
20b – 12.10.2010–24.5.2011, pt.
21 – Veľký kopec, Kráľovský Chlmec, 48°25'07.15" N, 21°57'47.16" E, 260 m a.s.l., SW slope with dry grassland, andesite, 12.10.2010–24.5.2011, pt, leg. AM, KT.
22a – Veľký vrch, Brehov, 48°29'39.51" N, 21°48'29.61" E, 191 m a.s.l., dry grassland with bushes at the NW edge of the hill, andesite, 28.5.–14.10.2009, pt, leg. AM, KT.
22b – 14.10.2009–27.4.2010, pt.
23a – Zemplínska jelšina (NR), Zemplínske Jastrabie, 48°28'59.34" N, 21°47'31.16" E, 109 m a.s.l., fragment of riparian and bog forest among fileds, fluvial sediments, 22.4.2008, is, leg. AM.
23b – 22.4.2008, ss, leg. KT.
23c – 21.10.2008, ss, leg. JB, KT.
23d – 22.4.2008–21.10.2008, pt, leg. AM, KT.
23e – 21.10.2008–28.5.2009, pt, leg. AM, KT.
Ia – Leles, without further information, 26.10.1961, leg. JG, revid. AM, KT (February 2013)
Ib – Leles, hard floodplain forest with *Quercus*, 6.11.1962, leg. JG

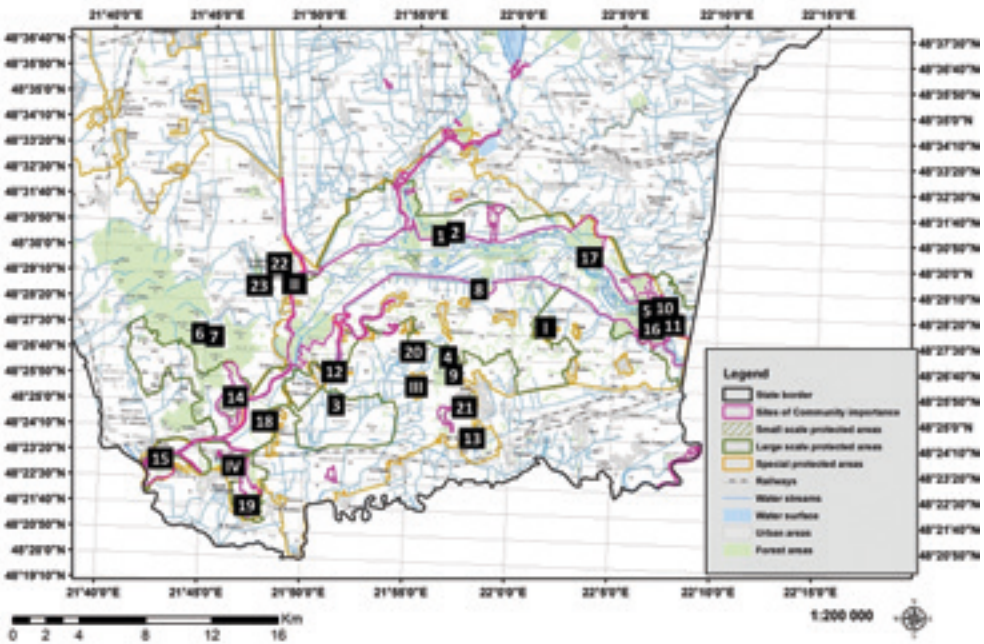

Fig. 1 *Distribution of localities in the study area.*

II – Brehov, without further information, 18.3.1961, leg. JG, revid. AM, KT (February 2013)
III – Svätuše, without further information, 21.7.1948, leg. JG, revid. AM, KT (February 2013)
IV – Tajba (NNR), Streda nad Bodrogom, without further information, 6.11.1968, leg. JG, revid. AM, KT (February 2013)

Results

In total, 2,214 harvestmen of 12 species from 4 families were recorded in the study area. The total numbers of individuals of each species from the study sites are summarized in Tab. 1. List of species contains detailed data on the total number of individuals, sex and age class recorded at the study localities.

List of species

Abbreviations: ♂ – males, ♀ – females, ? – unknown sex, juv – juvenile.

Family Nemastomatidae
Carinostoma elegans (Soerensen, 1894) – 13b: 1♀ adult; LII: 1♀ adult.

Table 1. *Total numbers of individuals of each harvestmen species recorded at the study localities (CE – Carinostoma elegans, MC – Mitostoma chrysomelas, NL – Nemastoma lugubre, TN – Trogulus nepaeformis, EC – Egaenus convexus, LE – Lacinius ephippiatus, LP – Lophopilio palpinalis, OT – Oligolophus tridens, RT – Rilaena triangularis, ZC – Zachaeus crista, NS – Nelima semproni, AL – Astrobunus laevipes).*

Locality	Species												∑
	CE	MC	NL	TN	EC	LE	LP	OT	RT	ZC	NS	AL	
1												184	184
2												432	432
3							3						3
4				2				1	6			12	21
5			74			25	8	28	3			132	270
6			2	1		3	2		8				16
7		2	3	5	1	13	11		12				47
8			2				1	1	2			16	22
9			2						12			3	17
10			34			128	17	12	2			260	453
11			15			2	4	2	1			94	118
12			5				3	2	2			1	13
13	1					1	4	6	7				19
14				1									1
15						1	2					213	216
16			33			4	13		4			61	115
17									11				11
18								1	1				2
19										16			16
20									5			41	46
21				4									4
22									3	1	1	3	8
23			59	2	2	36		9				65	173
I						1		1					2
II	1												1
III												1	1
IV								1					1
∑	**2**	**2**	**229**	**15**	**3**	**214**	**68**	**64**	**79**	**17**	**1**	**1 518**	**2 214**

Mitostoma chrysomelas (Hermann, 1804) – 7b: 2♀ adult.

Nemastoma lugubre (Müller, 1776) – 5a: 15♂ adult, 31♀ adult, 1? juv; 5b: 8♂ adult, 19♀ adult; L6a: 1♂ adult; 6b: 1♀ subadult; 7b: 2♂ adult, 1♀ adult; 8a: 1♂ adult; 8b: 1♂ adult; 9a: 1♂ adult; 9b: 1♂ adult; 10a: 10♂ adult, 13♀ adult; 10b: 6♂ adult, 5♀ adult; 11a: 4♂ adult, 7♀ adult; 11b: 3♂ adult, 1♀ adult; 12a: 4♂ adult; 12b: 1♂ adult; 16c: 25♂ adult, 8♀ adult; 23a: 1♂ adult; 23c: 1♀ adult; 23e: 42♂ adult, 1♂ subadult, 13♀ adult, 1 ♀ subadult.

Family Trogulidae

Trogulus nepaeformis (Scopoli, 1763) – 4b: 1♂ adult, 1♀ adult; 6b: 1♀ adult; 7b: 3♂ adult, 2♀ adult; 14: 1? juv; 21: 1♀ adult, 3♀ subadult; 23e: 1♀ adult, 1? subadult.

Family Phalangiidae

Egaenus convexus (C. L. Koch, 1835) – 7a: 1♀ adult; 23d: 1♂ adult, 1♀ adult.

Lacinius ephippiatus (C. L. Koch, 1835) – 5a: 3♂ adult, 13♀ adult, 3♀ subadult, 4? juv; 5b: 2♀ adult; 6a: 3♀ adult; 7a: 7♀ adult, 1? juv; 7b: 1♀ adult, 1♀ juv, 3? juv; 10a: 18♂ adult, 80♀ adult, 25♀ subadult, 5♀ juv; 11a: 2♀ adult; 13d: 1♀ adult; 15a: 1♀ adult; 16b: 1♀ adult, 1♀ subadult; 16c: 1♀ adult, 1♀ subadult; 23d: 22♂ adult, 4♂ subadult, 3♀ adult, 4♀ adult, 2? juv; 23e: 1♀ adult; Ia: 1♀ adult.

Lophopilio palpinalis (Herbst, 1799) – 3: 1♀ subadult, 2? juv; 5a: 1♀ adult, 6♀ subadult, 1♀ juv; 6b: 1♀ adult, 1? juv; 7a: 2♂ adult, 7♂ subadult, 1♀ adult; 7b: 1? subadult; 8b: 1♀ subadult; 10a: 1♂ subadult, 1♂ juv, 5♀ adult, 3♀ subadult, 1♀ juv, 2? juv; 10b: 3♂ adult, 1♀ subadult; 11a: 3♀ subadult; 11b: 1♂ adult; 12a: 1♀ subadult, 2? juv; 13c: 2♀ subadult; 13d: 1♂ adult, 1♀ adult; 15a: 2♀ subadult; 16c: 8♂ adult, 1♀ adult, 1♀ juv, 3? juv.

Oligolophus tridens (C. L. Koch, 1836) – 4b: 1♀ subadult; 5a: 12♀ adult, 8♀ subadult, 8? juv; 8b: 1♂ adult; 10: 1♂ adult, 1♂ subadult, 5♀ adult, 4♀ subadult, 1♀ juv; 11a: 2♀ subadult; 12a: 2♀ subadult; 13a: 4? juv; 13b: 2♂ adult; 18: 1♀ subadult; 23e: 8♂ adult, 1♀ adult; Ib: 1♀ adult; IV: 2♂ adult, 1♀ adult.

Rilaena triangularis (Herbst, 1799) – 4a: 5? juv; 4b: 1? juv; 5a: 1♀ adult, 2? juv; 6a: 1♂ adult, 1♀ adult; 6b: 4♀ juv, 2? juv; 7a: 1♂ adult; 7b: 4♀ subadult, 1♀ juv, 6? juv; 8a: 2♀ juv; 9a: 6♀ subadult; 9b: 6? juv; 10a: 1? juv; 10b: 1? juv; 11b: 1♀ adult; 12a: 2? juv; 13b: 1♀ juv; 13c: 1? juv; 13d: 5? juv; 16b: 1♀ adult; 16c: 2♀ juv, 1? juv; 17: 11♀ subadult; 18: 1? juv; 20: 5? juv; 22b: 3? juv.

Zachaeus crista (Brullé, 1832) – 19: 1♀ subadult, 15? juv; 22a: 1♀ adult.

Nelima semproni Szalay, 1951 – 22a: 1♂ adult.

Astrobunus laevipes (Canestrini, 1872) – 1a: 63♂ adult, 16♂ subadult, 56♀ adult, 1♀ subadult, 10? juv; 1b: 23♂ adult, 15♀ adult; 2a: 133♂ juv, 27♂ subadult, 217♀ adult, 13♀ subadult, 9♀ juv, 11? juv; 2b: 16♂ adult, 6♀ adult; 4a: 1♂ adult, 3♂ subadult, 3♀ adult, 2♀ subadult; 4b: 1♂ adult, 2♂ subadult; 5a: 41♂ adult, 5♂ subadult, 62♀ adult, 2♀ subadult, 7? juv; 5b: 12♂ adult, 3♀ adult; L8a: 2♀ adult; 8b: 7♂ adult, 4♀ adult, 1♀ subadult, 2? juv; 9a: 1♀ adult; 9b: 1♂ juv, 1♀ subadult; 10a: 50♂ adult, 10♂ subadult, 1♂ juv, 80♀ adult, 14♀ subadult, 8♀ juv, 22? juv; 10b: 51♂ adult, 24♀ adult; 11a: 13♂ adult, 11♂ subadult, 2♂ juv, 7♀ adult, 8♀ subadult, 5♀ juv, 47? juv; 11b: 1♀ subadult; 12a: 1♀ juv; 15a: 53♂ adult, 1♂ subadult, 91♀ adult, 1♀ subadult, 1♀ juv, 39? juv; 15b: 14♂ adult, 2♂ subadult, 11♀ adult; 16a: 1? juv; 16b: 18♂ adult, 2♂ subadult, 2♂ juv, 5♀ adult, 4♀ subadult; 16c: 17♂ adult, 12♀ adult; 20a: 5♂ adult, 2♀ adult, 1♀ subadult; 20b: 14♂ adult, 1♂ juv, 18♀ adult; 22b: 3? juv; 23b: 3? juv; 23c: 2♀ adult; 23d: 6♂ adult, 8♂ subadult, 12♀ adult, 3♀ subadult; 23e: 19♂ adult, 1♂ subadult, 11♀ adult; III: 1♂ adult.

The most abundant species was *Astrobunus laevipes* (1,518 ex.), 68.6 % of all recorded individuals belonged to this species. Relatively more numerous species were also *Nemastoma lugubre* (229 ex., 10.3 %) (Fig. 2) and *Lacinius ephippiatus* (214 ex., 9.7 %). In the lowest number of specimens were recorded *Nelima semproni* (1 ex.), *Carinostoma elegans* (2 ex.) (Fig. 3), *Mitostoma chrysomelas* (2 ex.) and *Egaenus convexus* (3 ex.). The most frequent species recorded on 15 study localities were *Rilaena triangularis* and *Astrobunus laevipes*.

Fig. 2 *Nemastoma lugubre (photo: S. Stašiov).*

Fig. 3 *Carinostoma elegans (photo: A. Christophoryová).*

Fig. 4 *Oligolophus tridens (photo: S. Stašiov).*

Lophopilio palpinalis, recorded on 11 localities, was also a frequented species.

Most individuals were captured in floodplain forest at the Latorica river (locality 10, 453 ex.), Beša (locality 2, 432 ex.), Botiansky luh NNR (locality 5, 270 ex.) and Klin nad Bodrogom (locality 15, 216 ex.). The lowest numbers of individuals were captured in localities number 14, II, III, IV (1 ex.), 18 and I (2 ex.), 3 (3 ex.) and 21 (4 ex.). The highest species richness (7 species) was found in hornbean forest at Cejkov (locality 7) and at the localities Botiansky luh NNR (locality 5), floodplain forest at the Latorica river 2, Boťany

(locality 10), floodplain forest at the Latorica river 3, Ptrukša (locality 11), and Zemplínska jelšina NR (locality 23); all with 6 species. Only one harvestmen species was recorded on 10 localities (locality numbers 1, 2, 3, 14, 17, 19, 21, II, III, IV).

Discussion

The opiliofauna of the Latorica PLA can be considered as quite diverse. It represents a third of the total up to now known opiliofauna of Slovakia (35 species) (Šestáková & Mihál 2014). For comparison, a total of 14 species of harvestmen were found in the Danubian Lowland (Stašiov 2004). It means that the Latorica PLA is only two species poorer than the far more larger orographic unit of Danubian Lowland.

So far, only three harvestmen species have been recorded in the territory of the Eastern Slovak Plain, namely *Zachaeus crista* (Brullé, 1832) (Šilhavý 1972), *Opilio parietinus* (De Geer, 1778) (Stašiov 2004) and *Astrobunus laevipes* (Canestrini, 1872) (Mock, Trebišov town, unpubl.). Only one harvestman species, *Leiobunum rotundum* (Latreille, 1798), was recorded within two neighboring orographic units of Eastern Slovakia (Eastern Slovak Upland, Zemplínske vrchy Mts.), specifically in the Eastern Slovak Upland in the vicinity of the Vranov nad Topľou city (Kratochvíl 1934). No data on the occurrence of harvestmen have been published from the Slovak part of the Zemplén Mts./Slanské vrchy Mts. However, in the Hungarian part of this mountain range, Lengyel & Murányi (2006) recorded four harvestmen species, *Mitostoma chrysomelas*, *Nemastoma lugubre*, *Trogulus tricarinatus* (Linnaeus, 1767), *Platybunus pallidus* (Šilhavý, 1938), in the Sátoraljaújhely located just a few hundred meters west of the Slovenské Nové Mesto village. However, the occurrence of *Platybunus pallidus* in this area is unlikely, as it is a mountain species. No data on the occurrence of harvestmen have been published from the Ukrainian part near the Eastern Slovak Plain.

Although the number of species of the Eastern Slovak and Danubian Lowlands is almost the same, this does not apply to the species composition of their opiliofauna. These units have eight common species: *Nemastoma lugubre*, *Egaenus convexus*, *Lacinius ephippiatus*, *Lophopilio palpinalis*, *Oligolophus tridens* (Fig. 4), *Opilio parietinus*, *Rilaena triangularis*, *Astrobunus laevipes*. In contrast to the Eastern Slovak Flat, the species *Nemastoma bidentatum* Roewer, 1914, *Trogulus tricarinatus* (Linnaeus, 1767), *Lacinius dentiger* (C. L. Koch, 1848), *Mitopus morio* (Fabricius, 1799), *Opilio saxatilis* C. L. Koch, 1839 and *Phalangium opilio* Linnaeus, 1758 were also recorded on the territory of the Danubian Lowland (Stašiov 2004). The occurrence of these species can be expected, also regarding their ecological demands, on the territory of the Eastern Slovak Plain and some of them also on the territory of the Latorica PLA. On the other hand, five species have been recorded in the Eastern Slovak Flat, which have not yet been identified in the Danubian Lowland (*Carinostoma elegans*, *Mitostoma chrysomelas*, *Trogulus nepaeformis*, *Zachaeus crista* and *Nelima semproni*). Despite relatively extensive research, the species composition of the opiliofauna of the Latorica PLA is probably not yet completely known. In addition to the mentioned six species recorded on the Danubian Lowland, it is possible to assume the occurrence of another harvestmen species, which have suitable living conditions here, e.g. *Leiobunum gracile* Thorell, 1876. Given that the research in the Latorica PLA was carried out only in habitats with a natural

character, the list of local species would certainly be extended by some synanthropic species from the genus *Opilio*.

Most of the species recorded in the Latorica PLA are common in Slovakia. An interesting species is *Carinostoma elegans*. This harvestman was recorded in Slovakia for the first time in 2014 in the area of the Mlyňany Arboretum (Šestáková & Mihál 2014). For the second time it was confirmed in the Slovak Karst National Park (Stašiov & Mock unpubl.), its occurrence there was already assumed by Šestáková & Mihál (2014). The third locality of its occurrence is located in the Burda Mts. (Mihál, Maršalek & Stašiov unpubl.). Húšťava, a forest locality near the Malý Horeš village (locality 13b) is the fourth in order with a confirmed occurrence of this rare species in Slovakia, representing the northernmost known border of its area of distribution. Carinostoma elegans is a south-east European species, which was recorded in five countries in addition to Slovakia (Bulgaria, Hungary, Romania, Serbia, Ukraine) (Šestáková & Mihál, 2014). It is an edaphic thermophilous forest species found in the litter, under tree remnants, stones or in deep humus soil (Avram & Dumitrescu 1969; Băbălean & Ilie 2003; Mitov & Stoyanov 2004; Mitov 2008).

In terms of the geographical distribution, the recorded species can be classified into four groups: European, Central European, Ponto-Mediterranean, South-Eastern European (Stašiov 2004). *Mitostoma chrysomelas*, *Nemastoma lugubre*, *Trogulus nepaeformis*, *Lacinius ephippiatus*, *Lophopilio palpinalis*, *Oligolophus tridens* and *Rilaena triangularis* are European species, *Egaenus convexus*, *Nelima semproni* and *Astrobunus laevipes* have a Central European distribution, *Zachaeus crista* is a Ponto-Mediterranean and *Carinostoma elegans* is a South-Eastern European species.

In terms of ecological requirements, *Trogulus nepaeformis*, *Lophopilio palpinalis* and *Lacinius ephippiatus* belong to the species favouring hydrophilous deciduous and mixed forests, which is in agreement with floodplain localities in the Latorica PLA. *Carinostoma elegans*, *Egaenus convexus*, *Rilaena triangularis*, *Zacheaus crista*, *Nelima semproni* and *Astrobunus laevipes* occur mainly in thermophilous deciduous and mixed forests and in their ecotones, which corresponds with open xerothermic habitats and andesite hills of the studied area. *Mitostoma chrysomelas*, *Nemastoma lugubre*, *Oligolophus tridens* are euryvalent species.

The ecological demands of the recorded species correspond to the natural conditions of the habitats occurring in the Latorica PLA. Most of the recorded species are euryvalent or prefer thermophilous deciduous and mixed forests and in their ecotones and occur in diverse habitats. Two species favouring hydrophilous deciduous and mixed forests (*Lophopilio palpinalis* and *Lacinius ephippiatus*) had the greatest abundance in such habitats. These species were the most numerous at the locality 10, i.e. in the riparian forest near the left bank of the Latorica river.

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Súhrn

Kosce (Opiliones) Chránenej krajinnej oblasti Latorica

Východoslovenská rovina a Zemplínske vrchy patrili z hľadiska poznania opiliofauny k najmenej preskúmaným orografickým celkom Slovenska. Z územia CHKO Latorica, ktorá leží v časti oboch orografickým celkov, neboli doposiaľ k dispozícii prakticky žiadne údaje o tejto skupine bezstavovcov. Táto práca preto poskytuje nielen prvé údaje o zložení tunajšej opiliofauny, ale aj prvý komplexnejší zoznam koscov tohto územia. Kosce boli získané v rokoch 2008 až 2011 z 23 lokalít pomocou troch rôznych metód: individuálnym zberom, tepelnou extrakciou z pôdnych vzoriek, metódou zemných pascí. Materiál koscov bol doplnený zbermi zo štyroch lokalít získaných z pozostalosti Jána Guličku. Celkovo bolo na území CHKO Latorica odchytených 2214 koscov z 12 druhov spadajúcich do 4 čeľadí. Zistenú opiliofaunu možno považovať za pomerne rozmanitú, pretože predstavuje zhruba tretinu doteraz známej opiliofauny Slovenska (35 druhov). Faunisticky najvýznamnejším bol nález druhu *Carinostoma elegans*. CHKO Latorica je štvrtým územím s doloženým výskytom tohto druhu na Slovensku a leží na najsevernejšej doposiaľ známej hranici jeho celkového areálu. Údaje z CHKO Latorica rozširujú známu opiliofaunu Východoslovenskej roviny na 13 druhov a Zemplínskych vrchov na 7 druhov (všetky sú prítomné aj v rovinatej časti územia).

Študované spoločenstvá koscov reprezentujú hlavné typy prírodnej krajiny CHKO Latorica s výnimkou málo zastúpených skalnatých stanovíšť. Charakteristickými druhmi teplých, suchých a bezlesných biotopov boli *Carinostoma elegans*, *Zachaeus crista*, *Nelima semproni*. Ostatné druhy tu zaznamenané (spolu 8 spp.) majú menej vyhranené nároky na stanovištné podmienky. Druhovo najpestrejšie sa ukazujú lesné komplexy v riečnej krajine i v kopcovitom teréne Zemplínskych vrchov, kde bola zaznamená najvyššia druhová pestrosť (dubovohrabový les pri Cejkove, 7 spp.). Mokrade majú tiež pomerne pestré spoločenstvá (napr. PR Zemplínska jelšina, 6 spp.), nezistili sme tu ale výskyt výhradných biotopových špecialistov, za ktoré možno považovať napríklad druhy *Nemastoma bidentatum* (u nás sa vyskytuje výhradne v inundácii vlhkých luhov), či *Lacinius dentiger* a *Phalangium opilio* (kosce vykytujúce sa iba na lúkach a pasienkoch).

Spider fauna (Araneae) in the Latorica Protected Landscape Area and in surrounding places (South-eastern Slovakia)

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Abstract

The area in the scope of the Latorica Protected Landscape Area in terms of species diversity of spiders belongs to the high-valuable area of Slovakia. 431 spider species (more than 40% of Slovakian araneofauna) is concentrated in such a small area. Thanks to the the geographical location, specific abiotic conditions, but also the various habitats, to date, 86 endangered or potentially endangered species and several zoogeographically important species have been recorded here. Suitable conditions for many ecological groups of spiders are created in diverse habitats, including rare and protected ones.

Keywords: spiders, Eastern Slovak Plain, Zemplínske vrchy Mts., complete faunistics.

Introduction

The inventory of fauna of large-scale protected areas in Slovakia has its history and more complex areas were researched, such as the Slovak Karst National Park (NP), Poloniny NP, Poľana Protected Lanscape Area (PLA), the High Tatras NP, Cerová vrchovina PLA, etc. Several studies processed in this way become important tools for summarizing knowledge about the area, but they are also used for a more effective setting of management measures for surveyed localities. Spiders are essential part of the fauna. Spiders are predators and their abundance in biocenoses has an important influence in regulating the plenty of other groups of invertebrates. They are very sensitive to changes in the environment and therefore spiders

are used as a very suitable bioindication group of animals for assessment of environmental quality and monitoring of environmental changes.

Research on spider fauna in south-eastern Slovakia has a long history. The period of arachnological research can be divided into the following 4 phases: I. phase (1867-1918), which significantly expanded the knowledge of araneofauna in the region, II. phase (1918-1971), III. phase (1971-2000) and IV. phase (after 2000). The first published data are dated to the 1870s from the Austro-Hungarian period, regarding the species *Meta merianae, Pardosa poecila* (Herman 1879) and *Cheiracantium punctorium* (Mocsáry 1877). A significant shift in the knowledge of araneofauna occurred at the end of the 19th century, when Chyzer and Kulzyński published findings from collections realized by several collectors (Biró, Mathiáz, or Chyzer) at 28 sites in this region (Chyzer & Kulczyński 1891, 1894, 1897, 1899). During this period, the area was one of the most explored regions in present-day Slovakia, as well as the whole of Hungary (Slovakia was at that time part of the Austro-Hungarian monarchy).

The second phase is connected with the period of the establishment of the first Czechoslovak Republic after the First World War and lasts until 1971. Turning point in the development of arachnology in Slovakia was assured by publication of the determination key of spiders (Miller 1971). The knowledge of the araneofauna increased slightly with only a few sporadic finds associated with Czech arachnologists such as Miller, Kratochvíl, Buchar and partly with Hungarian arachnologists such as Kolosváry, Balogh and Loksa (Balogh & Loksa 1946; Kolosváry 1939; Miller & Kratochvíl 1940; Miller 1967). During this period, the Slovak zoologist Gulička repeatedly collected spiders here, but the material remained unprocessed; we are publishing it for the first time in this study. The revival of research occurred in III. phase when Buchar publishes his collections from the 60's and Bílek conducts research in the 70's (collection of the East Bohemian Museum in Hradec Králové). The new generation of Slovak arachnologists (Svatoň, Thomka, Gajdoš, Přídavka, etc.) as well as some Czech arachnologists (Antuš, Kasal, Buchar, Zbytek, etc.) also have participated in research in this period. The organization of field research (Arachnological days 1991) in the town of Kraľovský Chlmec also made a significant contribution to expanding knowledge about the araneofauna in the area. From this research, only Thomka's results were published (Thomka 2001). Interesting findings of two species were published in non-arachnologic publications: *Argyroneta aquatica* (Kokorďák 1982) and *Lycosa singoriensis* (Ponec 1989). In the last period, after the year 2000, research in the southeast of Slovakia was only sporadic. During this period, a more systematic research of synanthropic spiders occurred in the area (Mihoková 2019; Szinetár et al. 2020; Gajdoš et al. in prep.), which brought several important faunistic finds. In 2004, the field research was part of the Arachnological Days focused on sand dune research, and in 2020 a one-off capture was organized at 10 localities. During this period in 2008-2012, the zoologists Tajovský and Mock repeatedly collected spiders here, but the material remained unprocessed; we are publishing it for the first time in this study. Knowledge about the fauna has also expanded especially by published data on the internet from the photo archive of the amateur expert (Dobránsky 2020).

The aim of the presented work was to summarize the results of arachnological research carried out in the area of interest and summarize historical literary, published or unpublished data on the spider fauna of the studied area, its evaluation and pointing out the importance of the area in terms of rare and endangered species.

Material and methods

For the current evaluation of the knowledge of the spider fauna of the area of interest, it was necessary to summarize all available data and supplement the knowledge about spiders from the last research period carried out in a one-time collection in 2020. We extracted all available data as well as suitable data in published photo archives from 2011 to 2016. The data collected document that the research was carried out in different habitats and localities using different entomological methods, which made it possible to capture a relatively wide diversity of habitats. On the other hand, it is a pity that no more comprehensive and long-term research of araneofauna has been carried out, nor have quantitative year-round collections, e.g. ground pitfall traps, Malaise traps, etc, which would capture a much wider range of species living in the study area. The overall summary of knowledge was based on a database that contains 2,637 data (245 of them are only at the genus level) from 214 localities.

An overview of localities (fig.1), with cadastres, codes, coordinates, altitude, collection dates, names of collectors and determinants, citation, habitat type and number of records from the locality is given in the following list. For sites that represent not precise larger scale localities, the coordinates are in bold, indicating that it is a larger area within the cadastre with an unknown exact study sites (mainly historical data). Name of the geomophological units and its code is according to Dabank of Slovakian Fauna (Jedlička 1980).

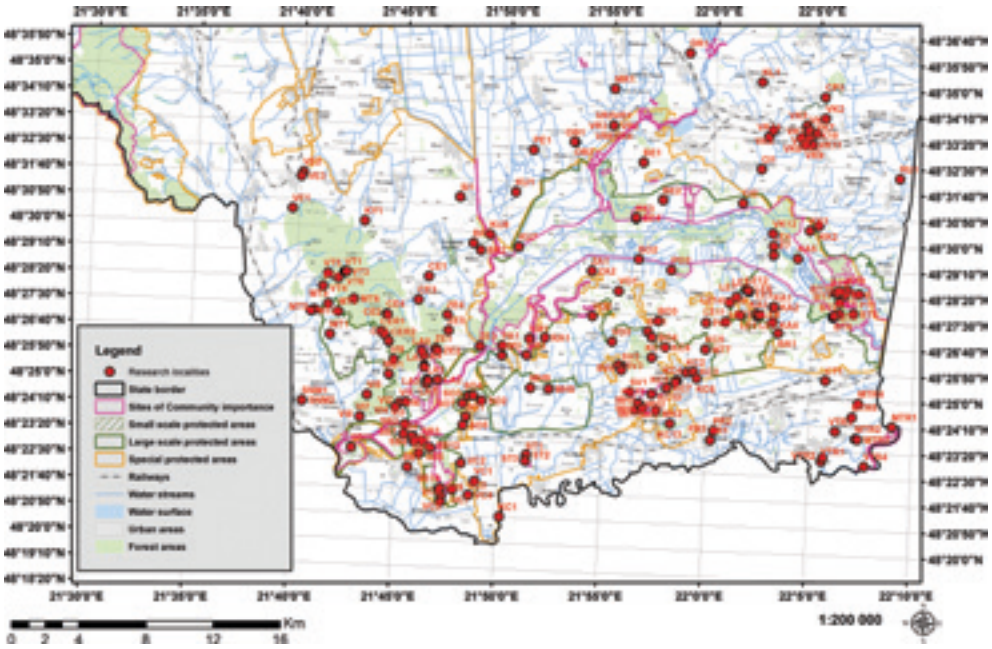

Fig. 1 *Map of study area with localities (author J. Černecký).*

List of localities

Zemplínske vrchy Mts. (450)

CE1 – **Cejkov,** Cejkov – 48.47556 N, 21.77333 E, 154 m a.s.l., leg. Chyzer, Miller, before 1894 and 1 record before 1960, det. Chyzer, Miller (Chyzer & Kulczyński 1894, 1897), 14 and 1 records.

CE2 – **Cejkov**, Cejkov, woodland, hornbeam forest (*Carpineto – Quercetum*) on fluvial sediments on paleozoic ryolites and dacites – 48.454167 N, 21.741111 E, 208 m a.s.l., leg. Tajovský and Mock, 29 April 2010 – 12 October 2010, det. Gajdoš, 27 records.

CE3 – **Cejkov**, Cejkov, *Quercetum* (oak forest) – 48.462778 N, 21.765556 E, 220 m a.s.l., leg. Gulička, 26 October 1961, det. Gajdoš, 1 record.

CE4 – **Cejkov**, Cejkov, alluvium of stream, bank of stream in woodland (*Caprinus, Alnus*, *Quercus, Fagus, Acer campestre*) – 48.454444 N, 21.740556 E, 206 m a.s.l., leg. Tajovský and Mock, 28 April 2010 – 12 October 2010, det. Gajdoš, 10 records.

CE5 – **Cejkov**, Cejkov-sedlo saddle, oak-hornbeam forest on triassic quartcites and sandstones – 48.439722 N, 21.742778 E, 260 m a.s.l., leg. Gulička, 16 March 1961, det. Gajdoš, 10 records.

CER1 – **Černochov,** Černochov, semi-natural dry grasslands and scrubland facies on calcareous substrates, Pannonic and sub-Pannonic thickets – 48.44500 N, 21.73639 E, 191 m a.s.l., leg. Chyzer before 1894 , det. Chyzer (Chyzer & Kulczyński 1894), 2 records.

CER2 – Černochov, Černochov, pasture on the SW slope at oak forest on quartz conglomerates and sandstones – 48.443333 N, 21.739444 E, 255 m a.s.l., leg. Gulička, 26 March 1961, det. Gajdoš, 1 record.

KY1 – **Kysta,** Kysta, Vysoký kopec Hill – 48.50389 N, 21.71972 E, 408 m a.s.l., leg. Zbytek, 30 May 1991, det. Zbytek, 36 records.

LA1 – **Ladmovce,** SKUEV0032 Ladmovské vápence, Natura 2000 site, semi-natural dry grasslands and scrubland facies on calcareous substrates, pannonic and sub-pannonic thickets – 48.41997 N, 21.77493 E, 150 m a.s.l., leg. Černecký, 9 July 2020, det. Gajdoš, 4 records.

LA2 – **Ladmovce,** Ladmovce-Kašvár, semi-natural dry grasslands and scrubland facies on calcareous substrates, Pannonic and sub-Pannonic thickets – 48.42028 N, 21.78333 E, 151 m a.s.l., leg. Prídavka, 30 June 1996 (1 record) – 24 May 1997, det. Prídavka, 14 records.

LA3 – **Ladmovce,** Kašvár National Nature Reserve, semi-natural dry grasslands and scrubland facies on calcareous substrates, Pannonic and sub-Pannonic thickets – 48.41779 N, 21.77439 E, 173 m a.s.l., leg. Gajdoš, 28 May 1991 – 29 May 1991, det. Gajdoš, 34 records.

LA4 – **Ladmovce,** Kašvár National Nature Reserve, semi-natural dry grasslands and scrubland facies on calcareous substrates, Pannonic and sub-Pannonic thickets – 48.42750 N, 21.77222 E, 194 m a.s.l., leg. Zbytek, 28 May 1991 – 29 May 1991, det. Zbytek, 14 records.

LA5 – **Ladmovce,** Zemplínske vrchy Mts., Dlhá hora, oak forest, under bark – 48.42667 N, 21.77222 E, 250 m a.s.l., leg. Christophoryová, 25 May 2011, det. Šestáková, 1 record.

LA6 – **Ladmovce**, Dlhá hora Hill, forest-free stand with shrubby and grass-herbaceous vegetation, dolomite and limestone (Triassic) bedrock – 48.431425 N, 21.773519 E, 237 m a.s.l., leg. Tajovský and Mock, 28 April 2010 – 13 October 2010, det. Gajdoš, 12 records.

LA7 – **Ladmovce**, Kašvár National Nature Reserve, xerothermic grassland with bushes on dolomite and limestone (Triassic) bedrock – 48.419444 N, 21.775556 E, 161 m a.s.l., leg. Tajovský and Mock, 22 April 2008 – 21 October 2008, det. Gajdoš, 2 records.

MB1 – **Malá Bara,** Malá Bara, hill over village, mesophillous meadow – 48.42222 N, 21.74389 E, 166 m a.s.l., leg. Zbytek, 1 June 1991, det. Zbytek, 24 records.

MT1 – **Malá Tŕňa,** Malá Tŕňa scenic tower, mesophillous meadow – 48.44242 N, 21.69525 E, 191 m a.s.l., leg.Černecký 9 July 2020, det. Gajdoš, 4 records.

MT2 – **Malá Tŕňa**, Tokaj wine cellar, long historical wine cellar in neovolcanic tuff – 48.454722 N, 21.679167 E, 156 m a.s.l., leg. Tajovský and Mock, 12 January 2012, det. Gajdoš, 1 record.

MT3 – **Malá Tŕňa,** Malá Trňa, Šimonov vrch Hill, forest steppe, xerotermic grassland – 48.45473 N, 21.70136 E, 338 m asl, leg. Gajdoš, 31 May 1991, det. Gajdoš, 43 records.

MT4 – **Malá Tŕňa,** Malá Trňa, Šimonov vrch Hill, near sand pit, xerotermic grassland – 48.45878 N, 21.69286 E, 243 m a.s.l., leg. Gajdoš, 30 May 1991, det. Gajdoš, 24 records.

MT5 – **Malá Tŕňa,** Tokaj region, wine cellers, wine cellars in loess – 48.40722 N, 21.77500 E, 132 m a.s.l., leg. Christophoryová, 2012 – 2013, det. Růžička, 4 records, leg. Mock, Haľková, 15 November 2011 - 28 September 2012, det. Růžička, 10 records.

MT6 – **Malá Tŕňa,** Malá Tŕňa, Šimonov vrch Hill, around sand pit, xeroterm on abandoned sand pit – 48.46194 N, 21.71333 E, 370 m a.s.l., leg. Zbytek, 30 May 1991, det. Zbytek, 8 records.

MT7 – **Malá Tŕňa,** Malá Tŕňa, Šimonov vrch Hill, abandoned pasture, abandoned pasture – 48.45556 N, 21.71333 E, 350 m a.s.l., leg. Zbytek, 30 May 1991, det. Zbytek, 16 records.

SNM1 – **Sátoraljaujhély, partly in Slovenské Nové Mesto** (only part of this locality is located in Slovakia), Slovenské Nové Mesto – 48.40639 N, 21.67472 E, 101 m a.s.l., probably before 1894 (Chyzers records), (Miller 1967; Miller 1971; Miller & Kratochvíl 1940; Miller & Weiss 1979), 16 records.

SNM2 – **Sátoraljaujhély, partly in Slovenské Nové Mesto,** Slovenské Nové Mesto, – 48.40639 N, 21.67472 E, 101 m a.s.l., before 1877 (Mocsáry 1877), before 1879 (Herman 1879); before 1894 (Chyzer & Kulczyński 1894, 1897; Balogh & Loksa 1946; Miller & Weiss 1979); before 1917 (Szombathy 1917), 133 and 5x1 records.

VE1 – **Veľaty,** Veľaty, roadhouse, outside of building, in nest of *Hirundo rustica*, – 48.50917 N, 21.66111 E, 195 m a.s.l., leg. Krumpál, 1 October 1986, det. Gajdoš,

determinated to genus level (*Scotophaeus* sp., *Theridion* sp. and *Xysticus* sp.), 3 records.

VI1 – **Viničky,** Viničky, xeroterm habitat – 48.41056 N, 21.75778 E, 102 m a.s.l., leg. Prídavka, 25 May 1997, det. Prídavka, 30 records.

VI2 – **Viničky,** Viničky – 48.40944 N, 21.75889 E, 100 m a.s.l., leg. Chyzer, before 1894 , det. Chyzer (Chyzer & Kulczyński 1894, 1897), 29 records.

VI3 – **Viničky,** Viničky, steppic grassland, central european steppic grasslands – 48.40762 N, 21.75841 E, 134 m a.s.l., leg. Gajdoš, 7 April 1983 – 12 April 1983, det. Gajdoš, (Řezáč et al. 2008 - 1 record), 37 records.

VI4 – **Viničky,** Viničky, meadow over vineyards, abundaned mesophilic lowland meadows – 48.40484 N, 21.75000 E, 145 m a.s.l., leg. Gajdoš, 12 April 1983 , det. Gajdoš, (Řezáč et al. 2008 - 1 record), 10 records.

VI5 – **Viničky,** Viničky-surroundings of SOUP (Secondary vocational school of agriculture), – 48.41083 N, 21.72694 E, 126 m a.s.l., leg. Prídavka, 22 May 1997, det. Prídavka, 15 records.

VI6 – **Viničky,** Viničky, former name Seleška, Kráľovský Chlmec District – 48.40944 N, 21.75889 E, 100 m a.s.l., leg. Chyzer, before 1891, det. Chyzer (Kratochvíl 1932; Miller & Kratochvíl 1940 – data from Chyzer), 2 records.

VI7 – **Viničky**, Tokaj wine cellar in the area of the secondary school, part B, an arm of corridor with concrete walls without wine barrels, on the wall – 48.398889 N, 21.721667 E, 118 m a.s.l., leg. Tajovský and Mock, 14 October 2011 – 12 Januar 2012, det. Gajdoš, 4 records.

VI8 – **Viničky**, Tokaj wine cellar in the area of the secondary school, part A, long, but recent wine cellar excavated in neovolcanic tuff, on a wall overgrown with mold – 48.398889 N, 21.721667 E, 118 m a.s.l., leg. Mock, Tajovský and Lukáčová, 23 November 2011 – 23 March 2012, det. Gajdoš, 4 records, leg. Mock, Haľková, 15 November 2011 – 21 November 2011, det. Růžička, 12 records.

VI9 – **Viničky**, Hatfa, oak-hornbeam forest on the slope of the Brezina hill on triassic quartcites and sandstones – 48.430278 N, 21.7475 E, 185 m a.s.l., leg. Mock, 31 May 2005, det. Gajdoš, 4 records.

VI10 – **Viničky**, Viničky – 48.409444 N, 21.758889 E, 102 m a.s.l., leg. Gulička, 08 September 1961, det. Gajdoš, 1 record.

VT1 – **Veľká Tŕňa,** Veľká Tŕňa, Rozhľadňa Hill – 48.48250 N, 21.71111 E, 439 m a.s.l., 18 August 2003 (Řezáč et al. 2008b), 1 record.

VT2 – **Veľká Tŕňa,** Veľká Tŕňa – 48.46806 N, 21.68806 E, 235 m a.s.l., leg. Chyzer, before 1894, det. Chyzer (Chyzer & Kulczyński 1894, 1897), 1 records.

VT3 – **Veľká Tŕňa,** Veľká Tŕňa, Rozhľadňa Hill – 48.48333 N, 21.71389 E, 422 m a.s.l., leg. Zbytek, 30 May 1991, det. Zbytek, 8 records.

VT4 – **Veľká Tŕňa,** Veľká Trňa, massif of Rozhľadňa Hill, forest glade after wood cutting – 48.47275 N, 21.70034 E, 361 m a.s.l., leg. Gajdoš, 30 May 1991, det. Gajdoš, 39 records.

VT5 – **Veľká Tŕňa,** Veľká Trňa, massif of Rozhľadňa Hill, oak forest and shruby margin of clercut – 48.47523 N, 21.69184 E, 256 m a.s.l., leg. Gajdoš, 30 May 1991, det. Gajdoš, 44 records.

VT6 – **Veľká Tŕňa,** Veľká Trňa, massif of Rozhľadňa Hill, oak forest and its forest margins – 48.46779 N, 21.71565 E, 410 m a.s.l., leg. Gajdoš, 30 May 1991, det. Gajdoš, 36 records.

ZE1 – **Zemplín,** Zemplín, Farský les - forest, Dlhá hora, oak forest margin – 48.43694 N, 21.77250 E, 266 m a.s.l., leg. Zbytek, 29 May 1991, det. Zbytek, 25 records.

ZE2 – **Zemplín,** Zemplín, Dlhá hora forest, oak forest and its forest margins – 48.43604 N, 21.78252 E, 192 m a.s.l., leg. Gajdoš, 29 May 1991, det. Gajdoš, 37 records.

Východoslovenská pahorkatina - Eastern Slovak Uplands (810)

VE2 – **Veľaty,** Veľaty – 48.52889 N, 21.66861 E, 138 m a.s.l., leg. Chyzer, before 1894, det. Chyzer (Chyzer & Kulczyński 1894, 1897), 10 records.

Východoslovenská rovina - Eastern Slovak Plain (820)

BA1 – **Bačka,** Bačka – 48.45194 N, 22.05639 E, 102 m a.s.l., leg. Chyzer, before 1894, det. Chyzer (Chyzer & Kulczyński 1894, 1897), 3 records.

BE1 – **Beša,** Beša, in nest of *Merops apiaster* – 48.55333 N, 21.95750 E, 103 m a.s.l., leg. Krištofík, 28 September 1992, det. Gajdoš, 1 record.

BE2 – **Beša,** Moldva, Beša polder, wetlands – 48.52099 N, 21.95995 E, 98 m a.s.l., leg. David, 24 June 2008, det. Gajdoš, 1 record.

BE3 – **Beša**, Beša, forest locality no. 1, hard mixed floodplain forest outside the right bank of the Latorica River on fluvial sediments – 48.510556 N, 21.938611 E, 105 m a.s.l., leg. Tajovský and Mock, 28 May 2009 – 15 October 2009, det. Gajdoš, 18 records.

BE4 – **Beša**, Beša, forest locality no. 2, hard floodplain forest ouside the right bank of the Latorica River on fluvial sediments – 48.511111 N, 21.938611 E, 104 m a.s.l., leg. Tajovský and Mock, 28 May 2009 – 15 October 2009, det. Gajdoš, 5 records.

BO1 – **Boľ,** Boľské rašelinisko Nature Reserve, swamp and broadleaved swamp woodland not on acid peat – 48.48222 N, 21.95667 E, 102 m a.s.l., leg. Zbytek, Thomka, 27 May 1991, det. Zbytek and Thomka (Zbytek not published; Thomka 2001), 15 and 19 records.

BO2 – **Boľ,** Boľ, Eastern Leles chanel, litoral of chanel – 48.48876 N, 21.94186 E, 101 m a.s.l., leg. Černecký, 9 July 2020, det. Gajdoš, 3 records.

BO3 – **Boľ,** swamp located SW from Bolské rašelinisko Nature Reserve, swamp and broadleaved swamp woodland not on acid peat – 48.45611 N, 21.95944 E, 100 m a.s.l., leg. Thomka, 27 May 1991, det. Thomka (Thomka 2001), 21 records.

BO4 – **Boľ,** Boľské rašelinisko Nature Reserve, swamp and broadleaved swamp woodland not on acid peat – 48.44730 N, 21.95474 E, 100 m a.s.l., leg. Kasal, 24 June 1974, det. Kasal, (Kasal 1984), 1 record.

BR1 – **Brehov**, Veľký vrch Hill, dry grassland with bushes at the NW edge of the hill on andesite – 48.494167 N, 21.808056 E, 191 m a.s.l., leg. Tajovský and Mock, 27 May 2009 – 14 October 2009, det. Gajdoš, 68 records.

BR2 – **Brehov**, Brehov (Veľký vrch), steppe on andesite – 48.490556 N, 21.814167 E, 215 m a.s.l., leg. Gulička, 16 March 1961, det. Gajdoš, 2 records.

BT1 – **Boťany,** Latorický luh National Nature Reserve – 48.47750 N, 22.11000 E, 100 m a.s.l., leg. Prídavka, 23 May 1997, det. Prídavka, 38 records.

BT2 – **Boťany,** Latorický luh II, National Nature Reserve, shruby margin of meadow – 48.46146 N, 22.10018 E, 100 m a.s.l., leg. Gajdoš, 1 June 2004 , det. Gajdoš, 8 records.

BT3 – **Boťany,** Latorický luh II, National Nature Reserve, meadow, mesophilous meadow – 48.46177 N, 22.10015 E, 100 m a.s.l., leg. Gajdoš, 1 June 2004, det. Gajdoš, 1 record.

BT4 – **Boťany,** Latorický luh II National Nature Reserve, alluvial forests - 48.46210 N, 22.10123 E, 101 m asl, leg. Gajdoš, 1 June 2004, det. Gajdoš, 7 records.

BT5 – **Boťany**, Latorický luh National Nature Reserve, hard floodplain forest with oak and hornbeam on fluvial sediments – 48.463611 N, 22.116667 E, 111 m a.s.l., leg. Tajovský and Mock, 23 April 2008 – 23 October 2008, det. Gajdoš, 21 records.

BT6 – **Boťany,** Latorický luh I, National Nature Reserve, grassy embankment, field road – 48.47347 N, 22.10922 E, 103 m a.s.l., leg. Gajdoš, 1 June 2004, det. Gajdoš, 1 records.

BT7 – **Boťany,** Latorický luh I National Nature Reserve, margin of oxbow lake, 48.47433 N, 22.10123 E, 101 m a.s.l., leg. Gajdoš, 1 June 2004, det. Gajdoš, 7 records.

BT8 – **Boťany,** Latorický luh I National Nature Reserve, alluvial forest – 48.47450 N, 22.10134 E, 101 m a.s.l., leg. Gajdoš, 1 June 2004 , det.Gajdoš, 10 records.

BT9 – **Boťany,** Latorický luh I, National Nature Reserve, shrubby ecotone – 48.47597 N, 22.11118 E, 101 m a.s.l., eg. Gajdoš, 1 June 2004, det. Gajdoš, 4 records.

BT10 – **Boťany**, Botiansky luh (NNR), floodplain forest between enbankment and river arm, fluvial sediments – 48.475556 N, 22.104722 E, 107 m a.s.l., leg. Tajovský and Mock, 27 May 2009 – 14 October 2009, det. Gajdoš, 26 records.

BT11 – **Boťany**, Boťany, near the road from the village to Latorica River, outside of the area between dams (outside the inter-dam area), hard floodplain forest with oak and hornbeam on fluvial sediments – 48.4695 N, 22.1049833 E, 107 m a.s.l., leg. Mock, 7 April 2018, det. Gajdoš, 2 records.

CI1 – **Čičarovce,** Čičarovce – Udoč Stream, small scale meadow close to ti river bank – 48.53942 N, 22.03852 E, 101 m a.s.l., leg. Černecký, 9 July 2020, det. Gajdoš, 13 records.

CI2 – **Čičarovce,** Čičarovce, Latorica PLA, mosaic of wet biotopes – 48.52095 N, 22.02450 E, 100 m a.s.l., leg. Dobránsky, 12 May 2012, det. Dobránsky (Dobránsky FOTOnet), 1 record.

CP1 – **Čierne Pole,** Čierne Pole, Ortov, inside of buildings – 48.57917 N, 22.08806 E, 104 m a.s.l., leg. Dobránsky, 10 August 2011 – 18 May 2016, det. Dobránsky, (Dobránsky FOTOnet), 35 records.

CT1 – **Čierna nad Tisou,** Čierna nad Tisou – 48.42722 N, 22.09583 E, 102 m a.s.l., leg. Chyzer et al., before 1891, det. Chyzer (Chyzer & Kulczyński 1891), 1 record.

DR1 – **Drahňov,** Drahňov, family house, inside of buildings – 48.60028 N, 21.97750 E, 104 m a.s.l., leg. Mihoková, 15 January 2019, det. Szinetár (Mihoková 2019), 8 records.

HR1 – **Hráň**, Latorica, drainage channel B, netting from water – 48.5666361 N, 21.7918894 E, 97 m a.s.l., leg. Kokorďák, 1970 – 1982, det. Kokorďák (Kokorďák 1982), 1 record.

KA1 – **Kapoňa,** Kapoňa, sand area with pure vegetation – 48.46556 N, 22.05199 E, 100 m a.s.l., leg. Gajdoš, 1 June 2004, det. Gajdoš (Gajdoš & Svatoň 2008), 1 record.

KA2 – **Kapoňa,** Kapoňa, sunflower field on sand soil, intensive used field – 48.46591 N, 22.05207 E, 100 m a.s.l., leg. Gajdoš, 1 June 2004, det. Gajdoš (Gajdoš & Svatoň 2008), 1 records.

KA3 – **Kapoňa,** Kapoňa, abandoned sand pit with shrubs, on shrubs – 48.46591 N, 22.05247 E, 100 m a.s.l., leg. Gajdoš, 1 June 2004, det. Gajdoš (Gajdoš & Svatoň 2008), 6 records.

KA4 – **Leles-Kapoňa**, Kapoňa, steppe on sandy dune with aeolic sands – 48.4578125 N, 22.0518722 E, 99 m a.s.l., leg. Gulička, 17 March 1961, det. Gajdoš, 1 record.

KA5 – **Leles-Kapoňa**, Latorica, floodplain forest with Quercus on fluvial sediments – 48.492222 N, 22.070278 E, 100 m a.s.l., leg. Gulička, 25 April 1961, det. Gajdoš, 17 records.

KC1 – **Kráľovský Chlmec,** Berecky inlet chanel near Hungarian border, litoral of chanel – 48.34806 N, 21.83694 E, 101 m a.s.l., leg., Gajdoš, 7 June 2017, det. Gajdoš, 1 record.

KC2 – **Kráľovský Chlmec,** Kráľovský Chlmec – 48.42917 N, 21.98361 E, 117 m a.s.l., leg. Thomka, Miller, Bílek, 27 June 1991; 10 July 1956; 8 June 1976 – 12 June 1976, det. Thomka, Miller, Bílek, (Thomka 2001; Kůrka 1998; collection of Hradec Králové Museum), 1 and 1 and 20 records.

KC3 – **Kráľovský Chlmec,** Kraľovsky Chlmec – 48.42972 N, 21.98917 E, 102 m a.s.l., leg. Chyzer et al., before 1894 , det. Chyzer (Chyzer & Kulczyński 1894, 1897), 8 records.

KC4 – **Kráľovský Chlmec,** Kráľovský Chlmec, south slope of Vysoký Hill, central european steppic grasslands – 48.42472 N, 21.97639 E, 171 m a.s.l., leg. Buchar, 10 June 1960, det. Buchar (Buchar 1999), 7 records.

KC5 – **Kráľovský Chlmec,** Kráľovský Chlmec, outside of town, waterless fish pond – 48.45639 N, 21.98556 E, 103 m a.s.l., leg. Zbytek, 28 May 1991, det. Zbytek, 25 records.

KC6 – **Kráľovský Chlmec,** Kráľovský Chlmec, kinder garden, room, inside of buildings – 48.42611 N, 21.99194 E, 108 m a.s.l., leg. Mihoková, 28 November 2018, det. Szinetár (Mihoková 2019), 2 records.

KC7 – **Kráľovský Chlmec,** Kráľovský Chlmec, Veľký kopec Hill, meadow on the top of the hill – 48.42056 N, 21.96806 E, 264 m a.s.l., leg. Christophoryová, 24 May 2011, det. Šestáková, 1 record.

KC8 – **Kráľovský Chlmec,** Kráľovský Chlmec, swamp located SW from Bôlske rašelinisko Nature Reserve, swamp and broadleaved swamp woodland non acid peat – 48.44222 N, 21.96583 E, 100 m a.s.l., leg. Thomka, 27 May 1991, det. Thomka (Thomka 2001), 13 records.

KC9 – **Kráľovský Chlmec,** Kráľovský Chlmec, near castle ruin, xerotermic habitat – 48.42365 N, 21.97506 E, 125 m a.s.l., leg. Černecký, 9 July 2020, det. Gajdoš, 2 records.

KC10 – **Kráľovský Chlmec**, Královský Chlmec, (Gulička), pasture on andesite – 48.416944 N, 21.956111 E, 160 m a.s.l., leg. Gulička, 17 March 1961, det. Gajdoš, 1 record.

KC11 – **Kráľovský Chlmec**, Pod Veľkým kopcom (Nagy-hegy), pasture on andesite – 48.416944 N, 21.956111 E, 160 m a.s.l., leg. Gulička, 25 October 1961, det. Gajdoš, 10 records.

KC12 – **Kráľovský Chlmec**, Ereš, fragment of lowland woodland with fluvial sediments – 48.436389 N, 21.955278 E, 131 m a.s.l., leg. Tajovský and Mock, 30 April 2010 – 12 October 2010, det. Gajdoš, 14 records.

KC13 – **Kráľovský Chlmec**, Malý Horeš and Kráľovský Chlmec, floodplain forest with *Populus* and *Alnus* (Húšťava) on fluvial sediments – 48.401389 N, 21.971667 E, 103 m a.s.l., leg. Gulička, 06 November 1961, det. Gajdoš, 18 records.

KK1 – **Kapušianske Kľačany,** Kapušianské Kľačany, Latorica River, water-fringing reed beds and tall helophytes other than canes – 48.50735 N, 22.07929 E, 100 m a.s.l., leg. Gajdoš, 17 June 1988, det. Gajdoš, 17 records.

KK2 – **Kapušianske Kľačany,** Kapušianske Kľačany, arm of Latorica River, oxbow lake of Latorica River – 48.51000 N, 22.08639 E, 100 m a.s.l., 30 October 2013, (KIMS 2020), 1 record.

KL1 – **Krišovská Liesková,** Krišovská Liesková, garden wooden toillete, inside of buildings – 48.58611 N, 22.03667 E, 101 m a.s.l., leg. Mihoková 10 November 2018, det. Szinetár (Mihoková 2019), 22 records.

KU1 – **Oborín-Kucany,** Kucany, meadows near village – 48.52238 N, 21.84067 E, 99 m a.s.l., leg. Gajdoš, 20 May 1999, det. Gajdoš, 7 records.

KU2 – **Oborín-Kucany**, Somotorský hlavný kanál - Somotor main channel, drainage channel, netting from water – 48.392762 N, 21.8421861 E, 97 m a.s.l., leg. Kokorďák, 1970 – 1982, det. Kokorďák (Kokorďák 1982), 1 record.

KU3 – **Oborín-Kucany**, dead arm of the Latorica river near Kamenná Moľva, netting from water – 48.4925 N, 21.861389 E, 97 m a.s.l. leg. Kokorďák, 1970 – 1982, det. Kokorďák (Kokorďák 1982), 1 record.

KU4 – **Oborín-Kucany**, Kamenná Moľva, drainage channel D, netting from water – 48.4925 N, 21.837222 E, 97 m a.s.l., leg. Kokorďák, 1970 – 1982, det. Kokorďák (Kokorďák 1982), 1 record.

KU5 – **Oborín-Kucany**, Kamenná Moľva, drainage channel E, netting from water – 48.4925 N, 21.837222 E, 97 m a.s.l., leg. Kokorďák, 1970 – 1982, det. Kokorďák (Kokorďák 1982), 1 record.

KU6 – **Oborín-Kucany**, Kuciansky kanál, drainage channel A, netting from water – 48.492778 N, 21.841389 E, 97 m a.s.l., leg. Kokorďák, 1970 – 1982, det. Kokorďák (Kokorďák 1982), 1 record.

KU7 – **Oborín-Kucany,** Kamenná Molva, flooded meadows, wet flooded meadows – 48.49313 N, 21.84492 E, 97 m a.s.l., leg. Gajdoš, 20 May 1999, det. Gajdoš, 2 records.

KU8 – **Oborín-Kucany,** Kamenná Molva, bank of Ondava River, under bark of willow – 48.49914 N, 21.82134 E, 101 m a.s.l., leg. Gajdoš, 20 May 1999, det. Gajdoš, 4 records.

LE1 – **Leles,** Latorica PLA, Leles, near river, alluvial forest – 48.47056 N, 22.02194 E, 107 m a.s.l., leg. Holecová 10 June 2012, det. Šestáková, 1 record.

LE2 – **Leles,** Leles – 48.47361 N, 22.03194 E, 104 m a.s.l., leg. Žďarková, Bílek, 5 June 1960 (Kubcová) – 21 June 1976 (Bílek), det. Kubcová, Bílek (Kubcová 2004; collection of Hradec Králové museum), 1 a 4 records.

LE3 – **Leles,** Leles – 48.47361 N, 22.03194 E, 104 m a.s.l., leg. Chyzer, before 1894, det. Chyzer (Chyzer & Kulczyński 1894, 1897; Kolosvary 1939), 18 a 1 records.

LE4 – **Leles,** Leles, forest, alluvial forest – 48.49722 N, 22.07000 E, 100 m a.s.l., leg. Buchar, 6 June 1960 – 10 June 1960, det. Buchar (Buchar 1999), 6 records.

LE5 – **Leles,** Leles, wetlands in pasture depresions – 48.46083 N, 22.02556 E, 101 m a.s.l., leg. Buchar, 6 June 1960 – 10 June 1960, det. Buchar (Buchar 1999), 9 records.

LE6 – **Leles,** Leles, pasture – 48.47417 N, 22.03139 E, 104 m a.s.l., leg. Buchar, 6 June 1960 – 10 June 1960, det. Buchar (Buchar 1999), 5 records.

LE7 – **Leles,** Leles, sandy bank of Latorica river – 48.50028 N, 22.07444 E, 98 m a.s.l., leg. Buchar, 6 June 1960 – 10 June 1960, det. Buchar (Buchar 1999), 8 records.

LE8 – **Leles,** Leles, swamp and broadleaved swamp woodland on non acid peat – 48.46186 N, 22.03843 E, 104 m a.s.l., leg. Gajdoš, 7 April 1983, det. Gajdoš, 11 records.

LE9 – **Leles,** Leles, margin of field, shrubby margin of field – 48.46139 N, 22.04113 E, 101 m a.s.l., leg.Gajdoš, 7 April 1983, det.Gajdoš, 1 record.

LE10 – **Leles,** Leles, outbuilding of the house, garage, inside of buildings – 48.47444 N, 22.02944 E, 101 m a.s.l., leg. Mihoková, 21 October 2018 – 28 November 2018, det. Szinetár (Mihoková, Szinetar 2019), 6 records.

LE11 – **Leles,** Leles, Latorica PLA, mosaic of wet biotopes – 48.45703 N, 22.01368 E, 104 m a.s.l., leg. Dobránsky, 10 May 2011 – 26 August 2014, det. Dobránsky (Dobránsky FOTOnet), 5 records.

LE12 – **Leles,** Leles, family house, room, inside of buildings – 48.47444 N, 22.02944 E, 102 m a.s.l., leg. Mihoková, 27 November 2018 – 28 November 2018, 15 - 23 December 2018, det. Szinetár, (Mihoková 2019), 28 records.

LE13 – **Leles,** Leles, vineyards on sand soil – 48.46051 N, 22.03908 E, 104 m a.s.l., leg. Gajdoš, 8 April 1983 , det. Gajdoš, 5 records.

LE14 – **Leles,** Leles, Gothard bridge, abandoned arm of historical water streams – 48.46736 N, 22.01644 E, 99 m a.s.l., leg. Černecký, 9 July 2020, det. Gajdoš, 3 records.

MH1 – **Malý Horeš,** Poniklecová lúčka Nature Reserve, Pannonic sand steppes – 48.41163 N, 21.94556 E, 121 m a.s.l., leg. Gajdoš, 8 April 1983, det. Gajdoš (Gajdoš & Svatoň 2008), 1 record.

MH2 – **Malý Horeš,** Malý Horeš, near Poniklecová lúčka Nature Reserve, Fabriciusova lúka-meadow, Pannonic sand steppes meadow – 48.41139 N, 21.94614 E, 121 m a.s.l., leg. Gajdoš, 31 July 2007, det. Gajdoš, 1 record.

MH3 – **Malý Horeš,** Malý Horeš, semi-natural dry grasslands on sand dune – 48.40806 N, 21.96000 E, 99 m a.s.l., leg. Svatoň, 2 June 1991, det. Svatoň, 23 records.

MH4 – **Malý Horeš,** Malý Horeš, sand dune, margin of acacia forest – 48.41111 N, 21.96167 E, 126 m a.s.l., leg. Gajdoš, 2 June 1991, det. Gajdoš (Gajdoš & Svatoň 2008), 1 record.

MH5 – **Malý Horeš,** Poniklecová lúčka Nature Reserve, wet meadow – 48.41139 N, 21.94614 E, 121 m a.s.l., leg.Gajdoš, 20 May 1999, det. Gajdoš (Gajdoš & Svatoň 2008), 8 records.

MH6 – **Malý Horeš**, Hrušov, sand dune with grassland on eolic sands – 48.409167 N, 21.949167 E, 121 m a.s.l., leg. Gulička, 25 April 1961, det. Gajdoš, 1 record.

MH7 – **Malý Horeš**, Poniklecová lúčka Nature Reserve – presently Nature Reserve, pannonic sand steppes – 48.411944 N, 21.945833 E, 118 m a.s.l., leg. Ponec, before 1989, det. Ponec (Ponec 1989), 1 record.

MH8 – **Malý Horeš**, Kerestúr, open habitats (steppe, marshland, fields) southern to Hrušov village and a small fragment of woodland on eolic sands – 48.4175 N, 21.873056 E, 96 m a.s.l., leg. Gulička, 11 September 1961, det. Gajdoš, 1 records.

MH9 – **Malý Horeš**, Biele jazero Lake (NR), wet meadow, ecotone of pasture and marshland on aeolian sands on river sediments – 48.417778 N, 21.858333 E, 95 m a.s.l., leg. Tajovský and Mock, 26 May 2009 – 13 October 2009, det. Gajdoš, 47 records.

MR1 – **Malé Raškovce,** Malé Raškovce, cellar, inside of buildings, leg. Mihoková, 5 January 2019, det. Szinetár (Mihoková 2019), 13 records.

MTR1 – **Malé Trakany,** Malé Trakany – 48.40361 N, 22.15056 E, 100 m a.s.l., leg. Prídavka, 23 May 1997, det. Prídavka, 27 records.

MTR2 – **Malé Trakany,** Malé Trakany, river bank of Tisa River – 48.39667 N, 22.12139 E, 103 m a.s.l., leg. Zbytek, Prídavka, 31 May 1991 (Zbytek) – 23 May 1997 (Prídavka), det. Zbytek, Prídavka, 10 records and 1 record.

MTR3 – **Malé Trakany,** Malé Trakany, clay-sandy bank of Tisa River – 48.39639 N, 22.12306 E, 102 m a.s.l., leg. Buchar 10 March 1966, det. Buchar (Buchar 1999), 5 records.

MTR4 – **Malé Trakany,** Malé Trakany, litoral of oxbow lake of Latorica River – 48.41556 N, 22.12278 E, 101 m a.s.l., leg. Zbytek, 31 May 1991, det. Zbytek, 7 records.

MTR5 – **Malé Trakany,** Malé Trakany, tree-lined avenue – 48.40806 N, 22.11806 E, 102 m a.s.l., leg. Zbytek, 31 May 1991, det. Zbytek, 18 records.

OB1 – **Oborín,** Oborín, garage, inside of buildings – 48.55028 N, 21.88722 E, 102 m a.s.l., leg. Mihoková, 14 December 2018 – 15 December 2018, det. Szinetár (Mihoková 2019), 4 records.

OB2 – **Oborín,** Oborín, family house, garage, inside of buildings – 48.55056 N, 21.88667 E, 102 m a.s.l., leg. Mihoková, 6 March 2019 – 07 December 2018, det.Szinetár (Mihoková 2019), 10 records.

PA1 – **Pavlovo,** Pavlovo, dead arm of Bodrog River, water-fringing reed beds and tall helophytes other than canes – 48.43970 N, 21.83444 E, 98 m a.s.l., leg. Gajdoš, 18 June 1988, det. Gajdoš, 6 records.

PE1 – **Petrikovce,** Petrikovce, drained chanel located on margin of village, open water area – 48.5452950N, 21.8538606E, 99 m a.s.l., leg. Černecký, 1 May 2019, det. Gajdoš, 1 record.

PO1 – **Poľany,** Leles-Poľany – 48.47083 N, 22.02083 E, 101 m a.s.l., leg. Chyzer et al., before 1894, det. Chyzer (Chyzer & Kulczyński 1894, 1897), 2 records.

PO2 – **Poľany**, Čierny les, hard floodplain forest with predominated oak on fluvial sediments – 48.483611 N, 21.968611 E, 100 m a.s.l., leg. Tajovský and Mock, 14 October 2010, det. Gajdoš, 8 records.

PR1 – **Pribeník,** Príbeník – 48.39333 N, 22.00472 E, 102 m a.s.l., leg. Chyzer et al., before 1894, det. Chyzer (Chyzer & Kulczyński 1894), 2 records.

PR2 – **Pribeník,** Pribeník, family house, garage, inside of buildings – 48.39833 N, 22.00694 E, 101 m a.s.l., leg. Mihoková, 20 February 2019, det. Szinetár, (Mihoková 2019), 4 records.

PR3 – **Pribeník,** Pribeník, family house, room – 48.39833 N, 22.00694 E, 101 m a.s.l., leg. Mihoková, 20 February 2019, det. Szinetár (Mihoková 2019), 8 records.

PT1 – **Ptrukša**, forest at the Latorica River, riparian forest at the right bank of the Latorica river on fluvial sediments – 48.474167 N, 22.120556 E, 102 m a.s.l., leg. Tajovský and Mock, 27 May 2009 – 14 October 2009, det. Gajdoš, 23 records.

RA1 – Rad - Hrušov, Hrušov - Prudký, dry grassland on sandy dune with aeolian sands on river sediments – 48.445 N, 21.868611 E, 100 m a.s.l., leg. Tajovský and Mock, 13 October 2010 – 24 May 2011, det. Gajdoš, 10 records.

RU1 – **Ruská,** Ruská, 48.53667 N, 22.15056 E, 103 m a.s.l., leg. Chyzer et al., before 1894, det. Chyzer (Chyzer & Kulczyński 1894), 2 records.

SB1 – **Streda nad Bodrogom,** Tarbucka Nuture Reserve, xerotermic habitat, 48.37293 N, 21.76175 E, 250 m a.s.l., leg. Černecký, 9 July 2020, det. Gajdoš, 8 records.

SB2 – **Streda nad Bodrogom,** bank of Bodrog River, 48.40250 N, 21.75333 E, 97 m a.s.l., leg. Chyzer et al., before 1894, det. Chyzer (Chyzer & Kulczyński 1894), 1 record.

SB3 – **Streda nad Bodrogom,** Tajba National Nature Reserve, litoral of oxbow lake of Bodrog River – 48.39833 N, 21.78056 E, 98 m a.s.l., leg. Buchar, 8 June 1960, det. Buchar, (Buchar 1999), 2 records.

SB4 – **Streda nad Bodrogom,** Streda nad Bodrogom – 48.38944 N, 21.76556 E, 106 m a.s.l., leg. Bílek, 21 June 1976 – 24 June 1976, det. Bílek (collection of Easter Bohemian Museum in Hradec Kráľové), 15 records.

SB5 – **Streda nad Bodrogom,** Streda nad Bodrogom – 48.38944 N, 21.76444 E, 104 m a.s.l., leg.Chyzer et al., before 1894, det. Chyzer (Chyzer & Kulczyński 1894, 1897), 20 records.

SB6 – **Streda nad Bodrogom,** Streda nad Bodrogom – 48.38028 N, 21.77083 E, 97 m a.s.l., leg. Prídavka, 22 May 1997, det. Prídavka, 6 records.

SB7 – **Streda nad Bodrogom,** Streda nad Bodrogom, building of railway station, inside of building – 48.39556 N, 21.76583 E, 100 m a.s.l., leg. Zbytek, 29 May 1991, det. Zbytek, 1 record.

SB8 – **Streda nad Bodrogom,** Tajba, wetlands with reed and high vegetation 48.38688 N, 21.76627 E, 96 m a.s.l., Černecký, 9 July 2020, Gajdoš, 4 records.

SB9 – **Malý Kamenec,** Malý Kamenec, Tarbucká, Pannonic steppes on sand dunes which are situated on andesite hills – 48.36139 N, 21.78750 E, 154 m a.s.l., leg. Prídavka, Csefalvay, 24 May1997 (Prídavka) – 28 August 2013 (Csefalvay) 1 record - *Argiope*, det. Prídavka, Csefalvay (KIMS - Csefalvay (1 record)), 43 records.

SB10 – **Streda nad Bodrogom**, Tarbucka, top of the hill, rocky dry grassland with bushes at the top of the andesite hill – 48.362222 N, 21.788611 E, 265 m a.s.l., leg. Tajovský and Mock, 25 April 2008 – 21 October 2008, det. Gajdoš, 1 record.

SB11 – **Streda nad Bodrogom**, Klin nad Bodrogom, a belt of willow trees between river arm and meadow on fluvial sediments – 48.382222 N, 21.715833 E, 97 m a.s.l., leg. Tajovský and Mock, 27 May 2009 – 13 October 2009 , det. Gajdoš, 70 records.

SB12 – **Streda nad Bodrogom**, Tajba, forest at bank of pond with *Robinia* and *Populus* on eolic sediments and andesite – 48.383611 N, 21.779444 E, 106 m a.s.l., leg. Gulička, 6 November 1962., det. Gajdoš, 1 record.

SI1 – **Sirník,** Sirník, hill over village, xeroterm pasture – 48.51865 N, 21.79594 E, 155 m a.s.l., leg. Gajdoš, 19 May 1999, det.Gajdoš, 12 records.

SM1 – **Svätá Mária,** Svätá Mária, litoral chanel near Latorica River – 48.44417 N, 21.85611 E, 97 m a.s.l., leg. Gajdoš, 7 June 2017, det. Gajdoš, 1 record.

SM2 – **Svätá Mária,** Latorica, sand dune, sand habitat, on and under tree bark – 48.46889 N, 21.85444 E, 97 m a.s.l., leg. Christophoryová, 24 May 2011, det. Šestáková, 1 record.

SM3 – **Svätá Mária**, Hrušov – Tice (Dlhé Tice NNR), grassland along the bank of marshland (former riverbed) on fluvial sediments – 48.435278 N, 21.854167 E, 98 m a.s.l., leg. Tajovský and Mock, 29 May 2009 – 13 October 2009, det. Gajdoš, 20 records.

SO1 – **Somotor,** Somotor wetland, chanel with reeds and shrubs and ruderal vegetation 48.40104 N, 21.80713 E, 102 m a.s.l., leg. Černecký, 9 July 2020, det. Gajdoš, 4 records.

SO2 – **Somotor-Véč,** Somotor-Véč – 48.41000 N, 21.81944 E, 97 m a.s.l., leg.Chyzer et al., before 1894, det. Chyzer, (Chyzer & Kulczyński 1894, 1897), 14 records.

SO3 – **Somotor-Véč,** Somotor-Véč, sand pit, under stones – 48.41222 N, 21.80861 E, 139 m a.s.l., leg. Buchar, 11 March 1963, det. Buchar (Buchar 1999), 7 records.

SO4 – **Somotor-Véč,** Somotor-Véč, sand dunes – 48.41250 N, 21.81250 E, 98 m a.s.l., leg. Buchar, 9 June 1960, det. Buchar (Buchar 1999), 2 records.

SO5 – **Somotor,** Somotorský chanel near road, chanel with reeds – 48.39647 N, 21.80496 E, 97 m a.s.l., leg. Černecký, 9 July 2020, det. Gajdoš, 3 records.

SO6 – **Somotor**, Somotorské abandoned arm of the Laborec river, netting from water – 48.3970936 N, 21.8063089 E, 97 m a.s.l., leg. Kokorďák, 1970 – 1982, det. Kokorďák, (Kokorďák 1982), 1 record.

SO7 – **Somotor**, Somotorská hora Hill, dry grassland with bushes on a flat top of the hill on a andesite – 48.408056 N, 21.804167 E, 141 m a.s.l., leg. Tajovský and Mock, 29 May 2009 – 13 October 2009 , det. Gajdoš, 52 records.

ST1 – **Strážne,** Strážne, mesophilous pasture near village – 48.38130 N, 21.85677 E, 102 m a.s.l., leg. Gajdoš, 2 June 2004, det. Gajdoš, 5 records.

ST2 – **Strážne,** Strážne, wet part of pasture near village – 48.38186 N, 21.85693 E, 100 m a.s.l., leg Gajdoš, 2 June 2004, det. Gajdoš, 2 records.

ST3 – **Strážne**, Strážne, sandpit, steppe with black locust forest on eolic sands – 48.378611 N, 21.856389 E, 100 m a.s.l., leg. Gulička, 20 April 1961, det. Gajdoš, 1 record.

SV1 – **Svätuše,** Svätuše – 48.43639 N, 21.93833 E, 157 m a.s.l., leg. Prouza, 6 May 1989, det. Rězáč (Rězáč et al. 2008a), 1 record.

SV2 – **Svätuše,** Svätuše, (Plešany), hill above a quarry, shrubs, trees, xeroterm with shrubs and solitere trees – 48.43110 N, 21.93124 E, 132 m a.s.l., leg. Gajdoš 2 June 2004, det. Gajdoš, 8 records.

SV3 – **Svätuše,** Svätuše, quarry, xeroterm andesite habitat – 48.42901 N, 21.93104 E, 134 m a.s.l., leg. Dobránsky, 7 May 2012, det. Dobránsky (Dobránsky FOTOnet), 1 record.

VC1 – **Veľký Kamenec,** Veľký Kamenec – 48.36667 N, 21.81611 E, 101 m a.s.l. leg. Chyzer, before 1891, det. Chyzer (Chyzer & Kulczyński 1891), 4 records.

VC2 – **Veľký Kamenec,** Veľký Kamenec, slope of hill, xeroterm meadows – 48.37611 N, 21.80472 E, 118 m a.s.l. leg. Buchar, 8 June 1960, det. Buchar, Řezáč (Buchar 1999; Řezáč et al. 2008), 7 records.

VC3 – **Veľký Kamenec,** Veľký Kamenec, margin of sand pit with dense vegetation – 48.35915 N, 21.81148 E, 97 m a.s.l., leg. Gajdoš, 2 June 2004, det. Gajdoš (Gajdoš & Svatoň 2008), 5 records.

VC4 – **Veľký Kamenec,** Veľký Kamenec, abandoned sand pit, open sand habitat with pure vegetation – 48.35915 N, 21.81148 E, 97 m a.s.l., leg. Gajdoš, 2 June 2004, det. Gajdoš (Gajdoš & Svatoň 2008), 5 records.

VC5 – **Malý Kamenec,** Tarbucká, forest steppe, Pannonic steppes on sand dunes situated on andesite hills– 48.35811 N, 21.78963 E, 213 m a.s.l., leg. Gajdoš, 10 November 1982 – 13 April 1983, det. Gajdoš, 60 records.

VC6 – **Malý Kamenec,** Tarbucká, margin of vineyards on sand soil 48.35507 N, 21.78930 E, 146 m a.s.l., leg. Gajdoš, 9 November 1982, det. Gajdoš, 3 records.

VC7 – **Malý Kamenec**, Malý Kamenec, steppe on the southern slope of Tarbucka hill on andesite – 48.361667 N, 21.798333 E, 140 m a.s.l., leg. Gulička, 16 March 1961, det. Gajdoš, 1 record.

VE3 – **Veľaty,** Veľaty – 48.52667 N, 21.66722 E, 185 m a.s.l., leg. Řezáč, 18 August 2003, det. Řezáč (Řezáč et al. 2008b), 1 record.

VK1 – **Veľké Kapušany,** Veľké Kapušany, garage, inside of buildings – 48.56139 N, 22.07611 E, 108 m a.s.l., leg. Mihoková, 30 October 2018, det. Szinetár (Mihoková 2019), 1 record.

VK2 – **Veľké Kapušany,** Veľké Kapušany, Labaška – 48.56778 N, 22.08889 E, 109 m a.s.l., leg. Dobránsky, 10 May 2011 – 9 October 2014, det. Dobránsky (Dobránsky FOTOnet), 29 records.

VK3 – **Veľké Kapušany,** Veľké Kapušany, outside of town, building – 48.55750 N, 22.07694 E, 101 m a.s.l., leg. Dobránsky, 12 September 2012 – 19 August 2014, det. Dobránsky, (Dobránsky FOTOnet), 10 records.

VK4 – **Veľké Kapušany,** Veľké Kapušany, gardening colony, gardens – 48.56045 N, 22.04688 E, 110 m a.s.l., leg. Dobránsky, 7 May 2011 – 19 May 2013, det. Dobránsky (Dobránsky FOTOnet), 5 records.

VK5 – **Veľké Kapušany,** Veľké Kapušany, block of flats, room, inside of buildings – 48.56389 N, 22.07417 E, 108 m a.s.l., leg. Mihoková 13 November 2018 – 15 November 2018, det. Szinetár (Mihoková 2019), 2 records.

VK6 – **Veľké Kapušany,** Veľké Kapušany, family house, room, inside of buildings – 48.56139 N, 22.07611 E, 108 m a.s.l., leg. Mihoková, 19 October 2018 – 20 February 2019, det. Szinetár (Mihoková 2019), 27 records.

VK7 – **Veľké Kapušany,** Veľké Kapušany, family house, cellar, inside of buildings – 48.56139 N, 22.07611 E, 108 m a.s.l., leg. Mihoková, 27 February 2019, det. Szinetár (Mihoková 2019), 2 records.

VK8 – **Veľké Kapušany,** Veľke Kapušany Teheľňa, area of abandoned brickfield – 48.55694 N, 22.06972 E, 100 m a.s.l., leg. Dobránsky, 13 October 2011 – 29 August 2016, det. Dobránsky (Dobránsky FOTOnet), 21 records.

VK9 – **Veľké Kapušany,** Veľké Kapušany, buildings, inside and outside of buildings - 48.55336 N, 22.07301 E, 110 m a.s.l., leg. Dobránsky, 8 March 2013 – 12 August 2016, det. Dobránsky, (Dobránsky FOTOnet), 14 records.

VK10 – **Veľké Kapušany,** Veľké Kapušany, cemetery – 48.55863 N, 22.07507 E, 110 m a.s.l., leg. Dobránsky, 12 October 2013 – 06 September 2014, det. Dobránsky (Dobránsky FOTOnet), 4 records.

VK11 – **Veľké Kapušany,** Veľké Kapušany, bonded warehouse, inside of buildings – 48.55364 N, 22.07890 E, 110 m a.s.l., leg. Dobránsky, 12 September 2011 – 2 July 2015, det. Dobránsky (Dobránsky FOTOnet), 7 records.

VK12 – **Veľké Kapušany,** Veľké Kapušany, Latorica PLA, mosaic of wet and xeroterm biotopes – 48.45005 N, 21.98178 E, 100 m a.s.l., leg. Dobránsky, 30 June 2011 – 11 August 2013, det. Dobránsky (Dobránsky FOTOnet), 20 records.

VK13 – **Veľké Kapušany,** Veľké Kapušany, margins of the town, mosaic of biotopes (shrubby margin, margin of forests, mesophilous meadows, wetlands, etc. – 48.55961 N, 22.08193 E, 110 m a.s.l., leg. Dobránsky, 2 July 1905 – 14 October 2016, det. Dobránsky (Dobránsky FOTOnet), 123 records.

VK14 – **Veľké Kapušany,** Veľké Kapušany, Údoč, mosaic of wet biotopes – 48.55703 N, 22.04390 E, 100 m a.s.l., leg. Dobránsky, 5 August 2014 – 23 September 2014, det. Dobránsky (Dobránsky FOTOnet), 4 records.

VO1 – **Vojka,** Vojka – 48.47139 N, 21.92667 E, 100 m a.s.l., leg. Chyzer, before 1891, det. Chyzer (Chyzer & Kulczyński 1897), 1 record.

VO2 – **Vojka,** Vojka, sand pit near the village, open sand with pure vegetation, sand pit – 48.45746 N, 21.90629 E, 107 m a.s.l., leg. Gajdoš, 2 June 2004, det. Gajdoš (Gajdoš & Svatoň 2008), 6 records.

VO3 – **Vojka**, Veľké jazero (NR), ecotone of marshland bank and agroecoenoses (field) on aeolian sands on river sediments – 48.444167 N, 21.922778 E, 99 m a.s.l., leg. Tajovský and Mock, 29 April 2010 – 12 October 2010 , det. Gajdoš, 29 records.

VR1 – **Veľké Raškovce,** Veľké Raškovce, outbuilding of the house, garage, inside of buildings – 48.56000 N, 21.91778 E, 100 m a.s.l., leg. Mihoková, 12 October 2018, det. Szinetár (Mihoková 2019), 13 records.

VR2 – **Veľké Raškovce,** Veľké Raškovce, outbuilding of the house, rabbit hutch, inside of buildings – 48.56000 N, 21.91778 E, 100 m a.s.l., leg. Mihoková, 13 October 2018, det. Szinetár (Mihoková & Szinetar 2019), 1 record.

VR3 – **Veľké Raškovce,** Veľké Raškovce, family house, room, inside of buildings – 48.56000 N, 21.91778 E, 100 m a.s.l., leg. Mihoková, 10 October 2018 – 28 January 2019, det. Szinetár (Mihoková 2019), 19 records.

VR4 – **Veľké Raškovce,** Veľké Raškovce, family house, attic, inside of buildings – 48.56000 N, 21.91778 E, 100 m a.s.l., leg. Mihoková, 12 October 2018, det. Szinetár (Mihoková 2019), 2 records.

VR5 – **Veľké Raškovce,** Veľké Raškovce, family house, vestibule, inside of buildings – 48.56000 N, 21.91778 E, 100 m a.s.l., leg. Mihoková, 30 October 2018, det. Szinetár (Mihoková 2019), 1 record.

VR6 – **Veľké Raškovce,** Veľké Raškovce, family house, cellar, 48.56000 N, 21.91778 E, 100 m a.s.l., leg. Mihoková, 12 October 2018 43420, det. Szinetár (Mihoková 2019), 12 records.

VR7 – **Veľké Raškovce**, Duša channel, bank of the drainage channel, under the road bridge, netting from water – 48.562778 N, 21.917222 E, 101 m a.s.l., leg. Kokorďák, 1970 – 1982, det. Kokorďák (Kokorďák 1982), 1 record.

VTR1 – **Veľké Trakany,** V. Trakany, Stará Tisa – Old Tisa River, near agricultural farm, bank of river covered by shrubs, 48.38391 N, 22.09457 E, 99 m a.s.l., leg. Gajdoš, 31 May 2004, det. Gajdoš, 3 records.

VTR2 – **Veľké Trakany,** V. Trakany, Stará Tisa – Old Tisa River, near agricultural farm, open an sunny bank of river, 48.38599 N, 22.09550 E, 99 m a.s.l., leg. Gajdoš, 31 May 2004, det Gajdoš, 4 records.

VTR3 – **Veľké Trakany,** Veľké Trakany – 48.40028 N, 22.10500 E, 103 m a.s.l., leg. Chyzer, before 1894, det. Chyzer, (Chyzer & Kulczyński 1894, 1897), 6 records.

VTR4 – **Veľké Trakany,** Veľke Trakany, alluvial forest near Tisa River, – 48.38202 N, 22.12899 E, 100 m a.s.l., leg. Gajdoš, 31 May 2004, det. Gajdoš, 6 records.

ZA1 – **Zatín,** Zatín, family house, room, inside of buildings – 48.48167 N, 21.90444 E, 98 m a.s.l., leg. Mihoková, 25 January 2019 - 8 March 2019, det. Szinetár (Mihoková 2019), 8 records.

ZA2 – **Zatín,** Zatín, family house, cellar, inside of buildings – 48.48167 N, 21.90444 E, 98 m a.s.l., leg. Mihoková 9 January 2019, det. Szinetár (Mihoková 2019), 10 records.

ZE3 – **Zemplín,** Zemplín– 48.44778 N, 21.81806 E, 104 m a.s.l., leg. Chyzer, before 1891, det Chyzer (Chyzer & Kulczyński 1891), 1 record.

ZE4 – **Zemplín,** Zemplín, Farský les - forest, oak forest – 48.45528 N, 21.78944 E, 181 m a.s.l., leg. Zbytek, 29 May 1991, det. Zbytek, 28 records.

ZE5 – **Zemplín,** Zemplín, Farský les, oak forest and its forest margins - 48.44685 N, 21.79065 E, 156 m a.s.l., leg. Gajdoš 29 May 1991, det. Gajdoš, 39 records.

For individual documented species, their occurrence at individual localities (listed locality code) and their conservation status within Slovakia according to the Red list (Gajdoš & Svatoň 2001) are stated. Species and their classification into families are listed according to the World Spider Catalog (2020).

Results – List of species

Preference of habitat conditions is according to Nentwig et al. (2020).

Agelenidae

Agelena labyrinthica (Clerck, 1757) – CP1, MH3, SNM2, VK13 – warm, sunny forest edges (on bushes).

Allagelena gracilens (C. L. Koch, 1841) – SNM2, SO2, VE2 – warm, sunny localities (on bushes).
Eratigena agrestis (Walckenaer, 1802) – VC5, VK13, VR2 – warm localities (among plants, under stones).
Eratigena atrica C. L. Koch, 1843 – DR1, MT4,VK3 – synanthropic species, originally in warm localities (under stones).
Histopona torpida (C. L. Koch, 1834) – SNM2 – forests (under stones, between roots).
Tegenaria domestica (Clerck, 1757) – MR1, SB9, SNM2, VE2, VI2, VI7, VK1, VK9, VR3, ZA2 – synanthropic species, originally in warm localities (under stones).
Tegenaria ferruginea (Panzer, 1804) – MR1, VR1 – in forests (under stones, bark).
Textrix denticulata (Olivier, 1789) – SNM2, VTR3 – sunny forest edges, walls, rocks.

Amaurobiidae
Amaurobius erberi (Keyserling, 1863) – SNM1, VI1 – rare species, under stones.
Amaurobius ferox (Walckenaer, 1830) – SB9, ZA2 – caves, basements, also in buildings.
Amaurobius pallidus L. Koch, 1868 – VI5 – rarely found, under stones.
Coelotes atropos (Walckenaer, 1830) – CE2, CE4, SNM2 – deciduous forests (under stones).
Inermocoelotes inermis (L. Koch, 1855) – CE2, SNM2 – forests, open habitats (under stones).
Urocoras longispina (Kulczyński, 1897) – BR1, BR2, KC12, LA6, SNM2, VI2 – xerotherms and open oak forests (under stones).

Anyphaenidae
Anyphaena accentuata (Walckenaer, 1802) – BO1, BT1, MTR5, VK12, VK13, VK2, VR1, VT4, ZE5 – forests (tree trunks, crowns).

Araneidae
Aculepeira ceropegia (Walckenaer, 1802) – KU1, MT3, SB9 – open habitats, forest edges herbs and bushes).
Agalenatea redii (Scopoli, 1763) – LA3, MT3, MTR1, SB1, SB9, VK13 – warm, sunny, steppic localities (dry grass, bushes).
Agriope bruennichi (Scopoli, 1772) – VI10 – in meadows.
Araneus alsine (Walckenaer, 1802) – VK13 – meadows, forest edges (in grass).
Araneus diadematus Clerck, 1757 – CP1, SV2, VK12, VK13, VK2, VK8, VT5 – very abundant species in forests, open habitats, also in human settlements (bushes, tall vegetation).
Araneus marmoreus Clerck, 1757 – CI1, CP1, KA5, KC13, KK1, ST3, VK2, VK8, VK12, VK13 – meadows, forest edges (bushes, low vegetation).
Araneus quadratus Clerck, 1757 – CP1, MH8, VK2, VK8, VK13 – meadows, wetlands (on herb vegetation) (Fig. 3).
Araneus triguttatus (Fabricius, 1775) – KA5, KY1, VT3, VT4, VT5, ZE5 – deciduous forests, forest edges (on young trees).
Araniella cucurbitina (Clerck, 1757) – BT10, CI1, KA5, KC5, KC11, KY1, MH3, SB9, VI1, VT4, VT5, ZE1, ZE2, ZE4, ZE5 – forest, open habitats (low vegetation, bushes, trees).
Araniella incospicua (Simon, 1874) – VT3, VT6 – thermophilic, on forest edges (bushes).

Araniella opisthographa (Kulczyński, 1905) – BT1, MH5, PA1 – forest, open habitats (low vegetation, bushes, trees).
Argiope bruennichi (Scopoli, 1772) – MT1, SB1, SB9 (KIMS 2020 – Csefalvay), VK2, VK4, VK8, VK13, VK14 – very abundant species in open habitats (tall and also low vegetation).
Cercidia prominens (Westring, 1851) – VK13 – forests, wetlands, on low vegetation.
Cyclosa conica (Pallas, 1772) – VK12, VK13, VK2, VT5, VT6 – forests, forest edges (bushes, lower branches of trees).
Gibbaranea bituberculata (Walckenaer, 1802) – VI1, VK2, VT5, VK13, ZE5 – sunny, warm localities (low vegetation).
Gibbaranea gibbosa (Walckenaer, 1802) – MB1, VT6, ZE5 – sunny, warm localities, orchards (low vegetation).
Hypsosinga heri (Hahn, 1831) – KC13, LE1, PA1, SB8, VK2 – wetlands (on tall vegetation).
Hypsosinga pygmaea (Sundevall, 1831) – KC5, KC11, KU1, ZE1 – open habitats (on vegetation).
Hypsosinga sanguinea (C. L. Koch, 1844) – SB9, VK13, VT4, ZE5 – sunny, warm localities (on vegetation).
Larinioides cornutus (Clerck, 1757) – BO1 (Thomka 2001), MTR5, VC1, VK2 – habitats near water (on reed and othe tall vegetation).
Larinioides ixobolus (Thorell, 1873) – VK3, VK9 – buildings near water (walls, bridges).
Larinioides patagiatus (Clerck, 1757) – BT1, KA5, LE11, SB3 – wetlands, forest edges (lower twigs of trees).
Larinioides suspicax (O. Pickard-Cambridge, 1876) – CP1, KC2, LE1, VK12, VK8 – wetlands (on vegetation).
Mangora acalypha (Walckenaer, 1802) – CE5, KC11, KC13, KU1, KY1, LA3, MH3, MH5, MT3, MTR1, SB4, SB9, SV2, VK2, VT6, VK13, ZE2, ZE4 – warm, sunny, localities (on vegetation).
Neoscona adianta (Walckenaer, 1802) – SB1 – wide range of habitats (on herbs and low bushes).
Nuctenea umbratica (Clerck, 1757) – MTR1, VK13 – buildings, forests (walls, under bark).
Singa hamata (Clerck, 1757) – BO1, KA5, KC11, KC13, KK1, KU1, LE8, MTR5, ZA1, ZE5 – open areas (on vegetation).
Singa nitidula C. L. Koch, 1844 – BO1 (Thomka 2001), KC2, LE1, MTR1, VK12, VK13, VK2, ZE2 – wetlands (on bank vegetation).
Zilla diodia (Walckenaer, 1802) – VI3, VK13, VT5, ZE1 – forests, open habitats (bushes, lower twigs of trees).

Clubionidae
Clubiona brevipes Blackwall, 1841 – ZE5 – sunny forest (under bark, on shrubs).
Clubiona caerulescens L. Koch, 1867 – BT1, PO1, SNM2 – forests (on bushes).
Clubiona diversa O. Pickard-Cambridge, 1862 – KC2 – wide wariety of habitats (under stones, among grass).
Clubiona frutetorum L. Koch, 1866 – KC3 – forests (on vegetation).
Clubiona germanica Thorell, 1871 – KA5 – on trees and shrubs.

Clubiona lutescens Westring, 1851 – BO1 (Thomka 2001), BO3, BT1, KC2, KU8, PT1, SB5, VTR4 – forests, open habitats (on vegetation).
Clubiona marmorata L. Koch, 1866 – MB1, SNM2, VT4, ZE4, ZE5 – on forests and solitary trees (bark, branches).
Clubiona pallidula (Clerck, 1757) – LE3, SNM2, ZE1 – forests (tree trunks, herbs, bushes).
Clubiona phragmitis C. L. Koch, 1843 – BA, BE2, BO1 (Thomka 2001), BO3, KC3, MTR2, SNM2, VK2 – wetlands (on reed vegetation).
Clubiona stagnatilis Kulczyński, 189 – KC5 – wetlands (on vegetation).
Clubiona subtilis L. Koch, 1867 – VE2 – wetlands (grass, moss, detritus).

Dictynidae
Altella biuncata (Miller, 1949) – VT4 – sunny rock steppes.
Argenna patula (Simon, 1874) – SB8 – wetlands (detritus).
Argenna subnigra (O. Pickard-Cambridge, 1861) – MT3 – rock steppe, xerotermic grasslands (among grass, under stones).
Argyroneta aquatica (Clerck, 1757) – HR1 (Kokorďák 1982), KC3, KU2 (Kokorďák 1982), KU4 (Kokorďák 1982), KU5 (Kokorďák 1982), KU6 (Kokorďák 1982), LE3, LE5, SNM2, SO6 (Kokorďák 1982), VR7 (Kokorďák 1982) – rare, in water.
Brigittea civica (Lucas, 1850) – SB6, SB7, VK3, VK9 – synanthropic species, walls of buildings, originally on rocks.
Brigittea latens (Fabricius, 1775) – MT3, SB3, VK13 – xerotermic habitats (on plants and shrubs).
Dictyna arundinacea (Linnaeus, 1758) – KA3, LE9, MH3, MT7, SV2, VC5, VI4, VK13, VT3, VT5, VT6, ZE2, ZE4 , ZE5 – very abundant in meadows and forest edges (on herbs).
Dictyna uncinata Thorell, 1856 – BO3, BT1, BT2, BT8, BT9, CP1, KC5, KC8, MB1, MTR2, MTR5, VTR1, ZE1, ZE2, ZE4, ZE5 – very abundant, forest edges (bushes, plants).
Lathys humilis (Blackwall, 1855) – MT7 – sunny localities (on bushes, herbs and trees).
Lathys stigmatisata (Menge, 1869) – VC5 – rock steppes (on the ground).
Nigma flavescens (Walckenaer, 1830) – CP1, VT4, VT5, ZE1, ZE4, ZE5 – frequently found in oak forests and their shrubby edges (on foliage of trees and shrubs).
Nigma walckenaeri (Roewer, 1951) – CP1 – gardens, forest edges, walls of buildings.

Dysderidae
Dysdera cechica Řezáč, 2018 – LA4, VI3, VI4 – species distributed only in Central Europe, in the study area in heathlands, grasslands, vineyards, gardens (under stones and bark, in litter, in caves).
Dysdera hungarica Kulczyński, 1897 – BR1, CE2, CE4, SO7, VE3, VT1 – rare species, in forests (in leaf litter, under stones and in rubbish).
Dysdera longirostris Doblika, 1853 – SNM1 – very rare, in forests, shrubs, semi-dry grasslands (under stones or in litter).
Harpactea hombergi (Scopoli, 1763) – VI5 – forests, steppic habitats (under stones, scree).
Harpactea rubicunda (C. L. Koch, 1838) – LA3, MT6, SB9, VC5, VI1, VI3, VK13 – open habitats, forests, in houses (under stones, debris, detritus).

Eresidae

Eresus moravicus Řezáč, 2008 – SB9, SV1, VC2, VI1 – in rocky steppes and sandy soils with grasslands (Fig. 4).

Gnaphosidae

Callilepis nocturna (Linnaeus, 1758) – KY1, SNM2, ST1, VK8, VO2 – xerotherms (under stones, detritus).

Callilepis schuszteri (Herman, 1879) – SNM2 – rock steppes, dry meadows (leaf litter, among grass).

Civizelotes caucasius (L. Koch, 1866) – SNM1, SNM2 – xerotherms (under stones).

Civizelotes gracilis (Canestrini, 1868) – LA2, LA3 – dry, warm slopes, rock steppes.

Civizelotes pygmaeus Miller, 1943 – SI1 – warm, dry slopes, rock steppes (under stones).

Drassodes cupreus (Blackwall, 1834) – SNM2 – wide variety of habitats (under stones).

Drassodes lapidosus (Walckenaer, 1802) – KC2, LA3, LA4, MT4, MT6, SB9, SI1, SNM2, VI1, VI3, VT2 – wide variety of xerothermic habitats (under stones).

Drassodes pubescens (Thorell, 1856) – MT4, SNM2, ZE2 – wide variety of habitats (under stones).

Drassyllus lutetianus (L. Koch, 1866) – BO3, KC8 – wetlands (moss, detritus).

Drassyllus praeficus (L. Koch, 1866) – BR1, KY1, LA2, MT6, SB9, SNM2, VI1, VI2, VT4, ZE2, ZE4 – abundant species in xerotherms (under stones).

Drassyllus pumilus (C. L. Koch, 1839) – LA4, SNM2 – xerotherms (under stones).

Drassyllus pusillus (C. L. Koch, 1833) – MH9, SNM2, SO2 – wide variety of habitats (in litter).

Drassyllus villicus (Thorell, 1875) – VT4 – xerotherms (under stones).

Gnaphosa bicolor (Hahn, 1833) – VI1 – mountainous terrain (under stones, in moss, leaf litter).

Gnaphosa fallax Herman, 1879 – SNM2 – species inquirenda.

Gnaphosa lucifuga (Walckenaer, 1802) – LA2, MT4, SNM2, SV3, VK13 – rock steppes, dry meadows (under stones).

Gnaphosa lugubris (C. L. Koch, 1839) – SB4, SNM2, VT2 – in warm locations (dry meadows, rock steppes), under stones, bark or in moss during the day.

Gnaphosa opaca Herman, 1879 – KC2, LA2, LA3, SB9, SNM2, VC5 – xerotherms (under stones).

Haplodrassus kulczynskii Lohmander, 1942 – BR1, SB9, SNM2 – xerotherms (among grass, under stones).

Haplodrassus minor (O. Pickard-Cambridge, 1879) – KA1, MH9, SNM1, SNM2 – not frequent, found in xeroterm sand and limestone habitats, but also in fields.

Haplodrassus signifer (C. L. Koch, 1839) – KY1, MT4, SB4, SNM2, VI3 – forests and open habitats (on ground).

Haplodrassus silvestris (Blackwall, 1833) – SNM2, VI1, VI9 – forests (leaf litter).

Haplodrassus umbratilis (L. Koch, 1866) – SNM2, VT4 – forests, forest edges (under stones, in moss).

Micaria dives (Lucas, 1846) – BR1, LA3, MT4, SI1, VI3 – rock steppes (under stones, among grass).

Micaria fulgens (Walckenaer, 1802) – MT4, VT6 – steppes, forest edges (among grass, detritus).
Micaria pulicaria (Sundevall, 1832) – BO3, KC8, SNM1, ST2, VK12, VT6 – wide variety of open habitats (among grass and moss).
Micaria sociabilis Kulczyński, 1897 – SNM1 – very rare, found on solitary trunks.
Scotophaeus blackwalli (Thorell, 1871) – SNM2 – under the bark of trees, also in inside of buildings.
Scotophaeus scutulatus (L. Koch, 1866) – LE12, SNM2, VI1 – synanthropic, originally under bark.
Sosticus loricatus (L. Koch, 1866) – SNM2 – synanthropic, originally rock steppes.
Trachyzelotes pedestris (C. L. Koch, 1837) – BT1, MH9, PO2, SM3, SNM2, VI2 – xerotherm grasslands, meadows and floodplain forests (under stones, in detritus, etc.).
Zelotes apricorum (L. Koch, 1876) – KC3, SNM2, SO2, VI1, VT4 – forests, floodplain forests, meadows (under stones).
Zelotes electus (C. L. Koch, 1839) – BR1, SI1, SNM2, SO2, SO7, VC5 – xerotherms (under stones, litter layer).
Zelotes erebeus (Thorell, 1870) – SNM2 – xerotherms (under stones).
Zelotes hermani (Chyzer, 1897) – BR1, LA2, LA3, MT4, SNM2, VI2 – warm localities (under stones).
Zelotes latreillei (Simon, 1878) – BR1, BT6, SNM2, SO7, VC4, ZE2 – open habitats, forests, wetlands.
Zelotes longipes (L. Koch, 1866) – SNM2, SO2, SO7, VC5 – steppes, dunes, xerotherms (under stones).

Hahniidae
Antistea elegans (Blackwall, 1841) – MH9, SM3, SNM2, VO1 – wetlands, reed swamps (among moss, in detritus).
Cicurina cicur (Fabricius, 1793) – CE2, CE4, KC12, SNM2, VK13 – forests, humid microspaces (in soil, under stones, in caves).
Hahnia nava (Blackwall, 1841) – MH9, SNM2, VI3 – rock steppes.
Hahnia pusilla C. L. Koch, 1841 – PO2 – in moss and leaf litter, humid locations.

Cheiracanthiidae
Cheiracanthium elegans Thorell, 1875 – MH3, SNM2 – open habitats (on grass and bushes).
Cheiracanthium erraticum (Walckenaer, 1802) – BT1, KC2, MTR1, SNM2, VK13, ZE4 – open habitats (on vegetation).
Cheiracanthium mildei L. Koch, 1864 – LE12, OB2, PR3, VK6, VK9 – synanthropic species, on shrubs.
Cheiracanthium montanum L. Koch, 1878 – SNM1, SNM2 – sunny localities (on bushes).
Cheiracanthium oncognathum Thorell, 1871 – MB1 – sunny localities (on bushes).
Cheiracanthium punctorium (Villers, 1789) – MH2, SNM2 (Mocsary 1877), VI1, VK13 – warm, open habitats (on grass) (Fig. 5).
Cheiracanthium virescens (Sundevall, 1833) – MB1 – rare species, in rock steppes and xeroterm meadows (in herb and bush layers, also under stones).

Linyphiidae

Abacoproeces saltuum (L. Koch, 1872) – KY1, MB1, VT4 – in dry and warm localities.

Acartauchenius scurrilis (O. Pickard-Cambridge, 1872) – SNM2 – rare myrmecophilous species, found on xeroterm habitats with sparsely vegetation, in a nest of ants.

Agyneta affinis (Kulczyński, 1898) – MT3 – in moderately dry habitats (moss, grass).

Agyneta fuscipalpa (C. L. Koch, 1836) – SB5, SNM2 – rare species, rocky steppes and dry meadows (in grass).

Agyneta mollis (O. Pickard-Cambridge, 1871) – LE3, SB5, SNM2, VC6 – rare, in open habitats (wet and dry meadows, steppes, fields, vineyards, etc.).

Agyneta rurestris (C. L. Koch, 1836) – KA3, KC11, KK1, LE3, SB5, SB12, SNM2, VC4, VC5, VE2, VI2, VI3 – in forest edges, meadows and gardens.

Agyneta saxatilis (Blackwall, 1844) – MH9 – in various habitats (grass, low plants).

Allomengea vidua (L. Koch, 1879) – SB11, SB11 – humid, often flooded localities (on plants).

Anguliphantes angulipalpis (Westring, 1851) – CE1 – in the litter layer of forest steppes and oak forests.

Araeoncus humilis (Blackwall, 1841) – MT3, SB11, VC5, VI2 – in various habitats (from the ground to the tree layer).

Bathyphantes approximatus (O. Pickard-Cambridge, 1871) – BO3, KC8, LE8 – in very damp and shadowed localities.

Bathyphantes gracilis (Blackwall, 1841) – CE5, KC2, KU8, SB11, SNM2, VC5, VI3 – in humid localities (on low plants).

Bathyphantes nigrinus (Westring, 1851) – BT10, LE8, SB11, SNM2 – in very damp and shadowed localities, mostly in bog forests.

Bolyphantes alticeps (Sundevall, 1833) – SNM2 – in meadows and forest edges.

Centromerita bicolor (Blackwall, 1833) – SNM2 – in open, dry forests (in moss layer).

Centromerus cf. *capucinus* (Simon, 1884) – BR1 – forest edges (low plants).

Centromerus incilium (L. Koch, 1881) – LA6 – forests, forest edges (moss).

Centromerus sylvaticus (Blackwall, 1841) – BE3, LE3, PO2, PT1, SB5, SB11, SM3, SNM2, VO3, VTR – in moderately damp forests (leaf litter).

Ceratinella brevipes (Westring, 1851) – BE3 – in various habitats (moss, litter layer).

Ceratinella brevis (Wider, 1834) – LE3, LE8, SNM2, VI2 – in various types of habitats, except very humid and dry localities.

Ceratinella major Kulczyński, 1894 – LE3 (Kolosvary 1939), VO3 – rare, in detritus of deciduous forests.

Ceratinella scabrosa (O. Pickard-Cambridge, 1871) – SNM2 – in damp forests (litter layer).

Dicymbium nigrum (Blackwall, 1834) – BO1 (Thomka 2001), KC2 (Thomka 2001), LE8 – in forest edges, in meadows. Probably this taxon belongs to *Dicymbium nigrum brevisetosum*.

Dicymbium nigrum brevisetosum Locket, 1962 – PT1, SM3 – in forest edges, meadows.

Diplocephalus cristatus (Blackwall, 1833) – KC2, SB5, SNM2, VT5 – in slightly humid habitats (forest edges, gardens, etc.).

Diplocephalus picinus (Blackwall, 1841) – BE3, BE4, BT4, BT8, PO2, SB11, VI2, VTR4 – in deciduous forests (leaf litter and detritus).

Diplostyla concolor (Wider, 1834) – BE3, BR1, BR2, BT4, BT5, BT10, CE2, CE4, KC3, KC5, KC12, KK1, LE3, LE8, MH9, MTR1, PO2, PT1, SB5, SB11, SM3, SNM2, SO2, SO7, VI2, VI7, VK12, VO3, VT5, VTR3, VTR4 – very abundant species, in forests (leaf litter, detritus) and also in open habitats (Fig. 6).

Dismodicus bifrons (Blackwall, 1841) – KK1 – wetlands, sporadic in floodplain forests (in detritus).

Dismodicus elevatus (C. L. Koch, 1838) – SNM2 – wetland, sporadic in floodplain forests (in detritus).

Drapetisca socialis (Sundevall, 1833) – SNM2, VE2, VI2 – in forests (tree bark).

Entelecara acuminata (Wider, 1834) – BT2, BT9, MT3, MT7, SB5, SB6, SNM2, VT4, VT5, VT6, ZE1, ZE5 – widespread species in forests and shrubby habitats (bushes and trees).

Entelecara erythropus (Westring, 1851) – KY1 – rare species, in oak forests and their shrubby edges (on bushes and in moss and grass).

Entelecara media Kulczyński, 1887 – MTR1 – known only one record from Malé Trakany.

Erigone atra Blackwall, 1833 – KC2, MTR5, SNM2, VI2 – wide range of open habitats (grass, fields).

Erigone dentipalpis (Wider, 1834) – CE5, MT3, SB5, SNM2, VI2, VT – very abundant species, wide range of open habitats (grass).

Floronia bucculenta (Clerck, 1757) – KC3, SNM2 – wetlands, floodplains (tall vegetation).

Frontinellina frutetorum (C. L. Koch, 1834) – MTR5, SNM2, VE2 – rock steppes, heatlands (on small shrubs) (Fig.7).

Gnathonarium dentatum (Wider, 1834) – BA, BO3, KC8, LE3, LE8, SB5, SNM2, VI2, VTR2 – widespread species in wetlands (detritus).

Gonatium rubellum (Blackwall, 1841) – PO1 – in woodland and forest (litter layer, moss, grass).

Gonatium rubens (Blackwall, 1833) – SNM2 – wetlands (on vegetation).

Gongylidiellum murcidum Simon, 1884 – LE8, SB11, VO3 – in swamps and reed swamps (detritus, moss).

Gongylidium rufipes (Linnaeus, 1758) – BO3, KC5, KC8, SB11, SNM2 – abundant species in wetlands and floodplains (detritus, plants and shrubs).

Hypomma bituberculatum (Wider, 1834) – BO1, BO3, KC3, SNM2 – wetlands (dense vegetation).

Incestophantes crucifer (Menge, 1866) – SNM2 – in open forests.

Ipa keyserlingi (Ausserer, 1867) – BR1, MT4, SB9, SNM2, VC5, VI2, VI3 – in dry habitats.

Kaestneria dorsalis (Wider, 1834) – BO1 (Thomka 2001), BT1, KA5, RU1, SO2, ZE1 – in forest edges (bushes, trees).

Kaestneria pullata (O. Pickard-Cambridge, 1863) – SB5 – wetlands (on vegetation).

Lepthyphantes leprosus (Ohlert, 1865) – KC3, SB5, SNM2, VC6, VI2, VI8, VR6 – synanthropic, in human settlements including cellar for Tokaj wine, rare in natural habitats.

Lepthyphantes minutus (Blackwall, 1833) – SNM2, VE2 – forest habitats (under tree bark and in hollow trees).

Linyphia hortensis Sundevall, 1830 – LE13, SNM2, VC5, VT5, VI8, VTR3 – abundant species in deciduous forests and their margin araes (herb layer, shrubs), accidentaly in cellar for Tokaj wine (at entrance).

Linyphia triangularis (Clerck, 1757) – CP1, LE14, PO1, SNM2, SO1, VE2, VI2, VK2, VK13, VTR3 – very abundant species, wide range of forest and open habitats (on shrubs and plants).
Lophomma punctatum (Blackwall, 1841) – SNM2 – wetlands (moss and grass).
Macrargus rufus (Wider, 1834) – CE2, VI2 – deciduous forests (leaf litter, detritus).
Megalepthyphantes pseudocollinus Saaristo, 1997 – SI1 – rare species, xeroterm pasture (ground level).
Micrargus herbigradus (Blackwall, 1854) – BT5, CE2, PO2, SM3 – forests (moss, leaf litter), troglophile species.
Micrargus subaequalis (Westring, 1851) – MH9, SB4 – in open habitats.
Microlinyphia impigra (O. Pickard-Cambridge, 1871) – BA – in humid habitats (dense vegetation).
Microlinyphia pusilla (Sundevall, 1830) – CP1, KU1, MH5, SI1, VK13, ZE2 – meadow and othr sopen habitats (in herb layer).
Microneta viaria (Blackwall, 1841) – BT8, CE4, KC12, PO2, VO3 – deciduous forests (in leaf litter, detritus).
Minicia marginella (Wider, 1834) – MT3, VT6 – xerotherm habitats (among grass).
Moebelia penicillata (Westring, 1851) – KC3, SB5, SNM2 – deciduous forests (tree bark).
Nematogmus sanguinolentus (Walckenaer, 1841) – SM3, VK12 – rare species, dry and sunny grasslands (among grass).
Neriene clathrata (Sundevall, 1830) – BO1 (Thomka 2001), BO3, BR1, BT2, CE3, KC5, KC13, LE13, MTR2, PO2, PR1, SB5, SB11, SNM2, SO2, VI2, VK2, VK13, VT6 – forests, meadows (in leaf litter, detritus and low wegetation).
Neriene emphana (Walckenaer, 1842) – SNM2 – forests (shrubs, dry tree branches).
Neriene montana (Clerck, 1757) – BO1 (Thomka 2001), KC3, LE11, KU8, MTR1, SNM2, VK13 – floodplains, parks, human settlements (on bushes, tree trunks).
Neriene peltata (Wider, 1834) – LE4, SNM2 – forests (on bushes, trees).
Neriene radiata (Walckenaer, 1842) – VT5, VT6 – forests, forest edges (on shrubs).
Oedothorax apicatus (Blackwall, 1850) – BO3, KC8, SB11, SNM2, SO2 – in humid, open localities.
Oedothorax gibbosus (Blackwall, 1841) – PT1 – open, humid localities.
Oedothorax fuscus (Blackwall, 1834) – SNM2 – in open, humid localities.
Oryphantes angulatus (O. Pickard-Cambridge, 1881) – VO3 – in bogs.
Palliduphantes insignis (O. Pickard-Cambridge, 1913) – MT2, MT5, VI8 – in a wide range of habitats; the species regularly lives in the deeper part of the cellar for tokaj wine.
Palliduphantes pallidus (O. Pickard-Cambridge, 1871) – BT5, PO2, VO3 – damp forests, caves.
Panamomops mengei Simon, 1926 – BT5, BT8, CE2, KC12, PO2 – deciduous forests (detritus).
Panamomops sulcifrons (Wider, 1834) – CE1, SNM1, SNM2, VT5 – deciduous forests (humid conditions).
Panamomops inconspicuus (Miller & Valešová, 1964) – LA7, SO7 – xerotherms.
Pelecopsis elongata (Wider, 1834) – SNM2 – rock steppes, forests (rock sufface, moss, detritus).

Pelecopsis parallela (Wider, 1834) – LE3, SB5, SNM2 – open dry and also humid habitats (detritus).
Pelecopsis radicicola (L. Koch, 1872) – BR1, VT6 – oak forests (detritus).
Pocadicnemis juncea Locket & Millidge, 1953 – MH9 – open, humid areas.
Pocadicnemis pumila (Blackwall, 1841) – KA3, MT3, MT7, VT6, ZE2, ZE4 – abundant species, deciduous forests (grass, moss).
Porrhomma campbelli F. O. Pickard-Cambridge, 1894 – SB11 – under stones.
Porrhomma microphthalmum (O. Pickard-Cambridge, 1871) – LE13, MH9, VC5, VI3, VT5 – abundant species, various open habitats (leaf litter, grass).
Porrhomma microps (Roewer, 1931) – BT10, CE2 – troglophile species.
Porrhomma oblitum (O. Pickard-Cambridge, 1871) – BT10 – alluvial habitats.
Porrhomma pygmaeum (Blackwall, 1834) – BT5, KC3, LE3, LE8, PT1, SB5, SB11, SNM1, SNM2, SO2, VI2, VI6, VO3 – very abundant species wetlands, floodplains (leaf litter, detritus, herb vegetation and bushes).
Prinerigone vagans (Audouin, 1826) – SNM2 – rare species, in open xerotermic habitats.
Saloca diceros (O. Pickard-Cambridge, 1871) – CE1, CE2, CE4 – deciduous forests (leaf litter, detritus).
Sintula retroversus (O. Pickard-Cambridge, 1875) – SNM2 – very rare species, in Slovakia known only from historical record.
Sintula spiniger (Balogh, 1935) – LA6 – open deciduous forest (leaf litter).
Stemonyphantes lineatus (Linnaeus, 1758) – SNM2, VI2, VI3 – open xerothermic grasslands (grass).
Talussia experta (O. Pickard-Cambridge, 1871) – MH9 – meadows, forest edges (moss).
Tapinocyba insecta (L. Koch, 1869) – KC12, LE3, MH9, PO2, SNM2, VI2 – deciduous forests (leaf litter, detritus).
Tapinopa longidens (Wider, 1834) – CE1 – sunny, dry forest edges and decidous forests (ground layer).
Taranucnus setosus (O. Pickard-Cambridge, 1863) – BO1 (Thomka 2001) – wetlands, swamps (sedge).
Tenuiphantes cristatus (Menge, 1866) – BT10, CE1, CE2, PO2 – in deciduous forests (litter layer).
Tenuiphantes flavipes (Blackwall, 1854) – BT4, BT8, CER1, LA6, PO2, SB11, SNM2, VI5 – in deciduous forests (litter layer).
Tenuiphantes mengei Kulczyński, 1887 – MT5, SB2, SNM2, VT5 – open and also forest habitats (in leaf litter, in moss, under stones).
Tenuiphantes tenebricola (Wider, 1834) – CER1 – deciduous forests (litter layer).
Tenuiphantes tenuis (Blackwall, 1852) – VC5 – wide range of open habitats.
Theonina cornix (Simon, 1881) – SNM1, SNM2 (Chyzer & Kulczyński 1891; Miller & Weiss 1979) – in forest steppe and rock steppes (grass, rock, shrubs).
Theonina kratochvili Miller & Weiss, 1979 – SNM1 – dry and warm grasslands (on open ground).
Thyreosthenius parasiticus (Westring, 1851) – MTR1, SNM2, VK13 – wide variety of habitats (scree slopes, deciduous forests, etc.) with stable microclimatic conditions (detritus, under bark, scree).

Tiso vagans (Blackwall, 1834) – MTR3 – in open, humid localities, clay-sandy bank of rivers.
Trematocephalus cristatus (Wider, 1834) – KC2, SNM2, ZE1, ZE5 – forests and open habitats (on trees, shrub and herb vegetation).
Trichoncus affinis Kulczyński, 1894 – SNM2, VT5 – in dry and warm localities amongst low vegetation.
Trichoncus hackmani Millidge, 1955 – VI3 – rock steppes (grass, under stones).
Trichoncus saxicola (O. Pickard-Cambridge, 1861) – SO2 – occurs mainly on xeroterm grassland, (in moss and grass).
Trichopterna cito (O. Pickard-Cambridge, 1872) – BR1, LE3 – xerothermic habitats (grass).
Troxochrus scabriculus (Westring, 1851) – MTR3, SNM2 – in open habitats (sparse grass, detritus).
Walckenaeria alticeps (Denis, 1952) – BT5, SM3 – shadowed, damp habitats.
Walckenaeria antica (Wider, 1834) – BR1, SNM2 – open and forest habitats.
Walckenaeria capito (Westring, 1861) – RA1 – xerotherms, heathlands, forest margins.
Walckenaeria cucullata (C. L. Koch, 1836) – CE2, LE3 – forests (leaf litter, detritus).
Walckenaeria dysderoides (Wider, 1834) – BR1, BT5, BT10, SNM2 – forests (in leaf litter, moss, detritus).
Walckenaeria furcillata (Menge, 1869) – BR1, VI5 – warm habitats in forests (grass, detritus).
Walckenaeria mitrata (Menge, 1868) – CE1, SNM2 – forests (moss, detritus).
Walckenaeria nudipalpis (Westring, 1851) – BE3, BO3, BT10, KC8, SB11, SM3, SNM2, VO3 – humid floodplain forests, swamps (moss).
Walckenaeria obtusa Blackwall, 1836 – SNM2 – humid forests (moss, grass).
Walckenaeria simplex (Chyzer, 1894) – CE1 – oak forests (leaf litter).
Walckenaeria unicornis (O. Pickard-Cambridge, 1861) – BO1 (Thomka 2001) – wetlands, swamps (detritus).
Walckenaeria vigilax (Blackwall, 1853 – SB5 – wetlands, wet meadows, swamps (grass).

Liocranidae
Agroeca brunnea (Blackwall, 1833) – KC13 – wide variety of habitats.
Agroeca cuprea Menge, 1873 – MH3, MH9, SB9, SO7, VO3 – dry forests, dry meadows, steppes (under stones, detritus).
Apostenus fuscus Westring, 1851 – CE2, LA2 – forests, forest steppes, quarries, caves (under stones, leaf litter).
Liocranoeca striata (Kulczyński, 1882) – BE3, BT4, BT5, BT8, MH9, SB11,VTR4 – wetlands, forests (scree slopes, quarries, detritus).

Lycosidae
Alopecosa aculeata (Clerck, 1757) – BO1 (Thomka 2001), LA3, MTR4, VT6 – open areas, forest edges (moss, litter layer).
Alopecosa cuneata (Clerck, 1757) – BR1, LA6, LE6, MTR4, VC2, VC5, VI4 – steppes, open areas, forest edges.
Alopecosa farinosa (Herman, 1879) – BR1, KC4, KC5, LA4, SB9, SI1, VC5, VI3 – open xeroterm habitats, mainly on rocky grounds.

Alopecosa mariae (Dahl, 1908) – BR1, CE5, KA4, KC4, KC10, RA1, SO7, VC5, VI3 – dry rock steppes.
Alopecosa pulverulenta (Clerck, 1757) – MTR4 – open habitats.
Alopecosa schmidti (Hahn, 1835) – SO4, VC5 – dry sand and rock steppes.
Alopecosa solitaria (Herman, 1876) – CE5, LA3, VC2, VI3 – rock steppes and dry meadows.
Alopecosa striatipes (C. L. Koch, 1837) – VC5 – on rock steppes and forest edges.
Alopecosa sulzeri (Pavesi, 1873) – KC4, VI1 – forest steppes.
Alopecosa trabalis (Clerck, 1757) – MT6, MTR2 – open sunny habitats, steppes and forest edges.
Arctosa leopardus (Sundevall, 1833) – KC2 (Kůrka 1998), LE5, LE6, LE7, VK2, VTR2 – in humid habitats such as wet meadows, pond margins, swamps (moss, humid ground litter).
Arctosa maculata (Hahn, 1822) – MTR1, VC2 – near flowing water (under stones).
Arctosa perita (Latreille, 1799) – MH6, VC4 – on sand dunes.
Arctosa stigmosa (Thorell, 1875) – MTR3 – sand localities near water.
Aulonia albimana (Walckenaer, 1805) – BR1, BT1, KY1, LA2, LA3, LA4, MT4, SB9, VC2, VI3, VI5, VK13, VT5, ZE2, ZE4 – rock steppes, dry meadows and forest edges (moss, under stones).
Hogna radiata (Latreille, 1817) – LE5 – warm, dry sand steppes and open areas.
Lycosa singoriensis (Laxmann, 1770) – LE7, MH7 (Ponec 1989) – sandy river banks, sand steppes.
Pardosa agrestis (Westring, 1861) – KU7, LE2, MTR1, SO3, VK13 – very abundant, various open habitats.
Pardosa alacris (C. L. Koch, 1833) – KC12, LA6 – deciduous forests.
Pardosa amentata (Clerck, 1757) – BO3, KC5, KC8, LE11, LE7, MTR1, MTR4, VI1, VTR2 – very abundant, different types of wetlands.
Pardosa bifasciata (C. L. Koch, 1834) – SO7 – meadows, dry areas
Pardosa hortensis (Thorell, 1872) – KC4, KY1, VC2, VI7, VK13 – different types of open areas (meadows, gardens, rock steppes etc.).
Pardosa lugubris (Walckenaer, 1802) – BE3, BO1 (Thomka 2001), BO3, BT1, BT5, CP1, KC5, KY1, MB1, MH3, MH9, PO2, SB11, SM3, VI1, VI5, VK2, VK8, VK13, VO3, VT4, VT6, ZE2, ZE4 – very abundant, in forest edges and in light forests.
Pardosa monticola (Clerck, 1757) – LE2 – xeroterm habitats and their edges.
Pardosa nebulosa (Thorell, 1872) – LE7, VK8 – very rare species, found in area of abandoned brickfield (Fig.8).
Pardosa paludicola (Clerck, 1757) – BT1, MH9, VK13 – wetlands.
Pardosa palustris (Linnaeus, 1758) – LE6, MT4, MTR4, SO3, VT6 – open, dry areas.
Pardosa poecila (Herman, 1879) – SNM2 (Herman 1879) – first described in 1879 by Herman and found only in Hungary and Slovakia, in Slovakia it is known only from historical record.
Pardosa prativaga (L.Koch, 1870) – BO1 (Thomka 2001), BO3, BT1, LE1, LE6, MH9, MTR1, PT1, SO5, ST2, VK2, VK13 – wetlands and meadows.
Pardosa pullata (Clerck, 1757) – VO3, VTR2 – forests, forest edges, meadows.
Pardosa riparia (C. L. Koch, 1833) – SO3 – forests, rock steppes, wet meadows.
Pirata piraticus (Clerck, 1757) – BO1 (Thomka 2001), BO3, CI1, LE5, PA1, SO5, VK13, VTR2 – bogs and wetlands (near water, on water surface).

Pirata piscatorius (Clerck, 1757) – BO3, KC8, LE5, PA1, VK2 – bogs and wetlands (near water, on water surface).
Piratula hygrophila (Thorell, 1872) – BE3, BE4, BO1 (Thomka 2001), BO3, BT5, BT7, KC5, LE5, MH9, MTR4, PO2, PT1, VO3, VT6 – humid habitats, bog forests, near water.
Piratula latitans (Blackwall, 1841) – LE7, PO2 – wetlands.
Trochosa robusta (Simon, 1876) – MB1, SO7, VC2, VI3, VK13 – warm, steppic localities.
Trochosa ruricola (De Geer, 1778) – BT7, LE5, LE7, MH9, MTR1, MTR3, OB2, SB11, SO7, VI4, VI8, VO3 – open habitats, accidentaly in cellar for tokaj wine (at entrance).
Trochosa spinipalpis (F. O. Pickard-Cambridge, 1895) – BE3, BT1, BT5, BT10, MTR4, PO2, PT1, SB11 – wet meadows and other humid habitats.
Trochosa terricola (Thorell, 1856) – CE1 (Kůrka 1998), BR1, CE2, LA2, LA6, SO7, VC5, VI3, VO3, VI4, VR3 – forest edges.
Xerolycosa miniata (C. L. Koch, 1834) – KC4, LE6, LE7, MH3, SO3, ST1, VC4, VK13, VO2 – widespread species, sand and rock steppes with pure vegetation, sand pits, etc.
Xerolycosa nemoralis (Westring, 1861) – KA2, MTR1, VT6 – sunny oak forests and dry open habitats.

Mimetidae
Ero aphana (Walckenaer, 1802) – LE4, SB6, VI2 – in warmer areas (on bushes at coniferous forest edges).
Ero furcata (Villers, 1789) – CE2, LA5, SNM2, SO7, VI2, VR6 – various open and forest habitats (detritus, moss and also on trees, bushes and shrubs near the ground).

Miturgidae
Zora silvestris Kulczyński, 1897 – SB4, ZE2 – forests, open habitats.
Zora spinimana (Sundevall, 1833) – BT1, PO2 – forests, open habitats.

Nesticidae
Kryptonesticus eremita (Simon, 1880) – VK11 – in caves and cellars. Only one record from Slovakia from the inside of building (Gajdoš et al. 2018; Szinetár et al. 2020)
Nesticus cellulanus (Clerck, 1757) – MT5, VI8, SNM2 (Szombathy 1917) – in cellars (including also a cellar for Tokaj wine), caves and basements, in screes, on walls, sporadically in forests.

Oxyopidae
Oxyopes ramosus (Martini & Goeze, 1778) – CI1, VK2, VK13 – xeroterm habitats, swamps (on herb vegetation and shrubs).

Philodromidae
Philodromus albidus Kulczyński, 1897 – BT2, VK2, ZE5 – forest steppes, parks, orchards (on shrubs, trees).
Philodromus aureolus (Clerck, 1757) – BO1, BT1, LA3, MB1, MH3, MT3, SB8, VI1, VT4, VT5, VT6, ZE2, ZE4, ZE5 – forest edges, grasslands, orchards (on vegetation).

Philodromus cespitum (Walckenaer, 1802) – BT1, KC2, MT7, SB9, VK13 – wide variety of open habitats (on vegetation).
Philodromus dispar Walckenaer, 1826 – KC13, KY1, MB1, VT3, VT5, VT6, ZE1 – forests and their edges (on vegetation).
Philodromus margaritatus (Clerck, 1757) – VK13 – deciduous forests (on tree trunks).
Philodromus marmoratus Kulczyński, 1892 – LE2 (Kubcová 2004) – lowland forests (Bryja et al. 2005).
Philodromus rufus Walckenaer, 1826 – KC5, MTR1 – forest edges (on bushes).
Rhysodromus histrio (Latreille, 1819) – ZE5 – forest edges (on bushes).
Thanatus arenarius L. Koch, 1872 – BR1, LA3, SB9, SO3, SO7 – steppes (ground level).
Thanatus formicinus (Clerck, 1757) – KY1, VI1, VT6 – xerotherms (ground level).
Thanatus sabulosus (Menge, 1875) – VT4 – forest steppes, forest edges (ground level).
Thanatus striatus C. L. Koch, 1845 – VK10, VK2 – wetlands (among grass, detritus).
Thanatus vulgaris Simon, 1870 – VC5 – synanthropic, dry steppes.
Tibellus macellus Simon, 1875 – LE14, LE7 – rock steppes (among grass).
Tibellus maritimus (Menge, 1875) – BO3, KC8, KK1 – sunny places in wetlands (among grass near water).
Tibellus oblongus (Walckenaer, 1802) – CE5, CER2, KC2, MH3, MH5, MT3, MTR1, SO5, VC3, VK2, VK13, ZE2 – wide variety of open habitats (among grass).

Pholcidae
Pholcus opilionoides (Schrank, 1781) – KK1, KL1, LA2, MH4, PR2, SB9, VC5, VI4, VI5, VK4, VR1, VR3, ZA1, ZA2 – under rocks, in quarries, in hollow trees, in the ground layer in the forest, synantropicaly in basements.
Pholcus phalangioides (Fuesslin, 1775) – LE12, OB2, SB6, VI5, VI8, VK3, VK5, VK6, VK9, VK11, VR1, VR3, VR6, ZA1, ZA2 – synanthropic species, originally troglophile species - species of Asian origin.
Pholcus ponticus Thorell, 1875 – VR1 – synanthropic east Palearctic species (from Ukraine, Romania, Bulgaria to China), spreding in central Europe, garage in Veľké Raškovce is first record on Slovak territory (Szinetár et al. 2020; Gajdoš et al. in prep).

Phrurolithidae
Phrurolithus festivus (C. L. Koch, 1835 – BR1, BT1, BT4, BT5, BT8, KC2, MH9, SM3, SO7, VC3, VI3, VK13, VO3, VTR4, ZE2, ZE4 – very abundant in sunny and dry habitats (grass, detritus).
Phrurolithus pullatus Kulczyński, 1897 – LA3, MT4, SB4, VC5, VI3 – steppes, open forests.
Phrurolithus szilyi Herman, 1879 – LA2, SB4, SB9 – rock steppes, dry meadows.

Pisauridae
Dolomedes fimbriatus (Clerck, 1757) – LE5, LE8 – wetlands, near water, on water surface.
Dolomedes plantarius (Clerck, 1757) – CP1, KK2, PA1, VK2 – wetlands, near water, on water surface (Fig.9).
Pisaura mirabilis (Clerck, 1757) – BO1, CI1, CP1, KC6, KC13, KK1, KY1, LE11, MH3, MT3, OB1, SB4, SB6, SB9, SO1, VC5, VI4, VK2, VK6, VK13, VR1, VR3, VT6, ZE2, ZE4 – wide variety of open habitats.

Salticidae

Asianellus festivus (C. L. Koch, 1834) – MH9, VI3, VI1 – steppes (among grass).
Attulus floricola (C. L. Koch, 1837) – CI2, KC2, PA1 – wetlands (on vegetation).
Attulus pubescens (Fabricius, 1775) – VC5, VK10, VK13 – scree, rocks, buildings (on walls and bark).
Attulus rupicola (C. L. Koch, 1837) – BO1 – subalpine habitats (among grass, under stones).
Attulus saltator (O. Pickard-Cambridge, 1868) – SB9 – in steppe meadows and forest edges (on vegetation).
Attulus zimmermanni (Simon, 1877) – VO2 – sandy and rock steppes.
Ballus chalybeius (Walckenaer, 1802) – BT1, BT2, BT9, KY1, MT4, MT7, MTR5, SB9, VK13, VT4, VT5, ZE1, ZE4, ZE5 – forests edges (on shrubs).
Carrhotus xanthogramma (Latreille, 1819) – BT1, KY1, MB1, VT4, VT5, ZE1, ZE4, ZE5 – xerotherms (tree trunks).
Euophrys frontalis (Walckenaer, 1802) – BR1, KC2, MT3, SB1, SB9 – forests (in moss, leaf litter, low vegetation, under stones).
Evarcha arcuata (Clerck, 1757) – BT1, CP1, KY1, MB1, MH3, MTR2, SB9, SO7, VK13, ZE2, ZE5 – open habitats (on vegetation).
Evarcha falcata (Clerck, 1757) – KC13, KK1, MT7, VT5, VT6, ZE5 – forests, open habitats (on vegetation, on litter).
Evarcha laetabunda (C. L. Koch, 1846) – MB1 – rock steppes (on vegetation).
Heliophanus aeneus (Hahn, 1831) – KA3, SV2 – scree, rocks, tree trunks.
Heliophanus auratus C. L. Koch, 1835 – BT1, SO1, VTR1, ZE2 – wetlands also on xeroterm habitats (at ground level and also on vegetation).
Heliophanus cupreus (Walckenaer, 1802) – CI1, KA3, KY1, MB1, MH3, MT3, MT4, MT7, MTR5, SB9, SO7, SV2, VI1, VT5, ZE2, ZE4, ZE5 – forests, forest edges, open areas (on vegetation).
Heliophanus flavipes (Hahn, 1832) – KK1, MTR2, MTR5, ST1, VC3, VK13, ZE1, ZE4 – rock steppes and other xeroterm habitats (on vegetation).
Heliophanus kochii Simon, 1868 – VI3 – rare species found in xeroterm habitats on plants and flowers (e.g. rose and hawthorn bushes).
Heliophanus simplex Simon, 1868 – VI1 – very rare species found in xeroterm habitats on vegetation.
Leptorchestes berolinensis (C. L. Koch, 1846) – VI1, VK10 – forest edges (on vegetation) (Fig.10).
Macaroeris nidicolens (Walckenaer, 1802) – BT1, KY1, MB1, MT7, MTR1, MTR5, VT3, VT4, ZE1, ZE5 – sand dunes and other xeroterm habitats (in the crown of big conifers).
Marpissa muscosa (Clerck, 1757) – BO3, CP1, KC5, KC8, MTR1, VI5, VK13, ZE5 – under bark on tree trunks.
Marpissa pomatia (Walckenaer, 1802) – BO1 – wetlands, swamps (on vegetation).
Mendoza canestrini (Ninni, 1868) – SB8 – reed swamps, among the reeds near water (Fig. 11).
Myrmarachne formicaria (De Geer, 1778) – LE5, VT5, VT6 – wide variety of open wet and dry habitats (on vegetation).
Neon reticulatus (Blackwall, 1853) – LE4 – forests (moss, leaf litter, detritus).
Pellenes nigrociliatus (Simon, 1875) – LA2, VC5, VI3 – xerotherms (snail shells).

Pellenes tripunctatus (Walckenaer, 1802) – MT3 – rocky steppes.
Phlegra fasciata (Hahn, 1826) – BR1, KY1, VI1 – sunny, dry localities (among grass).
Pseudeuophrys obsoleta (Simon, 1868) – LA2, LA3, VC5, VI3 – rocky steppes.
Pseudeuophrys vafra (Blackwall, 1867) – SNM1 – unknown biology, only historical record.
Pseudicius encarpatus (Walckenaer, 1802) – VI5, VK6 – forests, parks (under bark and stones).
Salticus cingulatus (Panzer, 1797) – KA5, LA2, LE13, VI3 – open habitats, forest edges (on bark, rarely on walls of buildings).
Salticus scenicus (Clerck, 1757) – MB1, VC5, VI3, VK13 – walls, trunks (in sunny walls and rocks, rarely on bark).
Salticus zebraneus (C. L. Koch, 1837) – CP1, MT3, SB9, VI5, VK13 – open areas, forests (on walls and bark).
Sibianor aurocinctus (Ohlert, 1865) – MH3 – dry localities (on litter, moss, low vegetation).
Synageles hilarulus (C. L. Koch, 1846) – MT4 – xerotherms (among grass).
Synageles venator (Lucas, 1836) – VT3 – xerotherms (on vegetation).
Talavera aequipes (O. Pickard-Cambridge, 1871) – VI5 – xerotherms, rocky steppes, sandy habitats and sunny lowland forest edges (at ground level).
Talavera aperta (Miller, 1971) – BR1 – dry habitats.
Talavera thorelli (Kulczyński, 1891) – SNM1 – forests, meadows, only one very old record.

Scytodidae
Scytodes thoracica (Latreille, 1802) – LE12, MT5, VK3, VI8, VK9, ZA1 – synantropic species, rare on the whole territory, especially in human settlements and in the cellar for Tokaj wine.

Sparassidae
Micrommata virescens (Clerck, 1757) – SB9, VT6, ZE2 – sunny and warm localities (on vegetation).

Tetragnathidae
Metellina mengei (Blackwall, 1869) – BO1 (Thomka 2001), VT5, VT6, ZE1 – open forests, forest edges (on vegetation).
Metellina merianae (Scopoli, 1763) – VK7 – on rocks, caves, scree forests.
Pachygnatha clercki Sundevall, 1823 – MT5, VC6, VK8, ZE3 – wetlands, damp meadows (detritus), the record for MT5 is from the deeper part of the cellar for Tokaj wine (accidental occurrence).
Pachygnatha degeeri Sundevall, 1830 – KC13, LA6, LE9, MH9, PO2, SB11, VC1, VK13 – in fields, meadows and gardens (detritus).
Pachygnatha listeri Sundevall, 1830 – BT10, MH9, PO2, PT1, SB11, VT5 – wetlands, humid forests (leaf lotter, grass).
Tetragnatha extensa (Linnaeus, 1758) – CP1, KU7, VK13, – humid, open habitats (on vegetation edges).
Tetragnatha montana Simon, 1874 – BO1 (Thomka 2001), BT2, MTR1, VK2 – humid localities near water (on vegetation).

Tetragnatha nigrita Lendl, 1886 – BO1, VK12 – humid localities near water (on shrubs, trees).
Tetragnatha obtusa C. L. Koch, 1837 – MTR2, SB11 – forests, wetlands (on shrubs, trees).
Tetragnatha pinicola L. Koch, 1870 – KC11, KU1, VT5, ZE2 – forests, forest edges (on vegetation).

Theridiidae
Anelosimus vittatus (C. L. Koch, 1836) – SNM2, VI2 – on trees and bushes in sunny forest edges, also in orchards.
Asagena phalerata (Panzer, 1801) – KC3, KY1, SB5, SB9, SNM2, VC5, VI2, VI3 – in sunny dry open places (on the ground).
Crustulina guttata (Wider, 1834) – SNM2 – in open forest areas (on the ground).
Crustulina sticta (O. Pickard-Cambridge, 1861) – SNM1, SNM2 – in bogs and swamp lands.
Cryptachaea riparia (Blackwall, 1834) – MH5, MT3, SB4, SNM2 – sunny forest edges, walls, rocks.
Dipoena braccata (C. L. Koch, 1841) – SNM2 – in warmer areas (on lower twigs of pines).
Dipoena erythropus (Simon, 1881) – SNM2 (Chyzer & Kulczyński 1894; Balogh & Loksa 1946) – on xerotermic localities (on the ground).
Dipoena melanogaster (C. L. Koch, 1837) – RU1, SB4, SNM2, VI1, VI2, VT4, VT5 – in sunny forest edges (on the ground or on lower twigs of bushes and trees).
Dipoena nigroreticulata (Simon, 1879) – SNM2 – in warm forest edges and hedges (on bark and in canopy region).
Enoplognatha ovata (Clerck, 1757) – CE1, CP1, KC9, MT3, SB5, SNM2, SO1, SO2, VK13, VT5, ZE5 – in sunny places (dense plant growth) (Fig. 13).
Enoplognatha thoracica (Hahn, 1833) – MT3, SB9, VI1, VI9, VO2, VT4 – in very warm and sunny places (wide variety of habitats).
Episinus angulatus (Blackwall, 1836) – KC5, VT4, VT6 – in damp habitats (on shrubs, bushes, near the ground).
Episinus truncatus Latreille, 1809 – SNM2 – on shrubs and small bushes near the ground.
Euryopis flavomaculata (C. L. Koch, 1836) – BT4, BT8, CE1, LE3, VI3, VK11, VO3 – in forests, heathlands, raised bogs, vineyards, among moss and litter.
Heterotheridion nigrovariegatum (Simon, 1873) – KC4, SB4, VT4 – in very warm localities (on shrubs).
Lasaeola coracina (C. L. Koch, 1837) – VI3 – on xerotermic localities (on low plants).
Lasaeola prona (Menge, 1868) – SNM1, SNM2, SO2, VTR3 – in sunny forest edges (on the ground or on low plants).
Neottiura bimaculata (Linnaeus, 1767) – CI1, KC13, KU1, KY1, LA2, MH3, MT3, MT7, MTR2, SI1, SB9, SNM2, VC3, VT4, VT5, VT6, ZE2, ZE4, ZE5 – widespread very abundant species in open and forest habitats (on grass and herb vegetation).
Neottiura suaveolens (Simon, 1879) – BR1, LE2, MT3, MT4, SI1, VC5, VI3 – in sunny localities (on vegetation, shrubs and bushes).
Parasteatoda lunata (Clerck, 1757) – BT1, SNM2, VI1, VI2 – forests, on tree trunks or branches.

Parasteatoda tepidariorum (C. L. Koch, 1841) – KL1, PR1, PR3 – alien species, synanthropicaly in buildings.

Pholcomma gibbum (Westring, 1851) – SNM2 – in forest edges, scree forest (under stones and in moss).

Phylloneta impressa (L. Koch, 1881) – BA, BO2, CI1, SNM2, VT2 – in forest edges, meadows and ruderal areas (on shrubs and bushes).

Phylloneta sisyphia (Clerck, 1757) – BT1, KA3, LE3, SNM2, SV2, VI2 – in sunny, sandy or swampy localities (on heath or on other plants).

Platnickina tincta (Walckenaer, 1802) – SNM2, VT4, ZE1 – in warm, dry meadow (in litter layer).

Robertus arundineti (O. Pickard-Cambridge, 1871) – BT1 – in damp forest edges and in bogs (near the ground).

Robertus lividus (Blackwall, 1836) – BE3, CE1, KC12, KK1, LA3, MH9, MTR5, SNM2, VC5, VE2, VO3, VT5 – in forests (in moss and leaf litter).

Robertus neglectus (O. Pickard-Cambridge, 1871) – CE1 – in forest edges (in moss and leaf litter).

Sardinidion blackwalli (O. Pickard-Cambridge, 1871) – KY1, – forests, on tree trunks and under bark.

Simitidion simile (C. L. Koch, 1836) – BT3, MB1, MT3, SNM2, VI1, VI2 – in forests, gardens, dry meadows, dunes etc. (on low vegetation).

Steatoda albomaculata (De Geer, 1778) – LA3, MT4, SB5, SNM2, VI2, VK9, VK13 – in dry and sunny localities (scarce vegetation near the ground).

Steatoda bipunctata (Linnaeus, 1758) – KK1, LE3, MTR1, SNM2, SO2, VI2, VK9 – synanthropic species, originally on bark and on rocks.

Steatoda castanea (Clerck, 1757) – LE3, SNM2, VE2, VI2, VK9 – synanthropic species, rare in warm forest edges (under bark).

Steatoda triangulosa (Walckenaer, 1802) – LE12, MR1, OB1, PR2, PR3, VK3, VK6, VK9, VR1, VR3, VR4, VR5, ZA1, ZA2 – only synanthropic in central Europe, originally in caves, dunes, littoral salty areas, etc.

Theridion hemerobium Simon, 1914 – BO4 – near water (river banks, pond littorals, sides of lakes, bridges on rivers etc.). This species was described from Bol' by Kasal as a new species *T. antusi* Kasal, 1982 which presently is a new synonym (World Spider Catalog, 2020).

Theridion melanurum Hahn, 1831 – PR3 – found in houses (inside of buildings, in crevices and mural chinks).

Theridion pictum (Walckenaer, 1802) – BO1 (Thomka 2001), BT1, CP1, KC2, KU8, MTR1, MTR5, VI1, VK2, VK13, ZE5 – in wet habitat-wetlands, meadows (on herb and bushy vegetation).

Theridion pinastri L. Koch, 1872 – CE1, VI5, ZE5 – in forests and forest edges, moist meadows, marshes,on river banks (on low vegetation).

Theridion varians Hahn, 1833 – BT2, CE1, KA5, SB5, SNM2, VI2, VT3, VT4, ZE5 – on plants and bushes, on buildings.

Thomisidae

Bassaniana baudueri (Simon, 1877) – SNM1 – on trees (under bark).
Cozyptila blackwalli (Simon, 1875) – BT11 – stony grasslands (under stones, among grass).
Diaea dorsata (Fabricius, 1777) – KY1, VT4, VT5, ZE5 – forests (leaves of trees and bushes).
Ebrechtella tricuspidata (Fabricius, 1775) – BO3, BT1, KA5, KC5, KC8, LA1, LE2, LE4, MB1, MT3, MTR2 (Prídavka), MTR5, SB9, SB11, SV2, VI1, VTR1, ZE5 – in dry meadows, an sunny forest edges, steppes (on vegetation).
Misumena vatia (Clerck, 1757) – CI1, CP1, KC7, KY1, MB1, SB9, VK12, VK2, VK8, VK13, VT5, ZE1, ZE2, ZE4 – in dry meadows, in sunny forest edges (on flowers).
Ozyptila atomaria (Panzer, 1801) – BR1, SO7 – humid places (moss, under stones).
Ozyptila claveata (Walckenaer, 1837) – BR1, MB1, SO7, VC5 – rock steppes, dry meadows (among grass).
Ozyptila praticola (C. L. Koch, 1837) – BE3, BT4, BT8, BT10, KK1, PO2, PT1, SB1, VK13, VO3, VTR4 – various forests habitats.
Ozyptila pullata (Thorell, 1875) – SO7 – dry meadows (among vegetation).
Ozyptila scabricula (Westring, 1851) – SO7, VC7, VI3 – rocky steppes (under stones, among grass).
Ozyptila trux (Blackwall, 1846) – BR1, MH9, SM3 – various types of habitats.
Pistius truncatus (Pallas, 1772) – VT4, ZE5 – forest steppes, forest edges (on bushes and lower tree branches).
Psammitis ninnii (Thorell, 1872) – SB4 – forest steppes (among grasss).
Runcinia grammica (C. L. Koch, 1837) – BO2, LA1, MT1 – xeroterm habitats (in grass and on bushes).
Spiracme striatipes (L. Koch, 1870) – SO7, VC1, VC5 – xerotherm habitats (on vegetation, under stones).
Synema globosum (Fabricius, 1775) – BT1, KK1, KY1, LE4, VK12, VK13, VK14, VT4, VT5 – frequent in open dry and wet habitats, forest edges (mainly on flowers and leaves) (Fig.13).
Thomisus onustus Walckenaer, 1806 – KC2, LA3, MT1, MT3, SB1, SB4, SB9, SO3, VC1 – rocky steppes and other xeroterm open habitats (mainly on flowers).
Tmarus piger (Walckenaer, 1802) – BT1, BT2, CP1, KC4, MB1, MH5, SB9, VK2, VT4, VT5 – forest steppes, forest edges (on vegetation) (Fig.14).
Xysticus acerbus Thorell, 1872 – VC5 – rocky steppes (among grass).
Xysticus audax (Schrank, 1803) – MH1, MTR1 – forests, open areas (on vegetation).
Xysticus cristatus (Clerck, 1757) – BR1, MH5, MT3, SI1, VT5 – open habitats (among grass).
Xysticus erraticus (Blackwall, 1834) – BR1 – heatlands, semi-dry meadows (in low vegetation, under stones).
Xysticus kochi Thorell, 1872 – BT1, MB1, MT3, MTR1, SB4, SB9, ST1, VI1 – open areas (among grass).
Xysticus lanio C. L. Koch, 1835 – BT1, KK1, KY1, LE4, MT7, VT4, ZE1, ZE2, ZE4, ZE5 – in forests (on vegetation).
Xysticus luctator L. Koch, 1870 – LA3 – forest steppes (among grass, on bushes).
Xysticus ulmi (Hahn, 1832) – BT1, KC5, KK1, KY1, MT3, MTR1, VK13, VK2, ZE1, ZE2 – wetlands (on vegetation).

Fig. 3 *Araneus quadratus – typical species of orb weavers of the Latorica wetlands living on herb vegetation. Figure from Labaška wetlands near Veľké Kapušany (photo: M. Dobránsky).*

Fig. 4 *Eresus moravicus – protected species with rare occurrence in rocky steppes and sandy habitats in the studied area (photo: A. Šestáková).*

Fig. 5 *Cheiracanthium punctorium – "seriously" venomous spider, it is probably a rare species in the study area, only known from four warm open localities (on grass). Veľké Kapušany (photo: M. Dobránsky).*

Fig. 6 *Diplostyla concolor – the most abundant species in the study area living in forest epigeon and in open habitats. Leles (photo: M. Dobránsky).*

Fig. 7 *Frontinellina frutetorum – dwarf spider lives in rock steppes in the study area (photo: M. Dobránsky).*

Fig. 8 *Pardosa nebulosa – very rare and redlisted wolf spider lives in the locality Tehelňa near Veľké Kapušany (photo: M. Dobránsky).*

Fig. 9 *Dolomedes plantarius – the great raft spider characteristic, redlisted and threatened species within the Latorica wetlands. Figure is from Labaška wetlands near Veľké Kapušany (photo: M. Dobránsky).*

Fig. 10 *Leptorchestes berolinensis – ant-like species belonging to the jumping spiders lives on sunny tree trunks, fences in different open types of habitats in the study area, e.g. in Veľké Kapušany, cemetery (photo: M. Dobránsky).*

Fig. 11 *Mendoza canestrinii – jumping spider lives in reed swamps, among the reeds near water. Figure is from Labaška wetlands near Veľké Kapušany (photo: M. Dobránsky).*

Fig. 12 *Enoplognatha ovata – widely distributed species in sunny places in the study area. Veľké Kapušany (photo: M. Dobránsky).*

Fig. 13 *Synema globosum – crab/flower spider frequently occurs mainly on flowers and leaves in open dry and wet habitats, forest edges of Latorica area, Veľké Kapušany, Udoč (photo: M. Dobránsky).*

Fig. 14 *Tmarus piger – crab/flower spider lives on vegetation in forest steppes and forest edges of Latorica region. Veľké Kapušany, Ortov (photo: M. Dobránsky).*

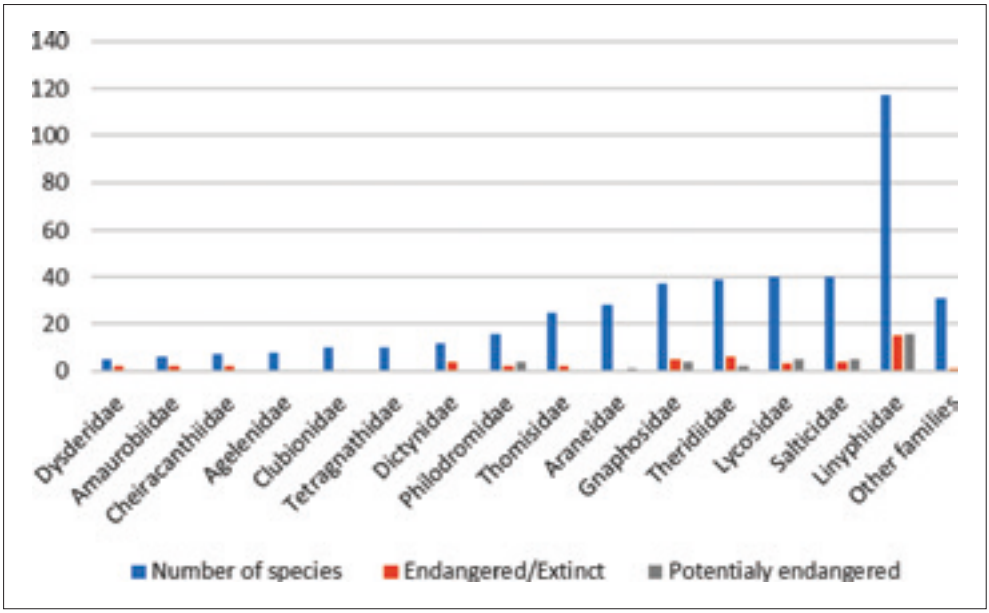

Fig. 2 *Representation of the number of species, endangered and potentionaly endangered species in families.*

Titanoecidae

Titanoeca quadriguttata (Hahn, 1833) – LA3, MT4, SB4, VI6 – xerotherms, rock steppes (under stones).

Titanoeca schineri L. Koch, 1872 – KC2, LA4, MT4, SO3, SO4, ST1, VC5, VI6 – xerotherms, rock steppes (under stones).

Zodariidae

Zodarion germanicum (C. L. Koch, 1837) – BR1, CE1, KY1, SI1, SNM2, VI5, VT4, VT5, xerotherms (among grass, under stones).

Zodarion rubidum Simon, 1914 – VK3 – found in human settlement on building.

Representation of families

The 431 species found belong to 30 families. The most represented species are Linyphiidae (117 species), Lycosidae (41), Salticidae (40 species), Theridiidae (39), Gnaphosidae (37), and Araneidae (28) (Fig. 2).

Species diversity in orographic units in time aspect

Based on the analysis of all available data (published and unpublished) for the last period (since 2000), the number of identified species in the area covered by the Latorica PLA increased by only 52 species. Most species were found in the third phase (287 species) but also many species were reported also in the first phase (176 species) where arachnological researchs only started. From the point of view of orographic units, most species are documented for

the Eastern Slovak Plain – Východoslovenská rovina (360 species) and slightly less for the Zemplínske vrchy Mts. (298 species). Relatively few species are probably from the East Slovak Uplands – Východoslovenská pahorkatina (10 species), but this orographic unit extends into the area of interest only very marginally (only a small part of Veľaty cadaster) and the location of these records is rough. Given the size of the area, we consider the Zemplínske vrchy Mts. to be better explored; there has been a greater tradition of research, especially in the past (Table 1).

Tab. 1. *Number of species in orographic units of the area within the scope of the PLA Latorica in individual stages of spider research. The code of orographic units is according to Databank of Slovakian fauna.*

Orographic units with code and summaries	Number of species				Sum	Number of records
	I. phase 1877-1918	II. phase 1918-1971	III. phase 1971-2000	IV. phase after 2000		
Eastern Slovak Plain (820)	73	77	206	239	360	1869
East Slovak Uplands (810)	10				10	10
Zemplínske vrchy Mts. (450)	149	1	185	24	298	758
Total number of species	**176**	**78**	**287**	**247**	**431**	
Increase in number of species	**176**	**235**	**379**	**431**	**431**	
Number of records	**309**	**132**	**1016**	**1180**	**2637**	**2637**

Conservation status

In the territory of south-eastern Slovakia within the scope of the Latorica PLA, the occurrence of 76 endangered and potentially endangered species of Slovak spiders has been documented and two of them are considered extinct (*Sintula retroversus* and *Trichoncus saxicola*). The species *Argenna patula*, listed as an extinct species of Slovak fauna, was found in the studied area during research in 2020 and will be reclassified into the category CR. Representation of species in individual IUCN Red List of Threatened Species categories is provided in Tables 2 and 3.

Tab. 2. *Number of species in different red list categories according to the Red List of Spiders of Slovakia (Gajdoš & Svatoň 2001). Explanations: CR - critically endangered, EN - endangered, VU - vulnerable, NT – near threatened, LC – least concern, EX - extinct, DD - species with insufficient data on their occurrence*

Red list of Slovakia	Category of threat							Total
	EX	CR	EN	VU	NT	LC	DD	
Number of species	2	6	14	26	11	15	12	86

Of the identified species, five species are nationally protected, namely *Arctosa perita, Arctosa stigmosa, Argyroneta aquatica, Cheiracanthium montanum* and *Dolomedes plantarius* (Decree of Ministry of Environment SR No. 158/2014). *Dolomedes plantarius* is also listed in the IUCN Red List in the vulnerable (VU) category (World Conservation Monitoring Center 1996). *Eresus moravicus* was added into the list of nationaly protected species in 2021.

Tab.3. *List of endangered and potentionally endangered species found in the investigated area and their red list categories.*

Red List	Species	Red List	Species	Red List	Species
EX	*Sintula retroversus*	VU	*Haplodrassus minor*	LR (nt)	*Walckenaeria simplex*
EX	*Trichoncus saxicola*	VU	*Cheiracanthium montanum*	LR (lc)	*Acartauchenius scurrilis*
CR	*Argenna patula*	VU	*Incestophantes crucifer*	LR (lc)	*Agyneta saxatilis*
CR	*Crustulina sticta*	VU	*Lasaeola prona*	LR (lc)	*Alopecosa mariae*
CR	*Dipoena nigroreticulata*	VU	*Lathys stigmatisata*	LR (lc)	*Alopecosa striatipes*
CR	*Dolomedes plantarius*	VU	*Marpissa pomatia*	LR (lc)	*Civizelotes gracilis*
CR	*Dysdera longirostris*	VU	*Mendoza canestrini*	LR (lc)	*Entelecara erythropus*
CR	*Micaria sociabilis*	VU	*Nematogmus sanguinolentus*	LR (lc)	*Ero aphana*
EN	*Allomengea vidua*	VU	*Pardosa nebulosa*	LR (lc)	*Haplodrassus kulczynskii*
EN	*Amaurobius erberi*	VU	*Porrhomma campbelli*	LR (lc)	*Heliophanus aeneus*
EN	*Amaurobius pallidus*	VU	*Prinerigone vagans*	LR (lc)	*Lasaeola coracina*
EN	*Attulus zimmermanni*	VU	*Runcinia grammica*	LR (lc)	*Lycosa singoriensis*
EN	*Centromerus capucinus*	VU	*Sardinidion blackwalli*	LR (lc)	*Moebelia penicillata*
EN	*Civizelotes pygmaeus*	VU	*Scotophaeus blackwalli*	LR (lc)	*Pseudicius encarpatus*
EN	*Gonatium rubens*	VU	*Synageles hilarulus*	LR (lc)	*Troxochrus scabriculus*
EN	*Cheiracanthium oncognathum*	VU	*Theonina kratochvili*	LR (lc)	*Zelotes longipes*
EN	*Panamomops inconspiicus*	VU	*Trichoncus hackmani*	DD	*Megalepthyphantes pseudocollinus*
EN	*Sintula spiniger*	VU	*Walckenaeria unicornis*	DD	*Oryphantes angulatus*
EN	*Taranucnus setosus*	VU	*Zelotes caucasius*	DD	*Panamomops mengei*
EN	*Thanatus sabulosus*	LR (nt)	*Alopecosa schmidti*	DD	*Panamomops sulcifrons*
EN	*Tibellus macellus*	LR (nt)	*Attulus saltator*	DD	*Pardosa alacris*
EN	*Xysticus albomaculatus*	LR (nt)	*Kaestneria pullata*	DD	*Philodromus albidus*
VU	*Altella biuncata*	LR (nt)	*Neoscona adianta*	DD	*Philodromus rufus*
VU	*Anelosimus vittatus*	LR (nt)	*Pelecopsis parallela*	DD	*Pocadicnemis juncea*
VU	*Arctosa perita*	LR (nt)	*Rhysodromus histrio*	DD	*Porrhomma microps*
VU	*Arctosa stigmosa*	LR (nt)	*Robertus neglectus*	DD	*Talavera aperta*
VU	*Argyroneta aquatica*	LR (nt)	*Sosticus loricatus*	DD	*Talavera thorelli*
VU	*Dipoena erythropus*	LR (nt)	*Thanatus striatus*	DD	*Walckenaeria alticeps*
VU	*Dysdera hungarica*	LR (nt)	*Theonina cornix*		

Conservation of spider communities and their species diversity

Based on the analysis of data at different time levels, it appears that in the study area there is significant disturbance of the natural environment present (significant drainage of wetlands, sand mining on sand dunes, degradation of xerothermic forest-steppe localities, etc.) and subsequent degradation of the original araneocenoses in a broader context. As stated in the work, out of 176 documented species for the period of Austro-Hungarian Monarchy (until 1918) and in other periods in more than 100 years, the occurrence of up to 71 species has not been confirmed, representing almost 40% of the previously known araneofauna. Of these, up to 26 species are endangered and potentially endangered and two species (*Sintula retroversus* and *Trichoncus saxicola)* are considered extinct. Unfortunately, in such an important area, monitoring of araneofauna is not performed in terms of biodiversity, as well as systematic monitoring of the occurrence of *Dolomedes plantarius* (Fig. 8), which is the only one of species in the IUCN Red List in the VU category (World Conservation Monitoring Center 1996). In the area of interest, we assume that this species has one of the most important populations in Slovakia. Many European countries have rescue programs in place for this species and populations are being monitored. In Slovakia, such a document is missing, and no species of spider is systematically monitored. Without long-term and systematic monitoring, it is not possible to adequately set the most appropriate type of practical measures needed for effective protection of spiders in this area. We can only assume that the negative impact of the use of chemicals and pesticides in agriculture has a significant negative impact, and efforts are needed in the future to reduce the effect and intensity of this threat. Restoration of the water regime, revitalization of streams and efforts to retain water in the open land are also important. In xerothermic habitats, active measures such as grazing and mowing are important to reduce non-native and invasive plant species and to maintain secondary succession to an acceptable level (e.g., in the Tarbucka area, Ladmovské vápence area). Although the situation has now improved by realization of projects in some areas, e.g., in the mentioned Tarbucka, but from the whole point of view it would be necessary to introduce such management in a larger volume and on a much larger scale in other localities. In the case of rare sand habitats, active management and disturbance is also needed, because these habitats are gradually disappearing under the influence of insufficient active land use, or, conversely, they are disappearing under the pressure of excessive sand extraction. Despite human intervention in the water regime through the construction of a system of canals, these man-made habitats also surprisingly often have suitable conditions for the life of rare animal communities, including spiders, and therefore their thorough and sensitive and long-term maintenance is essential. Efforts to restore the original Latorica dead arm network should be significant, which would gradually restore the country to its original character and the conditions for spider communities could be expected to improve.

The direction of other research and conservation activities should ensure comprehensive araneological research, monitoring of selected bio indication species (selected protected and endangered species such as *Dolomedes plantarius* (Fig. 8)*, Eresus* species (Fig. 4), *Argyroneta aquatica*, etc.) and based on their research and monitoring results to implement not only the mentioned but also other management measures for the conservation of rare and endangered habitat types in which the greatest diversity of araneofauna is concentrated. These measures should be aimed at the preservation of wetland habitats (active participation

in the preparation of management plans for protected areas and their implementation), the mentioned preservation of xerothermic parts of the area (removal of unwanted shrubs and trees, mowing, grazing, or small-scale directed burning in winter time), to preserve the sand habitats (regulation of the extraction of sand and again removal of undesirable shrubs and trees, mowing, grazing), to preserve the remnants of the original (little disturbed) forests, whether floodplain forests or the original oak forests (active approach in the preparation of management plans for forest stands), further to reduce the negative impact of human activities resulting from commercial, recreational activities (trampling, accumulation of communal waste in reservations, spread of non-native species, etc.) and illegal trapping of animals. It is also necessary to point out that reckless logging in the original oak and oak-cereal forests leads to a strong succession of aggressive expanding species, white agate (*Robinia pseudoacacia*), into these forest biocenoses, and thus to their degradation. In this context, this naturally leads to a depletion of the species composition of existing araneocenoses significantly negatively influencing the undisturbed forest habitat formations of the studied area. It is necessary to state that the reducing of the species richness of araneofauna and animals in a broader context leads to the destruction of the fine links between the various components of living nature, on which the ecological stability of the landscape depends.

Discussion

Despite the documented high number of species, the area is relatively insufficiently known in terms of araneofauna, because no more comprehensive research has ever been carried out. The material has been collected by quantitative methods only in several localities and the majority of data are coming from one-off or short-term collection events. We assume that approximately 600 species of spiders can live in the area of interest, similarly to the Danube Plain (Gajdoš et al. 1999). The stated number of species can be partially overestimated by listing the species from the locality of Slovenské Nové Mesto, whose cadastre was divided after the disintegration of Austro-Hungarian Monarchy and part was incorporated into the former Czechoslovakia and part into Hungary (published name of the locality is Sátoraljaujhély by Chyzer & Kulczyński (1891, 1894, 1897, 1899). Therefore, it is not possible to unambiguously determine whether the data were obtained in Slovakia or Hungary, but based on knowledge of the current landscape on the Hungarian side, the original xerothermic habitats on the hill above the village are preserved and in our territory the village cadastre is covered mainly by fields. Of the large protected areas, the analysis of araneofauna with more complex research after the year 2000 was performed only for the Poloniny NP (Svatoň et al. 2003) and the Cerová vrchovina PLA (Svatoň et al. 2009). A total of 485 species of spiders belonging to 36 families were found in the Cerová vrchovina highlands (Svatoň et al. 2009), which is more than in the area covered by the Latorica PLA Administration, although this area is significantly smaller in size. Furthermore, the proportion of endangered and potentially endangered species in this area was significantly higher (101 species) compared to Latorica PLA. The species richness of the araneofauna of the Poloniny NP is slightly lower as Latorica PLA - 403 species found (Svatoň et al. 2003). Of the species spreading to Central Europe from the south or east in the last few years, the first finds of species such as *Pholcus ponticus* (abundant species in buildings in Ukraine) and *Kryptonesticus eremite* – a troglophile species (Mammola et al. 2018) have been documented in human settlements in the area in southern and eastern Europe. The species *Brigittea civica* and *Cheiracanthium mildei*

are also abundant in the area, which began to spread intensively to Slovakia only at the end of the last century (Miller & Žitňanská 1976; Svatoň 1985; Krumpálová 1999, 2001; Purgat et al. 2020). Their current spreading is probably induced by climate change. Nevertheless, they shall not be listed as alien or invasive because they are native to Europe (Nentwig et al. 2020).

Of the alien species with invasive potentiation, only two species are currently considered in Slovakia, namely *Ostearius melanopygius* with South American origin (first record 1906 in England, since then further expansion to the east) (Růžička 1995; Krumpálová & Krajča 1999) and *Mermessus trilobatus* species widely distributed in North America, presumably imported to south-western Germany in the 1970th by the US Army (Nentwig et al. 2020). These two species have not yet been identified in the study area, but their intensive distribution from west to east, abundant in a wide range of habitats in western and central Slovakia and their occurrence in Ukraine, as well as in the greenhouses of the Košice Botanical Garden suggests that these species will spread to the territory of the Latorica River, or they already live here, but have not been found yet. It would be appropriate to monitor their potential occurrence so that, if their occurrence is identified, changes in the original spider communities can be assessed and appropriate management implemented.

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Súhrn

Fauna pavúkov (Araneae) Chránenej krajinnej oblasti Latorica a okolitých lokalít (juhovýchodné Slovensko)

Územie v pôsobnosti CHKO Latorica z hľadiska druhovej diverzity pavúkov patrí k vysoko hodnotným územiam Slovenska. Na tak malom území je sústredených viac ako 40% našej araneofauny, teda 431 z 975 doteraz publikovaných druhov z územia Slovenska. Dokladovaný tu bol výskyt 86 ohrozených druhov a tiež aj viacero zoogeograficky významných druhov. Je to spôsobené geografickou lokalizáciou, špecifickými abiotickými pomermi, ale aj širokou habitatovou rozmanitosťou skúmaného záujmového územia. Týmto sú vytvorené vhodné životné podmienky pre mnohé ekologické skupiny pavúkov.

Na základe analýzy dát v rôznych časových úrovniach sa javí, že v území CHKO Latorica a jeho okolí došlo k podstatnejšiemu narušeniu prírodného prostredia (výraznému odvodňovaniu mokradí, ťažbe piesku na pieskových dunách, degradácii xerotermných lesostepných lokalít a pod.) a tým aj k následným degradačným zmenám pôvodných araneocenóz v širších súvislostiach. Ako je v práci uvedené, zo 176 dokumentovaných druhov za obdobie Rakúsko-Uhorska (do roku 1918) v ďalších obdobiach (za viac ako 100 rokov) nebol potvrdený

výskyt až 71 druhov, čo prestavuje takmer 40% vtedajšej poznanej araneofauny. Z nich až 26 druhov je ohrozených alebo potencionálne ohrozených a 2 druhy, *Sintula retroversus* a *Trichoncus saxicola* sú považované za vyhynuté. Napriek uvedenému, predmetné územie má ešte stále široké spektrum rôznych pavúčích spoločenstiev, ktoré sú viazané na rôzne habitaty a je veľmi dôležité zachovať toto spektrum habitatov pre ochranu araneofauny prostredníctvom dlhodobého manažmentu územia. Je na škodu, že tak významné územie z hľadiska biodiverzity nerealizuje žiadne monitorovanie araneofauny. Veľmi významný je v území aj výskyt druhu *Dolomedes plantarius*, ktorý ako jediný z našich druhov je v Červenom zozname IUCN v kategórii VU (World Conservation Monitoring Centre 1996). V záujmovom území predpokladáme, že má tento druh jednu z najvýznamnejších populácií na Slovensku. Mnoho európskych krajín má vypracované programy záchrany pre tento druh a realizuje sa aj jeho monitorovanie. Na Slovensku takýto dokument chýba a žiadny druh pavúka nie je systematicky monitorovaný. Bez dlhodobého a systematického monitoringu nie je možné následne adekvátne nastaviť najvhodnejší typ praktických opatrení potrebných pre efektívnu ochranu pavúkov v tomto území. Môžeme len predpokladať, že sa postupne prejavuje negatívny vplyv využívania chemických látok a pesticídov v poľnohospodárstve a do budúcna sú potrebné snahy o redukciu tohto vplyvu. Dôležitá je aj obnova vodného režimu, revitalizácia tokov a snaha o zadržanie vody v krajine. Pri xerotermných biotopoch je dôležitá aktívna starostlivosť prostredníctvom pasenia a kosenia s cieľom redukcie nepôvodných a inváznych druhov rastlín a udržania sekundárnej sukcesie v prijateľnej miere (napr. v oblasti Tarbucky a Ladmovských vápencov). I keď v súčasnosti prostredníctvom projektov sa situácia v niektorých oblastiach zlepšila, napr. na spomínanej Tarbucke, z celoplošného pohľadu by bolo potrebné zaviesť takýto manažment vo väčšom objeme a na oveľa väčšej výmere na ďalších lokalitách. Pri vzácnych pieskových biotopoch je taktiež potrebný aktívny manažment, rozrušovanie, pretože tieto habitaty postupne zanikajú pod vplyvom nedostatočného aktívneho využívania územia, alebo naopak zanikajú pod tlakom nadmernej ťažby piesku. Napriek zásahu človeka do vodného režimu prostredníctvom budovania sústavy kanálov majú aj tieto umelo vytvorené biotopy prekvapivo často vhodné podmienky pre život vzácnych spoločenstiev živočíchov, vrátane pavúkov a preto je nevyhnutná aj ich dôsledná a citlivá a dlhodobá údržba. Významné by mali byť snahy o obnovu pôvodnej siete mŕtvych ramien Latorice, čo by postupne navrátilo krajine jej pôvodný charakter a bolo by možné očakávať aj zlepšenie podmienok pre spoločenstvá pavúkov. Smerovanie ďalších výskumných a ochranárskych aktivít by malo zabezpečiť komplexný araneologický výskum, monitorovanie vybraných bioidikačných druhov (vybrané chránené a ohrozené druhy ako *Dolomedes plantarius* (obr. 9.), *Eresus* spp. (obr. 4.), *Argyroneta aquatica*, etc.) a na základe ich výsledkov výskumov a monitoringu realizovať nielen spomínané, ale aj ďalšie manažmentové opatrenia pre zachovanie vzácnych a ohrozených typov biotopov, v rámci ktorých je koncentrovaná najväčšia diverzita araneofauny. Tieto opatrenia by mali smerovať k zachovaniu mokraďových stanovíšť (aktívna účasť pri prípravách programov starostlivosti o chránené územia a ich realizácii), k spomínanému zachovaniu xerotermných častí územia (výrub nežiadúcich krov a stromov, kosba, pastva, prípadne maloplošné usmerňované vypaľovanie v zimnom období a pod.), k zachovaniu pieskových habitov (regulácia ťažby piesku, výrub nežiadúcich krov a stromov, kosba, pastva), k zachovaniu zbytkov pôvodných (málo narušených) lesov či už sa jedná o lužné lesy alebo pôvodné dubové lesy (aktívnym prístupom pri príprave programov starostlivosti

o les), dalej k zníženiu negatívneho vplyvu ľudskej činnosti vyplývajúcej z komerčných, rekreačných aktivít (zošlapávanie, hromadenie odpadu v rezerváciách, šírenie nepôvodných druhov, ai.) a nelegálneho odchytu živočíchov. Potrebné je tiež vidieť, že neuváženou ťažbou dreva v pôvodných dubových a dubovo-cerových lesných porastoch dochádza k silnej sukcesii agresívnej dreviny, agáta bieleho (*Robinia pseudoacacia*), do týchto lesných biocenóz, a tým aj k ich degradácii. Tým zákonite dochádza k ochudobňovaniu druhového zloženia stávajúcich araneocenóz, než tomu je na pôvodnejších a podstatnejšie nenarušených lesných biotopových formáciach skúmaného územia. Je potrebné vidieť, že ochudobnenie druhového bohatstva araneofauny, a živočíšstva v širších súvislostiach, zákonite podmieňuje deštrukciu jemných väzieb medzi jednotlivými zložkami živej prírody, na ktorých závisí ekologická stabilita krajiny.

Prezentovaný stav poznania araneofauny a poznatky o ekologických nárokoch jednotlivých druhov, je možné využiť v ochranárskej praxi pre smerovanie ďalších výskumných a ochranárskych aktivít, ktoré sú v práci navrhnuté.

Ticks (Ixodida) in the Latorica Protected Landscape Area

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Abstract

The article summarizes information about ticks (Ixodida) confirmed in the territory of the Latorica Protected Landscape Area (PLA), either by multi-year research of the author of the article, or from literary sources. Sampling from vegetation and from several groups of hosts (mammals, bird nests) were confirmed the occurrence of six tick species: *Ixodes trianguliceps*, *I. ricinus*, *I. lividus*, *Dermacentor reticulatus*, *D. marginatus*, *Haemaphysalis concinna*. The four registered species of ticks (*I. ricinus*, *D. reticulatus*, *D. marginatus*, *H. concinna*) represent generalists, individual stages of ticks can attack different groups of birds, mammals, resp. and lizards. *Ixodes lividus* tick represents narrow host specialists strongly preferring one host bird species (*Riparia riparia*). *Ixodes trianguliceps* tick is a specialist whose all developmental cycle runs on small mammals (rodents and insectivores), occurrence in the studied area is rare and atypical, the species prefers moist habitats of foothills and mountain areas. The author also discusses the possible occurrence of three other species of ticks in Latorica PLA - *Ixodes arboricola*, *Ixodes vespertilionis*, *Ixodes apronophorus*, ticks are preferred by other host organisms (birds, bats, water voles) which have not yet received sufficient attention.

Key words: ticks, Ixodidae, Latorica Protected Landscape Area, Eastern Slovakia

Introduction

Ticks represent a group of ectoparasites whose all three life stages, it means larvae, nymphs and female ticks parasitize on vertebrate hosts. They suck blood of different vertebrate host groups, which are mainly birds and mammals; some tick species can also parasitize on lizards. All tick species registered in our conditions are three-host ticks, i.e. each stage parasitizes on a different host, often on a different group of hosts. This is the epidemiological significant feature of ticks, as they can transmit several group of pathogens causing many viral, bacterial, and protozoal diseases. The pathogens are maintained in tick populations as transstadial (larva - nympha - imago), but also transovarian way (female - eggs).

Literature data on ticks from the Latorica PLA can be found in several works from the last century. In the paper of Mačička et al. (1956), the authors focused on the ecology of the tick *Dermacentor reticulatus* in Czechoslovakia, except it they report the occurrence of two other species (*Dermacentor marginatus* and *Haemaphysalis concinna*) collected seeking ticks by flagging of vegetation in the Latorica alluvium. In another work (Mačička et al. 1956), the authors provide specific information on the infestation and distribution of *D. reticulatus* ticks on bodies of cattle (Veľké Kapušany, May 1954 and May 1955) and sheep (Leles, April 1955). Some informations related to *D. marginatus* distribution and ecology are in the paper Mačička et al. (1955). In the alluvium of Latorica river, from the vicinity of Leles, Nosek also reports the occurrence of *H. concinna*, *D. reticulatus* and *D. marginatus* ticks in two other works (Nosek 1971, 1972). In the later period of Ambros et al. (1986) report *I. ricinus* ticks from small mammals from two localities (Leles, Boťany). On the small mammals in the Latorický luh National Nature Reserve, Stanko (1998) reports the occurrence of three species of ticks (*Ixodes trianguliceps*, *I. ricinus*, *D. reticulatus*). In two publications related to this area, the authors report the occurrence of *Ixodes lividus* in the sand martin nests (*Riparia riparia*) or bee – eater (*Merops apiaster*). Krumpál et al. (1995) report ticks from *R. riparia* nests at Streda nad Bodrogom and Krištofík et al. (1996) present the findings of *Ixodes lividus* ticks in the *M. apiaster* nests from the Somotor and Beša localities.

Material and methods

Two methods were used for ticks sampling. Ticks were obtained by ectoparasitological examination of small mammals. Small mammals (rodents and shrews) were captured in snap traps placed in lines of 50 traps and usually exposed for 2 nights in one place. Information on the capture dates of small mammals in individual localities are given in the work of Stanko et al. (1998). Additional data on ticks in the study area were obtained by flagging vegetation. Flannel flags were used for flagging. At each collection, the ticks were collected at the site for at least 1 hour. Flagging was carried out at the localities Boťany and Kráľovský Chlmec in terms of: 22th June 2011, 15th March 2012, 13th March 2014 (leg. M. Stanko, L. Mošanský, M. Bona). Ticks were determined according to the keys of Filippova (1977) and Siuda (1993).

List of localities

1 – Beša – 7497b – 48°32′ N; 21°56′ E – Krištofík et al. (1996) – position of localities on Mape 1.
2 – Boťany – 7598b – 48°28′ N; 22°5′ E – Latorický luh I. and II. National Nature Reserve (NNR) – floodplain forests, meadows near Latorica and shrubs.
3 – Kráľovský Chlmec – 7597d – 48°25′ N; 21°58′ E – Čierna hora, Erős – oak forest with acacia trees.
4 – Leles – 7598a – 48°28′ N; 21°1′ E – meadows, thorn and willow shrubs – (Ambros et al. 1986; Nosek 1971, 1972; Mačička & Rosický 1956).
5 – Malý Horeš – 7597c – 48°24′ N; 21°57′ E – acacia forests on sand dunes, agrocenoses, ruderal vegetation.
6 – Nová Vieska pri Bodrogu – 7597c – 48°25′ N; 21°48′ E – acacia forests, poplar windbreak, ruderal vegetation along the melioration channel.

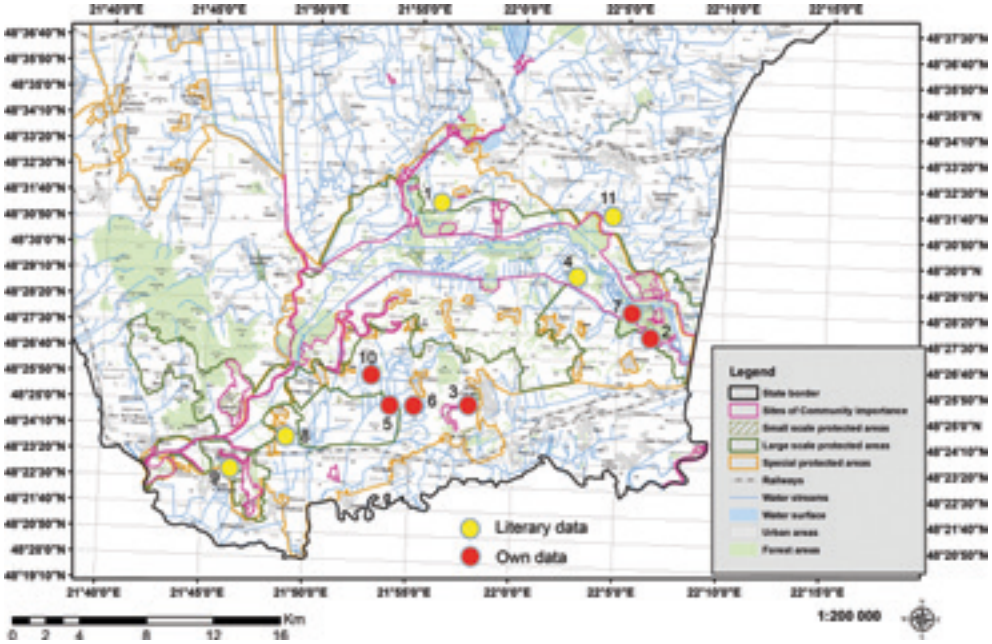

Fig. 1 *Tick collection sites on the territory of the Latorica Protected Landscape area.*

7 – Ptrukša – 7598a – 48°29′ N; 22°7′ E – Ulmeto-Fraxinetum, Querceto – Fraxinetum.
8 – Somotor – 7596 – 48°23′ N; 21°47′ E – Krištofík et al. (1996).
9 – Streda nad Bodrogom – 7698b – 48°23′ N; 21°45′ E – Tarbucka Natural Reserve (NR) – acacia stands, ruderál (Dudich & Štollmann 1985; Krumpál et al. 1995).
10 – Svinice – 7597c – 48°27′ N; 21°52′ E – acacia stands, poplar windbreak.
11 – Veľké Kapušany – 7498 – 48°33′ N; 22°3′ E – Mačička et al. (1956).

Results – List of species

Ixodes trianguliceps Birula, 1895 – 1; 6; from small mammals together 4 larvae (L), 1 nympha (N), 1 female (F) – Palaearctic species – nest – burrow tick – tick developmental cycle on rodents and insectivores – prefers humid habitats in foothill and mountain areas (Lichard 1965) – rare occurrence in lowland areas (Stanko 1996);

Ixodes ricinus Linnaeus, 1758 – 2; 3; 5; 6; 7; 10; from small mammals together 3652 L, 324 N – from vegetation: 51 males (M), 50 females (F), 60 N (own data) - Boťany and Leles (Ambros et al. 1986) – Europe, Asia, North Africa – parasite of lizards, birds and mammals – abundant tick species in shrubs and forests from lowlands up to mountainous areas;

Ixodes lividus Koch, 1844 – Streda nad Bodrogom, Somotor and Beša; larvae and nymphs in the nests of *Riparia riparia* (Krumpál et al. 1995) or *Merops apiaster* (Krištofík et al. 1996) – specific parasites of sand martin – Palaearctic species;

Fig. 1 and 2 *Ecotones of lowland forests and pastures near the Latorica River in April 2004 (photo: M. Stanko).*

Fig. 3 *Searching for Dermacentor reticulatus female on grass near the Latorica River, April 2004 (photo: M. Stanko).*

Haemaphysalis concinna Koch, 1844 – 22 males, 15 females and 29 nymphs collected by flag in the Latorica alluvium (Mačička et al. 1955; Nosek 1971, 1972) – Eurasia – prefers moist deciduous forests, river alluvium and lake shores – larvae and nymphs often parasitize on birds, adult ticks on bigger mammals;

Dermacentor reticulatus (Fabricius, 1794) – 1; 2; 4; 6; from small mammals together 10 larvae, 1 nympha; – ticks collected from vegetation 258 males, 263 females (own data) – Veľké Kapušany, 679 adult ticks on cattle and near Leles 279 adults on sheep (Mačička & Rosický 1956) – Leles, 1.117 adult ticks sampled on flags in alluvium of Latorica river (Mačička et al. 1955); Palaearctic species – prefers moist habitats in the alluvium of lowland rivers;

Dermacentor marginatus (Sulzer, 1776) – non-abundant collection of adult ticks by flagged in the alluvium of Latorice (Mačička et al. 1955; Nosek 1971, 1972) – Palaearctic species – prefers forest-steppe habitats.

Conclusions

Sampling from vegetation, from several groups of hosts (insectivores, rodents, domestic animals) and from bird nests (*Riparia riparia* and *Merops apiaster*) were confirmed the occurrence of six tick species (Ixodida) in the Latorica PLA: *Ixodes trianguliceps*, *I. ricinus*, *I. lividus*, *Dermacentor reticulatus*, *D. marginatus*, *Haemaphysalis concinna*. All recorded tick species have a Palaearctic distribution and a three-host development cycle. Among the registered tick species we find narrow host specialists strongly preferring one host species (i.e. *Ixodes lividus* - *Riparia riparia*). *Ixodes trianguliceps* tick is a specialist whose all developmental cycle runs on small mammals (rodents and insectivores). Occurrence of *I. trianguliceps* in the Latorica PLA is rare, atypical; the species prefers moist habitats of foothills and mountain areas. The other 4 species of ticks (*I. ricinus*, *D. reticulatus*, *D. marginatus*, *H. concinna*) represent generalists, individual stages of ticks can attack different groups of birds, mammals, resp. and lizards. Among them *I. ricinus* has the widest host spectrum in our conditions, Černý (1972) states that in the conditions of Czechoslovakia its host spectrum includes more than 100 species of vertebrates. The common tick (*Ixodes ricinus*) dominates in all habitats of the studied area. A faunistic interesting (apart from the occurrence of *I. trianguliceps* in the Botiansky luh NNR and Latorický luh NNR is that in the past the occurrence of the xerophilic species *Dermacentor marginatus* was confirmed in the vicinity of Leles together with the hydrophilic species *D. reticulatus* and *H. concinna* ((Mačička et al. 1956; Nosek 1971)). Repeated research in the last three decades on the same site to confirmation this data has not been carried out. The occurrence of two other species of ticks - *Ixodes arboricola* and *Ixodes vespertilionis* in the studied area is probable. *I. arboricola* is an ornithophilous tick species that parasitizes on hollow species of birds nesting in trees. *I. vespertilionis* parasitizes on several groups of bats (*Miniopterus*, *Myotis*, *Plecotus*). This type of research in the monitored area has not yet received attention. The occurrence of *the Ixodes apronophorus* tick, which was confirmed in the Blatenská lowland below Vihorlat mountains (currently Zemplínska Šírava) in Eastern Slovakia in similar lowland habitats from *Apodemus agrarius*, is not excluded. The tick prefers mainly water voles (*Arvicola amphibius*), but it has also been recorded on other small species (*Sorex*, *Neomys*, *Apodemus*, *Microtus* and others) and some larger mammals - *Ondatra*, *Myocastor*, *Castor* (Sandor 2017).

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Súhrn

Kliešte (Ixodida) Chránenej krajinnej oblasti Latorica

Zbermi z vegetácie, z viacerých skupín hostiteľov (hmyzožravce, hlodavce, domáce zvieratá) a z vtáčích hniezd (*Riparia riparia* and *Merops apiaster*) bol na území Chránenej krajinnej oblasti (CHKO) Latorica potvrdený výskyt šiestich druhov kliešťov (Ixodida): *Ixodes trianguliceps*, *I. ricinus*, *I. lividus*, *Dermacentor reticulatus*, *D. marginatus*, *Haemaphysalis concinna*. Všetky zaznamenané druhy kliešťov majú palearktické rozšírenie a trojhostiteľský vývinový cyklus. Medzi registrovanými druhmi kliešťov nachádzame úzkych hostiteľských špecialistov výrazne preferujúcich 1 hostiteľský druh (t.j. *Ixodes lividus – Riparia riparia*). Špecialistu, ktorého celý vývinový cyklus prebieha na drobných cicavcoch (hlodavcoch a hmyzožravcoch) predstavuje kliešť *Ixodes trianguliceps*. Výskyt tohto druhu v CHKO Latorica je raritný, atypický, druh preferuje vlhké biotopy podhorských a horských oblastí. Ostatné 4 druhy kliešťov (*I. ricinus*, *D. reticulatus*, *D. marginatus*, *H. concinna*) predstavujú generalistov, jednotlivé štádia kliešťov môžu v našich podmienkach napádať rôzne skupiny vtákov, cicavcov, resp. aj jašterice. Najširšie hostiteľské spektrum v našich podmienkach má *I. ricinus*, Černý (1972) uvádza, že v podmienkach bývalého Československa jeho hostiteľské spektrum zahŕňa vyše 100 druhov stavovcov. Vo všetkých habitátoch študovaného územia dominuje kliešť obyčajný (*Ixodes ricinus*). Faunistickou zaujímavosťou (okrem výskytu *I. trianguliceps* v NPR Botiansky a Latorický luh je, že v minulosti bol v okolí Lelesa potvrdený výskyt xerofilného druhu *Dermacentor marginatus* spoločne na lokalite s hydrofilnými druhmi *D. reticulatus* a *H. concinna* (Mačička et al. 1956; Nosek 1971). Opakovaný výskum v posledných troch desaťročiach na danej lokalite na potvrdenie tohto údaja nebol uskutočnený. Výskyt ďalších dvoch druhov kliešťov – *Ixodes arboricola* a *Ixodes vespertilionis* v študovanej oblasti je pravdepodobný. *I. arboricola* je ornitofilný druh, ktorý parazituje na dutinových druhoch vtákoch. *I. vespertilionis* parazituje na viacerých skupinách netopierov (*Miniopterus*, *Myotis*, *Plecotus*). Tomuto typu výskumov v sledovanej oblasti nebola venovaná doposiaľ pozornosť. Nie je vylúčený výskyt druhu *Ixodes apronophorus*, ktorý bol potvrdený na Blatenskej nížine pod Vihorlatom (v súčasnosti VN Zemplínska Šírava) z *Apodemus agrarius* v podobných podmáčaných biotopoch (Mrciak 1967). Kliešť preferuje hlavne hryzce (*Arvicola amphibius*), no bol zaznamenaný aj na iných druhoch drobných (rody *Sorex, Neomys, Apodemus, Microtus* a ďalšie) a na niektorých väčších cicavcoch – *Ondatra, Myocastor*, *Castor* (Sandor 2017).

Oribatid mites (Acari: Oribatida) of the Latorica Protected Landscape Area

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Abstract

In total, 171 oribatid species were found in Latorica Protected Lanscape Area (PLA) (i.e. 31,4 % of the total Slovakian oribatid fauna), belonging to 55 families and 101 genera or subgenera in the material of 29 822 individuals collected during the years 2008 – 2011 on 24 localities completed by literary data from another two localities in the territory of Latorica PLA. Following 17 species are new records for the fauna of Slovakia - *Atropacarus* (*Atropacarus*) *phyllophorus, Brachychthonius bimaculatus, Dometorina plantivaga, Indotritia consimilis, Lichthonius alpestris, Liochthonius leptaleus, Machuella draconis, Ophidiotrichus connexus, Oribatella reticulata, Phthiracarus bryobius, Platyliodes doderleini, Podoribates longipes, Sellnickochthonius jacoti, Sellnickochthonius rostratus, Sellnickochthonius subcricoides, Sellnickochthonius suecicus,* and *Steganacarus* (*Tropacarus*) *brevipilus.* The most important record from a faunistic point of view is the record of *Indotritia consimilis* from Kašvar National Nature Reserve, which is the third one for the world oribatid fauna. Following species show preference for flooded and riparian forests - *Carabodes coriaceus, Euphthiracarus cribrarius, Chamobates subglobulus, Liacarus coracinus, Liochthonius leptaleus, Liochthonius strenzkei, Oppia denticulata*, and *Suctobelba granulata.* Important faunistic elements are stenotopic, xerophilous species with Southern European and Mediterranean distribution characteristic for dry, open biotopes – *Berniniella (Berniniella) aeoliana, Ceratozetes minutissimus, Eremobelba geographica, Indotritia consimilis, Microzetorchestes emeryi,* and *Zetorchestes falzonii.*

Key words: Oribatid mites, faunistics, Latorica PLA, Eastern Slovakia, check list

Introduction

Within the soil mesofauna, soil mites of the order Oribatida are undoubtedly one of the most numerous groups. This mite group is dominant mainly in forest habitats, where it regularly achieves a dominance of around 50% or higher (Behan-Pelletier & Newton 1999). In open habitats, the values are slightly lower, but even here oribatid mites belong to the

most numerous groups of soil invertebrates. Oribatid mites are sensitive to environmental changes and their activity significantly affects the decomposition of organic matter in the soil (Heneghan et al. 1999), mineralization (Beare et al. 1992), nutrient cycle in the soil (Setälä & Huhta 1991) and the development of soil texture and microstructure (Maraun et al. 1998). They are therefore considered important bioindicators of functional relationships in the soil (Paoletti et al. 2007).

The faunistic investigation of oribatid mites has a comparatively long tradition in Slovakia and oribatid fauna is relatively well known, especially in some areas of the country. A total of 544 species and subspecies of oribatid mites belonging to 183 genera and 74 families have been found in the territory of Slovakia (Starý 2006) so far. The first record of oribatid mites was published by Karpelles (1893) from the soils of the Eastern Slovak Plain from the locality Cejkov near the territory of Latorica PLA. More recently, the long-term soil zoological research focused primarily on the study of agrocenoses on arable agricultural soils (Miko 1995; Ľuptáčik & Miklisová 2002, 2005; Ľuptáčik 2006; Miko 2009; Ľuptáčik et al. 2012; Jakšová et al. 2020), poplar windbreaks (Miko 1993) and nests of small mammals (Miko & Stanko 1991) brought a significant contribution to the knowledge of the oribatid fauna of the East-Slovak Plain. Unfortunately, the only the locality Svätá Mária, from this extensive research lies in the Latorica PLA territory. Oribatid species recorded from this locality (Miko 1995; Miko & Weigmann 1996) were listed in this contribution.

Material and methods

Samples of leaf litter, mosses, lichens, grass rhizosphere and decaying wood were taken during soil zoological research in the years 2008 – 2011 on 24 localities in the territory of Latorica PLA. Oribatid mites were extracted in the laboratory using a modified Tullgren apparatus (Marshall 1972), cleared in temporary slides with lactic acid and determined to the species level. The whole determined oribatid material is deposited in glycerol in the comparative collection of the Institute of Soil Biology, AS CR, České Budějovice, Czech Republic. All localities in the list are in alphabetical order.

List of localities

A total of 24 localities were studied and supplemented by two other localities from literature. The numbering of localities was used in the list of recorded oribatid species agreeing with the designation of localities on the attached map (Fig. 1). The name of the locality is followed by the name of the relevant cadastral area, geographical coordinates, altitude, a short characteristic of locality and bedrock. Abbreviations used: NNR – National Nature Reserve, NR – Nature Reserve.

1 – Bešiansky les, Beša, 48 °30’ 39” N, 21° 56‘19” E, 105 m a.s.l., hard mixed floodplain forest outside the right bank of the Latorica river, fluvial sediments.
2 – Biele jazero NR, Malý Horeš, 48 °25’ 5” N, 21 °51’ 35” E, 95 m a.s.l., wet meadow, pasture and marshland, aeolian sands on river sediments.
3 – Boľské rašelinisko NR, Boľ and Kráľovský Chlmec, 48° 26’ 50” N, 21° 57’ 17” E, 101 m a.s.l., alder belt between peat bog, fluvial sediments.

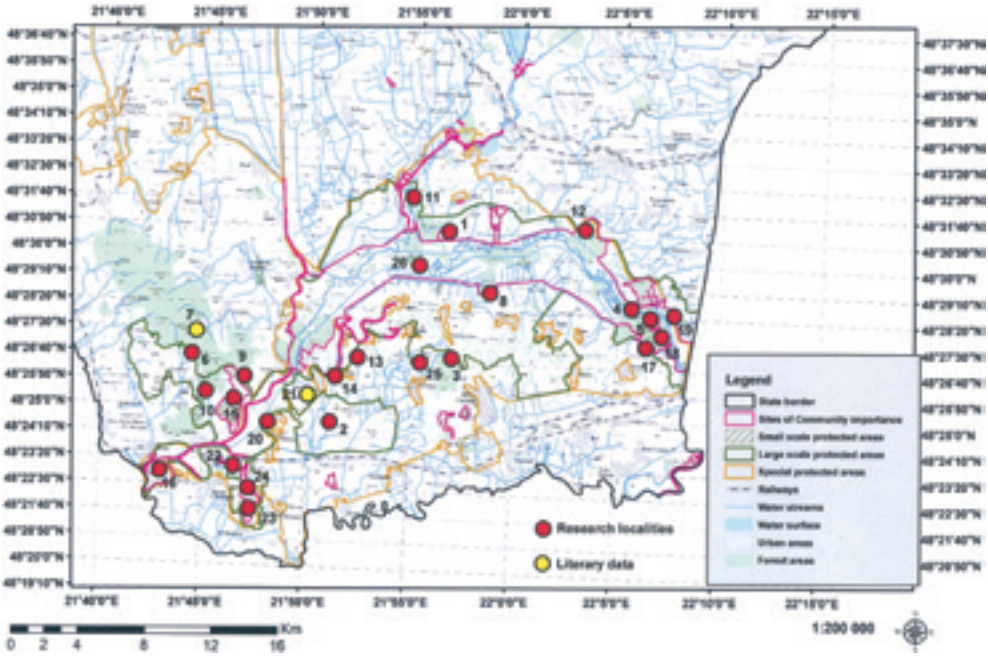

Fig.1 *Location of research localities and localities with only literary data in the Latorica PLA (for locality numbers see chapter Material and methods).*

4 – Botiansky luh NNR, Boťany, 48° 27’ 33” N, 22° 6’ 18” E, 107 m a.s.l., floodplain forest between embankment and river arm, fluvial sediments.
5 – Botiansky luh NNR, Boťany, 48°28’ 28” N, 22° 6’ 24” E, 112 m a.s.l., riparian forest near the left bank of the Latorica river, eastern part of the NNR, fluvial sediments.
6 – Cejkov, Cejkov, 48° 27’ 16” N, 21° 44’ 28” E, 196 m a.s.l., oak-hornbeam woodland, fluvial sediments on paleozoic ryolites and dacites.
7 – Cejkov, (Karpelles 1893), poplar forest, under bark tree.
8 – Čierny les, Poľany, 48° 29’ 2” N, 21° 58’ 7” E, 100 m a.s.l., hard floodplain forest with predominated oak, fluvial sediments.
9 – Dlhá hora, Ladmovce, 48° 25’ 59” N, 21° 46’ 18” E, 260 m a.s.l., steppe-forest, oak-dogwood, bedrock: dolomites.
10 – Hatfa, Viničky, 48° 25’ 45” N, 21° 45’ 10” E, 190 m a.s.l., oak-hornbeam forest on the slope of the Brezina hill, triassic quartcites and sandstones.
11 – Horný les, Oborín, 48° 32’ 4” N, 21° 54’ 38” E, 100 m a.s.l., flooded oak forest outside the dam, W of the Beša village, fluvial sediment.
12 – Hrušky, Veľké Kapušany, 48° 30’ 51” N, 22° 3’ 4” E, 100 m a.s.l., floodplain forest by the right-bank dam of the Latorica river, fluvial sediments.
13 – Hrušov – Prudký, Rad, 48° 26’ 43” N, 21° 52’ 7” E, 100 m a.s.l., dry grassland on sandy dune, eolic sand.

Fig. 2 *Kašvár NNR – view of xerothermic grassland with bushes on limestone bedrock (photo: J. Starý).*

Fig. 3 *Tarbucka NR – view on the top of the hill with dry grassland with bushes on andesite bedrock (photo: J. Starý).*

Fig. 4 *Zatínský luh NR – view of hard floodplain forest on fluvial sediments (photo: J. Starý).*

14 – Hrušov – Tice, Rad and Svätá Mária, 48° 26’ 8” N, 21° 51’ 16” E, 98 m a.s.l., grassland along the bank of marshland (former riverbed), flluvial sediments.
15 – Kašvár NNR, Ladmovce, 48° 25’ 10”, 21° 46’ 33” E, 161 m a.s.l., xerothermic grassland with bushes, dolomite and limestone.
16 – Klin nad Bodrogom, Streda nad Bodrogom, 48° 22’ 57”, 21° 42’ 58” E, 97 m a.s.l., a belt of willow trees between river arm and wet meadow, fluvial sediments.
17 – Latorický luh NNR, Boťany, 48° 27’ 38” N, 22° 6’ 9” E, 111 m a.s.l., hard floodplain forest with oak and hornbeam, fluvial sediments.
18 – Latorický luh, Boťany, 48° 27’ 49” N, 22° 7’ 0’ E, 95 m a.s.l., hard floodplain forests with oak and hornbeam outside the NNR, fluvial sediments.
19 – Ptrukša, Ptrukša, 48° 28’ 27” N, 22° 7’ 14” E, 102 m a.s.l., riparian forest at the right bank of the Latorica river, fluvuial sediments.
20 – Somotorská hora, Somotor, 48° 24’ 29” N, 21° 48’ 15” E, 141 m a.s.l., dry grassland with bushes on a flat top of the hill, andesite.
21 – Svätá Mária (Miko 1995) – agricultural agrocenosis, 98 m a.s.l., regular plowing, wheat field (1991), barley field (1992), fluvisol.
22 – Tajba NNR, Streda nad Bodrogom, 48° 23’ 13” N, 21° 46’ 30” E, 98 m a.s.l., belt of willows on the N shore of the lake, fluvial sediments.
23 – Tarbucka NR, Streda nad Bodrogom, 48° 21’ 45” N, 21° 47’ 19” E, 265 m a.s.l., rocky dry grassland with bushes at the top of the hill, andesite.
24 – Tarbucka NR, Streda nad Bodrogom, 48° 22’ 15” N, 21° 47’ 4” E, 189 m a.s.l., dry grassland with bushes on sandy soil, aeolian sands on andesite.
25 – Veľké jazero NR, Vojka, 48° 26’ 39” N, 21° 55’ 22” E, 99 m a.s.l., ecotone of marshland bank and agroecoenoses (field), aeolian sands on river sediments.
26 – Zatínsky luh NR, Zatín, 48° 29’ 45” N, 21° 54’ 54” E, 104 m a.s.l., fragment of hard mixed floodplain forest with arms of the Latorica river, fluvial sediments.

Results – Annotated check list

The checklist of found species has the following structure. The complete scientific name of species is followed by the locality number with positive records of the species, autecological characteristics and distribution of the species. Records of new species for the fauna of Slovakia are marked by an asterisk (*).

Acari Leach, 1817
Oribatida Dugés, 1833

Brachychthoniidae Thor, 1934

**Brachychthonius bimaculatus* Willmann, 1936 – 3, 16, 22 – hygrophilous – Holarctic (Palearctic, Canada) – preferring peat bogs and other wet habitats.

Brachychthonius pius Moritz, 1976 - 1, 4, 5, 6, 8, 10, 16, 17, 18, 19, 20, 23, 26 – silvicolous, parthenogenetic – Holarctic (Palaearctic Region, Canada) – frequently in moist litter and mosses of deciduous and mixed forests.

**Lichthonius alpestris* (Forsslund, 1958) – 3, 11, 22, 25 – hygrophilous, silvicolous, microphytophagous – Palaearctic – common in wet mixed forests and peat bogs.

Liochthonius brevis (Michael, 1888) – 1, 4, 5, 6, 8, 11, 12, 13, 14, 16, 17, 18, 19, 20, 22, 25, 26 – silvicolous - Palaearctic - frequently in deep moist leaf litter and mosses on boulders.

Liochthonius horridus (Sellnick, 1928) – 6, 8, 9, 10, 11, 12, 16, 17, 18, 19 – hygrophilous, silvicolous, microphytophagous – Palaearctic – frequently in wet litter.

Liochthonius hystricinus (Forsslund, 1942) – 1, 2, 3, 5, 8, 11, 12, 16, 18, 19, 22, 23, 25, 26 – euryhygric, eurytopic, parthenogenetic – semicosmopolitan (Holarctic Region, Chile) – common in mosses and litter of floodplain forests and wet meadows.

**Liochthonius leptaleus* Moritz, 1976 - 17, 18, 19, 26 - silvicolous, microphytophagous – South Palaearctic (Central and Southern Europe, Iran, Japan) – leaf litter, and mosses on boulders.

Liochthonius muscorum Forsslund, 1964 – 3, 4, 8, 9, 10, 13, 15, 17, 18, 19, 25, 26 – silvicolous, euryhygric, microphytophagous and parthenogenetic – Holarctic (Palaearctic Region, Greenland) – common in litter and soil of coniferous and deciduous forests.

Liochthonius simplex (Forsslund, 1942) – 21 – Svätá Mária (Miko 1995) – without recent records – silvicolous, hygrophilous – semicosmopolitan (Palaearctic Region, Greenland, India, Australia, South Africa).

Liochthonius strenzkei Forsslund, 1963 – 1, 6, 12, 17, 18, 19, 26 – silvicolous – Holarctic – common in litter of forests.

Neobrachychthonius magnus Moritz, 1976 – 10, 14, 18, 19, 20, 23 – silvicolous Palaearctic – common in wet litter of forest.

Poecilochthonius spiciger (Berlese, 1910) – 2, 9, 10, 11, 12, 15, 20, 23 – xerophilous – semicosmopolitan (Holarctic Region, South-Eastern China, Taiwan, Argentina) – common in litter of dry forests.

Sellnickochthonius hungaricus (Balogh, 1943) – 9, 10, 15, 20 - silvicolous, xerophilous, parthenogenetic – Palaearctic – frequent in leaf litter of dry oak forests.

Sellnickochthonius immaculatus (Forsslund, 1942) – 1, 4, 6, 8, 10, 11, 13, 14, 15, 17, 18, 19, 20, 22, 23, 25, 26 – eurytopic, euryhygric, microphytophagous, parthenogenetic – Holarctic – frequent in soil and leaf litter of deciduous forests.

**Sellnickochthonius jacoti* (Evans, 1952) – 8, 9, 10, 18, 26 – silvicolous – Holarctic.

**Sellnickochthonius rostratus* (Jacot, 1936) – 3, 5, 16, 22 – hygrophilous – Holarctic – common in wet habitats.

**Sellnickochthonius subcricoides* (Balogh et Mahunka, 1979) – 4, 5, 6 – rare silvicolos – Palaearctic.

**Sellnickochthonius suecicus* (Forsslund, 1942) – 10, 26 – silvicolous – cosmopolitan (Palaearctic and Northern Nearctic Regions, New Zealand, Subantarctic Islands) – soils of mixed forests.

Sellnickochthonius zelawaiensis (Sellnick, 1928) – 1, 3, 4, 5, 8, 11, 12, 16, 17, 18, 19, 22, 25, 26 – hygrophilous, silvicolous, microphytophagous – Holarctic – abundant in litter and mosses of moist forests.

Synchthonius elegans Forsslund, 1957 – 2, 9, 23 – xerophilous – Holarctic (Palearctic and Northern Nearctic Regions) – litter and decaying wood of dry deciduous forests.

Sphaerochthoniidae Grandjean, 1947

Sphaerochthonius splendidus (Berlese, 1904) – 9, 10, 13, 15, 20, 23, 24 – xerothermophilous – semicosmopolitan (Holarctic Region, Vietnam, Australia, Polynesia) – dry meadows, pastures, steppe habitats, dry mosses and lichnes on deciduous trees.

Hypochthoniidae Berlese, 1910

Hypochthonius luteus Oudemans, 1917 – 6, 8, 9, 10, 12, 13, 14, 20, 23 – xerophilous, silvicolous – semicosmopolitan (Holarctic Region, North–East of Oriental Region, New Zealand) – common in dry open habitats.

Hypochthonius rufulus C.L.Koch, 1835 – 3, 5, 6, 8, 10, 11, 16, 19, 25, 26 – hygrophilous, eurytopic – semicosmopolitan (Holarctic and Oriental Regions, Seychelles, Mexico) – common in wet grasslands, and forests.

Eniochthoniidae Grandjean, 1947

Hypochthoniella minutissima (Berlese, 1910) – 2, 6, 8, 9, 11, 12, 13, 14, 15, 17, 18, 20, 21, 24, 26 – Svätá Mária (Miko 1995) – eurytopic, euryhygric – cosmopolitan – common in soils of dry deciduous forests.

Mesoplophoridae Ewing, 1917

Mesoplophora pulchra Sellnick, 1928 – 15, 17, 18, 19 – hygrophilous – semicosmopolitan (Holarctic Region, Tanzania).

Epilohmanniidae Oudemans, 1923

Epilohmannia cylindrica (Berlese, 1904) – 6, 13, 15, 20, 23, 24 – xerophilous – cosmopolitan (Holarctic Region, Chad, India, Neotropical Region, Hawaii) – steppe habitats and dry forests.

Phthiracaridae Perty, 1841

**Atropacarus* (*Atropacarus*) *phyllophorus* (Berlese, 1904) – 20 – euryhygric, eurytopic – Central and Eastern Europe – very rare in humus and decaying wood.

Atropacarus (*Atropacarus*) *striculus* (C.L.Koch, 1835) – 5, 6, 8, 11, 12, 16, 17, 19, 25 – hygrophilous – semicosmopolitan – frequent and abundant in wet meadows and coniferous and deciduous forests.

**Phthiracarus bryobius* Jacot, 1930 – 1, 8, 10, 11 – silvicolous and macroptytophagous – Holarctic – frequent in rich organic leaf litter.

Phthiracarus globosus (C.L.Koch, 1841) – 4, 5, 6, 8, 10, 11, 12, 17, 18, 26 – euryhygric, silvicolous – Holarctic.

Phthiracarus longulus (C.L.Koch, 1841) – 1, 4, 6, 8, 9, 10, 17, 18, 19, 22, 26 – silvicolous – Holarctic – frequent in leaf litter of mixed forest.

Phthiracarus peristomaticus Willmann, 1951 – 4, 5, 17 – silvicolous West-Palaearctic (Central Europe, Balkan, Pontic and Magrebian areas) – frequent in leaf litter of deciduous forests.

**Steganacarus* (*Tropacarus*) *brevipilus* (Berlese, 1923) – 18 – silvicolous – Western Palaearctic (Central Europe, Mediterranean, Maghrebian, Anatolian Pontic and Iranian areas) – rare of leaf litter of deciduous forests.

Steganacarus (*Tropacarus*) *carinatus* (C.L.Koch, 1841) – 4, 5, 8, 9, 10, 11, 12, 17, 18, 19, 20, 26 – silvicolous, marcrophytophagous, hydrotolerant – South-Western Palaearctic, (Paneuropean, Magrebian, Anatolia, Iran and Kashmir) – common in litter of deciduous and mixed forests.

Oribotritiidae Grandjean, 1954

**Indotritia consimilis* Märkel, 1964 – 15 – probably xerothermophilous – Central and South European (Croatia, Hungary, Slovakia) – very rare with uncertain autecological requirements.

Euphthiracaridae Jacot, 1930

Acrotritia ardua (C.L.Koch, 1841) – 2, 3, 5, 9, 10, 14, 16, 18, 19, 21, 22, 25, 26 – Svätá Mária (Miko 1995) – silvicolous, eurytopic, mesophilous – semicosmopolitan – common in wet soils of peat bogs, riparian forests, and dry grass litter of meadows and steppe habitats.

Euphthiracarus cribrarius (Berlese, 1904) – 1, 5, 6, 10, 11, 12, 17, 18, 19 – silvicolous, euryhygric, macrophytophagous – Holarctic – frequent in decaying wood and leaf litter of dry forests.

Euphthiracarus monodactylus (Willmann, 1919) – 4, 8, 9, 16, 26 – silvicolous, euryhygric – Holarctic – common in forest soils, especially in decaying wood of stumps.

Trhypochthoniidae Willmann, 1931

Trhypochthonius tectorum (Berlese, 1896) – 9, 10, 12, 13, 15, 20, 23, 24 – xerophilous – semicosmopolitan (Holarctic, Oriental, Ethiopian and Neotropical Regions) – living in dry habitats.

Nothridae Berlese, 1896

Nothrus anauniensis Canestrini et Fanzago, 1876 – 6, 9, 10, 13, 14, 18, 20, 24 – euryhygric, eurytopic – semicomopolitan – frequent in pasture and steppe habitats.

Nothrus palustris C.L.Koch, 1839 – 1, 2, 3, 8, 11, 16, 19, 22, 25, 24, 26 – eurytopic, hygrophilous – semicosmopolitan (Holarctic Region, Himalayas, Saint Helena Island) – with preference for wet meadows, forests, and peat bogs.

Camisiidae Oudemans, 1900

Camisia segnis (Hermann, 1804) – 8, 11, 12, 17, 18, 19, 26 – silvicolous, arboricolous – semicosmopolitan (Holarctic, Oriental and Neotropical Regions) – frequent in lichens and moss growths on trees.

Platynothrus peltifer (C.L.Koch, 1839) – 3, 4, 5, 9, 10, 11, 12, 14, 16, 17, 18, 19, 22, 25 – eurytopic, hygrophilous – semicosmopolitan (Holarctic, Neotropical and Oriental Regions, New Zealand, Saint Helena Island) – common in mosses, litter and soils of wet forests.

Nanhermanniidae Sellnick, 1928

Nanhermannia nana (Nicolet, 1855) – 1, 4, 5, 6, 10, 11, 12, 15, 16, 17, 22, 25, 26 – hygrophilous, eurytopic – semicosmopolitan (Holarctis, Neotropical and Northern Oriental Regions, New Zealand, Saint Helena Island) – common and frequent in forest litter and grass litter of meadows.

Hermanniellidae Grandjean, 1934

Hermaniella dolosa Grandjean, 1931 – 2, 6, 8, 9, 10, 11, 15, 17, 18, 19, 20, 23, 24 – xerophilous and thermophilous – Palaearctic – frequent in mosses, lichens, grass litter of steppe habitats and dry oak forests.

Hermaniella granulata (Nicolet, 1855) – 9, 10, 11, 12, 18, 19, 24, 26 – silvicolous, xerophilous – semicosmopolitan (Palaearctic and Oriental Regions, Northern USA) – in litter and mosses of dry forests.

Neoliodidae Sellnick, 1928

**Platyliodes doderleini* (Berlese, 1883) – 23 – xerophilous – Ponto-Mediterranean.

Platyliodes scaliger (C.L.Koch, 1839) – 2, 13, 14, 15, 20 – xerothermophilous – Holarctic – frequent in moss and lichen growth on trees and rocks.

Poroliodes farinosus (C.L.Koch, 1839) – 9, 20 – silvicolous, xerophilous, arboricolous – Palaearctic – with preference of dry lichens and mosses.

Licnodamaeidae Grandjean, 1931

Licnodamaeus pulcherrimus (Paoli, 1908) – 9, 10, 14, 15, 20, 23, 24 – xerophilous, silvicolous – Palaearctic – living in dry forests, meadows and steppe habitats.

Damaeidae Berlese, 1896

Belba corynopus (Hermann, 1804) – 11, 18, 26 – hygrophilous, silvicolous, microphytophagous – semicosmopolitan (Holarctic, Oriental Region).

Damaeus (*Adamaeus*) *onustus* C. L.Koch, 1844 – 8, 9, 10, 11, 12, 17, 18 – silvicolous – semicosmopolitan (Palaearctic and Ethiopian Regions) – frequent in litter and mosses of deciduous and coniferous forests.

Damaeobelba minutissima (Sellnick, 1928) – 11, 21, 26 – Svätá Mária (Miko 1995) – silvicolous – Palaearctic – living in litter and decaying wood of mixed forests.

Metabelba italica (Sellnick, 1931) – 21 – Svätá Mária (Miko 1995) – without recent records – xerophilous – Southern and Central Europen .

Metabelba pulverosa Strenzke, 1953 – 1, 6, 17, 21, 26 – Svätá Mária (Miko 1995) – Holarctic (Palaearctic Region, USA) – mesophilous, silvicolous, microphytophages, in leaf litter and decaying wood of deciduous forests.

Cepheidae Berlese, 1896

Cepheus cepheiformis (Nicolet, 1855) – 5, 11, 16 – silvicolous, mesophilous – Holarctic (Palaearctic, USA, China).

Damaeolidae Grandjean, 1965

Fosseremus laciniatus (Berlese, 1905) – 13, 15 – xerophilous – Cosmopolitan – living in mosses and lichens of dry open habitats.

Hungarobelbidae Miko et Travé, 1996

Hungarobelba visnyai (Balogh, 1938) – 23 – rare submontane – Palaearctic (Central and Southern Europe, Eastern Palaearctic Region) – in litter and soil.

Ctenobelbidae Balogh, 1965

Ctenobelba pectinigera (Berlese, 1908) – 13, 14, 15, 23, 24 – xerophilous, heliophilous – Central and South European and Maghrebian – frequent in dry meadows, pastures and steppe localities.

Eremobelbidae Balogh, 1961

Eremobelba geographica Berlese, 1908 – 16 – hygrophilous – Southern Palaearctic (Central and South Europe, Iran) – rare, wet open habitats.

Eremaeidae Sellnick, 1928

Eremaeus hepaticus C.L.Koch, 1835 – 6, 8, 10, 11, 12, 18, 19, 26 – silvicolous, xerophilous – Holarctic (Palaearctic Region, USA) – common in litter and mosses of forests.

Eueremaeus oblongus (C.L.Koch, 1835) – 1, 5, 11, 12, 17, 18 – silvicolous – Holarctic – common in mosses and forest litter.

Zetorchestidae Michael, 1898

Microzetorchestes emeryi (Coggi, 1898) – 13, 23 – xerothermophilous – Central and Southern European – rare in steppe habitats.

Zetorchestes falzonii Coggi, 1898 – 13, 14, 15, 17, 20, 24 – xerophilous – Central and South European – frequent in dry and warm forests, pastures, and steppe habitats.

Tenuialidae Jacot, 1929

Hafenrefferia gilvipes (C.L.Koch, 1839) – 10, 11, 16, 19 – silvicolous – Palaearctic (West, South and Eastern Palaearctic Region) – common in forest litter.

Astegistidae Hull, 1916

Cultroribula bicultrata (Berlese, 1905) – 1, 8, 9, 19 – xerophilous, silvicolous – semicosmopolitan (Holarctic Region, Java).

Furcoribula furcillata (Nordenskiöld, 1901) – 26 – silvicolous, euryhygric – semicosmopolitan (South-Eastern Europe, Eastern Palaearctic Region, USA, Ethiopia) – living in mosses, leaf litter of forests and meadows.

Liacaridae Sellnick, 1928

Liacarus coracinus (C.L.Koch, 1841) – 1, 4, 5, 6, 8, 9, 10, 11, 12, 17, 18, 19, 26 – silvicolous, euryhygric – semicosmopolitan (Palaearctic Region, Ethiopia, Saint Helena Island) – frequent in decaying wood and forest litter.

Liacarus subterraneus (C.L.Koch, 1844) – 1, 8, 10, 11, 18, 19 – silvicolous – Holarctic (West-Palaearctic Region, South-East Siberia, USA) – forest litter and mosses on the ground.

Xenillus clypeator Robineau-Desvoidy, 1839 – 6, 8, 9, 10, 11, 15 – xerophilous – Holarctic (West, East and Southern Palaearctic Region, USA, Northern Mexico) – leaf litter of dry forests.

Xenillus tegeocranus (Hermann, 1804) – 5, 7, 11, 12, 15, 16, 17, 23 – Cejkov (Karpelles 1893) – eurytopic, euryhygric – semicosmopolitan (Palaearctic Region, South-Eastern China, Taiwan) – preference of habitats with rich organic litter.

Ceratoppiidae Grandjean, 1954

Ceratoppia bipilis (Hermann, 1804) – 2, 8, 9, 10, 11, 12, 14, 15, 21, 24, 26 – Svätá Mária (Miko 1995) – eurytopic, euryhygric – semicosmopolitan (Holarctic and Northern Neotropical Regions, Vietnam,) – frequent in forest litter, mosses, and grass litter of meadows.

Ceratoppia quadridentata (Haller, 1882) – 12, 13, 14, 15, 17, 23 – eurytopic, euryhygric – Holarctic (Palaearctic and Southern Nearctic Regions, South-East China) – indistinct preference of meadows and open habitats.

Carabodidae C.L.Koch, 1837

Carabodes areolatus Berlese, 1916 – 18, 26 – silvicolous – Holarctic – lichen and moss growth on trees, decaying wood of drier habitats.

Carabodes coriaceus C.L.Koch, 1835 – 5, 6, 11, 12, 17, 18, 19, 26 – silvicolous, hygrophilous – Holarctic (Europe, North Africa, USA) – litter of deciduous and mixed forest.

Carabodes femoralis (Nicolet, 1855) – 16 – silvicolous, hygrophilous – Palaearctic (West, South and Eastern Palaearctic Region) – litter and decaying wood of coniferous and deciduous forests.

Carabodes labyrinthicus (Michael, 1879) – 1, 5, 6, 9, 10, 11, 12, 17, 18, 19, 21, 26 – Svätá Mária (Miko 1995) – silvicolous, eurytopic, xerophilous – Holarctic – common in dry lichen and moss growths on trees.

Carabodes ornatus Štorkán, 1925 – 1, 12, 26 – silvicolous – West-Palaearctic (Europe, Western Siberia) – common in coniferous litter.

Carabodes rugosior Berlese, 1916 – 5, 9, 18 – silvicolous, euryhygric – Holarctic (Palaearctic and Southern Nearctic Regions) – frequent in forest leaf litter and decaying wood of stumps.

Tectocepheidae Grandjean, 1954

Tectocepheus minor Berlese, 1903 – 1, 10, 11, 12, 17, 18 – silvicolous, euryhygric – Holarctic (Central and Southern Europe, Iran, East Asia, Japan, USA) – frequent in forest litter.

Tectocepheus velatus (Michael, 1880) – 1, 2, 3, 4, 5, 6, 8, 9, 11, 12, 14, 15, 16, 18, 19, 20, 21, 22, 23, 25, 26 – Svätá Mária (Miko 1995) – almost ubiquist, eurytopic – cosmopolitan – very common in most habitats including ruderal sites and agrocenoses, one of the most frequent species.

Quadroppiidae Balogh, 1983

Quadroppia monstruosa Hammer, 1980 – 1, 4, 5, 6, 8, 12, 13, 14, 16, 18, 19, 20, 21, 23, 24, 25 – Svätá Mária (Miko, 1995, as Q. *paolii* syn. jun.) – eurytopic – semicosmopolitan (Europe, USA, Java).

Quadroppia quadricarinata (Michael, 1885) – 2, 3, 4, 5, 8, 9, 10, 11, 14, 15, 19, 20, 21, 22, 23, 25 – Svätá Mária (Miko 1995) – eurytopic, euryhygric – semicosmopolitan (Holarctic Region, South-East China, Tanzania, Mauritius).

Machuellidae Balogh, 1983

**Machuella draconis* Hammer, 1961 – 16 – semicosmopolitan (Mediterranean and Central Europe, Reunion, Tanzania) – rare in leaf litter of wet forests.

Oppiidae Grandjean, 1951

Berniniella (Berniniella) aeoliana (Bernini, 1973) – 21 – Svätá Mária (Miko 1995) – without recent records – xerophilous – Southern and Central European.

Berniniella (*Berniniella*) *bicarinata* (Paoli, 1908) – 4, 5, 8, 9, 10, 15, 17, 18, 21, 22, 23, 24, 26 – Svätá Mária (Miko 1995) – eurytopic, euryhygric – semicosmopolitan (Palaearctic Region, Madagascar, Vietnam) – frequent in forest litter and meadow soils.

Berniniella (*Berniniella*) *hauseri* (Mahunka, 1974) – 8, 21 – Svätá Mária (Miko 1995) – West-Palaearctic (South and Central Europe, West and Southern Asia).

Dissorhina ornata (Oudemans, 1900) – 1, 4, 6, 8, 9, 12, 13, 14, 15, 17, 18, 19, 20, 21, 23, 24 – Svätá Mária (Miko 1995) – eurytopic, euryhygric – Holarctic (Palaearctic Region, USA) – very frequent with slight preference of drier habitats.

Microppia minus (Paoli, 1908) – 1, 2, 5, 6, 8, 9, 10, 11, 12, 15, 16, 17, 18, 19, 24, 25, 26 – eurytopic, euedaphic – cosmopolitan – frequent small species living in deeper soil layers.

Multioppia glabra (Mihelčič, 1955) – 5, 6, 16, 17, 18, 21, 22 – Svätá Mária (Miko 1995) – silvicolous, hygrophilous – Palaearctic (Central and Southern Europe, Eastern Siberia).

Oppia denticulata (G. Canestrini et R. Canestrini, 1882) – 1, 19 – silvicolous – Palaearctic.

Oppiella (*Oppiella*) *acuminata* (Strenzke, 1951) – 21 – Svätá Mária (Miko, 1995) – without recent records – silvicolous – Holarctic (Europe, Canada, USA, Mongolia).

Oppiella (*Oppiella*) *falcata* (Paoli, 1908) – 12, 21, 26 – Svätá Mária (Miko 1995) – silvicolous, mesophilous – West-Palaearctic (Europe, Caucasus) – frequent in leaf litter of coniferous and deciduous forests.

Oppiella (*Oppiella*) *marginedentata* (Strenzke, 1951) – 21 – Svätá Mária (Miko 1995) – without recent records – silvicolous – Palaearctic (Central Europe, Iran) – rare in litter of deciduous and mixed forests also in agrocenoses.

Oppiella (*Oppiella*) *nova* (Oudemans, 1902) – 2, 3, 4, 5, 6, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26 – Svätá Mária (Miko 1995) – almost ubiquist, eurytopic, euryhygric – cosmopolitan – very frequent in many habitats including agrocenoses.

Oppiella (*Moritzoppia*) *keilbachi* (Moritz, 1969) – 17, 18, 19, 21 – Svätá Mária (Miko 1995) – silvicolous – Palaearctic – forest litter also in agrocenoses.

Oppiella (*Rhinoppia*) *fallax* (Paoli, 1908) – 21 – Svätá Mária (Miko 1995) – without recent records – eurytopic – semicosmopolitan (Holarctic Region, India, New Zealand, Chile).

Oppiella (*Rhinoppia*) *obsoleta* (Paoli, 1908) – 3, 4, 5, 6, 9, 11, 12, 13, 15, 16, 17, 18, 19, 21, 22, 25, 26 – Svätá Mária (Miko 1995) – eurytopic, euryhygric – semicosmopolitan (Palaearctic Region, Greenland, New Zealand, Hawaii).

Oppiella (*Rhinoppia*) *subpectinata* (Oudemans, 1900) – 1, 2, 8, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 24, 25, 26 – Svätá Mária (Miko, 1995) – almost euryecious, eurytopic, mesophilous – semicosmopolitan (West-Palaearctic Region, USA, Senegal) – very frequent in most habitats.

Ramusella clavipectinata Subias et Rodriguez, 1986 – 8, 9, 14, 15, 18, 19, 20, 22, 23, 25 – eurytopic – semicosmopolitan (Palaearctic Region, USA, Hawaii, Mexico).

Ramusella furcata (Willmann, 1928) – 3, 16, 21, 22, 25 – Svätá Mária (Miko 1995) – hygrophilous – European – in wet moses of moist meadows and peat bogs.

Ramusella insculpta (Paoli, 1908) – 13, 14, 15, 21, 24 – Svätá Mária (Miko 1995) – xerophilous, xerothermophilous – South and West-Palaearctic (Europe, Iran).

Subiasella quadrimaculata (Evans, 1952) – 20, 21, 23, 24 – Svätá Mária (Miko 1995) – Palaearctic (Europe, South Eastern Palearctis).

Suctobelbidae Jacot, 1938

Suctobelba granulata van der Hammen, 1952 – 26 – hygrophilous – West-Palaearctic (Europe, Caucasus) – rare, living in the forest litter.

Suctobelba trigona (Michael, 1888) – 4, 5, 10, 11, 15, 16, 20, 21 – Svätá Mária (Miko 1995) – hygrophilous, eurytopic – Holarctic (Europe, Central Asia, Greenland), frequent in forest litter.

Suctobelbella alloenasuta Moritz, 1971 – 21 – Svätá Mária (Miko 1995) – without recent records – silvicolous – Holarctic (Central and Southern Europe, USA).

Suctobelbella acutidens (Forsslund, 1941) – 4, 5, 21 – Svätá Mária (Miko 1995) – hygrophilous – semicosmopolitan (Holarctic Region, Argentina) – in wet habitats.

Suctobelbella arcana Moritz, 1970 – 1, 6, 21 – Svätá Mária (Miko 1995) – eurytopic – Holarctic (Europe, North-Eastern Siberia, USA, Canada) Europe.

Suctobelbella duplex (Strenzke, 1950) – 21, 26 – Svätá Mária (Miko 1995) – xerophilous – Holarctic (Palaeartic Region, Canada) – with preference of soils of beech forests.

Suctobelbella falcata (Forsslund, 1941) – 3, 16, 17, 18, 21, 22, 26 – Svätá Mária (Miko 1995) – silvicolous, hygrophilous – European – frequent in coniferous and mixed forests.

Suctobelbella hammerae (Krivolutsky, 1965) – 21 – Svätá Mária (Miko 1995) – without recent records – West-Palaearctic Region – with uncertain auecological requirements.

Suctobelbella nasalis Moritz, 1971 – 1, 3, 4, 5, 6, 11, 16, 21, 22, 25 – Svätá Mária (Miko 1995) – hygrophilous, silvicolous – Euro-Siberian – frequent in leaf litter of mixed and deciduous forests.

Suctobelbella palustris (Forsslund, 1953) – 2, 3, 16, 22, 25 – hygrophilous, heliophilous – Holarctic (Euro-Siberian, USA) – frequent in moist mosses of peat bogs and wet meadows.

Suctobelbella subcornigera (Forsslund, 1941) – 1, 4, 5, 6, 8, 9, 10, 11, 12, 17, 18, 19, 21, 26 – Svätá Mária (Miko 1995) – eurytopic, mesophilous – semicosmopolitan (Holarctic, New Zealand) – frequent in forest litter.

Suctobelbella subtrigona (Oudemans, 1900) – 3, 4, 8, 12, 13, 15, 17, 18, 19, 20, 22, 23, 24, 25 – eurytopic, euryhygric, almost euryecious – semicosmopolitan (West-Palaearctic and Northern Nearctic Regions, Mexico, Vietnam).

Autognetidae Grandjean, 1960

Autogneta longilamellata (Michael, 1885) – 3, 8, 13, 15, 17, 18, 19, 20, 26 – silvicolous, xerophilous – Holarctic – with preference to decaying wood of stumps in warm deciduous forests.

Thyrisomidae Grandjean, 1954

Banksinoma lanceolata (Michael, 1885) – 16, 22 – mesophilous – Holarctic.

Oribella pectinata (Michael, 1885) – 13, 14, 21, 23, 24 – Svätá Mária (Miko 1995) – silvicolous, eurythermic – Holarctic – frequent in nests of small mammals.

Pantelozetes paolii (Oudemans, 1913) – 8, 10, 13, 14, 15, 23, 24 – eurytopic, euryhygric, heliophilous – Holarctic – with preference of open habitats, meadows and dry deciduous forests.

Cymbaeremaeidae Sellnick, 1928

Cymberemaeus cymba (Nicolet, 1855) – 9 – xerophilous, silvicolous, arboricolous, – semicosmopolitan (Western Palaearctic Region, Sikkim, Mexico) – frequent in lichen growths on trees in deciduous forests.

Scaphaeremaeus palustris (Sellnick, 1924) – 16, 22, 25 – distinctly hygrophilous, limnophilous – Holarctic – with high preference of wet habitats, mosses and wet soil of peat bogs.

Micreremidae Grandjean, 1954)

Micreremus brevipes (Michael, 1888) – 9, 10, 15, 17, 18, 19, 26 – xerophilous, silvicolous, arboricolous – Palaearctic – frequent in warm forests in lichen growths on trees.

Licneremaeidae Grandjean, 1931

Licneremaeus licnophorus (Michael, 1882) – 9, 14, 15, 21, 23 – Svätá Mária (Miko 1995) – xerophilous – Holarctic – frequent in litter of dry and warm forests.

Passalozetidae Grandjen, 1954

Passalozetes africanus Grandjean, 1932 – 13, 15, 20, 23 – xerothermophilous, saxicolous – Palearctic (Mediterranean and Central Europe, Central Asia) – with preference for steppe habitats, especially dry grass litter.

Scutoverticidae Grandjean, 1954

Scutovertex minutus (C.L.Koch, 1835) – 13, 15 – xerophilous, heliophilous, hydrotolerant – Holarctic (Europe, Northern Africa, Greenland) – with preference to dry soil of meadows.

Phenopelopidae Petrunkevitch, 1955

Eupelops acromios (Hermann, 1804) – 8, 15, 20 – xerophilous, silvicolous, arboricolous – semicosmopolitan (Palaearctic Region, South Africa, Ethiopia, Argentina, Mexico).

Eupelops nepotulus (Berlese, 1916) – 13, 14, 24 – xerophilous, heliophilous – Western Palaearctic (Central and Southern Europe, Caucasus) – with preference of dry habitats.

Peloptulus phaenotus (C.L.Koch, 1844) – 9, 10, 17, 18, 19, 26 – xerophilous, heliophilous – Palaearctic – frequent in lichen and mosses growth on the trees.

Achipteriidae Thor, 1929

Achipteria coleoptrata (Linnaeus, 1758) – 1, 2, 8, 9, 10, 13, 14, 20, 23, 24 – eurytopic, euryhygric – semicosmopolitan (Palaearctic Region, USA, Sikkim, Vietnam, Saint Helena Island) – with indistinct preference of open habitats.

Achipteria nitens (Nicolet, 1855) – 11, 21 – Svätá Mária (Miko 1995) – silvicolous – Palaearctic – with preference of litter of deciduous forests.

Parachipteria punctata (Nicolet, 1855) – 1, 10, 15, 24, 26 – silvicolous, muscicolous, xerophilous – Holarctic.

Tegoribatidae Grandjean, 1954

Tegoribates latirostris (C.L.Koch, 1844) – 2, 14 – heliophilous – Palaearctic – with preference of meadows and pastures.

Oribatellidae Jacot, 1925

**Ophidiotrichus connexus* (Berlese, 1904) – 6, 11, 15 – xerophilous and silvicolous – European – common in litter of dry deciduous forests.

Ophidiotrichus borussicus (Sellnick, 1908) – 17, 18, 19, 21, 26 – Svätá Mária (Miko 1995) – xerophilous and silvicolous – West-Palaearctic – frequent in litter of beech and oak-hornbeam forests.

Oribatella calcarata (C.L.Koch, 1835) – 1, 6, 12, 19, 26 – silvicolous, mesophilous – Holarctic (Palaearctic Region, USA) – frequent in decaying wood and leaf litter of deciduous forests.

**Oribatella reticulata* Berlese, 1916 – 22 – hygrophilous – Holarctic (Southern and Central Europe, South–Eastern Palaearctic Region, Eastern USA) – rare, in wet forests.

Tectoribates ornatus (Schuster, 1958) – 23, 24 – xerophilous, heliophilous – Palaearctic – stenotopic of dry steppe and habitats.

Galumnidae Jacot, 1925

Galumna alata (Hermann, 1804) – 6, 7, 15, 16, 18 – Cejkov (Karpelles 1893) – eurytopic – cosmopolitan (West-Palaearctic Region, Mongolia, USA, Seychelles, Hawaii, Argentina, India, Taiwan, South Georgia).

Galumna lanceata (Oudemans, 1900) – 1, 5, 9, 11, 12, 16, 17, 18, 25, 26 – silvicolous, myrmecophilous, euryhygric – Palaearctic (Europe, Siberia) – frequent in leaf litter of deciduous forests.

Pergalumna myrmophila (Berlese, 1914) – 1 – silvicolous, myrmecophilous – Palaearctic (Mediterranean and Central Europe, Pakistan) – rare in litter and ant nests of coniferous forests.

Pergalumna nervosa (Berlese, 1914) – 2, 3, 5, 11, 12, 16, 17, 19 – hygrophilous, eurytopic – semicosmopolitan (Palaearctic Region, USA, South Africa) – frequent in wet meadows and mosses of coniferous forests.

Pilogalumna tenuiclava (Berlese, 1908) – 3, 16, 22, 25 – hygrophilous – Holarctic – in litter of forest and wet mosses of peat bogs.

Ceratozetidae Jacot, 1925

Ceratozetes gracilis (Michael, 1884) – 1, 4, 6, 8, 10, 11, 16, 17, 18, 19, 23, 24, 25, 26 – eurytopic, euryhygric – cosmopolitan (Holarctic Region, India, New Zealand, Chile, Panama, Saint Helena Island, South Shetland Islands) – frequent in litter of mixed and deciduous forests.

Ceratozetes mediocris Berlese, 1908 – 13, 14, 20, 21, 23, 24 – Svätá Mária (Miko 1995) – xerophilous, heliophilous – semicosmopolitan (Holarctic, India, Mexico, New Zealand) – preference for open habitats, dry meadows and pastures.

Ceratozetes minutissimus Willmann, 1951 – 9, 13, 14, 20, 21 – Svätá Mária (Miko 1995) – xerophilous – Central and Southern European – frequent in the soils of steppe habitats.

Latilamellobates incisellus (Kramer, 1897) – 2 – hygrophilous, heliophilous – Holarctic – preference of open habitats, meadows, pastures and steppes.
Melanozetes mollicomus (C.L.Koch, 1839) – 6, 10, 17, 18, 19, 21, 26 – Svätá Mária (Miko 1995) – silvicolous, euryhygric – Holarctic – in leaf litter, decaying wood and mosses of forests.

Zetomimidae Shaldybina, 1966
Zetomimus furcatus (Warburton et Pearce, 1905) – 3, 5, 6, 25 – hygrophilous – Palaearctic (Europe, Siberia, Eastern Russia) – in soils of wet meadows, marshes, peat bogs and wet lake banks.

Chamobatidae Grandjean, 1954
Chamobates borealis (Trägardh, 1902) – 19, 21 – Svätá Mária (Miko 1995) – hygrophilous, silvicolous – Palaearctic.
Chamobates cuspidatus (Michael, 1884) – 17, 18, 19, 21, 26 – Svätá Mária (Miko 1995) – silvicolous – Palaearctic.
Chamobates pusillus (Berlese, 1895) – 1, 5, 12, 19 – silvicolous, euryhygric – Palaearctic – scarce of forest litter.
Chamobates subglobulus (Oudemans, 1900) – 1, 6, 11, 12, 17, 18, 19, 26 – silvicolous – Palaearctic (Europe, Maghreb, Iran, Eastern Russia) – in litter of deciduous forests.
Chamobates voigtsi (Oudemans, 1902) – 2, 6, 10, 11, 17, 18, 19, 21, 26 – Svätá Mária (Miko 1995) – silvicolous, muscicolous, euryhygric – Palaearctic (Europe, Siberia, Eastern Palaearctic Region) – frequent in leaf litter especially oak forests.

Mycobatidae Grandjean, 1954
Minunthozetes pseudofusiger (Schweizer, 1922) – 5, 10, 11, 12, 20, 21, 25 – Svätá Mária (Miko 1995) – silvicolous, muscicolous – Palaearctic.
Minunthozetes semirufus (C.L.Koch, 1841) – 2, 3, 12, 16, 17, 21, 22, 25 – Svätá Mária (Miko 1995) – hygrophilous, heliophilous – Holarctic (Europe, Central Asia, Siberia, Canada) – in mosses on trees, wet meadows and bogs.
Punctoribates hexagonus Berlese, 1908 – 21, 25 – Svätá Mária (Miko 1995) – hygrophilous – Holarctic (Europe, Central Asia, Canada) – in marshes, peat bogs, reedbeds and wet meadows.
Punctoribates punctum (C.L.Koch, 1839) – 9, 13, 14, 15, 20, 21, 23, 24 – Svätá Mária (Miko 1995) – xerophilous, heliophilous, – semicosmopolitan (Palaearctic Region, USA, India, New Zealand) – frequent in open habitats, especially meadows and pastures.

Euzetidae Grandjean, 1954
Euzetes globulus (Nicolet, 1855) – 2, 4, 12, 14, 15, 17, 18, 19, 20, 25, 26 – eurytopic, euryhygric – semicosmopolitan (Europe, Northern Africa, Siberia, Eartern Asia, Argentina) – frequent in meadows, pastures, moist forests, especially floodplain forests.

Mochlozetidae Grandjean, 1960
**Podoribates longipes* (Berlese, 1887) – 23 – rare, xerophilous – Holarctic (Europe, Central Asia, Canada).

Haplozetidae Grandjean, 1936

Protoribates monodactylus (Haller, 1884) – 9, 13, 14, 20, 23, 24 – xerophilous – semicosmopolitan – freguent in steppe habitats.

Scheloribatidae Grandjean, 1933

**Dometorina plantivaga* (Berlese, 1895) – 9 – arboricolous, lichenophagous – semicosmopolitan (Palaearctic, Nearctic Regions, Yemen, India, Argentina) – rare of lichen growth on trees.

Hemileius initialis Berlese, 1916 – 1, 4, 5, 6, 8, 11, 14, 15, 16, 20, 22, 23, 24, 25, 26 – eurytopic, mesophilous – semicosmopolitan (Palaearctic and Neotropical Regions, Southern USA, Bali).

Liebstadia longior (Berlese, 1908) – 21 – Svätá Mária (Miko 1995) – without recent records – eurytopic – Holarctic (Palaearctic Region, Canada).

Liebstadia pannonica (Willmann, 1951) – 15, 20, 21, 23, 24 – Svätá Mária (Miko 1995) – xerophilous – Holarctic (Western and Central Europe, USA) – stenotopic of steppe and dry meadows localities.

Liebstadia similis (Michael, 1888) – 2, 16, 21, 22, 23, 24, 25 – Svätá Mária (Miko 1995) – hygrophilous, heliophilous – Holarctic – frequent in wet open habitats.

Scheloribates laevigatus (C.L.Koch, 1835) – 2, 3, 4, 6, 6, 8, 9, 10, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26 – Svätá Mária (Miko 1995) – eurytopic, euryhygric, heliophilous, almost euryecious – semicosmopolitan (Palaearctic Region, USA, Argentina, Bolivia) – very abundant with slight preference of open habitats.

Oribatulidae Thor, 1929

Lucoppia burrowsi (Michael, 1890) – 13, 14, 15, 20 – arboricolous, xerophilous – Holarctic – also in dry forest litter, and rhizosphere of meadows.

Oribatula tibialis (Nicolet, 1855) – 1, 2, 3, 4, 6, 9, 10, 11, 14, 15, 18, 19, 20, 21, 22, 23, 24, 25, 26 – Svätá Mária (Miko 1995) – eurytopic, mesophilous – semicosmopolitan (Holarctic and Neotropical Regions, Sikkim) – common in soil of pastures and mosses and litter of forests.

Zygoribatula cognata (Oudemans, 1902) – 20 – xerophilous – Europen, (Central and Southern Europe).

Zygoribatula exilis (Nicolet, 1855) – 9, 15 – xerophilous, heliophilous – Holarctic – frequent in moss and lichens growth on trees.

Zygoribatula terricola (Hammen, 1952) – 20, 21 – Svätá Mária (Miko 1995) – heliophilous – Central and Southern Europe – preference of open habitats, frequent in agrocenoses.

Conclusions

Altogether rich material of 29822 individuals of oribatid mites was obtained. In total, 171 oribatid species were found in Latorica PLA (i.e. 31,4 % of the total Slovakian oribatid fauna), belonging to 55 families and 101 genera or subgenera. Following 17 species are new records for the fauna of Slovakia: *Atropacarus* (*Atropacarus*) *phyllophorus, Brachychthonius bimaculatus, Dometorina plantivaga, Indotritia consimilis, Lichthonius alpestris, Liochthonius leptaleus, Machuella draconis, Ophidiotrichus connexus, Oribatella reticulata,*

Phthiracarus bryobius, Platyliodes doderleini, Podoribates longipes, Sellnickochthonius jacoti, Sellnickochthonius rostratus, Sellnickochthonius subcricoides, Sellnickochthonius suecicus, and *Steganacarus* (*Tropacarus*) *brevipilus.* From the faunistic point of view is the most interesting record of *Indotritia consimilis* from Kašvár NNR, from sample of leaf litter under a solitary bush, surrounded by xerothermic grassland (3 specimens). This species was originally described by Märkel (1964) as *Indotritia krakatuensis consimilis* from Croatia, locus typicus: Split, litter under coniferous tree in the town. Second record of this very rare species was published by Mahunka (1990) from Bátorliget in North-Eastern Hungary from decayed roots of a fern-tussock in birch forest. Our finding is the third for the World oribatid fauna (Mahunka & Mahunka-Papp 2004; Niedbała 2011).

The most frequent species in studied habitats and localities were ubiquitous, eurytopic species with wide ecological valence. These often semicosmopolitan species: *Dissorhina ornata, Microppia minus, Oppiella* (*Oppiella*) *nova, Oppiella* (*Rhinoppia*) *subpectinata, Oribatula tibialis, Platynothrus peltifer, Scheloribates laevigatus, Suctobelbella subcornigera* and *Tectocepheus velatus* often significantly dominate oribatid comunities in many ecologically diverse habitats and localities and create the basic structure of oribatid communities.

Very characteristic habitats for Latorica PLA are different type of wet flooded and riparian forests. Many silvicolous species were comparatively common in studied forested localities, but only the following species show preference for flooded forests: *Carabodes coriaceus, Euphthiracarus cribrarius, Chamobates subglobulus, Liacarus coracinus, Liochthonius leptaleus, Liochthonius strenzkei, Oppia denticulata*, and *Suctobelba granulata.*

Steppe and xerothermic grasslands with bushes are also important and characteristic for the studied area. This type of habitat is inhabited frequently by a community of distinctly xerophilous, heliophilous and saxicolous species like: *Epilohmannia cylindrica, Licnodamaeus pulcherrimus, Liebstadia pannonica, Lucoppia burrowsi, Passalozetes africanus, Protoribates monodactylus, Sphaerochthonius splendidus, Scutovertex minutus, Tectoribates ornatus* and *Trhypochthonius tectorum.* Important faunistic elements are stenotopic, distinctly xerophilous species with Southern European and Mediterranean distribution characteristic for dry, open biotopes: *Berniniella (Berniniella) aeoliana, Ceratozetes minutissimus, Eremobelba geographica, Indotritia consimilis, Microzetorchestes emeryi* and *Zetorchestes falzonii.*

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Súhrn

Roztoče (Acari: Oribatida) Chránenej krajinnej oblasti Latorica

Celkovo bol získaný bohatý materiál 29 822 jedincov panciernikov. Na 24 lokalitách v CHKO a 2 lokalitách mimo CHKO Latorica bolo nájdených celkom 171 druhov oribatidov (t. j. 31, 4% z celkovej fauny panciernikov Slovenska), ktoré patria do 55 čeľadí a 101 rodov alebo podrodov. Nasledujúcich 17 druhov predstavuje nové druhy pre faunu Slovenska: *Atropacarus (Atropacarus) phyllophorus*, *Brachychthonius bimaculatus*, *Dometorina plantivaga*, *Indotritia consimilis*, *Lichthonius alpestris*, *Liochthonius leptaleus*, *Machuella draconis*, *Ophidiotrichus connexus*, *Oribatella reticulata*, *Phthiracarus bryobius*, *Platyliodes doderleini*, *Podoribates longipes*, *Sellnickochthonius jacoti*, *Sellnickochthonius rostratus*, *Sellnickochthonius subcricoides*, *Sellnickochthonius suecicus*, and *Steganacarus* (*Tropacarus*) *brevipilus*. Z faunistického hľadiska je najzaujímavejší nález *Indotritia consimilis* z NPR Kašvár, zo vzorky listového opadu pod solitérnym kríkom, obklopeným xerotermnými lúkami (3 vzorky). Tento druh pôvodne opísal Märkel (1964) ako *Indotritia krakatuensis consimilis* z Chorvátska; locus typicus: Split, opad pod ihličnatým stromom v meste. Druhý nález tohto veľmi vzácneho druhu publikoval Mahunka (1900) z lokality Bátorliget v severovýchodnom Maďarsku z práchna koreňov trsu paprade v brezovom lese. Naše zistenie je tretím nálezom druhu pre faunu panciernikov sveta (Mahunka & Mahunka-Papp 2004; Niedbala 2011).

Najčastejšími druhmi na sledovaných stanovištiach a lokalitách boli ubikvistické a eurytopné druhy so širokou ekologickou valenciou. Tieto, často semikozmopolitné druhy: *Dissorhina ornata*, *Microppia minus*, *Oppiella* (*Oppiella*) *nova*, *Oppiella* (*Rhinoppia*) *subpectinata*, *Oribatula tibialis*, *Platynothrus peltifer*, *Scheloribates laevigatus*, *Suctobelbella subcornigera* a *Tectocepheus velatus* často tvoria základnú štruktúru mnohých spoločenstiev panciernikov.

Veľmi charakteristické stanovištia pre CHKO Latorica sú rôzne typy vlhkých lužných a brehových lesov. Mnoho silvikolných druhov panciernikov bolo bežných na študovaných zalesnených lokalitách, iba pri nasledujúcich druhoch bola zistená preferencia pôd lužných lesov: *Carabodes coriaceus*, *Euphthiracarus cribrarius*, *Chamobates subglobulus*, *Liacarus coracinus*, *Liochthonius leptaleus*, *Liochthonius strenzkei*, *Oppia denticulata*, a *Suctobelba granulata*.

Pre študovanú oblasť sú takisto charakteristické stepné a xerotermné lúky, porastené kríkmi. Tento typ stanovíšť obývajú spoločenstvá výrazne xerofilných, heliofilných a saxikolných druhov, akými sú: *Epilohmannia cylindrica*, *Licnodamaeus pulcherrimus*, *Liebstadia pannonica, Lucoppia burrowsi*, *Passalozetes africanus*, *Protoribates monodactylus*, *Sphaerochthonius splendidus*, *Scutovertex minutus*, *Tectoribates ornatus* a *Trhypochthonius tectorum*. Dôležitými faunistickými prvkami sú stenotopné, výrazne xerofilné druhy s juhoeurópskym a stredomorským rozšírením, preferujúce suché a otvorené biotopy: *Berniniella* (*Berniniella*) *aeoliana*, *Ceratozetes minutissimus*, *Eremobelba geographica*, *Indotritia consimilis*, *Microzetorchestes emeryi* a *Zetorchestes falzonii*.

Terrestrial and aquatic isopods (Isopoda: Oniscidea, Asellota) of the Latorica Protected Landscape Area

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Abstract

Isopod fauna of the Latorica Protected Landscape Area (PLA) was little known until recent times. Based on an intensive field research and evaluation of literary data, in this study we present annotated list of 19 terrestrial and 2 aquatic species from the order Isopoda. The findings of *Ligidium intermedium* are the first in Slovakia. This Eastern Carpathian species, originally described from Romania, inhabits wetter forest habitats of the Zemplínske vrchy Mts., together with another Eastern Carpathian species, *Hyloniscus transsilvanicus*. This hygrophilous species is also typical for floodplain forest communities in the river landscape of the Latorica PLA. Other observed species represent more less common part of the Central European lowland fauna of terrestrial isopods. For the aquatic isopod *Proasellus pribenicensis*, inhabiting a floodplain with overgrown marshes and reclamation channels, the Latorica PLA contains the type locality and represents north-western boundary of its distribution. Central European isopod fauna, although a relatively species-poor group of crustaceans, can prove the uniqueness of nature in the protected landscape as the Latorica PLA is.

Key words: woodlice, waterlice, mosaic landscape, lowland, mountainous woodland, faunistics, biogeographical junction, Latorica PLA, Eastern Slovakia

Introduction - history and objectives

The Latorica Protected Landscape Area (PLA) is a unique example of a lowland landscape, strongly influenced by the rivers that cross it and with their floodplains create a mosaic of wetlands, separated by sand dunes and andesite outcrops. The mosaic of contrasting habitats is situated at the crossroads of Pannonian and West and East Carpathian nature, connected by the rivers that meet here.

Previous knowledge about the terrestrial isopod fauna was very modest and did not refer much about the specificity of this area. From the wider territory of the region of the former Zemplín / Zemplén County (now both Hungarian and Slovak territory), adjacent to the Latorica PLA area, come little, rather old faunistic data. Dollfus (1901) and Csiki (1926) reviewed data on terrestrial isopods of the former Hungarian monarchy. They listed four widely distributed species from the surroundings of the Veľaty (= Velejte) village on the west foothill of the Zemplínske vrchy Mts.: *Armadillidium vulgare*, *Cylisticus convexus*, *Trachelipus rathkii* (as *Porcellio affinis*), and *Protracheoniscus politus* (as *Metoponorthus amoenus*). These findings were later repeated by Dudich (1942). In the meantime, other published data were focused mainly on the surroundings of the most locally important towns, Sátoraljaujhély and Sárospatak, located in Hungary downstream of the Bodrog river (Mehély 1929; Kesselyák 1930, 1936; Dudich 1942; Strouhal 1965; Allspach & Szlávecz 1990; Forró & Farkas 1998; Kontschán 2002, 2003; Csordás et al. 2005). An overview of the history of research of malacostracan crustaceans including terrestrial isopods in the Hungarian part of the Zemplín/Zemplén region were summarized and completed newly by Kontschán et al. (2006). Some of the listed species are of faunistic importance, e.g., the autochthonous *Haplophthalmus hungaricus, Hyloniscus transsilvanicus, Trichoniscus noricus* or *Ligidium intermedium* (all from the mountainous vicinity of the town of Sátoraljaujhély). Data about the synanthropic occurrence of *Protracheoniscus major* within the built-up area and finding of the blind subterranean species *Mesoniscus graniger* near the town of Sátoraljaujhély are also remarkable.

So far, the only paper published by Flasarová (1994) is dealing with the terrestrial isopod fauna directly from the Latorica PLA. Among the samples of isopods from various sites and habitats throughout Slovakia collected by Ján Brtek she recognized also six common European woodlice species in the region where our attention is focused: *Hyloniscus riparius* (road Borša-Bara, at Veľké Raškovce), *T. rathkii* (at roads Bodrog-Somotor, Veľké Kapušany – Leles), *Trachelipus nodulosus* (Oborín, Veľké Raškovce), *Porcellium collicola* (at road Borša-Bara), *Armadillidium versicolor* (Veľké Raškovce), *A. vulgare* (Borša-Bara, Oborín-Veľké Raškovce, Streda nad Bodrogom). Summarising, little data were available, even on the occurrence of several common species of terrestrial isopods, based on which the local fauna appeared to be species-poor and non-specific.

Aquatic isopods were investigated in given territory fundamentally by Flasarová (1977) and Brtek (2003), with Ján Brtek being the sole collector of field data in both studies. The occurrence of two species was documented, widespread *Asellus aquaticus*, and *Proasellus pribenicensis*, described by Flasarová (1977). Its type locality (an unidentified pond by the railway in or at the village Pribeník) is situated in the study area. Almost all other distributional data for *P. pribenicensis* in Slovakia, lie between the river system Latorica-Laborec and the borders with Ukraine and Hungary. Only two localities, Palín (Krášok) and Pavlovce nad Uhom, lie a little further north of the delimited area of its occurrence. The area of this lowland species is concentrated to the North-East promontory of the Pannonian lowland (Slovakia, Hungary, Romania and highly probably Ukraine). Brtek´s paper also carried bibliography on both aquatic isopods, where *A. aquaticus* is mentioned in some other papers dealing with water macrofauna of the different parts of the Eastern Slovak Plain. Interestingly, apart from these two cited sources, no other faunistic observations of *P. pribenicensis* have been published

from Slovakia to date. In an overview of macrozoobenthos of the southern part of the East Slovak Lowland, Kokorďák (1973, 1982) mentioned only the widespread *A. aquaticus* from the drainage channels or river arms of the Latorica river in the villages of Oborín, Somotor and Veľké Raškovce residential areas. Terek & Brázda (1986) hydrobiologically investigated an extensive set of wells on the Eastern Slovak Plain and the foothills of the Zemplínske Mts., more than a third of which are situated in the Latorica PLA or in its immediately vicinity. There was a very frequent occurrence of the species *Asellus aquaticus*. However, the authors did not specify the location of the findings for particular taxa. No representative of stygobiont isopods was detected in the wells. Koščo et al. (2006) mentioned *A. aquaticus* as frequent potential food source of fish in artificial pools along the Latorica river. The last four mentioned papers inform about the abundant occurrence of *A. aquaticus* in various aquatic habitats of the Latorica PLA. Their authors probably did not distinguish between the two species and attributed all the findings to *A. aquaticus*.

In the years 2008-2011, we sampled terrestrial isopods quite intensively. Part of the material was preliminary analysed by Škovranová (2013) in her diploma thesis, not yet published.

Beside this, numerous unpublished material collected over the last almost 70 years (since 1948) by a number of zoologists (J. Lác, J. Gulička, M. Suvák, P. Fenďa, J. Christophoryová, A. Čanády, M. Stanko, L. Mošanský) was elaborated or revised and involved into present list of species and thus allowed us for the first time to sharpen a comprehensive view of the isopodofauna of the Latorica PLA as well as notice changes in the composition of fauna, reflecting significant human interventions in the country in the post-war period. We tried to outline the biodiversity and habitat preferences of aquatic and terrestrial isopods in the characteristic localities of the mosaic landscape of the Latorica PLA in the broader framework of the isopod fauna of the southern part of the Eastern Slovak Plain and Zemplínske vrchy Mts.

Material and methods

The material of terrestrial isopods was sampled individually, altogether with heat-extracted soil samples dug by a steel frame (25x25 cm, 10 cm in depth) and by using of pitfall traps (5 plastic jars per study site, 7 cm in diameter, depth 12 cm, covered by metal roof, formaldehyde as fixative solution) or by sifting of leaf litter and humus soil horizon and subsequent hand sorting of invertebrates. The traps were exposed for one year, controlled twice, in autumn and spring. Other types of traps, designed for ant trapping (uncovered glass jars, 4.5 cm in diameter, depth 9 cm) with ethanol as fixative solution were exposed in different sites for 4 days (5 traps per site). We studied also invertebrate inhabitants of winter ground nests and mounds of steppe mouse (*Mus spicilegus*), which is typical coloniser of abandoned fields (cf. Šustek & Stanko 2012). Several samples of fillings from tree cavities were analysed and data involved in the present list too.

Aquatic isopods were collected by a common plastic kitchen strainer in the littoral zones of various water habitats. Some specimens were collected in pitfall traps located near the banks of water bodies during periods of water level rise.

For species identification, we used keys for the fauna of Central and Eastern Europe (Brtek 2003; Gruner 1966; Frankenberger 1959, Radu 1983, 1985; Farkas &Vilisics 2013).

The isopod material examined by the authors is preserved in denatured 75% ethanol and deposited the collections of authors.

List of localities

The localities are arranged alphabetically according to cadastres (villages) into two sets, terrestrial localities (Fig. 1) where terrestrial fauna has been studied and aquatic localities (Fig. 2) with data on aquatic isopods. Each locality is characterized by a cadastral area, name of the locality, coordinates, altitude, a short characteristic of biotope, bedrock, date, method of collection, the collector and in case of published data also by citation of the source document. Published data or those from the old collection of Ján Gulička (sampled in 1948, 1956, 1959 and 1961-2) are often incomplete, without the exact location (coordinates only estimated), habitat, or date of sampling. In the case of aquatic habitats, the geological bedrock (river sediments) and the harvesting method (catching by the macrozoobenthos net) were omitted. Localities in the cadastres of the villages Cejkov, Ladmovce, Veľká Tŕňa, Veľaty and Viničky lie in the orographic unit Zemplínske vrchy Mts., all others belong to the Eastern Slovak Plain.

Abbreviations used: NR – Nature Reserve, NNR – National Nature Reserve, at – ant trapping, is – individual sampling, ls – litter sieving, pt – pitfall trapping, ss – soil sampling with subsequent heat extraction, nMs – material from the ground nests of *Mus spicilegus*, CJG – collection of Ján Gulička, JB – Ján Brtek, JK – Ján Kokorďák. Unless otherwise stated, "is", "pt" and "ss" were done by the authors of the publication.

Terrestrial localities

1 – Beša, forest locality no. 1, 48° 30.643' N, 21° 56.317' E, 105 m a.s.l., hard mixed floodplain forest outside the right bank of the Latorica river, fluvial sediments, is, pt.

2 – Beša, forest locality no. 2, 48° 30.670' N, 21° 56.330' E, 104 m a.s.l., hard floodplain forest outside the the right bank of the Latorica river, fluvial sediments, is, pt, ss.

3 – Beša, Bešiansky polder, 48° 31.748' N, 21° 57.288' E, 98 m a.s.l., waterlogged meadows and pastures south of the village, fluvial sediments, is.

4 – Boľ, Kráľovský Chlmec, Boľské rašelinisko NR, 48° 26.851' N, 21° 57.128' E, 101 m a.s.l., alder belt between peat bog and agrocenoses, fluvial sediments, pt.

5 – Borša, by the road towards the village Bara, ca 48° 24.556' N, 21° 42.551' E, 109 m a.s.l., a strip of trees on the bank of a stream in a drier, open landscape of vineyards and fields, tuff, is, JB (Flasarová 1994).

6 – Borša, forest at castle, 48° 23.245' N, 21° 42.467' E, 107 m a.s.l., fragment of hard-wooded lowland forest, bank of small pond, fluvial sediments, ls.

7 – Boťany, Botiansky luh NNR, 48° 28.549' N, 22° 06.297' E, 107 m.s.l., floodplain forest between embankment and river arm, fluvial sediments, is, pt, ss

8 – Boťany, Botiansky luh NNR, floodplain forest at the Latorica river, 48° 28.466' N, 22° 06.400' E, 112 m a.s.l., riparian forest near the left bank of the Latorica River, fluvial sediments, is, pt, ss.

9 – Boťany, bank of the Latorica river, 48° 28.196' N, 22° 6.988' E, 104 m a.s.l., riparian forest, under the dead tree trunk near the bridge, floodplain forest of the left bank of the river, fluvial sediments, is.

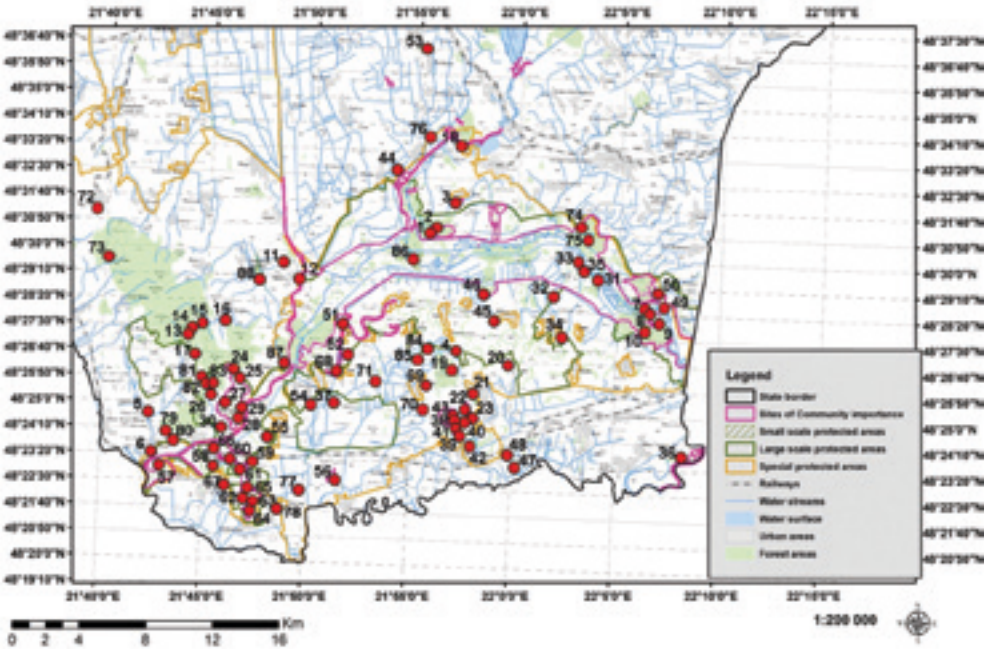

Fig. 1 *Location of research localities in the Latorica PLA for terrestrial isopods. For locality numbers see chapter, Terrestrial localities.*

10 – Boťany, Latorický luh NNR, 48° 27.751’ N, 22° 6.156’ E, 111 m a.s.l., hard floodplain forest with oak and hornbeam, fluvial sediments, is, pt, ss.
11 – Brehov, Veľký vrch, 48° 29.659’ N, 21° 48.494’ E, 191 m a.s.l., dry grassland with bushes at the NW edge of the hill, andesite, is, pt.
12 – Brehov, forest at the Ondava river, 48° 29.028’ N, 21° 49.249’ E, 101 m a.s.l., fragment of riparian forest at the right bank of the Ondava river, fluvial sediments, is.
13 – Cejkov, alluvium of the Mlynský potok stream in forest, 48° 27.268’ N, 21° 44.440’ E, 190 m a.s.l., bank of the woodland stream with deciduous mixed forest, paleozoic ryolites and dacites, is, pt (Fig. 3).
14 – Cejkov, hornbeam forest, 48° 27.265’ N, 21° 44.465’ E, 208 m a.s.l., woodland (*Carpineto-Quercetum*), fluvial sediments on paleozoic ryolites and dacites, is, pt.
15 – Cejkov, area of former spa (camp), 48° 27.377’ N, 21° 44.428’ E, 190 m a.s.l., oak-hornbeam forest, under bark, fluvial sediments on paleozoic ryolites and dacites, is.
16 – Cejkov, oak forest, 48° 27.759’ N, 21° 45.935’ E, 220 m a.s.l., *Quercetum*, triassic quartcites and sandstones, is, CJG.
17 – Cejkov, Cejkov-sedlo, 48° 26.399’ N, 21° 44.571’ E, 260 m a.s.l., oak-hornbeam forest, triassic quartcites and sandstones, is, CJG.
18 – Ižkovce, Horný les, 48° 33.638’ N, 21° 57.315’ E, 106 m a.s.l., hard-wooded forest between the flood barrier and the river, under the bark of dead trees, fluvial sediments, is.

19 – Kráľovský Chlmec, Ereš, 48° 26.171’ N, 21° 57.197’ E, 131 m a.s.l., fragment of lowland woodland, fluvial sediments, is, pt.
20 – Kráľovský Chlmec, Fejséš, Malé pole, 48° 26.584’ N, 21° 59.825’ E, 100 m a.s.l., border of black locust growth, sand dunes, at.
21 – Kráľovský Chlmec, urban area, ca 48° 25.436’ N, 21° 58.448’ E, 140 m a.s.l., dry urban habitat, andesite, is, CJG.
22 – Kráľovský Chlmec, Veľký kopec hill, 48° 25.119’ N, 21° 57.786’ E, 260 m a.s.l., SW slope with dry grassland, andesite, is, pt.
23 – Kráľovský Chlmec, Veľký kopec (Nagy Hegy), ca 48° 25.090’ N, 21° 57.891’ E, 200 m a.s.l., dry forest-steppe slope, andesite, is, CJG.
24 – Ladmovce, Dlhá hora hill, 48° 26.214’ N, 21° 46.185’ E, 260 m a.s.l., steppe-forest, oak-dogwood, dolomites, is, ls.
25 – Ladmovce, Dlhá hora hill, 48° 25.996’ N, 21° 46.299’ E, 255 m a.s.l., forest-free stand with shrubby and grass-herbaceous vegetation, dolomite and limestone (Triassic), is, pt.
26 – Ladmovce, Dupalisko, 48° 25.371’ N, 21° 45.550’ E, 180 m a.s.l., abandoned vineyard with old building (brick cottage), under the stone and brickets, dolomites, is.
27 – Ladmovce, Kašvár NNR, 48° 24.956’ N, 21° 45.595’ E, 160 m a.s.l., oak forest with Cornus maas, dolomites, ls.
28 – Ladmovce, Kašvár NNR, 48° 24.928’ N, 21° 46.396’ E, 170 m a.s.l., steppe with shrubs, dolomites, is, CJG.
29 – Ladmovce, Kašvár NNR, 48° 25.172’ N, 21° 46.543’ E, 161 m a.s.l., xerothermic grassland with bushes on limestone bedrock, dolomite and limestone (Triassic), is, pt.
30 – Ladmovce, Kašvár – quarry, 48° 24.605’ N, 21° 45.590’ E, 125 m a.s.l., abandoned limestone quarry, dolomites, is.
31 – Leles, Agardské pasienky, 48° 29.106’ N, 22° 4.134’ E, 99 m a.s.l., wet meadows and pastures with self-seed trees, fluvial sediments, is.
32 – Leles, bank of channel towards Velké Kapušany town, ca 48° 28.860’ N, 22° 1.854’ E, 99 m a.s.l., drainage channel, bank, fluvial sediments, is, JB (Flasarová 1994).
33 – Leles, Ilhanov, 48° 29.689’ N, 22° 3.461’ E, 101 m a.s.l., floodplain forest NE from Leles village near the Latorica river with absence of herb layer, fluvial sediments, is.
34 – Leles, kóta 115, 48° 27.531’ N, 22° 2.276’ E, 115 m a.s.l., meadow with high grass and isolated shrubs, sand dunes, at.
35 – Leles, floodplain forests, ca 48° 29.529’ N, 22° 4.213’ E, 100 m a.s.l., floodplain forest with oak near the Latorica river, fluvial sediments, is, CJG.
36 – Malé Trakany, Lužná húština, 48° 23.683’ N, 22° 8.748’ E, 105 m a.s.l., sandy-clay bank of the Tisa/Tisza river, under pieces of wood, fluvial sediments, is.
37 – Malý Horeš, Biele jazero Lake NR, 48° 25,079’ N, 21° 51.508’ E, 95 m a.s.l., wet meadow, ecotone of pasture and marshland, aeolian sands on river sediments, is, pt.
38 – Malý Horeš, Horeš – majer, 48° 24.624’ N, 21° 56.894’ E, 115 m a.s.l., grassland with shrubs on sandy dune, eolic sands, is, CJG.
39 – Malý Horeš, Horešské lúky NR, 48° 24.337’ N, 21° 57.388’ E, 96 m a.s.l., grassland within depression (salt marsh) in grounded riverbed, river sediments, is, pt.
40 – Malý Horeš, Hrušov, piesky, ca 48° 24.566’ N, 21° 56.956’ E, 121 m a.s.l., sand dune with grassland, eolic sands, is, CJG.

41 – Malý Horeš, 48° 24.345’ N, 21° 57.010’ E, 125 m a.s.l., secondary forest with black locust on sandy dune with wine cellars, eolic sandy sediments, is.
42 – Malý Horeš, Húšťava, ca 48° 24.071’ N, 21° 57.996’ E, 104 m a.s.l., fragment of lowland forest with oak, fragments of former river arms, fluvial sediments, is, pt, is, CJG.
43 – Malý Horeš, Poniklecová lúčka NR, 48° 24.742’ N, 21° 56.721’ E, 119 m a.s.l., dry grassland on sand, aeolian sands on andesite, is, at, pt.
44 – Oborín, drainage schaft, ca 48° 32.674’ N, 21° 53.958’ E, 98 m a.s.l., drainage schaft between Oborín and Veľké Raškovce villages, fluvial sediments, is, JB (Flasarová 1994).
45 – Poľany, agrofarm, 48° 27.914’ N, 21° 58.918’ E, 99 m a.s.l., the area of farmyard with old buildings, fluvial sediments, is.
46 – Poľany, Čierny les, 48° 29.031’ N, 21° 58.122’ E, 100 m a.s.l., hard floodplain forest with predominated oak, fluvial sediments, is, pt.
47 – Pribeník, park, 48° 23.416’ N, 22° 0.303’ E, 101 m a.s.l., old oaks at the western edge of the park, decaying wood from a tree hollow, fluvial sediments, is.
48 – Pribeník, urban area, 48° 23.547’ N, 22° 0.042’ E, 99 m a.s.l., northern bank of marshland in intravilan, liter of alder and willow, fluvial sediments, is.
49 – Ptrukša, floodplain forest at the Latorica river, 48° 28.451’ N, 22° 7.233’ E, 102 m a.s.l., riparian forest at the right bank of the Latorica river, fluvial sediments, is, pt, ss.
50 – Ptrukša, riparian forest, 48° 28.595’ N, 22° 7.373’ E, 99 m a.s.l., riparian forest at the bank of the old branch of the Latorica river, fluvial sediments, is.
51 – Rad, 48° 27.687’ N, 21° 51.538’ E, 97 m a.s.l., riparian forest at the bank of the old branch of the river, alder and willow, under bark of dead tree trunks, fluvial sediments, is.
52 – Rad – Hrušov, Hrušov – Prudký, 48° 26.709’ N, 21° 52,111’ E, 100 m a.s.l., dry grassland on sandy dune, aeolian sands on river sediments, is, pt.
53 – Slavkovce, Slavkovské slanisko NR, 48° 36.546’ N, 21° 54.946’ E, 101 m a.s.l., dry depression, grassland with halophytes, eolic sediments, is.
54 – Somotor, at road towards the Bodrog village, ca 48° 25.116’ N, 21° 50.067’ E, 98 m a.s.l., bank of flooded pits by the road, fluvial sediments, is, JB (Flasarová 1994).
55 – Somotor, Somotorská hora hill, 48° 24.491’ N, 21° 48.248’ E, 141 m a.s.l., dry grassland with bushes on a flat top of the hill, andesite, is, pt.
56 – Strážne, 48° 22.873’ N, 21° 51.250’ E, 95 m a.s.l., bank of periodic pool in the cattle pasture, under wood, fluvial sediments, is.
57 – Streda nad Bodrogom, Klin nad Bodrogom, 48° 22.948’ N, 21° 42.961’ E, 97 m a.s.l., a belt of willow trees between river arm and meadow, fluvial sediments, is, pt, ss (Fig. 4).
58 – Streda nad Bodrogom, Baraní vrch (Bak hegy), 48° 22.912’ N, 21° 45.663’ E, 125 m a.s.l., steppe, andesite, is, CJG.
59 – Streda nad Bodrogom, Medzi jarkami (Somotor), ca 48° 23.067’ N, 21° 47.279’ E, 110 m a.s.l., sand dune with grassland and black locust forest, eolic sands, is, CJG.
60 – Streda nad Bodrogom, Tajba NNR, ca 48° 23.218’ N, 21° 46.505’ E, 98 m a.s.l., muddy shore and belt of willows on the north shore of the pond, fluvial sediments, ls, is, CJG.

61 – Streda nad Bodrogom, Tajba NNR, 48° 23.025’ N, 21° 46.764’ E, 106, foot of the northern slope with black locust forest and willow growth on the shores of the swamp, fluvial sediments, ls, is, CJG.
62 – Streda nad Bodrogom, Tarbucka NNR, 48° 22.242’ N, 21° 47.058’ E, 189 m a.s.l., dry grassland with bushes on sandy soil, aeolian sands on andesite, is, pt.
63 – Streda nad Bodrogom, Tarbucka – sedlo, 48° 21.987’ N, 21° 47.282’ E, 210 m a.s.sl., steppe-forest old oaks with old stone walls, litter, humus and rotten wood, andesite, is.
64 – Streda nad Bodrogom, Tarbucka, top of the hill, 48° 21.746’ N, 21° 47.319’ E, 265 m a.s.l., rocky dry grassland with bushes at the top of the andesite hill, andesite, is, pt.
65 – Streda nad Bodrogom, dry meadow, 48° 22.290’ N, 21° 46.983’ E, 181 m a.s.l., meadow with isolated shrubs, sand dunes, at.
66 – Streda nad Bodrogom, 48° 23.449’ N, 21° 45.441’ E, 101 m a.s.l., ruderal environment of a railway station, aeolic sediments, is.
67 – Streda nad Bodrogom, ca 48° 22.176’ N, 21° 46.284’ E, 97 m a.s.l., bank of drainage channel in pasture, aeolic sediments, is, JB (Flasarová 1994).
68 – Svätá Mária, Hrušov – Tice (Dlhé Tice NNR), 48° 26.127’ N, 21° 51.267’ E, 98 m a.s.l., grassland along the bank of marshland (former riverbed), fluvial sediments, is, pt.
69 – Svätuše (Szentes), 48° 25.984’ N, 21° 55.420’ E, 135 m a.s.l, fragment of dry woodland, andesite, is, JG.
70 – Svätuše, vineyard, 48° 25.072’ N, 21° 56.309’ E, 135 m a.s.l., meadow with high grass, sand dunes, at.
71 – Svätuše (Plešany), ca 48° 25.786’ N, 21° 53.264’ E, 104 m a.s.l., landscape between the villages Svätuše and Hrušov, aeolic sediments, is. JB (Flasarová 1994).
72 – Veľaty (Velejte), ca 48° 31.233’ N, 21° 39.216’ E, 165 m a.s.l., county park or forest, fluvial sediments, is, K. Chyzer? (Csiki 1926; Dudich 1942).
73 – Veľká Tŕňa, valley at former spa, 48° 29.445’ N, 21° 40.278’ E, 215 m a.s.l., alluvium of the Hečka stream in mixed deciduous forest, fluvial sediments, ls, is.
74 – Veľké Kapušany, Hrušky, 48° 30.853’ N, 22° 3.063’ E, 100 m a.s.l., floodplain forest by the right-bank dam of the Latorica river, fluvial sediments, is.
75 – Veľké Kapušany, Panský les, 48° 30.102’ N, 22° 3.119’ E, 100 m a.s.l., riparian forest at the right bank of Latorica river near the road bridge, fluvial sediments, is.
76 – Veľké Raškovce, Duša channel, ca 48° 33.762’ N, 21° 55.400’ E, 101 m a.s.l., bank of the drainage channel, under the road bridge, fluvial sediments, is, JB (Flasarová 1994).
77 – Veľký Kamenec, 48° 22.200’ N, 21° 49.500’ E, 95 m a.s.l., abandoned field, eolic sands and river sediments, nMs.
78 – Veľký Kamenec, castle ruin, 48° 21.548’ N, 21° 48.455’ E, 115 m a.s.l., rocky steppe at castle ruin in the intravilan, andesite, is.
79 – Viničky, area of the secondary school, 48° 23.945’ N, 21° 43.295’ E, 118 m a.s.l., shelter, underground corridor, branch of wine cellar with concrete walls without wine barrels, tuff, is.
80 – Viničky, road to the Borša village, 48° 23.828’ N, 21° 43.22’ E, 106 m a.s.l., concrete sidewalk under the high school vineyards, tuff, is.
81 – Viničky, Hatfa, hill, 48° 25.833’ N, 21° 44.854’ E, 185 m a.s.l., oak-hornbeam forest on the slope of the Brezina hill, triassic quartcites and sandstones, ls.

82 – Viničky, Hatfa, old spa territory, 48° 25.597' N, 21° 44.942' E, 185 m a.s.l., wooded area of abandoned spa, triassic quartcites and sandstones, is, ls.
83 – Viničky, Hatfa, brook, ca 48° 25.661' N, 21° 45.153' E, 185 m a.s.l., alluvial forest, triassic quartcites and sandstones, is, CJG.
84 – Vojka, Čikóška, 48° 26.970' N, 21° 55.671' E, 120 m a.s.l., young black locust stand with high grass and shrubs, sand dunes, at.
85 – Vojka, Veľké jazero NR, 48° 26.651' N, 21° 55.360' E, 99 m a.s.l., ecotone of marshland bank and agroecoenoses, aeolian sands on river sediments, is, pt.
86 – Zatín, Zatínsky luh NR, 48° 29.748' N, 21° 54.905' E, 104 m a.s.l., fragment of hard mixed floodplain forest with arms of the Latorica river, fluvial sediments, is.
87 – Zemplín, former castle hill, 48° 26.459' N, 21° 48.805' E, 120 m a.s.l., ruderal dry environment (intavilan), andesite, is.
88 – Zemplínske Jastrabie, Zemplínska jelšina NR, 48° 28.989' N, 21° 47.519' E, 109 m a.s.l., fragment of riparian and bog forest among arable fields, fluvial sediments, is, pt.

Aquatic localities

89 – Čierna nad Tisou, ca 48° 25.189' N, 22° 6.344' E, 98 m a.s.l., swamp with Carex spp., JB (Flasarová 1977, Brtek 2003).
90 – Dobrá, ca 48° 25.083' N, 22° 1.153' E, 98 m a.s.l., periodic pool in the arable field between Dobrá and Kráľovský Chlmec, JB (Flasarová 1977, Brtek 2003).
91 – Leles, ca 48° 28.201' N, 22° 1.300' E, 98 m a.s.l., shallow pool in the arable field, JB (Flasarová 1977, Brtek 2003).
92 – Malý Horeš, ca 48° 24.215' N, 21° 57.290' E, 98 m a.s.l., JB (Brtek 2003).
93 – Oborín, Kamenná Moľva, channels "D, E", ca 48° 29.552' N, 21° 50.234' E, 97 m a.s.l., drainage channels, JK (Kokorďák 1973, 1982).
94 – Oborín, Kuciansky kanál (channel "A"), ca 48° 29.574' N, 21° 50.492' E, 97 m a.s.l., drainage channel, JK (Kokorďák 1982).
95 – Oborín, Odstavené rameno pri Kamennej Moľve, ca 48° 29.550' N, 21° 51.695' E, 97 m a.s.l., dead arm of the Latorica river, JK (Kokorďák 1982).
96 – Palín, Krášok, ca 48° 39.939' N, 21° 58.512' E, 102 m a.s.l, JB (Flasarová 1977, Brtek 2003).
97 – Pavlovce nad Uhom, ca 48° 37.135' N, 22° 4.408' E, 101 m a.s.l., JB (Flasarová 1977, Brtek 2003).
98 – Pribeník, 48° 23.528' N, 22° 0.058' E, 98 m a.s.l., great marshland in the centre of the village.
99 – Pribeník, Južný kanál, 48° 23.015' N, 22° 0.138' E, 96 m a.s.l., drainage channel south of the village.
100 – Pribeník, ca 48° 24.309' N, 21° 59.161' E, 97 m a.s.l., pool with *Salix* spp., toward the town Kráľovský Chlmec, JB (Flasarová 1977).
101 – Pribeník, ca 48° 23.799' N, 21° 59.534' E, 97 m a.s.l., pond at railway, JB (Flasarová 1977, Brtek 2003) – type locality for *Proasellus pribenicensis*.
102 – Ptrukša, ca 48° 29.134' N, 22° 8.211' E, 101 m a.s.l, JB (Brtek 2003).
103 – Solnička, ca 48° 28.106' N, 21° 57.941' E, 97 m a.s.l, deeper pools at the road, JB Flasarová 1977, Brtek 2003).

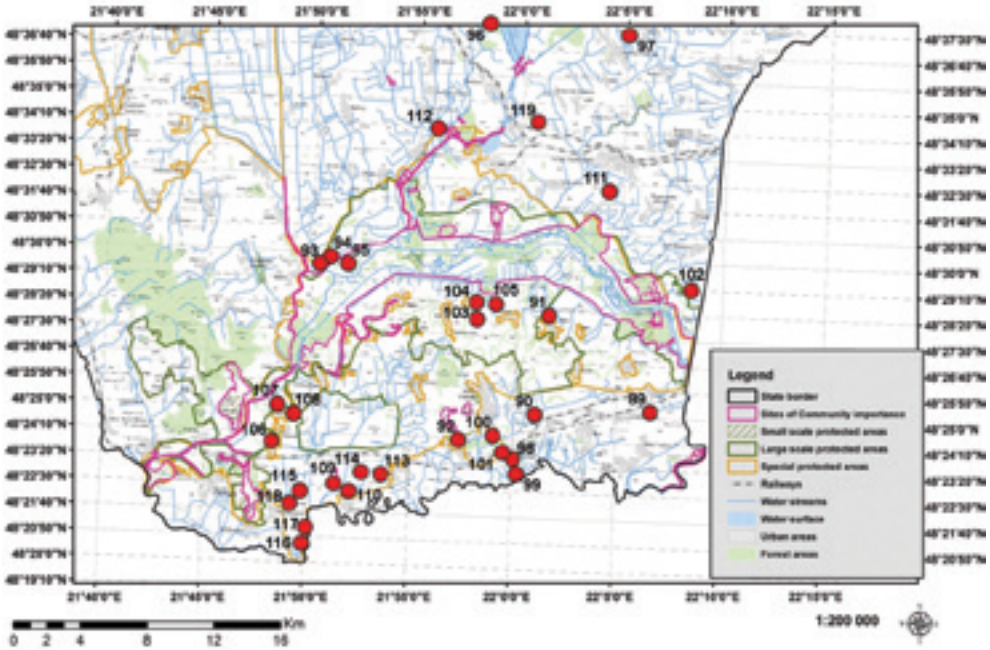

Fig. 2 *Location of research localities in the Latorica PLA for aquatic isopods. For locality numbers see chapter, Aquatic localities.*

104 – Solnička, ca 48° 28.477’ N, 21° 57.975’ E, 97 m a.s.l., swamp with *Carex* spp., JB (Flasarová 1977, Brtek 2003).

105 – Solnička, ca 48° 28.470’ N, 21° 58.683’ E, 99 m a.s.l., channel with standing water at the village Poľany, JB (Flasarová 1977, Brtek 2003).

106 – Somotor, ca Somotorský hlavný kanál, 48° 23.876’ N, 21° 48.346’ E, 97 m a.s.l., drainage channel, JK (Kokorďák 1982).

107 – Somotor, ca Somotorské mŕtve rameno, 48° 24.895’ N, 21° 48.236’ E, 97 m a.s.l., dead arm of the Bodrog river, JK (Kokorďák 1982).

108 – Somotor, Véč (Vécs), ca 48° 24.711’ N, 21° 49.313’ E, 97 m a.s.l., pool with *Salix* sp., JB (Flasarová 1977, Brtek 2003).

109 – Strážne, 48° 22.842’ N, 21° 51.260’ E, 97 m a.s.l., almost dried flooded depressions in pasture.

110 – Strážne, ca 48° 22.284’ N, 21° 51.828’ E, 97 m a.s.l., pool in the arable field with *Salix* sp., JB (Flasarová 1977, Brtek 2003).

111 – Veľké Kapušany, ca 48° 32.193’ N, 22° 4.071’ E, 99 m a.s.l., shallow pool in the arable field, JB (Flasarová 1977).

112 – Veľké Raškovce, Duša channel, ca 48° 33.762’ N, 21° 55.400’ E, 100 m a.s.l., drainage channel, JK (Kokorďák 1982).

113 – Veľký Horeš, ca 48° 22.944’ N, 21° 53.375’ E, 98 m a.s.l., pool in the arable field with *Salix* sp. toward the Strážne village, JB (Flasarová 1977; Brtek 2003).

114 – Veľký Horeš, ca 48° 22.592' N, 21° 52.721' E, 98 m a.s.l., deep trench in the meadow with *Salix* sp., *Carex* sp., JB (Flasarová 1977; Brtek 2003).
115 – Veľký Kamenec, 48° 22.115' N, 21° 49.610' E, 99 m a.s.l., marshland by the road at the east end of the village.
116 – Veľký Kamenec, Veľká Krčava, pond, 48° 20.737' N, 21° 50.073' E, 97 m a.s.l., lake (historical arm of the Bodrog river), littoral zone, northern bank.
117 – Veľký Kamenec, Veľká Krčava, pool, 48° 20.893' N, 21° 50.162' E, 98 m a.s.l., small marshland in depression near the bank of the lake.
118 – Veľký Kamenec, village, ca 48° 22.021' N, 21° 49.638' E, 97 m a.s.l., large pool at the road, JB (Flasarová 1977; Brtek 2003);
119 – Vojany, ca 48° 34.200' N, 22° 0.589' E, 98 m a.s.l., 50 cm deep pool with *Salix* sp., JB (Flasarová 1977, Brtek 2003).

Results

A total of 5378 specimens of terrestrial and 220 aquatic isopods were examined. The isopod fauna of the Latorica PLA and adjacent areas is documented by a total of 19 terrestrial and 2 aquatic species. The aquatic species were recorded exclusively in the lowland landscape. From the total number of 19 terrestrial isopod species, 17 were found in the orographic unit Zemplínske vrchy Mts. (of which 4 exclusively) and 15 species in the southern part of the Eastern Slovak Plain (2 of them missing in the Zemplínske vrchy Mts.). In the following list of species, beside localities with positive findings, a brief characteristic of the species, its distributional area and preferred habitat are given, based on literature (cf. Frankenberger 1959; Brtek 2003; Schmalfuss 2003) or the authors' own observations. System and nomenclature of terrestrial isopods are given according to Schmalfuss (2003).

Annotated check list of species

■ Order Isopoda

Suborder Oniscidea (terrestrial isopods)

Agnaridae

Orthometopon planum (Budde-Lund, 1885) – 29, 49, 81 – distributed in two disjunctive territories: the central part of the Mediterranean and the northern edge of the Pannonian Plain with the southern foothills of the Western Carpathians. It prefers drier forests to forest-steppes and rocky habitats. Rare in the Latorica PLA, found only in 3 localities, each time only a single specimen.

Protracheoniscus politus (C. Koch, 1841) – 13, 14, 15, 16, 19, 72, 73 – Central Europe and the Balkan Penninsula. Typical for extensive continuous woodland, up to the spruce forest climatic-vegetation bell in high mountains. It avoids the lowland habitats of the Latorica PLA, where it was found only at one site (woodland fragment Ereš). Common in forests of the Zemplínske vrchy Mts.

Fig. 3 *Spring aspect of the alluvium of the Mlynský potok stream in the woodland of the Zemplínske vrchy Mts. (locality no. 13, near the Cejkov village) with remarkably high diversity of isopod community and unique species composition, with co-occurrence of 5 isopod species: Hyloniscus riparius, Ligidium intermedium, Porcellium collicola, Protracheoniscus politus, and Trachelipus rathkii. The slopes above the valley floor covered by oak-hornbeam forest are inhabited beside above listed species also by Armadillidium vulgare, Ligidium hypnorum, Hylonisucus transsilvanicus, and Trachelipus ratzeburgii (photo: A. Mock).*

Fig. 4 *The floodplain of the Bodrog river with willow trees and meadows after a spring flood (Klin nad Bodrogom, locality no. 57). Locality with extreme flood conditions is inhabited by the only one terrestrial isopod species, Trachelipus rathkii, in close connection with two aquatic representatives, Asellus aquaticus and Proasellus pribenicensis (photo: A. Mock).*

Armadillidiidae

Armadillidium versicolor Stein, 1859 – 27, 48, 76, 79, 80 – Eastern European species; in Slovakia in warmer, rocky habitats, rich in calcium, often synanthropic. In the Latorica PLA only scarce occurrence.

Armadillidium vulgare (Latreille, 1804) – 4, 5, 9, 10, 11, 15, 17, 19, 20, 21, 22, 23, 28, 37, 39, 40, 41, 42, 43, 44, 45, 46, 51, 52, 53, 58, 59, 61, 62, 66, 67, 68, 69, 70, 71, 72, 76, 78, 82, 83, 85, 87, 88 – European, autochthonous in the Mediterranean region, by human activities introduced to all parts of the world. In the Latorica PLA very frequent in various habitats, within the whole range of humidity (from the driest places to wetlands) with no respect to the level of synanthropy.

Cylisticidae

Cylisticus convexus (De Geer, 1778) – 42, 72, 79, 83 – widespread in Europe, probably Mediterranean species, predominantly synanthropic in Central Europe. It also penetrates buildings and underground.

Ligiidae

Ligidium hypnorum (Cuvier, 1792) – 15, 73, 81 – widespread in Europe and Western Asia in various woodland, predominantly riparian forests.

Ligidium intermedium Radu, 1950 – 13, 14, 15, 65, 81, 83 – Eastern Carpathian species, distributed in the northern Romania, with isolated occurrence in NE Hungary and SE Slovakia. It prefers riparian habitats in deciduous forests in montane level. As the previous con-gener it was completely missed in lowland parts of the Latorica PLA.

Platyarthridae

Platyarthrus hoffmannseggii Brandt, 1833 – 26 – Europe and the Mediterranean countries in Asia and Africa. Myrmecophilous, living in underground nests of various species of ants. In Central Europe known mainly from the cultural landscape and synanthropic habitats. The only finding in the Latorica PLA comes from a nest of *Tetramorium immigrans* Santschi, 1927 (det. M. Suvák).

Porcellionidae

Porcellio spinicornis Say, 1818 – 21, 30 –European, in the Central Europe known exclusively from synanthropic habitats. Petricolous and calciphilous species, secondarily common on the walls of buildings in rural and urban environments.

Porcellionides pruinosus (Brandt, 1833) – 21, 41, 43, 45, 66 – European, probably of Mediterranean origin. In the Central Europe it avoids woodlands and riparian habitats and occurs only in habitats strongly altered by human activities. Frequent in cultural steppe and gardens, aggregated in heaps of hay, straw, and garden waste; penetrates the nests of birds and mammals.

Trachelipodidae

Porcellium collicola (Verhoeff, 1907) – 4, 5, 10, 11, 13, 14, 15, 19, 20, 23, 24, 27, 29, 33, 34, 37, 39, 51, 54, 60, 61, 62, 64, 68, 69, 73, 81, 83, 84, 85, 88 – Mediterranean to Central

European species, typical in forest edges and in other ecotones, and in open landscape in the litter of shrubs and lawns.

Trachelipus nodulosus (Koch, 1838) – 11, 21, 22, 23, 25, 26, 27, 28, 29, 30, 38, 41, 43, 44, 55, 58, 62, 63, 64, 66, 70, 78, 79 – Mediterranean to Central European species. Exclusively in dry steppe habitats, where it is often the only representative of isopods. Collected in a significantly lower number of localities than *T. rathkii*, although the number of examined *T. nodulosus* individuals is higher (mainly due to the numerous captures in traps).

Trachelipus rathkii (Brandt, 1833) – 1, 2, 3, 4, 6, 7, 8, 9, 10, 12, 13, 14, 18, 19, 22, 24, 29, 31, 32, 33, 36, 37, 39, 42, 46, 48, 49, 50, 51, 52, 54, 56, 57, 61, 62, 65, 66, 68, 71, 72, 74, 75, 76, 77, 85, 86, 88 – European except for Mediterranean regions. Very adaptable, preferring lowlands, in the Latorica PLA in almost all habitats preferring floodplains and banks of marshlands. It avoids only extremely dry habitats, where it is replaced by *T. nodulosus*, therefore these visually similar species rarely meet in nature. Living individuals of *T. rathkii* are often observed underwater indicate an excellent ability to survive floods in situ.

Trachelipus ratzeburgii (Brandt, 1833) – 15, 73 – Central and Eastern Europe. Typical woodland species, mainly sub-corticolous in dead deciduous trees.

Trichoniscidae

Haplophthalmus danicus Budde-Lund, 1879 – 51, 66, 83 – widespread in Europe, introduced worldwide. Adaptable species, in the Central Europe probably only in an environment strongly influenced by humans, what suggests that it is not autochthonous here. Strongly bound to dead wood in humid habitats.

Hyloniscus riparius (Koch, 1838) – 2, 3, 4, 5, 7, 8, 9, 10, 13, 14, 18, 19, 31, 33, 35, 37, 39, 42, 46, 49, 51, 56, 60, 61, 68, 74, 76, 79, 81, 83, 86, 88 – widespread in the Central and Eastern Europe, very adaptable. It prefers moist, shady habitats, including urbanised environment, also common in underground habitats.

Hyloniscus transsilvanicus (Verhoeff,1901) – 4, 7, 8, 10, 15, 19, 33, 42, 49, 73, 83, 88 – Carpathian species, widespread along the western and southwestern edges of the Carpathian arch and the contact zones of the Pannonian Plain from Serbia to northern Hungary and southern Slovakia. It prefers moist habitats in deciduous forests undisturbed by human activities.

Trichoniscus carpaticus Tabacaru, 1974 – 7, 8, 10, 73 – Carpathian hygrophilous element, described from Romania, in the west extending to the Central Slovakia. It accompanies undisturbed older forests, often in scree slopes.

Trichoniscus pusillus Brandt, 1833 – 10, 47 – European, probably a species complex; hygrophilous. In Central Europe usually documented exclusively only females (probably parthenogenetic). Usually accompanied by *H. riparius*.

Suborder Asellota (aquatic isopods)

Asellidae

Asellus aquaticus (Linnaeus, 1758) – aquatic localities 93, 94, 95, 98, 99, 100, 101, 106, 107, 109, 112, 115, 116, 117, 119; terrestrial localities (flooded traps or sample in riparian

zone) 7, 49, 57, 60, 88 – European, highly adaptable species inhabits mainly various types of surface waters rich in nutrients, tolerating rather high rate of organic pollution and oxygen deficiency.

Proasellus pribenicensis Flasarová, 1977 (Fig. 5) – aquatic localities 89, 90, 91, 92, 96, 97, 99, 100, 101, 102, 103, 104, 105, 108, 110, 111, 113, 114, 118; terrestrial locality (flooded traps) 57 – East-Pannonian species (endemic), occurring in stagnant surface waters rich in macrophytes. Segregation of niches of both species is unknown. Type locality is nameless pool in the Pribeník village near the railway (locality 13), type series is deposited in the Upper Nitra Museum (Hornonitrianske múzeum), Prievidza (former workplace of the zoologist Ján Brtek, who found the species) and in the Natural History Museum in Bratislava, Slovakia (Flasarová 1977).

Discussion

We confirmed the coexistence of two water representatives of the family Asellidae; both are relatively easy to distinguish based on the body size, colour of the dorsal side, and shape of the light spot on the cephalothorax (Brtek 2003). Although a review of the findings suggests that both representatives of the Asellota alternate in the investigated area, we think that this is partly a false picture due to selective sampling. The sampling indicates that *A. aquaticus* occupies a greater diversity of habitats than *P. pribenicensis*. Either both species coexist, or the habitat is inhabited only by *A. aquaticus*, for example, in wooded wetlands. The larger species *A. aquaticus* was more abundant and regular in the recent samplings. *P. pribenicensis*, the species with significantly smaller body size, was missing e.g. in wetlands shaded by trees

Fig. 5 *Proasellus pribenicensis has the type locality in the study area, the pond at railway near the Pribeník village (photo: A. Mock).*

and in running waters. Both species were trapped in large numbers on the flooded bank of the former Bodrog riverbed (Klin nad Bodrogom, Fig. 4), which is also the westernmost known locality of *P. pribenicensis* in Slovakia. At the same time, these observations show that *P. pribenicensis* also occurs in the river landscape, not just in swamps, channels, and periodic pools, which it prefers.

Communities of terrestrial isopods are much more varied in species. 19 species representing 8 families have different sensitivity to various conditions and a rate of anthropogenic influence on the studied habitats. The highest species diversity per site (up to 7 species) was found in the forested valleys of the Zemplínske vrchy Mts. (nearby the villages of Cejkov – Fig. 3 – and Veľká Tŕňa) but also in preserved lowland forests with a more varied tree composition (Latorický luh NNR, Botiansky luh NNR, Ereš) and wooded wetlands (Zemplínska jelšina NR). The high biodiversity created by the native fauna points to the extraordinary conservation value of these localities and habitats. Other typical habitats of the Latorica PLA are inhabited by a lower number of species, but even here with characteristic community structure. The drier landscape is inhabited by several adaptable species (regularly *A. vulgare, P. collicola, T. rathkii*), in the driest places of rocky steppes and sand dunes, the habitat specialist *T. nodulosus* predominates. Non-native species (such as *H. danicus, P. spinicornis, P. pruinosus*) also accompany strongly anthropically disturbed environments.

The records of *Ligidium intermedium* are the first for Slovakia. External features of *L. intermedium* resemble with *L. germanicum* (brownish coloration, endopodite of uropode is longer than its exopodite). A clear diagnostic feature can be found on the exopodite of the 1st pair of legs on the pleon of the male, where *L. intermedium* has three long terminal setae, while *L. germanicum* and *L. hypnorum* have only two. A similar composition of isopod assemblages with *L. intermedium* and *H. transsilvanicum*, which we found in forested valleys of the Zemplínske vrchy Mts. (Fig. 3), in Central Europe can be probably found only on the southern tip of the volcanic mountain range Slanské vrchy/Zempléni-Hegység (Kontschán 2002; Kontschán et al. 2006).

The biodiversity of terrestrial isopods of the studied area we consider as high; it represents two fifths of the fauna known in Slovakia. Towards the centre of the Pannonian Plain (in Hungary or south-western part of Slovakia), away from the influence of the Carpathian mountainous landscape, the isopod species richness significantly decreases with the absence of endemic representatives (Loksa 1973; Čarnogurský et al. 1994; Flasarová 1998; Slávecz 2003).

The peculiarity of the isopod fauna of the Latorica PLA can be interpreted as a consequence of the unique biogeographical location and heterogeneity of landscape. Typically, lowland species, characteristic of the Pannonian area, meet here mountainous species, even Carpathian endemites (*H. transsilvanicus, L. intermedium*), dry localities with xerophilous communities are adjacent to wetlands and their specific fauna. Connectivity of Carpathian and Pannonian areaa by streams and other water bodies throughout riparian forests supports penetration of Carpathian fauna down to the Pannonian basin. This probably ancient natural spread of fauna is evidenced by the mosaic character of the occurrence of most of the recorded species.

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Súhrn

Pôdne a vodné rovnakonôžky (Isopoda: Oniscidea, Asellota) Chránenej krajinnej oblasti Latorica

Predkladaná kapitola ponúka odpovede na otázky, koľko druhov kôrovcov-rovnakonôžok žije a akú biotopovú preferenciu vykazujú v južnej časti Východoslovenskej roviny a Zemplínskych vrchov, kde najcennejšie časti sú územne chránené v rámci CHKO Latorica. Preštudovali sme kompletnú literatúru, ktorá začína údajom z okraja študovaného územia, od obce Veľaty (Dollfus 1901; Csiki 1926); pravdepodobne sa jedná o dodatočne publikovaný zber Kornela Chyzera z druhej polovice 19. st. Publikovaných poznatkov o suchozemskej faune existuje málo, o to cennejšie sú nepublikované zbery z pozostalosti Jána Guličku, ktoré miestnu faunu dokumentujú od roku 1948 do 1962 (neroztriedená a neurčená zbierka obsahovala 12 druhov suchozemských a 1 druh vodných rovnakonôžok (98 ex.). J. Gulička sústredil pozornosť sa suché a teplé lokality (najmä lesostepy, menej suchšie lesy s dubom) a zachytil skôr bežné druhy, vrátane synatropných. K zaujímavostiam ale patrí jeho zber druhu *Hyloniscus transsilvanicus*, ktorý bol na lokalite Viničky-Hatfa (pri potoku) nájdený prvýkrát na Slovensku (18. 3. 1961), ale nález bol až doposiaľ prehliadaný (a druh bol prvýkrát zo Slovenska publikovaný v r. 1980 Flasarovou z Malých Karpát). Hlavným zdrojom predkladaného poznania sú ale vlastné zbery autorov a niektorých spolupracovníkov, získané v posledných dvoch desaťročiach. Vodné aj suchozemské rovnakonôžky na študovanom území v 60. a 70. rokoch zbieral najmä Ján Brtek a v 80. rokoch v rámci makrozobentosu povrchových vôd Ján Kokorďák, resp. studní Jozef Terek a Jaroslav Cyril Brázda. Rovnakonôžky (Isopoda) nepatria u nás k druhovo početným skupinám článkonožcov. Predbežne registrujeme 5 druhov vodných (podrad Asellota) a asi 50 druhov suchozemských (podrad Oniscidea) zástupcov. Žiadny z nich nie je endemitom v rámci Slovenska, ale 2 vodné druhy a 1 suchozemský zástupca majú u nás typovú lokalitu a časť endemického areálu. Jedným z nich je vodný druh *Proasellus pribenicensis*, zastúpený aj na území CHKO Latorica. Jeho typová lokalita (neidentifikovaná stojatá voda v obci Pribeník, blízko železničnej trate) a väčšina zvyšných známych lokalít u nás leží na území ohraničenom riekami Latorica-Bodrog a Tisa. U nás sa tento obyvateľ nížinných stojatých alebo pomaly

tečúcich vôd s bohatou vegetáciou vyskytuje výlučne v južnej časti Východoslovenskej roviny (jeho areál prebieha severovýchodným Maďarskom až do Rumunska). V prírode sa zvyčajne vyskytuje spolu s častejším druhom *Asellus aquaticus*. Popri dvoch vodných druhoch sa v CHKO Latorica a blízkom okolí môžeme stretnúť s 19 druhmi suchozemských rovnakonôžok. Hoci sme vyšetrili početný materiál (5378 jedincov suchozemských 220 jedincov vodných rovnakonôžok) zo značného množstva lokalít (88 suchozemských a 31 vodných), z ktorých mnohé boli skúmané aj viackrát, počet zistených druhov ešte nemusí byť definitívny. Druhové spektrum známe v blízkom okolí na maďarskej strane nížiny a v lesoch vulkanických masívov obsahuje ešte niekoľko ďalších druhov. V celku Východoslovenská rovina sme zaznamenali 14 druhov (2 z nich chýbali v Zemplínskych vrchoch). 17 druhov sme zaznamenali v Zemplínskych vrchoch, z nich 4 v nížinnom prostredí chýbali. Jeden z nich, *Platyarthrus hoffmannseggii*, je určite prítomný aj na vhodných stanovištiach rovinatej časti CHKO Latorica ako bežný myrmekofil. Ďalšie druhy, *Ligidium hypnorum*, *L. intermedium* a *Trachelipus ratzeburgii* sú viazané na horské lesné komplexy s mezofilným až vlhkým charakterom (obr. 3). *L. intermedium* predstavuje prvonález pre územie Slovenska. Okrem Zemplínskych vrchov je známy len z okolia neďalekého mesta Sátoraljaujhély v Maďarsku a z rumunských Karpát (typové územie). Ďalší lesný druh, *Protracheoniscus politus*, bol zaznamenaný len v Zemplínskych vrchoch a fragmente nížinného lesa Ereš pri K. Chlmci. Teplomilné elementy, tolerantné voči vysychaniu, v CHKO Latorica reprezentuje okrem hojného *Trachelipus nodulosus*, ktorý je často jediným druhom najsuchších prirodzených biotopov územia, aj *Orthometopon planum*, ktorý sa tu javí ako veľmi zriedkavý. Tieto biotopy zvyčajne obývajú ďalšie, veľmi prispôsobivé druhy (*Armadillidium vulgare*, prípadne *A. versicolor, Porcellium collicola* a *Trachelipus rathkii*). Silne antropicky pozmenené biotopy sekundárne osídľujú práve tieto adaptabilné pôvodné druhy – najčastejšie prítomné v rôznorodých biotopoch nížinnej časti CHKO Latorica (spolu s nimi aj *Hyloniscus riparius*) – ale i druhy zavlečené (*Haplopthalmus danicus, Porcellio spinicornis, Porcellionides pruinosus*).

Millipedes (Diplopoda) of the Latorica Protected Landscape Area

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Abstract

Until recently, the millipede fauna of the eastern lowland territories of Slovakia was few or incoherently studied. Nevertheless, the first published data in the end of the 19th century have already indicated the presence of interesting millipede fauna. Later, in the period 1948-1962, the millipedes were investigated here also by Gulička, as documented by material in his collection but never published. Actually, the intensive research in the Latorica Protected Landscape Area (PLA) and adjacent territories has yielded new and remarkable insights. During the present research at 83 localities, including both surface habitats and 2 long underground wine cellars, we obtained numerous millipede material, from which it was possible to summarize the relatively detailed distribution of individual species, their habitat preferences, and the composition of assemblages in typical habitats. In total, we present data about 27 species of millipedes, 24 of which were recorded during recent field studies, three other species are listed based on the literature data. The richest communities were observed in floodplain forests along the Latorica river and in the wetland of the Zemplínska jelšina Nature Reserve. The occurrence of East Carpathian faunistic elements that have descended to this promontory of the Pannonian Plain, *Enantiulus transsilvanicus*, *Polydesmus burzenlandicus* (first record for Slovakia) and apparently peculiar geographical and ecological form of *Polydesmus complanatus* represent the most interesting records. The recent research did not confirm historical data on the occurrence of *Polydesmus subscabratus*. Although this species is known primarily in the southern tip of the Carpathians, we cannot *a priori* rule out its occurrence in the studied region. The rare hygrophilic species *Xestoiulus laeticollis* deserves further attention, too. The unique millipede fauna of the given area can be derived from the geographical position of this territory located between the Carpathians and the Pannonian region as well as from the varied mosaic of landscape elements. Recorded data refer about the fauna of two orographic units, the Eastern Slovak Plain with 24 species and the Zemplínske vrchy Mts. with 16 species. Unique habitats of the Latorica PLA and their fauna deserve intensive attention and protection.

Keywords: millipedes, lowland mosaic landscape, mountainous woodland, wine cellars, faunistics

Introduction – history and objectives

Millipedes are the most diversified class of myriapods, a lineage of terrestrial arthropods. Characterized as stratobionts, they are dwellers of leaf litter layers, upper soil, decaying wood and all adjacent habitats as an important part of saprophytophagous invertebrates. In the territory delimited by the Latorica Protected Landscape Area (PLA), SE Slovakia, the millipede fauna was not in the past investigated systematically. Nevertheless, even scarce published data are important especially due to some interesting findings. The attention of previous zoologists was concerned with dry habitats, where the biodiversity of millipedes is usually low, whereas woodland sites were traditionally omitted.

The first data on millipedes from the whole Zemplín/Zemplén County were brought by Chyzer (1886). In the area of our interest, he announced the occurrence of three species. He provided his collections to the myriapodological authorities in Hungary, Ö. Tömösváry and J. Daday. Tömösváry (1852-1884) died prematurely and did not manage to publish the collections. The second zoologist included these collections in the monograph on the myriapods of Hungarian Monarchy (Daday1889,1896). In the tabular overview (Daday 1889, pp. 35-37) he listed a row of species from the Zemplín/Zemplén County. Based on the present knowledge of millipede fauna in this region (see references in this text and in the papers by Korsós 1994 and Bogyó et al. 2012) we can state that some species mentioned by him have been listed incorrectly and certainly do not occur in the given area. An important revision of Daday's data, based on a study of individuals deposited in the Hungarian Natural History Museum, was later carried out by Loksa (1957).

Although a comprehensive study on myriapods in the southern part of the East Slovak lowlands was recently lacking, some important findings were brought by zoologist and ecologist Ján Gulička. These data are available somewhat "hidden" in the publication related to the Slovak part of the Eastern Carpathians (Ložek & Gulička1962) and in the unpublished monograph on the myriapods of Slovakia (Gulička1951), later generally recapitulated in his dissertation (Gulička 1960). Additional information is involved also in the paper based on the manuscript, which only one was published after his death (Gulička et al. 2014).

Loksa (1973, 1983) examined millipede fauna in the lowland area of the Hortobágy National Park, the territory lying in the Panonnian Lowland in Hungary, south of the territory around the Latorica river. Bogyó et al. (2012) referred to the millipede fauna of the southern part of the volcanic Prešov-Tokaj Mountains (Slanské/Zemplény Mts.) but with wide adjacent lowland territory from the west and east, including samples from the area bordered by the rivers Latorica, Bodrog and Tisa (Tisza), named Medzibodrožie (Bodrogköz). Haľková & Mock (2018) published interesting records from the southeastern foothills of the Slanské vrchy Mts., the vicinity of the area of interest.

In the years 2008-2011, we carried out an intensive field research of soil fauna in the territory of Latorica PLA and the surrounding areas. We obtained extensive material of millipedes, which was partly analysed in the diploma thesis by Oravcová (2013), but not published. Here we complete the data based on all available sampled material including unpublished collections of other zoologists who studied various localities and microhabitats of the given area, and also more than 70-80-year-old collections of J. Gulička, which we identified in his legacy (mostly unpublished data). The following text is a synthesis of knowledge about the millipede fauna of the study area, including ecological demands and

biogeographical relationships of some rare species and notes on the species composition in characteristic habitats.

Material and methods

Millipedes were sampled individually, altogether with heat-extracted soil samples dug by a steel frame (25x25 cm, 10 cm in depth) and by using pitfall traps (5 plastic jars per study site, 7 cm in diameter, depth 12 cm, covered by a metal roof, formaldehyde as a fixative solution) or by sifting of leaf litter and humus soil horizon with subsequent hand sorting of invertebrates. The traps were exposed for one year, controlled twice, in autumn and spring. Other type of traps, designed for ant sampling (uncovered glass jars, 4.5 cm in diameter, depth 9 cm) with ethanol as a fixative solution were exposed in different sites for 4 days in a set of 5 traps per site (leg. M. Suvák). We studied also invertebrate inhabitants of winter ground nests and mounds of steppe mouse (*Mus spicilegus*), which is a typical coloniser of abandoned fields (cf. Šustek & Stanko 2012). Several samples of fillings from tree cavities were analysed and data involved in the present list. Two cellars for storing of the Tokaj wine were investigated during a year by using of pitfall traps and individual collecting along all their length (hundreds of meters of underground corridors were excavated in volcanic sediment 10-15 m deep under the surface). Millipedes were concentrated on wood material and on the cellar walls densely covered with mould (Haľková 2013).

For species identification, we used keys for the continental European millipede fauna (Attems 1940; Schubart 1934; Kocourek et al. 2017, Hauser & Voigtländer 2019).

All millipedes examined by the authors (5649 ex.) were preserved in denatured 75% ethanol and deposited in the collections of the institutions of the authors (no public collections of millipedes from study area were available).

List of localities

All localities with positive records of millipedes are alphabetically ordered in the following list. Beside own data of authors, localities with available material from the collection of Ján Gulička, numerous trapped materials sampled by Martin Suvák, individual samples taken by Jana Christophoryová and Ľubomír Panigaj and several samples of millipedes from the ground nests or winter mould of steppe mouse *Mus spicilegus* are involved. Position of individual localities is demonstrated in Fig. 1. In the following list the number and name of the relevant cadastral area is followed by name of the locality, geographical coordinates, altitude, short habitat and bedrock characteristics and methods used. Localities 17, 18, 19, 20, 21, 22, 28, 29, 30, 31, 32, 38, 69, 75, 76 and 77 as well as published data for Cejkov (Czéke), Veľaty (Velejte), Viničky (Szőllőske) belong to the orographic unit Zemplínske vrchy Mts., a small adjacent and geologically very diverse mountain range. All other localities belong to the orographic unit Eastern Slovak Plain (Východoslovenská rovina) created by fluvial and aeolian sediments with isolated andesite hills.

Abbreviations used: NR – Nature Reserve, NNR – National Nature Reserve, is – individual sampling, ls – litter sieving, ss – soil sampling with subsequent heat extraction, pt – pitfall trapping, nMs or mMs – material from the ground nests or winter mound of Mus spicilegus

with subsequent heat extraction (Michal Stanko, Alexander Čanády and Ladislav Mošanský leg.), CJG – collection of Ján Gulička, MS –Martin Suvák leg.

1 – Beša, forest locality no. 1,48°30.643’ N,21°56.317’ E, 105 m a.s.l., hard mixed floodplain forest outside the right bank of the Latorica river, fluvial sediments, is, pt.
2 – Beša. forest locality no. 2, 48°30.67’ N, 21°56.330’ E, 104 m a.s.l., hard floodplain forest outside the the right bank of the Latorica river, fluvial sediments, is, ss, pt.
3 – Beša, Bešiansky polder, 48°31.748’ N, 21°57.288’ E, 98 m a.s.l., waterlogged meadows and pastures south of the village, fluvial sediments, is.
4 – Beša, Moľva. sand dune, 48°31.483’ N, 21°57.445’ E, 101 m a.s.l., aeolian sand dune with black locust forest and grassland, is.
5 – Biel, Viničný vrch, 48°23.91’ N, 22°03.292’ E, 115 m a.s.l., ruderal vegetation, high grass and shrubs sand dunes, pt, MS.
6 – Boľ – Kráľovský Chlmec, Boľské rašelinisko NR, 48°26.851’ N, 21°57.128’ E, 101 m a.s.l., alder belt between peat bog and agrocoenoses, fluvial sediments, is, pt.
7 – Borša, forest at castle on the outskirts of the village, 48°23.245’ N, 21°42.467’ E,107 m a.s.l., fragment of hard-wooded lowland forest, bank of small pond, fluvial sediments, ls.
8 – Borša, Bodrog riverbank, 48°2.164’ N, 21°42.475’ E,97m a.s.l., riparian forest with willows and poplars, fluvial sediments, ls.

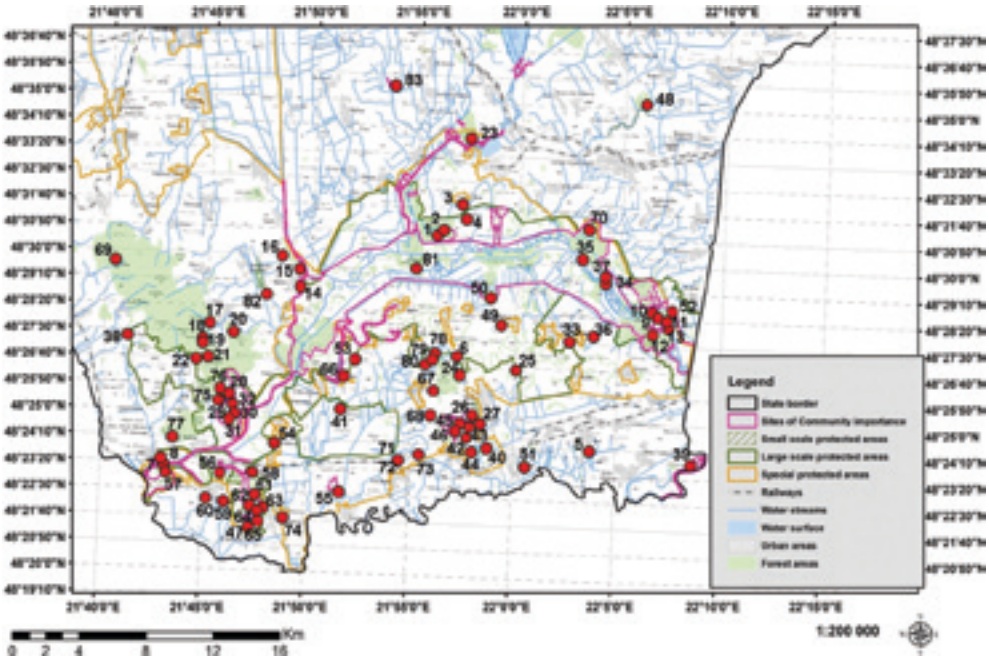

Fig. 1 *Location of localities in the Latorica PLA with available millipede data. For locality numbers see chapter List of localities.*

9 – Boťany, Botiansky luh NNR, 48°27.826’ N, 22°07.000’ E, 111 m a.s.l., hard floodplain forest with oak and hornbeam at the dam, fluvial sediments, ls.
10 – Boťany, Botiansky luh NNR, 48°28.549’ N, 22°06.297’ E, 107 m a.s.l., floodplain forest between dam and river arm, fluvial sediments, is, ss, pt.
11 – Boťany, Latorica,left bank of the river, 48°28.422’ N, 22°07.286’ E, 104 m a.s.l., riparian forest, under the dead tree trunk near the bridge, floodplain forest on the bank of the river, fluvial sediments, is.
12 – Boťany, Latorický luh NNR, 48°27.826’ N, 22°07.000’ E, 111 m a.s.l., hard floodplain forest with oak and hornbeam, fluvial sediments, is, ss, pt.
13 – Boťany, near the Latorica river, 48°28.466’ N, 22°06.400’ E, 112 m a.s.l., riparian forest near the left bank of the Latorica river, fluvial sediments, is, ss, pt.
14 – Brehov, forest at Ondava river, 48°29.028’ N, 21°49.249’ E, 101 m a.s.l., fragment of riparian forest at the right bank of Ondava river, fluvial sediments, is.
15 – Brehov, Veľký vrch, 48°29.659’ N, 22°48.494’ E, 191 m a.s.l., dry grassland with bushes at the NW edge of the hill, andesite, is, pt.
16 – Brehov, Veľký vrch, ca 48°29.429’ N, 21°48.851’ E, 215 m a.s.l., steppe on andesites, is, CJG.
17 – Cejkov, alluvium of the Mlynský potok stream, 48°27.268’ N, 21°44.440’ E, 190 m a.s.l., bank of small stream in woodland with *Carpinus betulus, Alnus glutinosa, Quercus* sp., *Fagus sylvatica, Acer campestre*), paleozoic ryolites and dacites, is, pt.
18 – Cejkov,area of former spa and camp, 48°27.377’ N, 21°44.428’ E, 190 m a.s.l., oak-hornbeam forest, old buildings, under barks, fluvial sediments on paleozoic ryolites and dacites, is.
19 – Cejkov, hornbeam forest, 48°27.265’ N, 21°44.465’ E, 208 m a.s.l., woodland (*Carpineto – Quercetum*), fluvial sediments on paleozoic ryolites and dacites, is, pt.
20 – Cejkov, oak forest, ca 48°27.759’ N, 21°45.935’ E, 220 m a.s.l., *Quercetum*, triassic quartcites and sandstones, is, CJG.
21 – Cejkov, saddle, ca 48°26.399’ N, 21°44.571’ E, 260 m a.s.l., oak-hornbeam forest, triassic quartcites and sandstones, is, CJG.
22 – Černochov, pasture, ca 48°26.604’ N, 21°44.36’ E, 255 m a.s.l., pasture on the SW slope at oak forest, quartz conglomerates and sandstones, is, CJG.
23 – Ižkovce, Horný les, 48°33.638’ N, 21°57.315’ E, 106 m a.s.l., hard-wooded forest between the dam and the river, under the bark of dead trees, fluvial sediments, is.
24 – Kráľovský Chlmec, Ereš, 48°26.200’ N, 21°57.315’ E, 131 m a.s.l., fragment of lowland woodland, fluvial sedimens, pt.
25 – Kráľovský Chlmec, Fejséš, Malé pole (altitude quote 118), 48°25.909’ N, 21°0.460’ E, 113 m a.s.l., black locust stand with shrubs, sand dunes, pt, MS.
26 – Kráľovský Chlmec, Veľký kopec, 48°25.119’ N, 21°57.786’ E, 260 m a.s.l., SW slope of the hill with dry grassland, andesite, pt.
27 – Kráľovský Chlmec, Veľký kopec (Nagy Hegy), ca 48°25.09’ N, 21°57.891’ E, 200 m a.s.l., dry forest-steppe slopeandesite, is, CJG.
28 – Ladmovce, Dlhá hora Hill, 48°25.886’ N, 21°57.411’ E, 237-270 m a.s.l., forest-free stand with shrubby and grass-herbaceous vegetation and forest-steppe (*Corno-Quercetum*), dolomite and limestone, is, pt.

29 – Ladmovce, Dupalisko, 48°25.371' N, 21°45.55' E, 180 m a.s.l., abandoned vineyard with old building (brick cottage), under the stone and brickets, dolomites, is.
30 – Ladmovce, Kašvár NNR, 48°25.173' N, 21°57.543' E, 161 m a.s.l., xerothermic grassland with bushes on limestone bedrock, dolomite and limestone, pt.
31 – Ladmovce, Kašvár, 48°24.956' N, 21°45.595' E,160 m a.s.l., oak forest with *Cornus mas*, dolomites, ls.
32 – Ladmovce, Kašvár, 48°24.928' N, 21°46.396' E, 170 m a.s.l., steppe with shrubs, dolomites, is.
33 – Leles, altitude quote 115, 48°27.531' N, 22°02.276' E, 115 m a.s.l., meadow with high grass and isolated shrubs, sand dunes, pt, MS.
34 – Leles, Agardské pasienky, 48°29.106' N, 22°04.134' E, 99 m a.s.l., wet meadows and pastures with self-seed trees, fluvial sediments, is.
35 – Leles, Ilhanov, 48°29.689' N, 22°03.461' E, 101 m a.s.l., floodplain forest NE from Leles village near the Latorica river with absence of herb layer, fluvial sediments, is.
36 – Leles, Kapoňa, ca 48°28.082' N, 22°4.379' E, 99 m a.s.l., steppe on sand dune, is, CJG.
37 – Leles, Latorica, ca 48°29.529' N, 22°04.213' E, 100 m a.s.l., floodplain forest with *Quercus*, fluvial sediment, is, CJG.
38 – Malá Tŕňa, wine cellar, 48°27.291' N, 21°40.761' E, 156 m a.s.l., long historical wine cellar in the centre of the village, mold-covered surface of walls and wine barrels, tuff, is.
39 – Malé Trakany, Lužná húština, 48°23.683' N, 22°08.748' E, 105 m a.s.l., sandy-clay bank of the river Tisa/Tisza, under pieces of wood, fluvial sediments, is.
40 – Malý Horeš, ca 48°24.091' N, 21°58.306' E, 103 m a.s.l., floodplain forest with *Populus* and *Alnus*, fluvial sediments, is, CJG.
41 – Malý Horeš, Biele jazero NR, 48°25.079' N, 21°51.508' E, 95 m a.s.l., wet meadow, ecotone of pasture and marshland, aeolian sands on river sediments, pt.
42 – Malý Horeš, Horešské lúky NR, 48°24.337' N, 21°57.388' E, 96 m a.s.l., grassland within depression (salt marsh) in grounded riverbed, river sediments, pt.
43 – Malý Horeš, Hrušov, piesky, ca 48°24.566' N, 21°56.956' E, 121 m a.s.l., dry grassland on sand dune with grassland, is, CJG.
44 – Malý Horeš, Húšťava, 48°24.071' N, 21°57.996' E, 104 m a.s.l., fragment of lowland forest with oak at former river arms, fluvial sediments, pt.
45 – Malý Horeš, Poniklecová lúčka NR, 48°24.742' N,21°56.721' E,119 m a.s.l., dry grassland on sand dune, pt.
46 – Malý Horeš, sand dune with wine cellars, 48°24.345' N, 21°57.01' E, 125 m a.s.l., secondary forest with black locust, is.
47 – Malý Kamenec, ca 48°21.699' N, 21°47.899' E, 140 m a.s.l., steppe on the southern slope of the Tarbucka hill, andesite, is, CJG.
48 – Pavlovce nad Uhom, Ortov-Dvor, ca 48°35.198' N, 22°5.868' E, 107 m a.s.l., fragment of lowland forest, fluvial sediments, is, CJG.
49 – Poľany, agrofarm, 48°27.914' N, 21°58.918' E, 99 m a.s.l., the area of farmyard with old buildings, fluvial sediments, is.
50 – Poľany, Čierny les, 48°29.031' N, 21°58.122' E, 100 m a.s.l., hard floodplain forest with predominated oak, fluvial sediments, is, ss, pt.

51 – Pribeník, park at the castle, 48°23.416' N, 22°0.303' E, 101 m a.s.l., old oaks at the western edge of the park, decaying wood from tree hollow, fluvial sediments, is.
52 – Ptrukša, right bank of the Latorica river, 48°28.451' N, 22°7.233' E, 102 m a.s.l., riparian forest, fluvial sediments, pt.
53 – Rad – Hrušov, Hrušov – Prudký, 48°26.709' N, 21°52.111' E, 100 m a.s.l., dry grassland on sand dune, pt.
54 – Somotor, Somotorská hora hill, 48°24.491' N, 21°48.248' E, 141 m a.s.l., dry grassland with bushes on a flat top of the hill, andesite, pt.
55 – Strážne, sand pit, ca 48°22.713' N,21°51.396' E,100 m a.s.l., steppe with black locust forest, aeolian sands, is, CJG.
56 – Streda nad Bodrogom, Baraní vrch (Bak hegy), ca 48°22.912' N, 21°45.663' E, 125 m a.s.l., steppe, andesite, is, CJG.
57 – Streda nad Bodrogom, Klin nad Bodrogom, 48°22.948' N, 21°42.961' E, 97 m a.s.l., belt of willow trees between river arm and meadow, fluvial sediments, pt.
58 – Streda nad Bodrogom, Medzi jarky (Somotor), ca 48°23.067' N, 21°47.279' E, 110 m a.s.l., sand dune with grassland and black locust forest, aeolian sands, is, CJG.
59 – Streda nad Bodrogom, Na požiarisku, 48°22.260' N, 21°45.950' E, 94 m a.s.l., groundnest of *Mus spicilegus*, agrocoenoses (stubble), aeolian sands and river sediments, nMs.
60 – Streda nad Bodrogom, park at the castle, 48°22.189' N, 21°45.145' E, 103 m a.s.l., historical park at castle, with older deciduous trees, dead wood material from tree hollow, fluvial sediments, is.
61 – Streda nad Bodrogom, Tajba, north-eastern bank of the pond, 48°23.218' N, 21°46.505' E, 98 m a.s.l., belt of willows on the north shore of the pond, fluvial sediments, is.
62 – Streda nad Bodrogom, Tajba, southern bank of pond, 48°23.025' N, 21°46.764' E, 106 m a.s.l., foot of the northern slope with black locust forest and willow growth on the shores of the swamp, fluvial sediments, is.
63 – Streda nad Bodrogom, Tarbucka, saddle at the top of the hill, 48°21.987' N, 21°47.282' E, 210 m a.s.l., steppe-forest old oaks with old stone walls, litter and humus, andesite, is.
64 – Streda nad Bodrogom, Tarbucka NR, sand dune, 48°22.242' N, 21°47.058' E, 189 m a.s.l., dry grassland with bushes on sandy soil, sand dune on andesite, pt.
65 – Streda nad Bodrogom, Tarbucka, top of the hill, 48°21.746' N, 21°47.319' E, 265 m a.s.l., rocky dry grassland with bushes at the top of the andesite hill, andesite, pt.
66 – Svätá Mária, Dlhé Tice NNR, 48°26.127' N, 21°51.267' E, 98 m a.s.l., grassland along the bank of marshland (former riverbed), fluvial sediments, pt.
67 – Svätuše, ca 48°25.984' N, 21°55.42' E, 135 m a.s.l., fragment of dry woodland, andesite, is, CJG.
68 – Svätuše, vineyard, 48°25.072' N, 21°56.309' E, 135 m a.s.l., meadow with tall-stalk grass, sand dunes, pt, MS.
69 – Veľká Tŕňa, alluvium of the Hečka stream, 48°29.445' N, 21°40.278' E, 215 m a.s.l., *Alnetum* with hornbeam, beech, oak, fluvial sediments, is.
70 – Veľké Kapušany, Hrušky, 48°30.853' N, 22°3.063' E, 100 m a.s.l., floodplain forest by the right-bank dam of the Latorica river, fluvial sediments, is.
71 – Veľký Horeš, 48°24.000' N, 21°55.020' E, 96 m a.s.l., ground nests of *Mus spicilegus* in stubble and abandoned field, aeolian sands and river sediments, nMs.

72 – Veľký Horeš, 48°24.000' N, 21°55.020'E, 96 m a.s.l., winter mounds (winter supplies of herbs and seeds) of *Mus spicilegus* in stubble, abandoned field, aeolian sands and river sediments, mMs.
73 – Veľký Horeš, Pupoš, ca 48°23.646' N, 21°55.076' E, 105 m a.s.l., steppe on sand dune, is, CJG.
74 – Veľký Kamenec, castle ruins, 48°21.548' N, 21°48.455' E, 115 m a.s.l., rocky steppe at castle ruins in the intravilan, andesite, is.
75 – Viničky, Hatfa, old spa territory, 48°25.597' N, 21°44.942' E, 185 m a.s.l., wooded area around an abandoned spa, triassic quartcites and sandstones, is.
76 – Viničky, Hatfa valley, 48°25.746' N, 21°45.168' E,190 m a.s.l., the bottom of the valley overgrown with hornbeam forest, triassic quartcites and sandstones, is.
77 – Viničky, wine cellar, 48°23.945' N, 21°43.295' E, 118 m a.s.l., recent long wine cellar excavated in neovolcanic tuff under the secondary school building, on a wall overgrown with mold, is.
78 – Vojka, Čikóška (altitude quote 121), 48°26.970' N, 21°55.671' E, 120-125 m a.s.l., young black locust stands with high grass and shrubs, sand dune, pt, MS.
79 – Vojka, Čikóška, sand pit, 48°26.787' N, 21°55.821' E, 105 m a.s.l., sand dune with grassland and black locust forest, sand dune, is.
80 – Vojka, Veľké jazero NR, 48°26.651' N, 21°55.360' E, 99 m a.s.l., ecotone of marshland bank and field, aeolian sands on river sediments, pt.
81 – Zatín, Zatínsky luh NR, 48°29.748' N, 21°54.905' E, 104 m a.s.l., fragment of hard mixed floodplain forest with arms of the Latorica river, fluvial sediments, is.
82 – Zemplínske Jastrabie, Zemplínska jelšina NR, 48°28.989' N, 21°47.519' E, 109 m a.s.l., fragment of riparian and bog forest among fields, fluvial sediments, pt.
83 – Zemplínske Kopčany, Zemplínske slanisko NNR, 48°35.468' N, 21°53.389' E, 101 m a.s.l., grassland in periodically flooded depression (salt marshlands), with halophytes, aeolian sediments, is.

Results

The analysed material consists of 24 millipede species; the other 3 species are listed based on the literature data, thus a total of 27 species represents all 6 millipede orders present in Central Europe.

The distributional data are supplemented by the characteristics of the species area and preferred habitats. The nomenclature follows Sierwald & Spelda (2021), while biogeography and ecology are in accordance with Kime & Enghoff (2011, 2013, 2017) and Kocourek et al. (2017).

■ Order Polyxenida

Polyxenidae

Polyxenus lagurus (Linnaeus, 1778) – 19, 28, 30, 31, 44, 63, 77, Kráľovský Chlmec, Svätuše (Gulička 1951, 1960; Ložek & Gulička 1962) – Palaearctic – prefers drier forest edges and shrubs, where it occupy leaf litter, bark of woody plants, nests of birds.

■ Order Glomerida

Glomeridae

Glomeris hexasticha Brandt, 1833 – 6, 11, 16, 18, 19, 24, 26, 27, 28, 32, 36, 44, 45, 46, 61, 63, 64, 65, 67, 70, 78, Kráľovský Chlmec, Svätuše (Gulička 1951, 1960; Ložek & Gulička 1962) – South and Central to Eastern Europe – typical inhabitant of sunny stands at low altitudes, grasslands and dry forests, but also variety of other sites; rather frequent in the Latorica PLA, including the driest locations (Fig. 2).

Glomeris tetrasticha Brandt, 1833 – 10, 12, 35, 52 – Central to Eastern Europe – various woodlands from broadleaf in lowlands to coniferous at higher altitudes, in moist places –exclusively in floodplain of the Latorica river in the studied area.

■ Order Polyzoniida

Polyzoniidae

Polyzonium germanicum Brandt, 1837– 9, 10, 12, 13, 20, 26, 35, 37, 40, 44, 48, 52, 65, 70, Cejkov, Veľaty (Daday 1889, 1896 – Czéke, Velejte) – European – moist to waterlogged forests and water edges, in leaf litter and rhizosphere.

■ Order Julida

Blaniulidae

Blaniulus guttulatus (Fabricius, 1798) – 34, 71 – European – a small species associated with soils rich in humus, in Central Europe almost exclusively synanthropic occurrence (parks, gardens, fields).

Nopoiulus kochii (Gervais, 1847) – 38, 77 – European, cosmopolitan by introduction – small, very adaptable, pioneering species, recolonizing an environment strongly influenced by man; mass occurrence in Tokaj cellars, on woods and continuous mold growths (*Cladosporium cellare*) on the walls.

Proteroiulus fuscus (Am Stein, 1857) – 12, 38, 51, 60, 77 – European – small species with a strong connection to dead wood, often mass-presented in tree cavities, in forests and parks in the lowlands and foothills.

Julidae

Brachyiulus bagnalli (Brolemann, 1924) – 42, 49, 59, 69, 71, 72 – Cejkov (Daday 1896, as *Isobates varicornis*; as *Brachyiulus* aff. *pusillus*, Loksa 1957 – Czéke) – South to Central Europe – small millipede mostly tied to deforested landscapes and cultural steppes.

Enantiulus nanus (Latzel, 1884) – 24 – Cejkov (Daday 1896, as *Julus podabrus*; as *Leptophyllum nanum*, Loksa 1957 – Czéke), Svätuše (Gulička 1951, 1960, as *L. nanum)* – European – a small species favouring forest edges and drier and warmer forests and forest-steppes.

Enantiulus transsilvanicus (Verhoeff, 1899) – Boľ, Svätuše, Kráľovský Chlmec (Gulička et al. 2014) – species area divided into two subareas, the eastern part of the Carpathians and the Alps – localities in the Eastern Slovak Plain are unique in Slovakia and outside of mountainous landscape; the individuals collected by Gulička were obtained probably in the seventies–eighties of the 20th century in the complex of lowland forest between above-mentioned villages; unfortunately without any recent record. It is worth noting the most

actual records of the species, including gonopod drawings, come from the Maramures County, Eastern Carpathians, northwestern Romania (Korsós & Lazányi 2008).

Julus terrestris Linnaeus, 1758– 1, 2, 3, 6, 7, 8, 9, 10, 12, 13, 14, 19, 23, 30, 34, 37, 41, 42, 45, 52, 54, 55, 57, 64, 66, 70, 72, 77, 79, 81, 82, 83 –Somotor (Chyzer1866, as *Julus ferreus* – Daday 1889, as *Julus rugifrons*, Loksa 1957 – Szomotor) – European, with origin in the continental bioregion –lowland species inhabiting mainly wet grasslands and waterlogged sites in deciduous forests; characteristic for waterlogged habitats in the Latorica PLA.

Kryphioiulus occultus (C.L. Koch, 1847) – 16, 26, 27, 64, 65 – Somotor (Daday, 1889, 1896 as *Julus occultus*, Loksa, 1957 – Szomotor), Kráľovský Chlmec, Svätuše (Gulička 1951, 1960 as *Cylindroiulus occultus*) – East-European – strongly prefers dry, hot, sunny grasslands; typical representative of the xerophilic fauna of the Latorica PLA.

Leptoiulus cibdellus (Chamberlin, 1921) – 14, 34, 37, 41, 45, 52, 70, 71, 81, 82 – Somotor (probably under the name *Julus fallax* by Daday, 1889, 1896, see Loksa 1957 – Szomotor), Kráľovský Chlmec, Leles, Poľany, Svätuše (Gulička 1951, 1960 as *Leptoiulus minutus*) – East-European – hygrophilous lowland species inhabiting open wetlands; the only regional representative of the genus *Leptoiulus* that does not inhabit the mountainous Carpathian landscape.

Leptoiulus proximus (Němec, 1896) – 9, 10, 11, 12, 13, 17, 18, 19, 23, 28, 30, 34, 44, 52, 62, 69, 70, 75, 76, 82– European – forest species, especially in lowlands and hills, associated mainly with oak and oak-hornbeam forests.

Megaphyllum projectum Verhoeff, 1894 – 14, 16, 17, 19, 21, 24, 25, 26, 27, 28, 29, 32, 45, 46, 61, 62, 63, 64, 65, 67, 69, 73, 75, 76, 78 – Cejkov, Viničky (Daday 1889 as *Julus austriacus* – Czéke, Szőllőske), Kráľovský Chlmec (Gulička 1951, 1960 as *Chromatoiulus projectus dioritanus*) – East-European – conspicuous large inhabitant of drier broadleaf forest with oak at low altitudes.

Megaphyllum unilineatum (C. L. Koch, 1838) – 4, 5, 15, 16, 22, 25, 26, 27, 29, 30, 33, 35, 43, 45, 46, 47, 50, 53, 54, 56, 58, 63, 64, 65, 67, 68, 73, 74, 78, 79, 80 – Somotor (Chyzer 1866; Daday 1889, 1896 as *Julus unilineatus* – Szomotor) – South-European – large species with typical coloration, longitudinal red dorsal stripe on an almost black background; inhabitant of dry grasslands.

Ommatoiulus sabulosus (Linnaeus, 1758) – Kráľovský Chlmec (Chyzer 1866, as *Julus sabulosus* – Király-Helmecz), Kráľovský Chlmec, Svätuše (Gulička 1951, 1960, as *Schizophyllum sabulosum*) – European – typical element of deforested drier landscape, preferring soil rich in calcium; from lowlands to rocky steppes at relative high altitudes. The occurrence of this conspicuous species in the study area (not even in the collection of J. Gulička) was not recently confirmed. The confusion of juveniles with other species with longitudinal dorsal bands is possible (*B. bagnalli* or *M. projectum*).

Unciger foetidus (C. L. Koch, 1838) – 17, 19 – Central European – adaptable forest species; unexpectedly avoids lowland forests in the study area.

Xestoiulus laeticollis (Porat, 1889) – 70, 82 – Northern European – small lowland hydrophilic species in marshlands; in the Latorica PLA scarce and probably rare overall in Central Europe. It occurs in a similar habitat in the Bártoliget NR, Hungary, where the findings were initially classified as a separate taxon (Verhoeff 1927; Loksa 1953; Korsós 1991).

■ Order Chordeumatida

Craspedosomatidae

Craspedosoma transsilvanicum Verhoeff, 1897 – 17 – South-East Europe – moist forests and banks of watercourses in the lowlands and foothills.

Mastigopohorophyllidae

Mastigona bosniensis (Verhoeff, 1897) – 1, 2, 6, 9, 10, 11, 12, 13, 24, 25, 34, 35, 37, 40, 42, 45, 50, 52, 70, 80, 81, 82 – Central and East European species – very adaptable, in forests as well as deforested land, the only representative of the order Chordeumatida in the lowland parts of the study area.

■ Order Polydesmida

Polydesmidae

Brachydesmus superus (Latzel, 1884) – 2, 6, 42 – European – in Central Europe it is usually synanthropic in cities, gardens, windbreaks in agrocenoses, sometimes in caves. Within the study area found sporadically in wetlands.

Polydesmus burzenlandicus Verhoeff, 1925 – 82 – South and East Carpathian – hygrophilous forest species of mountainous landscape. First record for Slovakia and outside the Alpine bioregion (Carpathian range).

Polydesmus complanatus (Linnaeus, 1761) – 1, 2, 7, 8, 9, 10, 11, 12, 13, 17, 18, 19, 23, 24, 32, 34, 35, 37, 39, 44, 52, 57, 89, 70, 81, 82 – Central to East-European – characteristic for larger forest complexes, with different woody compositions, including fir and beech forests; abundant in the floodplain of the Latorica river where it forms numerous aggregations on dead fallen tree trunks. The local population has several characteristics that distinguish it from the others in Central Europe: mass occurrence, floodplain, attachment to dead wood, and distinctive coloration, where the lighter head and collum contrast with the other body segments in a darker coloration (Figs. 3 and 4). We assume it as a different (separate) geographical form, with a connection to the Eastern Carpathians.

Polydesmus denticulatus C. L. Koch, 1847– 6, 12, 13, 14, 24, 34, 36, 42, 52, 57, 62, 67, 70, 71, 80, 82 – European – widespread species dwelling plenty of different habitats from marshland to dry sites, from lowland to mountainous landscape, forests, meadows, even caves and synanthropic habitats. Rather frequent in the Latorica PLA. Usually in waterlogged or flooded places, often in co-existence with other congeners.

Polydesmus inconstans Latzel, 1884 – 6, 42 – European with origin in Atlantic region – hygrophilous species, in Central Europe seems to be introduced, usually inhabits an environment significantly influenced by human activities.

Polydesmus subscabratus Latzel, 1884 – Veľaty (Daday 1889 – Velejte) – South Carpathian – it prefers wet forest stand. Its occurrence in the Slovak locality or its surroundings was not confirmed yet, but recent findings of *P. transylvanicus* Daday, 1889 (Haľková & Mock 2018) or *P. burzenlandicus* (this study), all with similar biogeography and ecology, in nearby localities within the Eastern Slovak Plain, showed that even the finding of *P. subscabratus* cannot be considered *a priori* erroneous. Exploring suitable habitats around the Veľaty village at the north-western foot of the Zemplínske vrchy Mts. will be needed.

Fig. 2 *Male of Glomeris hexasicha inhabiting even open sunny plots at the Poniklecová lúčka NR (photo: V. Pižl).*

Fig. 3 *Numerous aggregations of Polydesmus complanatus on dead fallen tree trunks in the floodplain of the Latorica river (photo: V. Pižl).*

Fig. 4 *Male of of Polydesmus complanatus; local population is characteristic with lighter head and collum (photo: V. Pižl).*

Fig. 5 *The interior of the intensely waterlogged alder forest of the Zemplínska jelšina NR in the spring aspect; the site of rare riparian fauna. Within eight millipede species, the populations of Xestoiulus laeticollis and Polydesmus burzenlandicus are of the highest faunistic importance (photo: A. Mock).*

Discussion

Twenty-seven documented species of millipedes represent more than a quarter of the species found in Slovakia. Within them, 16 species are now known in the Zemplínske vrchy Mts.; exclusively for this orographic unit: *Polydesmus subscabratus*, *Craspedosoma transsilvanicum* and *Unciger foetidus*). The fauna of lowland landscape of the Latorica PLA (southern part of Eastern Slovak Plain) is represented by 24 species, of which exclusively *Glomeris tetrasticha, Brachydesmus superus, Polydesmus burzenladicus, Polydesmus denticulatus, Polydesmus inconstans, Blaniulus guttulatus, Enantiulus nanus, Enantiulus transsilvanicus, Kryphioiulus occultus,* and *Xestoiulus laeticollis*.

In comparison with similar territories, like Hortobágy National Park (Loksa 1973, 1983; Bogyó et al. 2012), we consider this species spectrum as high for the lowland landscape. Moreover, some findings are unique in Central Europe, such as *Polydesmus burzenlandicus,* or *Enantiulus transsilvanicus* not yet known even from neighbouring Hungary (Gulička et al. 2014; Lazányi & Korsós 2020). However, it is strange that we did not confirm this species in the Latorica PLA, although Gulička collected it in several localities (in the biotope of lowland forests), where we also sampled in detail.

The occurrence of East-Carpathian faunistic elements of millipedes (as same as in other groups of invertebrates, like earthworms or isopods) is peculiar for the fauna of the Latorica PLA. Rather high species evenness of millipedes can be explained because of both the geographical position on the crossroads of Alpine (East- and Western-Carpathian) and Pannonian regions and heterogeneity of the environment with sharp-contrasted habitats like wetlands and sand dunes or rocky steppes on andesite outcrops.

Each of the characteristic habitats of the Latorica PLA has characteristic fauna, such as wetlands areregularly inhabited by julids, *Julus terrestris*, *Leptoiulus cibdellus* and *Xestoiulus laeticollis*, in riparian forests with *Glomeris tetrasticha*, *Polyzonium germanicum* with coexistence of diverse polydesmid assemblage, *Polydesmus complanatus*, *P. denticulatus* and *P. burzenlandicus* or *P. incostans* (the last one is highly probably introduced). Drier forest habitats are colonised by the species more tolerant to desiccation, such as *Polyxenus lagurus*, *Enantiulus nanus*, *E. transsilvanicus*, *Leptoiulus proximus* and *Megaphyllum projectum*, while dry open grasslands host *Glomeris hexasticha*, *Kryphioiulus occultus* and *Megaphyllum unilineatum*. Even artificial subterranean habitats of wine cellars have a permanent millipede fauna represented by two small-size blaniulid species, *Nopoiulus kochii* and *Proteroiulus fuscus*. Winter mounds of plant material as food reservoirs and the underground nests of the steppe mouse *Mus spicilegus* at the northernmost border of its distribution are also colonized by millipede assemblages represented by four blaniulid and julid species (*B. guttulatus, J. terrestris, L. cibdellus* and quit numerously *B. bagnalli*) and one polydesmid species (*P. denticulatus*).

Rather diversified julidan and polydesmidan fauna is in contrast with significantly low diversity of chordeumatidan millipedes. They are represented usually by the sole adaptable species, *Mastigona bosniensis*. These negative characteristics of chordeumatid fauna is probably true for the lowland landscape, but we suppose it is richer in the mountainous woodland of the Zemplínske vrchy Mts., as indicated by records of *Craspedosoma transsilvanicum*, or moreover interesting recent findings of other species in neighbouring localities (Haľková & Mock 2018). The Zemplínske vrchy Mts. deserve further detailed research, also due to the

interesting but questionable historical find of *Polydesmus subscabratus* (Daday 1889) in the vicinity of the Veľaty village, which would be significantly isolated from the rest of the area in the Southern Carpathians in Romania and Serbia (Kime & Enghoff 2011, 2013).

Localities with the exceptionally high biodiversity of millipedes include mainly riparian forests in the eastern part of the floodplain of the Latorica river within the municipalities of Boťany, Ptrukša and Veľké Kapušany, where co-existence of 8-10 species was recorded. Another unique locality is the Zemplínska jelšina NR (Fig. 5), a wetland with alder stand with 8 species of millipedes including rare *X. laeticollis* and *P. burzenlandicus*, both with eudominant occurrence. The first of them has been reported from Slovakia only once in the past (Tajovský et al. 2001), while the second one represents the first record for the Slovak fauna and Zemplínska jelšina is the only known locality hosting this species in Slovakia.

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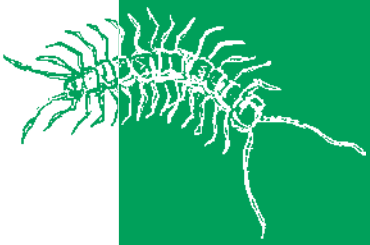
Súhrn

Mnohonôžky (Diplopoda) Chránenej krajinnej oblasti Latorica

Komplexný výskum mnohonôžok CHKO Latorica doposiaľ chýbal. V rokoch 2008-2011 sme intenzívne skúmali vybrané lokality a naše zbery obohatili o ďalší materiál zbieraný nesystematicky od r. 1948 viacerými zoológmi. Zaznamenali sme 24 druhov, ďalšie 3 uvádza literatúra. Tá je síce skromná, ale unikátna v tom, že vďaka pôsobeniu polyhistora Kornela Chyzera tu bol materiál zbieraný už od roku 1880, kedy sa ešte len formoval výskum pôdnej fauny v Európe. Mimoriadne bohaté spoločenstvá sme zaznamenali v zaplavovaných lesoch pri rieke Latorica a v lesnej mokradi Zemplínska jelšina. Na poslednej zmienenej lokalite sme zistili hojný výskyt vzácnych druhov, ako je *Xestoiulus laeticollis* (druhý záznam zo Slovenska) a *Polydesmus burzenlandicus* (prvý nález na Slovensku). *P. burzenlandicus* je drobný vlhkomilný zástupca radu Polydesmida, rozšírený predovšetkým v južných Karpatoch, nová lokalita je od zvyšku areálu značne vzdialená a izolovaná a svedčí o prenikaní niektorých druhov riečnou sieťou aj do prostredia na rozhraní panónskeho a alpínskeho (karpatského) biogeografického regiónu. Podobný areál má *Enantiulus transsilvanicus*, ktorý bol v minulosti doložený v lesoch v okolí Kráľovského Chlmca, ale možno i *Polydesmus subscabratus*, historicky zdokumentovaný v okolí obce Veľaty. Výskyt a identitu tohto druhu bude potrebné doložiť v teréne. Oba ostatne zmienené dva druhy v našom materiáli chýbali. Brehové porasty pri rieke Latorica obýva aj zaujímavá forma druhu *Polydesmus complanatus*, ktorá sa farebne líši od stredoeurópskych foriem a vytvára početné agregácie najmä na padnutých kmeňoch stromov. Ďalší druh rodu *Polydesmus* v CHKO Latorica, ktorý si zaslúži pozornosť, je *P. inconstans*, pravdepodobne zavlečený z atlantickej oblasti Európy. Výskyt 4-5 druhov rodu *Polydesmus* v južnej časti Východoslovenskej roviny a priľahlých Zemplínskych vrchoch je pozoruhodný. Otvorenú krajinu CHKO Latorica, najmä jej vlhšie

časti (brehy mokradí) obýva charakteristické spoločenstvo s *Julus terrestris* a *Leptoiulus cibdellus*. Spoločenstvá mokradí často tesne susedia s obyvateľmi suchých stepí a lesostepí pieskových dún a andezitových vŕškov, akými sú xerotolerantné *Glomeris hexasticha* či *Megaphyllum projectum*, alebo vyslovene suchomilné druhy, *Kryphioiulus occultus* a *Megaphyllum unilineatum*, Niekoľko vzoriek sme získali aj z výskumu podzemných hniezd a zimných kopčekov myši kopčiarky, aj tie môžu byť osídlené mnohonôžkami (zistili sme tu 5 druhov). Krajinný ráz CHKO Latorica dopĺňa aj malé pohorie Zemplínskych vrchov, sčasti zalesnené a čiastočne využívané na pestovanie vína. Pozornosť sme tu zamerali na lesné biotopy, vápencovú step a vínne pivnice, všade žije osobité spoločenstvo mnohonôžok. V Zemplínskych vrchoch je v súčasnosti zdokumentovaných 16 druhov, tri z nich sme v rovinatom teréne Latorica PLA nezaznamenali. Výskum pôdnej fauny Zemplínskych vrchov nepovažujeme za ukončený. V rovinatej časti územia sme zaznamenali 24 druhov (11 výlučne tu). Rovinatý reliéf CHKO Latorica s andezitovými vŕškami je v súčasnosti zrejme najpodrobnejšie prebádaný z hľadiska fauny mnohonôžok v nížinnom prostredí na Slovensku, ale možno aj v celej panónskej oblasti. Celé územie je unikátne a zaslúži si väčší dôraz na ochranu prírodných hodnôt, ako ten, čo autori registrovali počas terénneho výskumu. Zánik pieskových dún ich odťažením a následným zanášaním odpadom, nevhodné hospodárenie orbou s použitím hnojív a pesticídov v tesnej blízkosti vzácnych mokradí, veľká koncentrácia pasúceho sa dobytka na niektorých lokalitách, nevhodná meliorácia slanísk a bezodtokových mokradí a intenzívna ťažba dreva v záplavovom území Latorice sú len niektorými negatívnymi príkladmi nežiadúceho trendu.



Centipedes (Chilopoda) of the Latorica Protected Landscape Area

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Abstract

In the Latorica Protected Landscape Area (PLA) and several adjacent localities, 31 species of centipedes (Chilopoda) have been recorded up to the present time. The main part of the extensive material collected within the soil zoological research in 2008-2011 was completed by several other sampling activities and compared with historical literary data. The centipede fauna of the Latorica PLA involves mostly European or Central European species, closely related mainly to the forest soils. The most abundant species were *Lithobius forficatus*, *Lithobius muticus*, *Lithobius mutabilis*, *Lithobius curtipes* and *Geophilus flavus*. The records of *Cryptops anomalans*, *Henia illyrica*, *Schendyla carniolensis*, *Harpolithobius anodus*, *Lithobius dentatus*, *Lithobius piceus* and *Lithobius tenebrosus fennoscandius* are of faunistic importance. *Schendyla carniolensis* is documented from Slovakia for the first time. Flooded or wetland habitats are characterized by the frequent occurrence of *Lithobius curtipes* and *Lithobius forficatus*; the species *Pachymerium ferrugineum* and *Lamyctes emarginatus* related to flooded soils were less abundant than expected. For the dry open grassland localities at elevated sites with andesite, limestone or sandy bedrocks were typical *Cryptops anomalans*, *Henia illyrica*, *Schendyla carniolensis*, the species with Southern European or Mediterranean distribution. Greater diversity of habitat conditions supports an overall more diverse centipede fauna throughout the area. Consistent protection of all main types of habitats, the choice of appropriate management, including the maintenance of floods in alluvium of this area, is important for the protection and conservation of the centipede fauna in the Latorica PLA and surrounding neighbouring habitats.

Key words: centipedes, Chilopoda, faunistics, Latorica PLA, Slovakia

Introduction

Centipedes (Chilopoda) represent an important group of myriapod (multi-legged) invertebrates inhabiting litter and upper soil layers of most terrestrial ecosystems. As predators, they play an important role in trophic structures especially forest and grassland habitats. The centipede fauna in the Latorica Protected Landscape Area (PLA) has not yet been systematically studied.

However, the first few data on centipedes relating to this area were published as early as the end of the nineteenth century (Tömösváry 1880; Chyzer 1886; Daday 1889, 1896). Later, Gulička (1951) critically evaluated these data in the overview of centipedes of Slovakia and added several new records based on his own research. Additional faunistic records were afterwards published by Loksa (1955) and Ložek & Gulička (1962). In addition to several other individual samplings within various research activities in the following years, the systematic research of centipede fauna on the territory of Latorica PLA was carried out only in the years 2009-2011. The first data obtained during this research using the method of pitfall trapping were partly summarised by Lukáčová (2013) in her diploma thesis, but not yet published. Here we summarize all available material from the territory of the Latorica PLA including several adjacent localities in the Zemplínske vrchy Mts. and southern regions along the state border with Hungary. Additionally, a smaller part of historical material from the collection of Ján Gulička and from recent research on the nests of steppe mouse *Mus spicilegus* were also elaborated and involved in the presented list of species.

Material and methods

The main part of the material originating from soil zoological research in the years 2008-2011 was obtained by a combination of several methods. In addition to the individual collections used at practically all localities, in several core localities the centipedes were sampled using pitfall trapping (continual exposure of traps for a year with repeated sampling) and using heat extraction of invertebrates from soil samples. Additional material was obtained by sieving leaf litter, rotting wood and other organic material.

Valid nomenclature and notes on synonyms of centipede species are given according to Bonato et al. (2016). For localities listed from historical literary sources (Chyzer 1886; Daday 1889, 1896; Tömösváry 1880), their names in Hungarian are added in brackets next to the relevant citation. Notes on the species distribution were added based on the data from Bonato et al. (2016), Koren (1986, 1992) and Zapparoli (2003).

List of localities

The following list involves all localities in alphabetical order with positive records of centipedes (Fig. 1). Beside the own data of the authors, localities with available material from the collection of Ján Gulička and several records of centipedes from the research on steppe mouse *Mus spicilegus* (coll. Michal Stanko, Alexander Čanády and Ladislav Mošanský) are involved. Position of individual localities, including those based on the literature data only is demonstrated in Fig. 1. The number and name of the locality are followed by the name of the relevant cadastral area, geographical coordinates, altitude, a short characteristic of the locality and bedrock, and methods used. Localities No. 7, 8, 10, 12, 20, 27 and 43 as well

as published data for Cejkov (Czéke), Veľaty (Velejte), Viničky (Szőlőske) belong to the orographic unit Zemplínske vrchy, an adjacent small and geologically very diverse mountain range. All others belong to the orographic unit Eastern Slovak Plain (Východoslovenská rovina) created by fluvial and aeolian sediments with isolated andesite hills.

Abbreviations used: NR – Nature Reserve, NNR – National Nature Reserve, is – individual sampling, ls – litter sieving, ss – soil sampling with subsequent heat extraction, pt – pitfall trapping, nMs – material from the ground nests of Mus spicilegus, CJG – collection of Ján Gulička.

1 – Agardské pasienky, Leles, 48° 29.106' N, 22° 4.134' E, 99 m a.s.l., wet meadows and pastures with self-seed trees, fluvial sediments, is.
2 – Bešiansky les, Beša, 48 °30.643' N, 21° 56.317' E, 105 m a.s.l., hard mixed floodplain forest outside the right bank of the Latorica river, fluvial sediments, is, pt, ss.
3 – Biele jazero NR, Malý Horeš, 48 °25.079' N, 21 °51.508' E, 95 m a.s.l., wet meadow, ecotone of pasture and marshland, aeolian sands on river sediments, is, pt.
4 – Boľské rašelinisko NR, Boľ and Kráľovský Chlmec, 48° 26.851' N, 21° 57.128' E, 101 m a.s.l., alder belt between peat bog and agrocenoses, fluvial sediments, is, pt.
5 – Botiansky luh NNR, Boťany, 48° 28.549' N, 22° 6.296' E, 107 m a.s.l., floodplain forest between embankment and river arm, fluvial sediments, is, ls, pt, ss.
6 – Botiansky luh NNR, Boťany, 48°28.466' N, 22° 6.399' E, 112 m a.s.l., riparian forest near the left bank of the Latorica river, eastern part of the NNR, fluvial sediments, is, pt.
7 – Cejkov – oak-hornbeam forest, Cejkov, 48° 27.265' N, 21° 44.465' E, 208 m a.s.l., oak-hornbeam woodland, fluvial sediments on paleozoic ryolites and dacites, is, pt, CJG.
8 – Cejkov – banks of the woodland stream, Cejkov, 48° 27.267' N, 21° 44.439' E, 206 m a.s.l., bank of stream in mixed woodland, paleozoic ryolites and dacites, is, pt.
9 – Čierny les, Poľany, 48° 29.030' N, 21° 58.122' E, 100 m a.s.l., hard floodplain forest with predominated oak, fluvial sediments, is, pt.
10 – Dlhá hora, Ladmovce, 48° 25.996' N, 21° 46.299' E, 260 m a.s.l., steppe-forest, oak-dogwood, bedrock: dolomites, is ls, pt.
11 – Ereš, Kráľovský Chlmec, 48° 26.171' N, 21° 57.197' E, 131 m a.s.l., fragment of lowland woodland, fluvial sedimens, is, pt.
12 – Hatfa, Viničky, 48° 25.746' N, 21° 45.168' E, 190 m a.s.l., oak-hornbeam forest on the slope of the Brezina hill, triassic quartcites and sandstones, is, ls.
13 – Horešské lúky NR, Malý Horeš, 48° 24.337' N, 21° 57.388' E, 96 m a.s.l., grassland within depression (salt marsh) in grounded riverbed, river sediments, is, pt.
14 – Horný les, Oborín, 48° 32.059' N, 21° 54.633' E, 100 m a.s.l., flooded oak forest outside the dam, W of the Beša village, fluvial sediments, is.
15 – Hrušky, Veľké Kapušany, 48° 30.853' N, 22° 3.063' E, 100 m a.s.l., floodplain forest by the right-bank dam of the Latorica river, fluvial sediments, is.
16 – Hrušov – Prudký, Rad, 48° 26.709' N, 21° 52.111' E, 100 m a.s.l., dry grassland on sandy dune, eolic sand, is, pt.
17 – Hrušov – Tice, Rad, Svätá Mária, 48° 26.127' N, 21° 51.266' E, 98 m a.s.l., grassland along the bank of marshland (former riverbed), flluvial sediments, is, pt.

18 – Húšťava, Malý Horeš, 48° 24.071’ N, 21° 57.996’ E, 104 m a.s.l., fragment of lowland forest with oak, fragents of former river arms, fluvial sediments, is, ls, pt.
19 – Ilhanov, Leles, 48° 29.689’ N, 22° 3.461’ E, 101 m a.s.l., floodplain forest NE from Leles village, near the Latorica river with absence of herb layer, fluvial sediments, is.
20 – Kašvár NNR, Ladmovce, 48° 25.172’, 21° 46.543’ E, 161 m a.s.l., xerothermic grassland with bushes, dolomite and limestone, is, ls, pt.
21 – Klin nad Bodrogom, Streda nad Bodrogom, 48° 22.947’, 21° 42.961’ E, 97 m a.s.l., a belt of willow trees between river arm and wet meadow, fluvial sediments, is, pt, ss.
22 – Kráľovský Chlmec env., Kráľovský Chlmec, 48° 25.090’ N, 21° 57.891’ E, 200 m a.s.l., steppe-dry forest slope of the Veľký kopec hill, andesite, is, CJG, nMs.
23 – Latorický luh NNR, Boťany, 48° 27.641’ N, 22° 6.151’ E, 111 m a.s.l., hard floodplain forest with oak and hornbeam, fluvial sediments, is, ls, pt, ss.
24 – Latorický luh, Boťany, 48° 27.826’ N, 22° 7.000’ E, 95 m a.s.l., hard floodplain forests with oak and hornbeam outside the NNR, fluvial sediments, is, ls.
25 – Leles env., Leles, 48° 27.892’ N, 22° 1.076’ E, 103 m a.s.l., steppe on sandy dune, is, CJG.
26 – Lužná húština, Malé Trakany, 48° 23.683’ N, 22° 8.748’ E, 105 m a.s.l., sandy-clay bank of the river Tisa/Tisza, under pieces of wood, fluvial sediments, is.
27 – Malá Tŕňa – wine cellars, Malá Tŕňa, 48° 27.291’ N, 21° 40.761’ E, 156 m a.s.l., long, historical wine cellar in neovolcanic tuff, is, pt.
28 – Malý Kamenec – steppe, Malý Kamenec, 48° 21.699’ N, 21°47.899’ E, 140 m a.s.l., steppe on the S slope of the Tarbucka hill, andesite, is, CJG.
29 – Ortov – Dvor (Ortov NR), Pavlovce nad Uhom, 48° 35.198’ N, 22° 5.868’ E, 107 m a.s.l., fragment of lowland forest, fluvial sediments, is, CJG.
30 – Poniklecová lúčka NR, Malý Horeš, 48° 24.742’ N, 21° 56.721’ E, 119 m a.s.l., dry grassland on sand, aeolian sands on andesite, is, ls, pt.
31 – Ptrukša – riparian forest, Ptrukša, 48° 28.451’ N, 22° 7.233’ E, 102 m a.s.l., riparian forest at the right bank of the Latorica river, fluvuial sediments, is, pt.
32 – Rad – Tice, Rad, 48° 27.065’ N, 21°51.958’ E, 97 m a.s.l., grassland along the bank of marshland (former riverbed), fluvial sediments, is, ls.
33 – Somotor – Medzi jarky, Streda nad Bodrogom, 48° 23.067’ N, 21° 47.279’ E, 110 m a.s.l., sand dune with grassland and black locust forest, eolic sands, is, CJG.
34 – Somotorská hora, Somotor, 48° 24.491’ N, 21° 48.248’ E, 141 m a.s.l., dry grassland with bushes on a flat top of the hill, andesite, is, pt.
35 – Svätuše env., Svätuše, 48° 25.984’ N, 21° 55.420’ E, 135 m a.s.l., fragment of dry woodland, andesite, is, CJG.
36 – Tajba NNR, Streda nad Bodrogom, 48° 23.218’ N, 21° 46.505’ E, 98 m a.s.l., belt of willows on the N shore of the lake, fluvial sediments, is, ls, CJG.
37 – Tarbucka – top of the hill, Streda nad Bodrogom, 48° 21.748’ N, 21° 47.319’ E, 265 m a.s.l., rocky dry grassland with bushes at the top of the hill, andesite, is, pt.
38 – Tarbucka NR, Streda nad Bodrogom, 48° 22.242’ N, 21° 47.058’ E, 189 m a.s.l., dry grassland with bushes on sandy soil, aeolian sands on andesite, is, pt.
39 – Veľké jazero NR, Vojka, 48° 26.650’ N, 21° 55.360’ E, 99 m a.s.l., ecotone of marshland bank and agroecoenoses (field), aeolian sands on river sediments, is, pt.

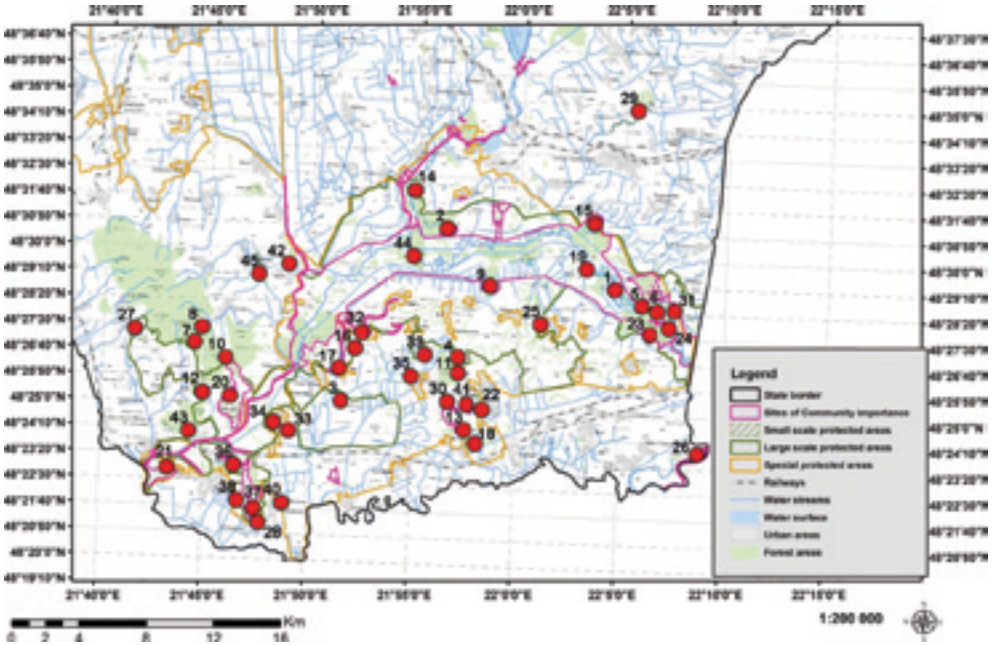

Fig. 1 *Location of research localities in the Latorica PLA. For locality numbers see chapter List of localities.*

40 – Veľký Kamenec env., Veľký Kamenec, 48° 22.200' N, 21° 49.500' E, 95 m a.s.l., abandoned field, eolic sands and river sediments, nMs.
41 – Veľký kopec, Kráľovský Chlmec, 48° 25.159' N, 21° 57.635' E, 260 m a.s.l., SW slope with dry grassland, andesite, is, pt.
42 – Veľký vrch, Brehov, 48° 29.659' N, 21° 48.494' E, 191 m a.s.l., dry grassland with bushes at the NW edge of the hill, andesite, is, pt.
43 – Viničky – Tokaj wine cellars, Viničky, 48° 23.945' N, 21° 43.295' E, 118 m a.s.l., wine cellar excavated in neovolcanic tuff, is.
44 – Zatínsky luh NR, Zatín, 48° 29.748' N, 21° 54.905' E, 104 m a.s.l., fragment of hard mixed floodplain forest with arms of the Latorica river, fluvial sediments, is.
45 – Zemplínska jelšina NR, Zemplínske Jastrabie, 48° 28.989' N, 21° 47.519' E, 109 m a.s.l., fragment of riparian and bog forest, fluvial sediments, is, pt.

Results – Annotated check list

■ Order Scutigeromorpha

Scutigeridae

Scutigera coleoptrata (Linnaeus, 1758) – Kráľovský Chlmec (Ložek & Gulička 1962) – Mediterranean species, synanthropically widespread – without recent records.

Order Lithobiomorpha

Henicopidae

Lamyctes emarginatus (Newport, 1844) – 2, 21, 23 – species typical for damp habitats, including arable fields and other disturbed sites – native to Australasia, but has been spread worldwide – recorded in flooded forest and meadow sites of the study area.

Lithobiidae

Harpolithobius anodus (Latzel, 1880) – 8 – relatively rare species related to natural forest and subterranean habitats – Southern and Eastern Europe – recorded only at one locality, forest stand along the woodland stream.

Lithobius aeruginosus L. Koch, 1862 – Somotor (Chyzer 1886 – Szomotor), Cejkov (Daday 1889 – Czéke) – Central and Southern European species – only historical data recently unverified.

Lithobius crassipes L. Koch, 1862 – 2, 5, 11, 18, 20, 37, Cejkov (Daday 1896 – Czéke) – predominantly forest species – European species – in study area present in some flooded and wet forests as well as in more open drier sites.

Lithobius curtipes C. L. Koch, 1847 – 1, 2, 5, 6, 7, 9, 13, 14, 15, 18, 19, 21, 23, 24, 31, 39 – woodland and moorland species – European species – on of the most frequent and in some localities also abundant representative of centipedes, frequently present in flooded and wet forest sites.

Lithobius dentatus C. L. Koch, 1844 – 8 – species of diverse habitats – European species – recorded only at one locality, a forest stand along the woodland stream.

Lithobius erythrocephalus C. L. Koch, 1847 – 7, 8, 11, 12, 13, 18, 20, 23, 27, 28, 30, 33, 36, 39, 42, Kráľovský Chlmec (Gulička, 1951), Somotor (Daday 1889; Chyzer 1886; Loksa, 1955 – Szomotor; Ložek & Gulička 1962), Veľaty (Daday 1889 – Velejte) – relatively eurytopic species inhabiting natural and seminatural sites – European species – relatively common, but not abundant species in the study area.

Lithobius forficatus Linnaeus, 1758 – 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 17, 18, 19, 22, 23, 24, 25, 27, 30, 31, 32, 35, 36, 39, 40, 42, 43, 45 – the most common species in natural as well as disturbed and synanthropic habitats – widely distributed in the whole Europe – the most common and most frequent species, one of the few species inhabiting flooded forests and also wet meadows.

Lithobius lapidicola Meinert, 1872 – Viničky (Daday 1889, 1896 – Szőlőske, as syn. *L. pusillus* Latzel, 1880) – European species – without recent records.

Lithobius lucifugus L. Koch, 1862 – Pribeník (Daday 1889 – Perbenyik) – European species – without recent records.

Lithobius melanops Newport, 1845 – 3 – species known from natural and also from synanthropic habitats – European species – recorded only at one locality.

Lithobius microps Meinert, 1868 – 8, 10, 11, 12, 18, 23, 25 – common species in natural habitats, but becomes more strongly associated with human activity (gardens, arable fields) – European species – higher frequency of its occurrence in two lowland and hard floodplain forests (Húšťava, Latorický luh) is probably also connected with used methods (heat extraction from soil samples).

Lithobius mutabilis L. Koch, 1862 – 3, 4, 7, 8, 9, 10, 11, 12, 13, 16, 17, 18, 20, 22, 23, 25, 30, 31, 34, 35, 36, 37, 39, 41, 42, 45, Cejkov (Daday 1889 – Czéke) – very common species inhabiting diverse natural and seminatural sites – Central European species – on of the most common and most frequent centipede in the study area living in forest and also grassland habitats.

Lithobius muticus C. L. Koch, 1847 – 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 17, 18, 20, 21, 22, 23, 25, 30, 31, 34, 36, 37, 38, 39, 41, 42, Kráľovský Chlmec (Gulička 1951) – species of moist but also dry forests and open habitats – European species – another common and most frequent species of the study area, with numerous occurrence in some wet as well as dry open sites.

Lithobius peregrinus Latzel, 1880 – Somotor (Chyzer 1886; Daday 1889, 1896 – Szomotor) – mostly with South European distribution – without recent records.

Lithobius piceus L. Koch, 1862 – 7, Cejkov (Daday 1889, 1896; Loksa 1955 – Czéke), Somotor (Gulička 1951; Ložek & Gulička 1962), Veľaty (Daday 1889, 1896 – Velejte) – forest species – Central European species – actually recorded only once on the edge of the protected area.

Lithobius tenebrosus Meinert, 1872 – 2, 23, 32, 44 – species of forest stands – European species – individuals collected only individually in moist forests of the studied area belong to the subspecies *Lithobius tenebrosus fennoscandius* Lohmander, 1948.

■ Order Scolopendromorpha

Cryptopidae

Cryptops anomalans Newport, 1844 – 12, 20, 22, 34, 42, Kráľovský Chlmec, Svätuše (Gulička 1951; Ložek & Gulička 1962) – generally European species, with the main area of occurrence in Mediterranean region, Iberia, Caucasus and Northern Africa – in given area characteristic mainly for all types of open grassland dry habitats on limestone, andesite as well as sandy soils.

Cryptops hortensis (Donovan, 1810) – 36, Somotor (Chyzer 1886 – Szomotor), Viničky (Daday 1889 – Szőlőske; Gulička 1951; Ložek & Gulička 1962) – mostly forest species – European species – recent records, albeit in only one locality, confirm historical information about its apparently rarer and mosaic occurrence in this region.

■ Order Geophilomorpha

Dignathodontidae

Henia illyrica (Meinert, 1870) – 10, 20, 30 – xerothermic Mediterranean species – its occurrence in warm, dry, xerothermic localities of the study area represent the northern edge of its distribution in this part of Europe.

Geophilidae

Clinopodes flavidus C. L. Koch, 1847 – 11, 22, 35, 43, Leles, Svätuše (Gulička 1951; Ložek & Gulička 1962), Kráľovský Chlmec (Ložek & Gulička 1962) – mostly forest geophilid - species of Central, Southern and Eastern Europe – in the study area in forests and also in the vicinity of human settlements (cellars).

Geophilus electricus (Linnaeus, 1758) – Veľaty (Daday 1889, 1896 – Velejte) – European species – no recent record available.

Geophilus flavus (De Geer, 1778) – 2, 5, 6, 8, 10, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 31, 35, 38, 42, 45 – common species known from a wide array of habitats – European-Siberian species – in the study area represent the most common and most frequent geophilomorph centipede occurring in wide spectrum of soils.

Pachymerium ferrugineum (C. L. Koch, 1835) – 25, 35, 39, 44, Somotor (Tömösváry 1880 – "Hungaria orientalis"; Chyzer 1886 – Szomotor, as *Geophilus paradoxus* Tömösváry, 1880; Daday 1889 – Szomotor; Gulička 1951) – species preferring wet soils, known from flooded areas – European species, introduced to other continents - in the alluvium of the Latorica River surprisingly this species is probably one of the rarer.

Stenotaenia linearis (C. L. Koch, 1835) – 7, 22, 27 – South-European Mediterranean species occurring to the North in synanthropic habitats – its records in the study area are related to both, seminatural and synanthropic sites.

Linotaeniidae

Strigamia acuminata (Leach, 1815) – 7, 8, 22, Cejkov, Somotor (Daday 1889 – Czéke, Szomotor; Gulička, 1951) – woodland species – European species – recorded in fact only in one locality in the alluvium, the other localities are on its edge.

Strigamia crassipes (C. L. Koch, 1835) – 2, 5, 6, 7, 8, 11, 17, 23, 24, 30, 34, 35, 42, Cejkov (Chyzer 1886; Daday 1889, 1896 – Czéke) – woodland and grassland species – European species – the second most frequent geophilomorph species of the study area occurring in forest as well as in open grassland sites.

Strigamia transsilvanica (Verhoeff, 1928) – 9, 17, 31 – mostly forest species of Central and South-Eastern Europe – in the study area relatively rare.

Schendylidae

Schendyla carniolensis Verhoeff, 1902 – 11, 29, 41, 42 – species of Southern Europe – in the study area recorded also at open grassland localities on andesite.

Schendyla nemorensis (C. L. Koch, 1837) – 8, 10, 11, 18, 20, 23, 36, 39, 45, Veľaty (Daday 1889, 1896 – Velejte) – predominantly forest species penetrating the soils of grasslands and gardens – widely European species – in the study area present in diverse habitats including floodplain and wet forests, open dry and wet meadows.

Note to the historical data in the literature

The first information reporting centipede species from the localities currently involved in the territory of Latorica PLA or from nearby adjacent areas were published in the end of the nineteenth century by Chyzer (1886) and Daday (1889, 1896); a row of species records come from the locality Sátoraljaújhely (a town in Hungary just at the border with Slovakia). Although Gulička (1951) designated the occurrence of those species confirmed in this Hungarian locality as doubtful for Slovakia, most of them have been finally confirmed in recent research in the Latorica PLA. Six species recorded for given area in the past, *Scutigera coleoptrata*, *Lithobius aeruginosus* and *Lithobius lapidicola*, *Lithobius lucifugus*, *Lithobius peregrinus* and *Geophilus electricus* have not been recorded in current research. However,

the occurrence of most of them can be expected in the given area and therefore we did not exclude them from the list.

Conclusions

Collected material comprising in total of 2695 individuals (including undetermined juveniles of the genus *Lithobius*) together with data from the literature represents 31 species of centipedes.

If we consistently distinguish the two main orographic units on which the localities listed in this paper are located, then for the orographic unit Zemplínske vrchy (relevant localities see chapter List of localities) a total of 21 centipede species is documented, and for the Eastern Slovak Plain 28 species.

Most of the recorded species are European or Central European representatives, closely related mainly to the forest soils. Generally, the most abundant species with the highest frequency of occurrence were *Lithobius forficatus*, *Lithobius muticus*, *Lithobius mutabilis*, *Lithobius curtipes* and *Geophilus flavus*. From the faunistic point of view, interesting records are for example *Harpolithobius anodus*, *Lithobius dentatus*, *Lithobius piceus* and *Lithobius tenebrosus fennoscandius*. The records of *Schendyla carniolensis* are new for the whole centipede fauna of Slovakia and correspond with its occurrence, e.g. in the lower part of the Tisza river basin (Loksa 1973, 1983).

Both forest and meadow flooded or wetland habitats of the Latorica PLA are characterized by the frequent occurrence of *Lithobius curtipes* and *Lithobius forficatus*; the open wet grasslands are settled often also by *Lithobius mutabilis* and *Lithobius muticus*. The geophilomorph centipede *Pachymerium ferrugineum*, with known occurrence in flooded soils, was confirmed, but less abundant than expected. Similarly, disturbed sites, both flooded and arable soils, were inhabited only at some localities by *Lamyctes emarginatus*, the small parthenogenetic centipede species otherwise typical for such habitat types.

As the faunistic elements with Southern European or Mediterranean distribution can be listed the species *Cryptops anomalans*, *Henia illyrica*, *Schendyla carniolensis* and recently unconfirmed species *Scutigera coleoptrata*. Their occurrence was characteristic for dry elevated locations on andesite, limestone and on sandy dunes of the area. For the dry open grassland localities there were also typical common eurytopic species such as *Lithobius muticus* and *Lithobius mutabilis*; in dry forest stands there was also abundant *Lithobius forficatus*.

Comparing to other Central European alluvial regions (e.g. Dányi 2006; Országh & Országhová 1995, 1997; Tajovský 1999, 2000; Tuf 2000), a higher diversity of habitats in the Latorica PLA and adjacent regions, with the spectrum ranging from xerothermic grasslands and other open biotopes on andesite, limestone or sandy bedrock to the floodplain meadows and forests on mostly fluvial sediments, resulted in higher diversity of present centipede fauna. The structure of communities and species spectrum described from our studied area is quite close to the conditions known from the southern locations along the Tisza river (Loksa 1973, 1983).

Well-preserved natural localities in floodplain as well as xerothermic grasslands are settled by interesting and diversified communities of these soil and litter invertebrates. The overall protection of these sites, the choice of appropriate management, including the maintenance

of floods in alluvium of this area, is therefore important for the protection and conservation of this group of invertebrates in the Latorica PLA and surrounding neighbouring habitats.

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Súhrn

Stonožky (Chilopoda) Chránenej krajinnej oblasti Latorica

Príspevok zhŕňa všetky doterajšie poznatky o faune stonožiek (Chilopoda) z územia CHKO Latorica a niektorých susediacich lokalít v Zemlínskych vrchoch aj ďalších lokalít nachádzajúcich sa južne pri hranici s Maďarskom. Podstatná časť analyzovaného materiálu pochádza z pôdno-zoologických výskumov realizovaných v rokoch 2008-2011. Materiál predstavuje celkom 2695 jedincov (vrátane nedeterminovaných juvenilných jedincov rodu *Lithobius*) a spolu s historickými literárnymi údajmi pozostáva celkovo z 31 druhov stonožiek. Oddelene pre lokality v Zemplínskych vrchoch je takto potvrdených 21 druhov, pre Východoslovenskú rovinu 28 druhov. Väčšina zaznamenaných druhov má areál európsky alebo stredoeurópsky a sú úzko viazané predovšetkým na lesnú pôdu. Najpočetnejšími druhmi s najvyššou frekvenciou výskytu boli bežné druhy, ako napríklad *Lithobius forficatus*, *Lithobius muticus*, *Lithobius mutabilis*, *Lithobius curtipes* a *Geophilus flavus*. Z faunistického hľadiska sú zaujímavými nálezy druhov *Harpolithobius anodus*, *Lithobius dentatus*, *Lithobius piceus* a *Lithobius tenebrosus fennoscandius*. Nálezy *Schendyla carniolensis* predstavujú prvé údaje

pre celé územie Slovenska a korešpondujú s výskytom tohto druhu v južnejších oblastiach strednej Európy.

Ako lesné, tak aj lúčne mokraďové stanovištia CHKO Latorica sa vyznačujú častým výskytom *Lithobius curtipes* a *Lithobius forficatus*; mokré lúky sú osídlené často tiež druhmi *Lithobius mutabilis* a *Lithobius muticus*. Výskyt druhu *Pachymerium ferrugineum*, so známou väzbou na zaplavované pôdy, bol doložený v oveľa menšej miere, než sa očakávalo. Podobne disturbované miesta, tj. zaplavované brehové porasty boli osídľovane len na niektorých lokalitách stonožkou *Lamyctes emarginatus*, čo je malý partenogeneticky druh, ktorý je pre tieto typy biotopov charakteristický.

Ako druhy s juhoeurópskym alebo stredozemným rozšírením možno uviesť *Cryptops anomalans*, *Henia illyrica* a *Schendyla carniolensis*. Ich výskyt bol charakteristický pre suché vyvýšené miesta na andezitových, vápencových vrchoch alebo piesočných dunách danej oblasti. Pre suché trávne porasty boli tiež typické bežné eurytopné druhy ako *Lithobius muticus* a *Lithobius mutabilis*; v suchých lesných porastoch bol tiež hojný *Lithobius forficatus*.

V porovnaní s ostatnými stredoeurópskymi aluviálnymi oblasťami (Dányi 2006; Országh & Országhová 1995, 1997; Tajovský 1999, 2000; Tuf 2000) sa vyššia diverzita stanovíšť v CHKO Latorica a priľahlých regiónoch premieta do vyššej rozmanitosti prítomnej fauny stonožiek. Dobre zachovalé prírodné lokality v lužných lesoch, aj otvorených xerotermných travinných porastoch, predstavujú biotopy osídlené zaujímavými a diverzifikovanými spoločenstvami týchto pôdnych a opadankových bezstavovcov.

Celková ochrana týchto lokalít, voľba vhodného manažmentu, vrátane udržiavania povodňových stavov v aluviálnej časti územia, je preto dôležitá pre ochranu a zachovanie diverzity tejto skupiny bezstavovcov v CHKO Latorica i okolitých stanovištiach.

Springtails (Collembola, Hexapoda) of the Latorica Protected Landscape Area

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Abstract

In the Latorica Protected Landscape Area (PLA), 147 species of Collembola have been recorded, of which nine species were newly identified and may be „a priori" considered to be endemic to the area. The majority of species are typical representatives of forest fauna. Considerable proportion of meadow and field species in forests indicate high intensity of colonization from the adjoining open habitats. Numerous xerothermophilous species were recorded in relatively high abundances, thus reflecting specific soil microclimatic conditions in characteristic habitats of this area. Six zoogeographical groups were distinguished: (1) species with wide geographical ranges including cosmopolitan (20 species), Holarctic (37 species) and Palaearctic species (26 species); (2) European and Central European species (30 species); (3) species with Southern and Central-European distribution (9 species); (4) East and Central European species (1 species); (5) montane species resctricted to European mountains (6 species), and (6) boreo-montane (5 species) and arctic-alpine species (1 species). The local springtail communities are strongly related to European and Central European fauna that is shown by its highest share. Remarkable importance of the Latorica area is documented by the presence of Carpathian endemic species such as *Heteraphorura carpatica*, *Hymenaphorura dentifera*, *Orthonychiurus rectopapillatus* and *Plutomurus carpaticus*. The area includes unique habitats with rare species, such as xerothermophilous *Xenylla uniseta*, collected from the soil rhizosphere of an andesitic rock slope in locality Tarbucka-Malý Kamenec with the wind-blown sands that is the first record of this species in Slovakia. Thus, this southern European element has the northernmost border of distribution in the Latorica PLA.

Key words: Collembola, faunistic research, habitat preference, Eastern Slovak Plain

Introduction

Springtails (Collembola) are an integral part of the soil biota, representing ecologically important invertebrates functionally important in the decomposition of dead plant material

in ecosystems (Hopkin 1997). Springtail fauna of Latorica PLA has not been studied systematically yet. Only a few sources are available concerning the collembolan communities of agricultural and inundated forest soils (pedobiological monitoring, 1991-1993) (Kováč 1997; Kováč & Miklisová 1995, 1997, 1998). It was Stach (1929), who conducted the first faunistic study on 9 species recorded in Hungarian localities near Latorica PLA at the state border with Slovakia.

Due to (1) biogeographical position of the area in the forelands of the Carpathians that belong to European biodiversity centres (Mráz & Ronikier 2016), and (2) uncomplete data on the species distribution, numerous undescribed short-range endemics may be potentially discovered among the soil fauna.

Material and methods

Recent investigation of the soil Collembola communities in 10 localities (specified below) was carried out on 23 April 2018. Soil samples representing soil cores 10 cm in diameter to a maximum depth of 10 cm were taken. Previous researches (6 and 25 May, 1993) were focused on Collembola of arable soils and floodplain forests from localities such as Svätá Mária, Čičarovce, and Zemplín, Veľké Raškovce which were sampled with soil cores 6 cm in diameter (again to maximum depth of 10 cm)**.** Vegetational associations of the study localities were characterized by Stanová & Valachovič (2002). Soil Collembola were extracted in a modified high-gradient apparatus (Crossley & Blair 1991) for 7 days, sorted under a binocular stereomicroscope and identified under a phase-contrast microscope e.g. Leica DM1000 or DM2500 (Leica Microsystems GmbH, Wetzlar, Germany). The list of Collembola species/taxa is based on system - Bellinger et al. (1996–2020) and Collembola specimens are deposited in collection of Institute of Biology and Ecology, Faculty of Science, P. J. Šafárik University, Košice, Slovakia. Specifically monographs of Weiner (1981); Pomorski (1998); Fjellberg (1998, 2007); Bretfeld (1999); Potapov (2001); Smolis & Skarzynski (2003); Thibaud et al. (2004); Dunger & Schlitt (2011) and other published sources were used for Collembola identification and also as the source of data on ecology and geographic distribution of individual species.

List of localities (Figs. 1A-D and 2)

1 – Borša-Boršiansky les – 48° 23.277´N, 21° 42.433´E – alluvial forest (*Querceto–Fraxinetum*) – sparse herbal cover –107 m a.s.l. – well-developed organic profile.

2 – Boťany-Botiansky luh – 48° 27.874´N, 22° 06.092´E – alluvial floodplain forest (*Querceto–Fraxinetum*) – sparse herbal cover – 93 m a.s.l. – near flooded area (3 m).

3 – Čičarovce – 48° 33´N, 22° 0.1´E – arable soil – 99.5 and 104 m a.s.l. – luvisol and fluvisol soil types.

4 – Győröcske – 48° 23′ N, 22° 9′ E (in Hungary, about 1 km from the border).

5 – Kucany – 48° 31.896´N, 21° 52.227´E – riparian forest (*Saliceto–Alnetum*) – dense grassland-herbaceous communities – 102 m a.s.l. – wet soil with well-developed rhizosphere.

6 – Latorica-most (motorest) – 48° 30.101´N, 22° 03.172´E – periodically flooded forest (*Saliceto–Alnetum*) – without herbal cover – 100 m a.s.l. – wet soil profile near riverbank (ground water near the soil surface).

Fig. 1A *Research localities in Latorica PLA: Boťany-Botiansky luh (2) (photo: N. Raschmanová); (for locality numbers see chapter Material and methods)*

Fig. 1B *Research localities in Latorica PLA: Tarbucka-Malý Kamenec (14) (photo: N. Raschmanová); (for locality numbers see chapter Material and methods)*

Fig. 1C *Research localities in Latorica PLA: Veľký Kamenec (10) (photo: A. Parimuchová); (for locality numbers see chapter Material and methods)*

Fig. 1D *Research localities in Latorica PLA: Svätá Mária (12) (photo: N. Raschmanová); (for locality numbers see chapter Material and methods)*

7 – Ladmovce-Kašvár – 48° 25.218´N, 21° 46.426´E – near limestone quarry — xerothermophilous grassland-herbaceous communities – 168 m a.s.l. – very stony soil (with mosses).
8 – Nové Mesto pod Šiatrom (Sátoraljaújhely) – 48° 23′ N, 21° 39′ E (in Hungary, about 1 km from the border).
9 – Raškovský luh (Spodný les) – 48° 34.230´N, 21° 57.292´E – young alluvial forest with *Fraxinus* and *Robinia*, with dense herbal cover –104 m a.s.l.
10 – Svätá Mária – 48° 26.502´N, 21° 50.262´E – periodically flooded forest (*Saliceto–Alnetum*) – dense wetland vegetation (near drainage channel) – 103 m a.s.l..
11 – Svätá Mária – 48° 26´N, 21° 51´E – arable soil – 98.5 m a.s.l. – fluvisol soil type.
12 – Tarbucka-Malý Kamenec – 48° 21.443´N, 21° 47.047´E – andesite hill with wind-blown sands – secondary xerophilous grassland-herbaceous communities – dense and well-developed rhizosphere – 117 m a.s.l.
13 – Veľké Raškovce-Raškovský luh – 48° 34.079'N, 21° 56.249'E – floodplain forest (*Saliceto–Alnetum*) – 101 m a.s.l.
14 – Veľký Kamenec – 48° 22.427´N, 21° 49.495´E (about 0.5 km NE of the village, Gerebcse) – sand dunes – xerophilous grassland communities – 104 m a.s.l.
15 – Zatín-Dlhé Tice – 48° 28.152´N, 21° 50.537´E – alluvial forest near Tice dead branch of the river (*Saliceto–Alnetum*) – dense grassland-herbaceous communities – 102 m a.s.l – wet/wetland soil.
16 – Zemplín – 48° 26.960'S, 21° 48.383'V – floodplain forest (*Saliceto–Alnetum*) – 104 m a.s.l.

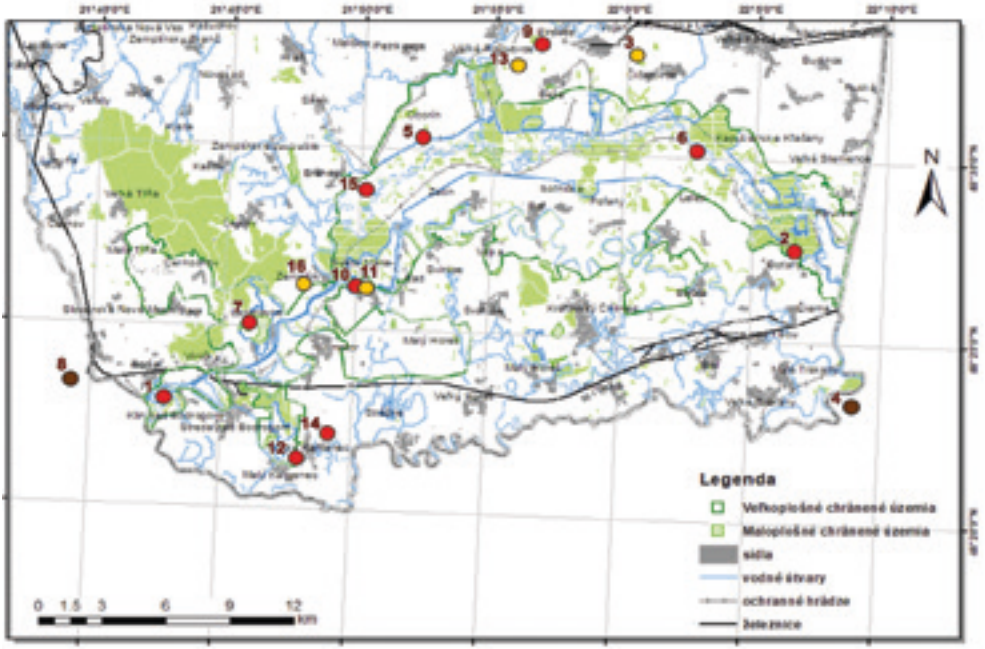

Fig. 2 *Location of research localities in Latorica PLA (red circles-research localities in 2018, yellow circles - research localities in 1993, brown circles-research localities in 1918); (for locality numbers see chapter Material and methods)*

Results – List of species

Abbreviations: MSS - mesovoid shallow substratum, type of subterranean habitats.

Allacma fusca (Linnaeus, 1758) Sminthuridae – 3, 6, 11, 13 – forest species – Holarctic species – hygrophilous species.

Anurida elipsoides Stach, 1949 Neanuridae – 16 – forest and wet-habitat species – Palaearctic species – common along forest streams.

Anurida thalassophila (Bagnall, 1939) Neanuridae – 1 – interstitial species – Palaearctic species – common in riparian habitats.

Arrhopalites caecus (Tullberg, 1871) Arrhopalitidae – 6, 15 – ripicolous and wet-habitat species – Holarctic species – common in floodlands.

Bourletiella hortensis (Fitch, 1863) Bourletiellidae – 3, 16 – eurytopic species – Holarctic species — xerosensitive species.

Bourletiella sp. juv. Bourletiellidae – 16 – ecological requirements unknown – uncertain distribution.

Bourletiella viridescens (Stach, 1920) Bourletiellidae – 8 (Stach 1929) – meadow species – cosmopolitan species – common in both wet and dry meadows.

Brachystomella parvula (Schäffer, 1896) Neanuridae – 3 – species of open habitats – cosmopolitan species — xeroresistant species.

Caprainea marginata (Schött, 1893) Sminthuridae – 2, 3, 6, 10 – forest species – European and Central European species.

Ceratophysella armata (Nicolet, 1841) Hypogastruridae – 3, 11 – eurytopic species but not ubiquist – Holarctic species.

Ceratophysella denticulata (Bagnall, 1941) Hypogastruridae – 1 – eurytopic species – cosmopolitan species (except Arctic) – wet - habitat species, especially in rich organic litter.

Ceratophysella engadinensis (Gisin, 1949) Hypogastruridae – 14 – forest species – European and Central European species.

C. granulata Stach, 1949 Hypogastruridae – 3, 9 – forest species – montane species – common in caves.

Ceratophysella luteospina (Stach, 1920) Hypogastruridae – 9 – forest species – South and Central European species –common in mountain forests.

Ceratophysella mosquensis (Becker, 1905) Hypogastruridae – 9, 10 – tyrphophilous species – Palaearctic species– typical for marshy shores.

Ceratophysella silvatica (Rusek, 1964) Hypogastruridae – 9 – forest species – montane species – especially in litter.

Ceratophysella succinea (Gisin, 1949) Hypogastruridae – 3, 11 – eurytopic species – Holarctic species – common for arable soils.

Cryptopygus ponticus (Stach, 1947) Isotomidae – 3, 11 — xerothermophilous and ruderal species Palaearctic species (except Scandinavia and northern regions of Russia) – common in agricultural soils, forest scree slopes (MSS).

Cryptopygus thermophilus (Axelson, 1900) Isotomidae – 2 – species of open habitats, thermophilous and nitrophilous species – cosmopolitan species – common for arable soils.

Cyphoderus albinus Nicolet, 1842 Isotomidae – 12 – forest species – Palaearctic species – myrmecophilous species.

Desoria germanica (Hüther & Winter, 1961) Isotomidae – 3 – species of open habitats – European and Central European species – especially in soils of pasture ecosystems.

Deuteraphorura silvaria (Gisin, 1952) Isotomidae – 3, 11 – forest species – montane species – common in forest, urban soils and in caves.

Deuterosminthurus sp. juv. Bourletiellidae – 7 – ecological requirements unknown – uncertain distribution.

Dicyrtoma fusca (Lubbock, 1873) Dicyrtomidae – 5 – eurytopic species – Holarctic species – common in forests, meadows from the lowlands to subalpine regions.

Dicyrtoma ornata (Nicolet, 1842) Dicyrtomidae – 2, 3 – forest and wet-habitat species – Palaearctic species –especially near river banks.

Dicyrtoma violacea (Tullberg, 1876) Dicyrtomidae – 11 – forest species – boreo-montane species.

Dicyrtomina minuta (Fabricius, 1783) Dicyrtomidae – 15 – forest and wet-habitat species, Palaearctic species – especially near river banks.

Doutnacia xerophila Rusek, 1974 Onychiuridae – 16 – forest species – European and Central European species – xerothermophilous species.

Entomobryidae juv. – 1, 2, 5 – ecological requirements unknown – uncertain distribution.

Entomobrya atrocincta (Schött, 1896) Entomobryidae – 9 – forest species – Holarctic species – especially near river banks.

Entomobrya corticalis (Nicolet, 1842) Entomobryidae – 11 – forest and corticophilous species – Palaearctic species — common under bark on dead trees.

Entomobrya handschini Stach, 1922 Entomobryidae – 3 – forest species – South and Central European species – typical for forests and meadows.

Entomobrya marginata (Tullberg, 1871) Entomobryidae – 3, 16 – forest and corticophilous species – arctic-alpine species – common under bark on dead trees.

Entomobrya multifasciata (Tullberg, 1871) Entomobryidae – 11 – species of open habitats – Holarctic and Macaronesian species.

Entomobrya superba (Reuter, 1876) Entomobryidae – 4 (Stach 1929) – species of open habitats – European and Central European species.

Folsomia candida Willem, 1902 Isotomidae – 9 – thermophilous and ruderal species – cosmopolitan –common in caves.

Folsomia fimetaria (L., 1758) Isotomidae – 3, 11 – species of open habitats, nitrophilous and ruderal species – Holarctic species – typical for arable soils and meadows.

Folsomia kerni Gisin, 1948 Isotomidae – 3, 11 – ruderal species – European and Central European species typical for arable soils and forest scree slopes (MSS).

Folsomia lawrencei Rusek, 1984 Isotomidae – 9 – forest species – European and Central European species – common in urban soils.

Folsomia manolachei Bagnall, 1939 Isotomidae – 3, 6, 9, 11 – eurytopic species – Palaearctic species – common in forests an meadows, both native and disturbed.

Folsomia mirabilis (Tullberg, 1871) Isotomidae – 6 – eurytopic and acidophilic species – cosmopolitan species – typical for wet forests, meadow and river banks.

Folsomia penicula Bagnall, 1939 Isotomidae – 11 – forest species – Holarctic species – common in lowland and lower monatne forests.

Folsomia quadrioculata (Tullberg, 1871) Isotomidae – 1, 3, 6, 11, 13, 16 – ubiquist, eurytopic species – Holarctic species – typical hygrophilous species, common in floodplain forests.

Folsomia spinosa Kseneman, 1936 Isotomidae – 9 – forest species – European and Central European species – typical also for arable soils and meadows.

Folsomides parvulus Stach, 1922 Isotomidae – 11 – xerophilous and psammophilous species – cosmopolitan species — species of open habitats.

Friesea afurcata (Denis, 1926) Neanuridae – 3 – hygrophilous species – South and Central European species.

Friesea truncata Cassagnau, 1958 Neanuridae – 1, 3, 5, 6, 9, 11, 13, 15, 16 – eurytopic species – Palaearctic species – especially wet- habitat species.

Heteraphorura carpatica (Stach, 1938) Onychiuridae – 3 – saproxylic species – montane species – Carpathian endemic species.

Heteromurus nitidus (Templeton, 1835) Entomobryidae – 3, 15 – eurytopic species – European and Central European species – common in arable and forest solis, especially in forest scree slopes (MSS), less in meadows, also known as ripicolous and synanthropic species near human settlements.

Heterosminthurus sp. juv. Bourletiellidae – 7 – ecological requirements unknown – uncertain distribution.

Hymenaphorura dentifera (Stach, 1934) Onychiuridae – 11 – species of wet habitats – montane species – common in montane forests and bog ecosytems, in mosses and forest scree slopes – Carpathian endemic species.

Hypogastrura sp. juv. Hypogastruridae – 10, 15 – ecological requirements unknown – uncertain distribution.

Hypogastrura sahlbergi (Reuter, 1895) Hypogastruridae – 11 – species of wet habitats – European and Central European species – common alongside lakes, rivers and bogs.

Isotoma anglicana Lubbock, 1862 Isotomidae – 3 – species of open habitats – Palaearctic species – common in wet and rich organic soils, especially in gardens.

Isotoma viridis Bourlet, 1839 Isotomidae – 3, 11, 13 – species of open habitats – Holarctic species – common in both forests and meadows.

Isotomiella minor (Schäffer, 1896) Isotomidae – 1, 2, 3, 5, 6, 9, 10, 11, 15, 16 – ubiquist, eurytopic species – cosmopolitan species – especially forest and xerosensitive species.

Isotomodes productus (Axelson, 1906) Isotomidae – 7, 14 – thermophilous species – cosmopolitan species – species of open habitats, common in riparian habitats.

I. sexsetosus Gama, 1963 Isotomidae – 12 – xerothermophilous species – South and Central European species – species of open habitats, typical for grasslands.

Isotormurus palustris (Müller, l866) Isotomidae – 2, 16 – strongly hygrophilous species – Holarctic species common in floodlands, bogs, wet meadows and forests, river banks.

Lepidocyrus curvicollis Bourlet, 1839 Entomobryidae – 4 (Stach 1929) – species of wet-habitats – European and Central European species – common near human settlements.

Lepidocyrtus cf. *szeptyckii* Rusek, 1985 Entomobryidae – 14 – ecological requirements unknown – uncertain distribution.

Lepidocyrtus cyaneus Tullberg, 1871 Entomobryidae – 3, 10, 11, 4 (Stach 1929) – species of open habitats – Holarctic species – common in floodlands.

Lepidocyrtus lanuginosus (Gmelin, 1788) Entomobryidae – 2, 9, 11, 14 – species of forest and open habitats – European and Central European species – typical for rich organic soils.

Lepidocyrtus lignorum (Fabricius, 1775) Entomobryidae – 1, 3, 9, 11, 12, 14, 15 – eurytopic species – Holarctic species – characteristic species of water surface and of moist habitats, common in floodlands.

Lipothrix lubbocki (Tullberg, 1872) Sminthuridae – 2, 5, 10, 16 – forest species – European and Central European species – strongly acidophilic species.

Megalothorax incertus Börner, 1903 Neelidae – 3, 11 – ecological requirements unknown (unclear species) –probably cosmopolitan species.

Megalothorax minimus Willem, 1900 Neelidae – 3, 2, 5, 6, 7 9, 10 – ubiquist species – cosmopolitan species – common in both coniferous and deciduous forest soils, mosses and arable soils.

Mesaphorura critica Ellis, 1976 Onychiuridae – 2, 3, 5, 11 – species of open habitats – Holarctic species.

Mesaphorura cf. *florae* Simon, Ruiz, Martin & Luciáñez, 1994 Onychiuridae – 14 – ecological requirements unknown – uncertain distribution – undescribed species.

Mesaphorura florae Simón, Ruiz, Martinez & Luciáñez, 1994 Onychiuridae – 2, 5, 6, 9, 10 – forest species – South and Central European species.

Mesaphorura hylophila Rusek, 1982 Onychiuridae – 3, 11, 13 – eurytopic species – Palaearctic species – common in arable soils.

Mesaphorura krausbaueri Börner, 1901 Onychiuridae – 3, 11, 16 – species of open habitats and floodplain forest – cosmopolitan species.

Mesaphorura macrochaeta Rusek, 1976 Onychiuridae – 3, 11, 13, 14, 16 – eurytopic, ubiquist species – Holarctic species.

Mesaphorura sylvatica (Rusek, 1971) Onychiuridae – 2, 5, 9 – forest species – Holarctic species – common in cave entrances.

Mesaphorura tenuisensillata Rusek, 1974 Onychiuridae – 3, 9 – forest species – Palaearctic species – acidophilic species.

Mesogastrura ojcoviensis (Stach, 1919) Onychiuridae – 5 – cavicolous species – South and Central European species – typical for guano and soil in caves.

Metaphorura affinis Börner, 1902 Onychiuridae – 11 – species of open habitats – European and Central European species – typical for meadows.

Micranurida pygmaea Börner, 1901 Neanuridae – 3, 10 – forest and acidophilic species – Holarctic species – species with plastic hygro-preference.

Neanura muscorum (Templeton, 1836) Neanuridae – 3, 11 – forest species – cosmopolitan species (except Arctic) – common in floodlands.

Neanura pseudoparva Rusek, 1963 Neanuridae – 15 – forest species – European and Central European species.

Oncopodura crassicornis Shoebotham, 1911 Cyphoderidae – 11– eurytopic species – South and Central European – species common in alder forests, forest scree slopes (MSS).

Onychiuroides pseudogranulosus (Gisin, 1951) Onychiuridae – 11 – forest species – European and Central European species, especially in thermophilous forest habitats.

Onychiurus rectospinatus Stach, 1922 Onychiuridae – 13 – species of open habitats – European and Central European species – typical for meadows.

Orchesella sp. juv. Entomobryidae – 14 – ecological requirements unknown – uncertain distribution.

Orchesella bifasciata Nicolet, 1841 Entomobryidae – 12 – forest species - Holarctic species – common on rocks, tree trunks.

Orchesella cincta (Linnaeus, 1758) Entomobryidae – 3, 8 (Stach 1929) – forest species – Holarctic species – usually found also in moss, meadows.

Orchesella. flavescens (Bourlet, 1843) Entomobryidae – 2 – forest species – European and Central European species –typical for lowlands as well as in mountains.

Orchesella multifasciata Stscherbakow, 1898 Entomobryidae – 3, 6 – xerothermophilous species – European and Central European species.

Orchesella villosa (Geoffroy, 1764) Entomobryidae – 8 (Stach 1929) – eurytopic species – Holarctic species – common in alder forests near river bank and in meadows, as synanthropic near human settlements.

Orthonychiurus rectopapillatus (Stach, 1933) Onychiuridae – 3 – montanne species – Carpathian endemic species.

Pachyotoma cf. crassicauda (Tullberg, 1871) Isotomidae – 10, 15 – ecological requirements unknown, probably neustonic species – uncerain distribution – undescribed species.

Parisotoma notabilis (Schäffer, 1896) Isotomidae – 1, 2, 3, 5, 7, 6, 9, 10, 11, 12, 13, 14, 16 – ubiquist, eurytopic species – cosmopolitan species – common in both natural and disturbed habitats.

Plutomurus carpaticus Rusek et Weiner, 1978 Tomoceridae – 9 – forest species – montanne species –Carpathian endemic species.

Pogonognathellus flavescens (Tullberg, 1871) Tomoceridae – 1, 2, 5, 8 (Stach 1929) – forest species – Holarctic species – wet- habitat species.

Proisotoma sp. juv. Isotomidae – 13 – ecological requirements unknown – uncertain distribution.

Proisotoma minima (Absolon, 1901) Isotomidae – 10, 11 – eurytopic species – cosmopolitan species – ripicolous and acidophilic species, xeroresistant especially in dry meadow.

Proisotoma minuta (Tullberg, 1871) Isotomidae – 10, 11 – compost and ruderal species – cosmopolitan species – thermophilous species, common in arable soils.

Protaphorura armata (Tullberg, 1869) Onychiuridae – 3, 5, 7, 11, 12 – eurytopic species – cosmopolitan species – common in wet forests, medows, and antropogenic soils.

Protaphorura aurantiaca (Ridley, 1880) Onychiuridae – 3, 11 – forest species – European and Central European species – wet-habitat species (probably hygrophilous), common in cold scree slopes and flood plain forests.

Protaphorura cancellata (Gisin, 1956) Onychiuridae – 3, 11 – ecological requirements unknown – probably European and Central European species – common in meadows and forests.

Protaphorura subarmata (Gisin, 1957) Onychiuridae – 3, 5, 11, 13 – forest and ripicolous species – European and Central European species – common in wet meadows.

Pseudachorutes corticicolus (Schäffer, 1896) Neanuridae – 6, 10, 15 – forest species – Holarctic species – corticophilous species.

Pseudachorutes dubius Krausbauer, 1898 Neanuridae – 3, 6 – forest species – Palaearctic species – species with plastic hygro-preference.

Pseudachorutes parvulus Börner, 1901 Neanuridae – 1, 6 – forest species without any preferential forest type – Palaearctic species – xerothermophilous species.

Pseudachorutes subcrassus Tullberg, 1871 Neanuridae – 5, 6, 13 – forest species – Palaearctic species – common in litter and mosses.

Pseudanurophorus boerneri Stach, 1922 Isotomidae – 3 – species of wet and humus soils – European and Central European.

Pseudisotoma sensibilis (Tullberg, 1876) Isotomidae – 3, 11 – forest species – cosmopolitan species – bryophilous and corticophilous species.

Pseudosinella sp. juv. Entomobryidae – 7 – ecological requirements unknown – uncertain distribution.

Pseudosinella sp. 1 Entomobryidae – 6 – ecological requirements unknown – uncertain distribution – undescribed species.

Pseudosinella sp. 2 Entomobryidae – 12 – ecological requirements unknown – uncerain distribution – undescribed species.

Pseudosinella alba (Packard, 1873) Entomobryidae – 3, 5, 11, 16 – species of open habitats – European and Central European species – typical for meadows and river banks.

Pseudosinella cf. *fallax (*Börner, 1903) Entomobryidae – 3 – ecological requirements unknown – uncertain distribution – undescribed species.

Pseudosinella cf. *noseki* Rusek, 1985 Entomobryidae – 5 – ecological requirements unknown, probably forest species – uncertain distribution – undescribed species.

Pseudosinella cf. *petterseni* Börner, 1901 Entomobryidae – 13 – ecological requirements unknown – uncerain distribution – undescribed species.

Pseudosinella cf. *pongei* Gama, 1979 Entomobryidae – 3 – ecological requirements unknown – uncerain distribution – undescribed species.

Pseudosinella horaki Rusek, 1985 Entomobryidae – 9, 11 – forest species – European and Central European species – common in thermophilous scree slopes (MSS).

Pseudosinella octopunctata Börner, 1901 Entomobryidae – 5, 11 – forest species – European and Central European species – species of dry and warm habitats.

Pseudosinella thibaudi Stomp, 1977 Entomobryidae – 2, 5 – forest species – European and Central European species – common in wet scree slopes (MSS).

Pygmarrhopalites sp. juv. Arrhopalitidae – 13, 16 – ecological requirements unknown – uncerain distribution.

*Pygmarrhopalites pygmaeus (*Wankel, 1860) Arrhopalitidae – 1, 2, 6, 10, 15 – hygrophilous species – Holarctic species – common in soil of open habitats, forests and in caves.

Schoettella ununguiculata (Tullberg, 1869) Hypogastruridae – 11 – eurytopic species – Holarctic species – typical for meadows, floodplain forests, river banks and lake margins.

Sminthurides malmgreni (Tullberg, 1876) Sminthurididae – 3, 11– hygrophilous species – Holarctic species – common near river banks.

Sminthurinus aureus (Lubbock, 1862) Sminthuridae – 1, 3, 11, 12, 16 – eurytopic species – European and Central European species – common in forests, meadows, urban soils.

Sminthurinus elegans (Fitch, 1863) Sminthuridae – 2, 3, 6, 9, 10, 11, 13, 16 – species of open habitats, xeroresistant – Palearctic species – typical for meadows, forests.

Sminthurinus signatus (Krausbauer, 1902) Sminthuridae – 2 – forest species – Palaearctic species – common in mosses.

*Sminthurus viridis (*L., 1758) Sminthuridae – 2 – species of open habitats – Cosmopolitan species.

Sphaeridia pumilis (Krausbauer, 1898) Sminthurididae – 3, 11, 13 – species species – Cosmopolitan species – hygrophilous species.

Stenaphorura denisi Bagnall, 1935 Onychiuridae – 3 – species of open habitats – European and Central European species – common in arable soils, meadows and vineyards.

Stenaphorura quadrispina (Börner, l90l) Onychiuridae – 13 – species of open habitats – South and Central European species – typical for arable soils, meadows and vineyards.

Tetracanthella cf. *pericarpatica* Kaprus et Tsalan, 2009 Isotomidae – 6 – ecological requirements unknown, probably xeroresistant – uncertain distribution – undescribed species.

Tetracanthella fjellbergi Deharveng, 1987 Isotomidae – 3, 11 – bryophilous and xeroresistant species – boreo-montane species.

Thalassaphorura encarpata (Denis, 1931) Onychiuridae – 3 – Cosmopolitan species – species of riparian habitats.

Tomocerus sp. juv. Tomoceridae – 3, 10 – ecological requirements unknown – uncertain distribution.

Tomocerus minor (Lubbock, 1802) Tomoceridae – 11 – forest species – montane species – hygrophilous species.

Tomocerus minutus Tullberg, 1876 Tomoceridae – 3, 11 – forest and corticophilous species – Holarctic species.

Tomocerus vulgaris (Tullberg, 1871) Tomoceridae – 4 (Stach 1929) – forest species – Holarctic species – common in floodlands.

Vertagopus westerlundi (Reuter, 1897) Isotomidae – 11 – bryophilous species – boreo-alpine species – especially in exposed habitats.

Willemia intermedia Mills, 1934 Hypogastruridae – 3 – species of open habitats – Holarctic species – common in acidophilic soils.

Willemia scandinavica Stach, 1949 Hypogastruridae – 11 – xerophilous species – Holarctic species — species of open habitats, common in dry, sandy habitats and meadows but also in floodlands forests.

Willemia virae Kaprus, 1997 Hypogastruridae – 1, 7 – ecological requirements unknown – Eastern and Central European species – common in mosses.

Willowsia nigromaculata (Lubbock,1873) Entomobryidae – 3 – xerothermophilous species – European and Central European species – common near human settlements.

Xenylla acauda Gisin, 1947 Hypogastruridae – 13 – species of dry and warm soils in mountains – Holarctic species.

Xenylla boerneri Axelson,1905 Hypogastruridae – 3, 11 – forest, corticophilous and xeroresistant species – Palaearctic species – common in mosses and lichens on trees.

Xenylla brevicauda Tullberg, 1869 Hypogastruridae – 3, 11, 16 – forest species – boreo-montane species – xeroresistant species.

Xenylla myrmecophila Stebaeva et Potapov, 1994 Hypogastruridae – 3, 13 – forest species – Palaearctic species –common in ant nests.

Xenylla subacauda Stebaeva et Potapov, 1994 Hypogastruridae – 3, 11 xeroresistant species – Palaearctic species.

Xenylla uniseta Gama, 1963 Hypogastruridae – 12 – forest and xerothermophilous species – South and Central European species – first record for Slovakia.

Xenyllodes armatus Axelson, 1903 Odontellidae – 3, 9 – forest, psamophilous and ripicolous species – boreo-montane species (in Central Europe) – common alongside lakes and streams.

Conclusions

This is the first detailed investigation of Collembola fauna in the Latorica PLA in Slovakia. In spite of the relatively small area, it is hosting highly diverse communities with overall 147 species reflecting high variety of studied habitats and microhabitats. Forest species had the highest share (42 species – 28.57 %), followed by species of open habitats and eurytopic species (25 species – 17.01 % and 22 species – 14.97 %, respectively). Moreover, high species richness was recorded in periodically flooded forests (shortly after spring flood). Most probably, this can be explained by the specific strategies of species (flood-resistant eggs, migration of more motile populations from unflooded habitats). Due to specific soil microclimatic conditions of the floodplain forests, wet riparian habitats and xerothermophilous habitats, the proportion of xeroresistant/xerothermophilous and hygrophilous species of Collembola was considerable (19 species – 12.93 % and 9 species – 6.12 %, respectively). Xerothermophiles were obviously more abundant than hygrophiles. Hygrophilous species such as *Folsomia quadrioculata* and *Pygmarrhopalites pygmaeus* were associated with wet and wetland soils in comparatively high abundances. From the autecology of specific species it can be concluded that one of the source habitats of collembolan diversity in studied area are agricultural fields, with characteristic species *Ceratophysella succinea*, *Cryptopygus thermophilus* and *Mesaphorura krausbaueri,* the former two occurred exclusively in arable soils. *M. krasubaueri* has wider ecological valence, frequent also in floodplain forests. The majority of recorded species have wide geographical ranges including cosmopolitan (20 species – 13.61 %), Holarctic (37 species – 25.17 %), Palaearctic (26 species – 17.69 %) and European and Central European distribution (30 species – 20.41 %). The share of Southern and Central-European species was small (9 species – 6.12 %), abundant *Mesaphorura florae* occurred in both alluvial floodplain forests and arable soils. *Willemia virae* (0.68 %) represented the only species with Eastern and Central-European distribution. The share of the montane, boreo-montane and arctic-alpine species was low (12 species – 8.11 %), but some of them had relatively high abundances, especially in alluvial forests and arable soils, namely Raškovský luh-Spodný les and Čičarovce. Montane species such as *Heteraphorura carpatica*, *Hymenaphorura dentifera*, *Orthonychiurus rectopapillatus* and *Plutomurus carpaticus* are Carpathian endemic species. This observation indicates their passive transport from the montane environment of the Eastern Carpathians during floods. Presence of such species with the narrow distribution outlines the importance of the protected landscape area Latorica.

Special attention must be paid to several interesting habitats with their unique fauna. Nine Collembola species such as *Mesaphorura* cf. *florae, Pachyotoma* cf. *crassicauda, Pseudosinella* sp. 1, *Pseudosinella* sp. 2, *P.* cf. *fallax, P.* cf. *noseki, P.* cf. *petterseni*, *P.* cf. *pongei* and *Tetracanthella cf. pericarpatica* were identified as undescribed species and could be „a priori“ considered to be endemic (more data is needed). Both *Pachyotoma* cf. *crassicauda* and *Tetracanthella* cf. *pericarpatica* were detected as abundant species in flooded

forests (*Saliceto–Alnetum*) with wetland vegetation and in river banks, namely localities Svätá Mária, Zatín-Dlhé Tice and Latorica-most**.** *Mesaphorura* cf. *florae* was recorded in sand dunes of Veľký Kamenec as accidental species (in very low abundance). Tarbucka-Malý Kamenec contains a specific habitat - andesite hill with the wind-blown sands occupied by the xerothermophilous *Xenylla uniseta* that is the first record of this species in Slovakia.

We can conclude, that the majority of Collembola species recorded in Latorica PLA are typical representatives of Central-European forest fauna. There is reasonable threat of climatic change, especially for collembolan fauna of wet and wetland ecosystems. The main task of nature conservation in the territory is protection of the whole PLA area with sustainable exploitation of the territorry, with regard to the preservation of its biodiversity, i.e. sensitive approach to unique species.

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Súhrn

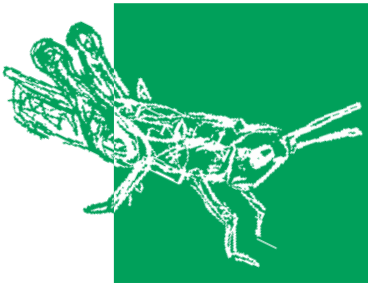
Chvostoskoky (Hexapoda: Collembola) Chránenej krajinnej oblasti Latorica

Toto je prvý detailnejší prieskum fauny chvostoskokov na území CHKO Latorica. Napriek relatívne malej rozlohe územia, bola tu zaznamenaná pomerne vysoká diverzita Collembola, celkovo 147 druhov, čo je odrazom veľkej rôznorodosti študovaných habitatov a mikrohabitatov danej oblasti. Najvšší podiel mali lesné druhy (42 druhov – 28,57 %), nasledovali druhy otvorených habitatov a eurytopné druhy (25 druhov – 17,01 % a 22 druhov – 14,97 %). Okrem toho, vysoký počet druhov bol zaznamenaný v periodicky zaplavovaných lesoch (krátko po jarných záplavách). Najpravdepodobnejším vysvetlením sú zrejme špecifické stratégie druhov (rezistentné vajíčka voči záplavám, migrácia pohyblivejších druhov z nezaplavených plôch). V dôsledku špecifických pôdno-mikroklimatických podmienok nížinných lužných lesov, vlhkých brehových a xerotermofilných habitatov, bol podiel xerorezistentných/xerotermofilných a hygrofilných druhov značný (19 druhov – 12,93 % a 9 druhov – 6,12 %). Xerotermofilné druhy mali zreteľne vyššiu abundanciu ako hygrofilné. Hygrofilné druhy s vyššou abundanciou, ako *Folsomia quadrioculata* a *Pygmarrhopalites pygmaeus*, boli asociované s vlhkým/mokraďovým typom pôd. Z autekológie jednotlivých druhov možno usudzovať, že zdrojom diverzity Collembola v danej oblasti je aj poľnohospodársky využívaná pôda, s charakteristickými druhmi ako *Ceratophysella succinea*, *Cryptopygus thermophilus* a *Mesaphorura krausbaueri,* prvé dva sa vyskytovali výlučne v orných pôdach. *M. krasubaueri* má širšiu ekologickú valenciu, druh bol tiež frekventovaný v lužných lesoch. Väčšina zaznamenaných druhov má široké geografické rozšírenie, zahrňujúce kozmopolitné (20 druhov – 13,61 %), holarktické

(37 druhov – 25,17 %), palearktické (26 druhov – 17,69 %) a európske a stredoeurópske druhy (30 druhov – 20,41 %). Podiel južných elementov zasahujúcich svojím rozšírením do strednej Európy bol malý (9 druhov – 6,12 %), abundantný druh *Mesaphorura florae* sa vyskytoval v lesných aj orných pôdach. *Willemia virae* (0,68 %) reprezentovala jediný druh s rozšírením vo východnej a strednej Európe. Podiel montánnych, boreo-montannych a arkticko-alpínskych druhov bol malý (12 druhov – 8,11 %), ale niektoré z nich mali relatívne vysokú abundanciu, konkrétne v lesoch v alúviách riek a orných pôdach, menovite lokality Raškovský luh-Spodný les a Čičarovce. Montánne druhy, ako *Heteraphorura carpatica*, *Hymenaphorura dentifera*, *Orthonychiurus rectopapillatus* a *Plutomurus carpaticus* patria ku karpatským endemitom. Toto zistenie indikuje ich pasívny transport z horského prostredia Východných Karpát počas záplav. Prítomnosť týchto endemických druhov poukazuje na význam tohto územia z pohľadu biodiverzity.

Špeciálnu pozornosť je potrebné venovať niekoľkým zaujímavým habitatom s ich jedinečnou faunou. Deväť druhov ako *Mesaphorura* cf. *florae, Pachyotoma* cf. *crassicauda, Pseudosinella* sp. 1, *Pseudosinella* sp. 2, *P.* cf. *fallax, P.* cf. *noseki, P.* cf. *petterseni*, *P.* cf. *pongei* a *Tetracanthella* cf. *pericarpatica* boli identifikované ako druhy doposiaľ nepopísané a mohli by byť potenciálne považované za endemity, k tomu je ale potrebných viac dát. Druhy *Pachyotoma* cf. *crassicauda* a *Tetracanthella* cf. *pericarpatica* dominovali v lužných lesoch (*Saliceto–Alnetum*) s mokraďovým typom vegetácie a vo vlhkých pôdach riečnych brehov, konkrétne v lokalitách Svätá Mária, Zatín-Dlhé Tice a Latorica-most**.** *Mesaphorura* cf. *florae* bola zaznamenaná v habitate – pieskové duny, v lokalite Veľký Kamenec ako druh s náhodným výskytom (nízka abundancia). Lokalita Tarbucka-Malý Kamenec predstavuje špecifický habitat – viate piesky na andezitovom svahu, ktorý bol obývaný xerotermofilným druhom *Xenylla uniseta*. Je to prvý nález tohto druhu pre faunu Slovenska.

Môžeme zhrnúť, že väčšina druhov chvostoskokov zaznamenaných v CHKO Latorica sú typickými predstaviteľmi stredoeurópskej lesnej fauny. Vlhké, mokraďové ekosystémy a pôdna fauna tohto vzácneho chráneného územia sú reálne ohrozené najmä v súvislosti so súčasnými klimatickými zmenami. Hlavnou úlohou ochrany prírody na území CHKO Latorica je celoplošná ochrana s trvalo udržateľným využívaním územia, so zreteľom na zachovanie jeho biodiverzity a citlivým prístupom k týmto jedinečným habitatom a druhom, ktoré ich obývajú.



Grasshoppers, crickets (Orthoptera) and mantids (Mantodea) of the Latorica Protected Landscape Area

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Abstract

In the Latorica Protected Landscape Area (PLA), 76 species of Orthoptera (59% of all Slovak species) and one mantid species have been recorded in 2004–2020. It includes the area among the Orthoptera species richest areas in Slovakia. They cover 34 Ensifera, and 42 Caelifera species), showing mainly grassland and steppe character of the area. Two species (*Acrotylus insubricus, Gampsocleis glabra*), have been recorded within Slovakia in the last 24 years exclusively only there. For at least nine species is this area the stronghold of their distribution in Slovakia (*Isophya modesta, Poecilimon fussii, Leptophyes discoidalis, Platycleis affinis, Montana montana, Tettigonia caudata, Acrida ungarica, Myrmeleotettix antennatus, Chorthippus dichrous)*. The majority of species are typical xerothermous representatives living mainly in well preserved sand dunes, salt marshes, xeric forest steppes or in wetlands. Numerous rare and endangered species were recorded in relatively high abundances (e.g. species of EU importance *Odontopodisma rubripes*, or *Polysarcus denticauda, Oedaleus decorus*, thus reflecting specific microclimatic conditions in characteristic habitats of this area. Five groups of habitat specialists were distinguished: (i) species preferably occurring in sand dunes and salt marshes (15 species); (ii) forest steppe species (12); (iii) species preferring wetlands, wet grasslands and riparian vegetation along rivers (18); (iv) forest edge dwelling species (13 species); (v) polytopic species (19 species). The local orthopteran assemblages are strongly related to Pannonian and Central European fauna (having contact to Pannonian basin in Hungary). The area includes unique sites with high specific and well-preserved habitats, e.g. sandy dunes around Horeš, Svätuše, Strážne, Beša and Somotor area, wet grasslands and riparian vegetation in Latorica, Tisa and Bodrog Rivers embankments, forest steppes around Ladmovce, Tarbucka, Veľký kopec, Brehov. All these sites are highly endangered by human activities (intensive farming techniques, drainage, sand exploitation, etc.), cover very rare orthopteran species and should be protected for the future generations.

Key words: Orthopteran insects, distribution, ecology, faunistics, biodiversity, SE Slovakia

Introduction

The diversity of insects in lowland habitats of the agricultural landscape in Central Europe is highly endangered. Hence, the patches of well-preserved seminatural habitats serve a crucial role (Duelli & Obrist 2003). These habitat fragments (sand dunes, wetlands, forest ecotones, riparian vegetation and open floodplain forests) are critically important for the reproduction, roosting and overwintering of insects. Orthoptera indicate the favourable conservation status of these habitats, also in small refuges and plots with intensive land use (Fahrig & Jonsen 1998). Fragments of seminatural habitats in lowland areas of Latorica area (SE Slovakia) are good examples of such an environment. This area is located at the zoogeographic zone of the Pannonian flora and fauna with northern distribution limits of several xerophilous and Mediterranean species (Mařan 1952a, b; 1954, Gulička 1967; Krištín et al. 2004a; Balla & Krištín 2019; Krištín et al. 2020). The area is only ca. 100–150 km from the well-preserved territories in the lowlands of E Hungary such as the Hortobágy National Park and the Bátorliget Nature Reserve, where the orthopterofauna has been investigated thoroughly (i.e. Nagy 1983, 1991).

Grasshoppers and crickets of the Eastern Slovak Plain were studied already in the past, with the first data from 19th century (Chyzer 1897), but mostly in 1951–1962 (Mařan 1952a, b, 1954; Gulička 1967). Later the data were missing and new samplings and studies started after 1997 (Krištín et al. 2004a, 2011; Balla & Krištín 2019). From the adjacent area in SE Hungary originated orthopterological studies from the eastern part of the Tisza River (Nagy et al. 2008), while the neighbouring Ukrainian Orthoptera fauna has been studied only scarcely (Storozhenko & Gorochov 1992; Nagy 2005; Krištín et al. 2011).

Therefore, the objective of this contribution is i) to summarize the structure of Orthoptera and Mantodea assemblages in the best-preserved fragments of seminatural habitats (sand dunes, salt marshes, wetlands, ecotones of floodplain forests and xerotherm forest steppes) in Latorica LPA in 1997–2020, ii) show the most valuable areas and habitats for Orthoptera there and iii) to suggest the conservation measurements in the most endangered habitats.

Material and methods

Orthoptera and Mantodea were collected in the catchments of Latorica, Bodrog and Tisa River. Altogether 48 sites situated in Latorica PLA (Eastern Slovak Plain – Východoslovenská rovina) in SE Slovakia (48.353–48.51N, 21.68–22.13E) were sampled. The results of 48 sites are summarized in 16 areas (Table 1), mainly for species conservation reasons. Raw and detailed data are at disposal in Latorica PLA administration and in the authors databases. Qualitative and quantitative survey concerning the Orthoptera assemblage structure was carried out in June–August in 1997, 1999, 2001, 2003, 2005–2008, 2011, 2013–2020. The material was sampled mostly by sweeping herbs and partially also the shrub vegetation. This method was supplemented with individual collection and acoustical identification of specimens. We (mostly 3–4 persons) spent at least one – two hours with the data sampling at each site.

The relative abundance of individual species on the studied plots was expressed by using the following classification scale: 1 – very rare (less than 3 adult specimens), 2 – rare (3–10 specimens), 3 – abundant (11–100 specimens), 4 – very abundant (more than 100

specimens). The relative semi-quantitative abundance values represented the highest values for adults recorded at one site within the study area and during one control. The material was identified directly in the field; specimens which were difficult to identify were stored in 75% alcohol and identified in the laboratory using identification keys (Harz 1969, 1975; Kočárek et al. 2005). The data about the species area distribution were taken from Ingrisch & Köhler (1998) and Harz (1969, 1975) and Hochkirch et al. (2016).

List of localities

This area is commonly called Tisa/Tisza River basin and belong to the lowest situated areas in Central Europe (Table 1).

1 – Beša – Moľva, (2 sites)**:** pastures (irregularly grazed) and grasslands on saline soils and sand dunes with preserved psammophytic vegetation (*Verbascum phoeniceum*, *Jasione montana*, *Artemisia campestris*, *Tithymalus cyparissias*), depressions between the dunes are filled with wetland vegetation and small water pools; the area is situated 0.5–3 km S from Beša village, in its adjacent territory (further a. t.) (99–107 m a.s.l., 12 ha, No. of the Databank of Slovak Fauna square (further DFS 7497).

2 – Kucany – Malé Raškovce – Kopčianske slanisko, (3 sites)**:** sand dunes in Kucany with wet depressions; wet and saline grasslands, partially ruderalized in Kopčianske slanisko SPA and ruderalized grasslands and pastures south of Malé Raškovce, locally overgrown with shrubs and woods (*Prunus spinosa*, *Salix* spp., *Populus* spp.); a.t. Zemplínske Kopčany, Malé Raškovce (105–107 m a.s.l., 10 ha, DFS 7497, 7597).

3 – Leles – Kapoňa – Solnička – Poľany, (4 sites)**:** sand dunes with rather ruderalized vegetation (*Lotus corniculatus* agg., *Echium vulgaris*, *Acosta rhenana*, *Poa pratensis*, *Galium verum*, *Chondrillajuncea*, *Berteroa incana*) and adjacent wetland patches in the vicinity of Leles, Kapoňa, Solnička and Poľany villages, (102–114 m a.s.l., 8 ha, DFS 7597, 7598).

4 – Veľký Kopec, Vysoká, (SKÚEV 0029, 1 site**):** gradient of habitats along steep xerotherm forest steppes on andezite at isolated hill near Kráľovský Chlmec, with less preserved xeric vegetation (*Iris aphylla* subsp. *hungarica*, *Pseudolysimachion incanum, Orchis morio, Pulsatilla grandis, Stipa pulcherima, Campanula boloniensis, Cerasus fruticosa, Rannunculus illyricus*) with shrubs *Crataegus, Rosa, Prunus* spp., locally overgrown with the black locust, with vineyards and ruderalized vegetation at the hill foot, a.t. Kráľovský Chlmec (195–264 m a.s.l., ca 3 ha, DFS 7597).

5 – Svätuše – Horeš, (5 sites): xerotherm grasslands on sand dunes with well-preserved psammophytic vegetation (*Gypsophila paniculata*, *Pulsatilla hungarica*, *Pulsatilla zimmermanii*, *Achillea pannonica*, *Acosta rhenana*, *Arenaria serpillifolia*, *Artemisia campestris*, *Berteroa incana*), locally partially ruderalized and the ecotones with vineyards, a.t. of the villages of Malý Horeš, Svätuše and the town of Kráľovský Chlmec (102–263 m a.s.l., 12 ha, DFS 7597).

6 – Somotor – Véč – Svätá Mária – Rad Esenka (4 sites): traditionally used grasslands and pastures with preserved psammophytic vegetation (*Gypsophila paniculata*, *Achillea pannonica*, *Artemisia campestris*, *Berteroa incana*) on sand dunes with adjacent

wetlands in inter-dune depressions with hygrophilous vegetation (*Allium angulosum*, *Juncus atratus*, *Alopecurus pratensis*, *Festuca pratensis*, *Elytrigia repens*, *Phalaroides arundinacea*, *Carex vesicaria*) and an extensive pasture land on saline soils in a.t. of Somotor, Svätá Mária and Rad settlements (100–150 m a.s.l, 20 ha, DFS 7596, 7597).

7 – Strážne – Opátske piesky – Kerestúr pusta – Veľký Kamenec (6 sites): irregularly grazed and traditionally farmed grasslands on sand dunes with adjacent wetlands in inter-dune depressions with rare hygrophilous vegetation (*Beckmania eruciformis*, *Cirsium brachycephalum*, *Eleocharis ovata*, *Elatine alsinastrum*, *Ranunculus repens*, *Lysimachia nummularia*, *Glyceria fluitans*, *Carex riparia*) in a.t. of Strážne and Veľký Kamenec villages (98–124 m a.s.l., 20 ha, DFS 7696, 7697).

8 – Latorica river area (5 sites): an inter-embankment area, wet meadows with *Leucojum aestivum*, *Allium angulosum*, *Lysimachia nummularia*, *Lythrum virgatum*, *Alopecurus pratensis*, rather ruderalized, partially regularly mown, partially overgrowing with willow and poplar succession, in a.t. of Rad, Zatín and Čičarovce villages (96–102 m a.s.l., 6 ha, DFS 7597, 7498).

9 – Floodplain of the Bodrog River (1 site): embankments with xerotherm vegetation, dry and wet meadows (with *Leucanthemella serotina*, *Allium angulosum*, *Gratiola officinalis*, *Pseudolysimachion longifolium*) and the proper partly ruderalized banks (*Galium boreale*, *Arrhenatherum elatius*, *Dactylis glomerata*, *Pimpinella saxifraga*) of Bodrog River, a.t. Klin nad Bodrogom (the lowest situated area in Slovakia, 95–99 m a.s.l., 6 ha, DFS 7696).

10 – Tarbucka hill (1 site)**:** altitudinal gradient at the hill with blown sands and xerotherm forest-steppes on andesite substrate with up to the top preserved xeropsammophytic vegetation (*Pulsatilla zimmermannii*, *P. pratensis* subsp. *hungarica*, *Gypsophila paniculata*, *Jasione montana*, *Dianthus serotinus*, *Stipa capillata*, *Festuca vaginata*), a.t. Streda nad Bodrogom, Veľký Kamenec (140–278 m a.s.l., 5 ha, DFS 7696).

11 – Ladmovce (Tardika – Kášvár – Dlhá hora, 3 sites): xerotherm forest steppes on limestones with well-preserved xerophytic vegetation (e.g. *Cerasus fruticosa*, *Adonis vernalis*, *Pulsatilla zimmermannii*, *Pulsatilla pratensis* subsp. *hungarica*) with different stages of successional overgrowing (oak, hazelnut, black locust and hedges), on the foot with vineyards, a.t. Ladmovce (140–208 m a.s.l., ca. 5 ha, DFS 7596).

12 – Tisa – Malé Trakany - Biel (3 sites): mesophytic and hygrophytic grasslands with scattered bushy and tree vegetation on the edges of floodplain willow-poplar forests on alluvial sands with riparian vegetation along the Tisa River, a.t. Malé Trakany and Biel villages (98–108 m a.s.l., ca. 4 ha, DFS 7598, 7698).

13 – Brehov (Veľký vrch, 1 site): gradient of steep xeric steppes on isolated andezite vulcanic hill in lowland agricultural landscape with less preserved xerophilous vegetation (e.g. *Stipa pulcherrima, Chrysopogon gryllus*) and scattered shrubs *Crataegus, Rosa, Prunus*, with ruderalized vegetation at the hill foot, a.t. Brehov, (195–272 m a.s.l., ca 5 ha, DFS 7596).

14 – Sírnik (1 site): fragments of well-preserved xerothermous vegetation (*Tithymalus cyparissias, Pilosella officinarum, Thymus pannonicus, Scabiosa ochroleuca*) with scatterred shrubs along the ridge of isolated hill in agricultural landscape 200–500 m NE of Sírnik village (195–270 m a.s.l., ca 5 ha, DFS 7496).

15. – Bara (1 site): eastern slopes of Stredný vrch hill, xerothermous forest steppes on andezite, with less preserved xeric vegetation, overgrown by secondary vegetation, and dispersed oaks, hazel, black locust, a.t. Bara, (180–228 m a.s.l., ca 4 ha, DFS 7596).

16 – Malá Trňa NE (1 site): fragments of xerothermous grasslands and forest steppe vegetation with scattered shrubs in higher stage of succession and oak forest edges, NE of Malá Tŕňa village (215–250 m a.s.l., ca 3 ha, DFS 7596).

Results and discussion

Structure and conservation status of Orthoptera species

Altogether, 76 species of Orthoptera (34 Ensifera, 42 Caelifera) and one mantid species have been recorded at 16 areas (48 sites) in the Latorica PLA in 2004-2020 (Table 1). These species represent 59% species of total number 129 Orthoptera species recorded in Slovakia, what includes the area among the Orthoptera species richest areas in Slovakia (Krištín et al. 2020). Of them, two species (*Acrotylus insubricus, Gampsocleis glabra*), have been recorded within Slovakia in the last 24 years exclusively only there. For at least nine species is this area the stronghold of their distribution in Slovakia (*Isophya modesta, Poecilimon fussi, Leptophyes discoidalis, Platycleis affinis, Montana montana, Tettigonia caudata, Acrida ungarica, Myrmeleotettix antennatus, Chorthippus dichrous)*.

Among all recorded species, there were seven species within three threatened categories (CR 2 = *P. fussii, A. insubricus*, EN 2 = *G. glabra, M. antennatus*, VU 3 = *I. modesta, O. rubripes, A. ungarica*) and 11 NT species, Table 1) from 22 threatened and 18 near threatened species listed in the National Red List in Slovakia (Krištín et al. 2020). All these species confirm very high importance for insect biodiversity in Slovakia.

In each of the 16 areas of Latorica area were found 28–54 Orthoptera species (mean 40 per site), the praying mantis *Mantis religiosa* was found in all the sites. The species numbers in particular sites and areas were related to diversity in vegetation, diversity in mosaic of micro-habitat patches and the preservation status and/or isolation of the site. The richest in the species were areas comprising mosaic of sand habitats, salt marshes and wetlands, i. e. Somotor – Véč area (55 species), Strážne – Veľký Kamenec (53 species/ 20 ha) and a similar mosaic of habitats in the sites of Beša-Moľva, and Horeš - Svätuše area (51, resp. 50 species; Table 1).

Habitats

The majority of species are typical xerothermous representatives living mainly in well preserved habitats as sand dunes, salt marshes, xeric forest steppes or in wetlands. Numerous rare and endangered species were recorded in relatively high abundances (e.g. species of EU importance *Odontopodisma rubripes*, or *Polysarcus denticauda, Oedaleus decorus*, thus reflecting specific microclimatic conditions in characteristic habitats of this area. Five groups of habitat specialists were distinguished: (i) species preferably occurring in sand dunes (15 species, e.g. *P. affinis, G. glabra, A. insubricus, A. ungarica, M. antennatus*, *O. decorus, D. brevicollis*); (ii) forest steppe species (12, e.g. *E. ephippiger, Platycleis grisea, E. bordigalensis*, *S. crassipes, S. nigromaculatus*); (iii) species preferring wetlands, wet grasslands and riparian vegetation along rivers (18, e.g. *Ruspolia nitidula, Conocephalus*

Table 1. *Grasshoppers, crickets (Orthoptera) and mantids (Mantodea) in 16 areas (48 sites) in Latorica LPA (sites, see Methods; abundance: 1 very rare – less than 3 individuals, 2 rare, 3–10 ind., 3 abundant – 11–100 ind., 4 very abundant – more than 100 ind., f% – frequency within 16 areas; habitats: FE = forest ecotone, FS = forest steppes, SD = sandy dunes, PO = polytopic, W = wetland; * = compare maps of particular species distribution in Slovakia in* Krištín *et al. (2020).*

Species/Study areas	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	F%	Red List	Habitat
Ensifera																			
Tettigoniidae																			
Isophya kraussii Brunner von Wattenwyl, 1878										1	2						12,5		FE
Isophya stysi Čejchan, 1957											2						6,3	NT	FE
Isophya modesta (Frivaldsky, 1867)*											2						6,3	VU	FE
Leptophyes albovittata (Kollar, 1833)	2	3	3	3	4	2	3	3	2	3	4	1	4	2	4	2	100,0		PO
Leptophyes discoidalis (Frivaldsky, 1867)*								2	1		1	1			1		31,3	NT	FE
Barbitistes constrictus Brunner v. Watt., 1878										1	1						12,5		FE
Phaneroptera falcata (Poda, 1761)		2	1	3	2	2	1	1		2	2		2	3		2	75,0		FE
Phaneroptera nana Fieber, 1853*	2	2	2	2	2	2	3	3	2	2	2	3	2	1		1	93,8		W
Poecilimon fussii Fieber, 1878*											3						6,3	CR	FE
Poecilimon schmidtii (Fieber, 1853)*											2				2		12,5		FE
Polysarcus denticauda (Charpentier, 1825)	3						3	1		2							25,0		W
Meconema thalassinum (Degeer, 1773)	2			1	2	2					2				1		37,5		FE
Conocephalus fuscus (Fabricius, 1793)	2	3	3	2	3	4	3	4	4	1		3	1		2		81,3		W
Conocephalus dorsalis (Latreille, 1804)	2	3	1		2	3	3	4	3			1					56,3		W
Ruspolia nitidula (Scopoli, 1786)	2	2	2	2	2	2	3	3	2	2		2			2	1	81,3		W
Decticus verrucivorus (Linnaeus, 1958)	3	2	3	3	3	3	3	3		3	3		3	2	2	1	87,5		PO
Gampsocleis glabra (Herbst, 1786)*	3	2	3		2	2	3	2									43,8	EN	SD
Bicolorana bicolor (Philippi, 1830)	2	2	3	3	3	2	2	2	2	3	3		3	3	3	3	93,8		PO
Roeseliana roeselii (Hagenbach, 1822)	3	3	3	3	2	2	3	3	2	1	2	1	2		2	3	93,8		PO
Pholidoptera griseoaptera (De Geer, 1773)	2		2	2	2			2	2	1	3	1	1		2	1	75,0		FE
Platycleis affinis Fieber, 1853*					2	3	3										18,8	NT	SD
Platycleis grisea (Fabricius, 1781)	1		2	2	3	3	3	2	1	3	3		4	3	3	3	87,5		FS
Montana montana (Kollar, 1833)			2	3	3	3				3				3			37,5	NT	SD
Tesselana veyseli (Koçak, 1984)*					1	2	3										18,8		SD
Tettigonia caudata (Charpentier, 1842)	2				2	2	3										25,0		SD
Tettigonia viridissima (Linnaeus, 1758)	3	1	2	1	3	2	2	2	2	1	1	1	2	1	2	2	100,0		PO
Ephippiger ephippiger (Fiebig, 1784)				1		1				1	3		1		3		37,5		FS
Gryllotalpidae																			
Gryllotalpa gryllotalpa (Linnaeus, 1758)	2		2		2	1	2	2	2			2					50,0		W

Species/Study areas	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	F%	Red List	Habitat
Gryllidae																			
Pteronemobius heydenii (Fischer, 1853)	1				1		2	1									25,0		W
Eumodicogryllus bordigalensis (Latreille, 1804)	1				1	2	2		1	2				1			43,8		FS
Gryllus campestris Linnaeus, 1758	3	2	2	2	4	2	2	3	2	3	3	1	3	2	1	2	100,0		PO
Melanogryllus desertus (Pallas, 1771)	1			1	1	1					2						31,3		SD
Modicogryllus frontalis (Fieber, 1844)				1		1	2		1	1							31,3		W
Oecanthus pellucens (Scopoli, 1763)	3	3	3	3	4	3	3	3	2	3	4	3	4	3	4	2	100,0		PO
Caelifera																			
Tridactylidae																			
Xya pfaendleri Harz, 1970	4		4			3	4	3	4								37,5	NT	W
Xya variegata (Latreille, 1809)	1		2			4	2	3	3			4					43,8	NT	W
Tetrigidae																			
Tetrix bipunctata (Linnaeus, 1758)	1		2	1					1			1	1				37,5		FS
Tetrix bolivari Saulcy, 1901*	1					1	3	3	2								31,3	NT	W
Tetrix subulata (Linnaeus, 1758)	2		2				3	1	3	1	1	1					50,0		PO
Tetrix tenuicornis (Sahlberg, 1893)				1			2	2	3	1	2		1		2	2	56,3		PO
Tetrix undulata (Sowerby, 1806)										1	1			1			18,8		FE
Acrididae																			
Calliptamus italicus (Linnaeus, 1758)	2	4	3	2	3	3	3	3	1	3	4		3	3	3	3	100,0		FS
Odontopodisma rubripes (Ramme, 1931)*												3					6,3	VU	FE
Acrida ungarica (Herbst, 1786)*					3	3	2										18,8	VU	SD
Aiolopus thalassinus (Fabricius, 1781)	3	4				3	3	3	2			1					43,8		SD
Mecostethus parapleurus (Hagenbach, 1822)		2				4	3	3	2								31,3	NT	W
Oedaleus decorus (Germar, 1826)*					3												6,3	NT	SD
Oedipoda caerulescens (Linnaeus, 1758)	4	3	2	2	3	2	3	3		3	3		3	3	3		87,5		FS
Sphingonotus caerulans (Linnaeus, 1767)											3						6,3	NT	SD
Stethophyma grossum (Linnaeus, 1758)	2	2				3	3	4				1					37,5		W
Acrotylus insubricus (Scopoli, 1786)*					3	3				2	2						25,0	CR	SD
Dociostaurus brevicollis (Eversmann, 1848)*	4	4	3		4	3	4	2	2	3				3			75,0		SD
Omocestus haemorrhoidalis (Charpentier, 1825)	1	2	3	2	3	3	2	3	2	3	3			3	2	2	87,5		FS
Omocestus petraeus (Brisout de Barneville, 1856)*	3				2	2	2			1							31,3	NT	FS
Omocestus rufipes (Zetterstedt, 1821)	2	3	2	2	3	2	3	1	2	2	1	1	1	2	1		93,8		W
Stenobothrus crassipes (Charpentier, 1825)	3	3		3	3	3	3	2		3	3	1	3	2	3	4	87,5		FS
Stenobothrus lineatus (Panzer, 1796)	1	3		2	3	2	2	1		2	3		2	2	4	3	87,5		PO

Species/Study areas	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	F%	Red List	Habitat
Stenobothrus nigromaculatus (Herrich-Schäffer, 1840)	2		3	3	3	1	2			3	3		4				56,3		FS
Stenobothrus stigmaticus (Rambur, 1838)															2		6,3		FS
Chrysochraon dispar (Germar, 1834)		1	2	1	1	2	3	3	3			2				1	62,5		W
Euthystira brachyptera (Ocskay, 1826)	1	1	2	3	3		1	3		1	3		3	1	2		81,3		PO
Gomphocerippus rufus (Linnaeus, 1758)				2							3						12,5		FE
Myrmeleotettix antennatus (Fieber, 1853)*	2				2	2	2										25,0	EN	SD
Myrmeleotettix maculatus (Thunberg, 1815)	3			2	3	3	2				2						37,5		SD
Chorthippus albomarginatus (Degeer, 1773)										1				2			12,5		W
Chorthippus apricarius (Linnaeus, 1758)	1		1			2				1	1	2					31,3		PO
Chorthippus biguttulus (Linnaeus, 1758)	2	2	2	2	2	2	3	2	2	1	2	2	3	2	1	1	100,0		PO
Chorthippus brunneus (Thunberg, 1815)	3	3	3	2	3	3	3	3	3	3	3	2	2	3	3	2	100,0		PO
Chorthippus dichrous (Eversmann, 1859)*	1	1	2		2	3	2	2		2		1		2			62,5		SD
Chorthippus dorsatus (Zetterstedt, 1821)	2	4	2	2	1	2	2	3	3	1		2	3	2	2	2	93,8		PO
Chorthippus mollis (Charpentier, 1825)	2	1	2	2	2	3	2	1	1	3	2	1	3	1		2	93,8		PO
Chorthippus oschei Helversen, 1986*	3	3	4	2	3	3	2	3	3	3		3		2			75,0		W
Pseudochorthippus montanus (Charpentier, 1825)								2	1								12,5		W
Pseudochorthippus parallelus (Zetterstedt, 1821)	2	3	3	3	3	3	3	3	2	2	2	3	3	2	3	3	100,0		PO
Euchorthippus declivus (Brisout de Barneville, 1848)*	2	4	2		3	3	3	3		2	3	3	2		2	4	81,3		PO
Euchorthippus pulvinatus (Fischer von Waldheim, 1846)*	2		1		2	1				1	1						37,5		FS
MANTODEA																			
Mantis religiosa (Linnaeus, 1758)	3	2	2	2	2	1	2	2	2	3	3	1	2	2	3	1	100,0		PO
Total species/area	**51**	**34**	**40**	**38**	**50**	**55**	**53**	**46**	**37**	**46**	**45**	**31**	**29**	**29**	**30**	**25**			

spp., *P. heydenii, T. bolivari, M. parapleurus, S. grossum*); (iv) forest edge dwelling species (13, e.g. *P. fussii, P. schmidtii, Isophya modesta, I. stysi, L. discoidalis, T. undulata, G. rufus, O. rubripes*) and (v) polytopic species (19 species). The local orthopteran assemblages are strongly related to Pannonian and Central European fauna (mainly to Pannonian basin in Hungary) that shown by its highest share. The area includes unique sites with high specific and well-preserved habitats, e.g. sandy dunes around Veľký Horeš, Svätuše, Veľký Kamenec, Beša and Somotor area, wet grasslands and riparian vegetation in Latorica, Tisa and Bodrog Rivers embankememts, forest steppes around Ladmovce, Tarbucka, Veký kopec, Brehov. All these sites are highly endangered by human activities (intensive farming techniques, drainige, sand exploatation, etc), cover very rare orthopteran species and should be protected for the future generations.

The first group of sand dunes habitats consists of rare, so-called pseudo-psammophilous species (Mařan 1954), in Slovakia found mainly in sand dunes; however, in the Mediterranean area and other parts of S Europe these are occurring also on other substrates. Among the rare species occurring both on sand dunes and in wetlands were *Tettigonia caudata* and *Gampsocleis glabra* (see also Krištín et al. 2007). These and several others rarely found 60 years ago by Mařan (1954), or 50 years ago by Gulička (1967, 1992) in blown sands in E and S Slovakia may be still considered as indicators of well- preserved sand dunes in this area.

The most frequent orthopteran species in the studied sites across the whole study area were eurytopic species such as *L. albovittata*, *T. viridissima*, *G. campestris*, *O. pellucens*, *Calliptamus italicus*, *Chorthipus biguttulus* and *P. parallelus*.

Notes to rare species

The most remarkable, in terms of faunistics and zoogeography are the species *Isophya stysi*, *I. modesta*, *L. discoidalis*, *Phaneroptera nana*, *Poecilimon fussii*, *P. schmidtii*, *Polysarcus denticauda*, *G. glabra*, *Platycleis affinis*, *M. montana*, *T. caudata*, *O. rubripes*, *A. ungarica*, *A. insubricus, O. decorus*, and *M. antennatus* (Table 1).

Isophya stysi – a species of European importance (Annex II, Habitats Directive), was found only in ecotones of xerotherm forest steppes near the village Ladmovce, is an extreme SE finding of this species in Slovakia (Kaňuch et al. 2006). At the same site, some zoogeographically important thamnobiont species were also found, such as *I. modesta*, *P. nana, P. fussii* (>100 ind./ ha/ check in July.

The thamnobiont species *L. discoidalis* is reaching its northern distribution limit in Slovakia and was found in various habitats. It was found preferably in shrubby vegetation in riparian vegetation and floodplain forest margins along the Bodrog, Latorica and Tisa rivers as well as in ecotones of xerotherm forest steppes. In these habitats, the species occurred together with the accompanying species *P. schmidtii* and *O. rubripes*.

The Ponto-Pannonian species *P. fussii* reaches the northern limit of its area in Latorica PLA area (Ladmovce) and it is the well-recognised vital population in Slovakia, distinctly isolated from similar insular populations in Slovakia (Krištín et al. 2020), Hungary and Ukraine (Nagy 2005). The abundance of *P. fussii* in oak forest steppes ecotones (site Ladmovce) approached max >100 ind. / 200 m long transect of herbaceous and shrubby vegetation in ecotone of a xerotherm forest steppe (also from stands of *Cerasus fruticosa*, *Rosa* sp. *Salvia* sp., and similar). The occurrence of this species in Slovakia has not been confirmed for as long as 50

years. In July 1951 this species, under the name *Poecilimon matisi,* was described by Mařan (1952b) from the Piliš hill (at about 6 km W from the site Ladmovce). At present this taxon is considered a subspecies of *P. fussii* (Harz 1969, Nagy 2005). It is adult early in the season, from mid-June to the end of July, and associated with ecotones of xerotherm oak forest steppes.

The closely related Pontic species *P. schmidtii* is found more frequently in Slovakia, when its northern range limit is in Polish borderland with Slovakia (Krištín & Jarčuška 2016).

Polysarcus denticauda, one of the largest central-European bush crickets, is very abundant in grassland sites there. Adults occur very early (May 25–June 30) in wet meadows and adjacent ruderal vegetation and sand dunes (the most abundant e.g. in sites Strážne, Veľký Kamenec, Somotor, Leles). The species regularly occurs associated with the rare *Gampsocleis glabra* and *Tettigonia caudata.*

Gampsocleis glabra has been found in warm lowland habitats at altitudes 98–150 m a.s.l., when the species occurs recently in Slovakia only in Latorica area. It prefers there desiccating wet meadows and sand dunes along wet depressions, but also ruderal vegetation along similar well-preserved habitats. The species was found mostly as adult in July, e.g. Veľký Kamenec, July 14, 2005, > 100 stridulating males/ ha (Krištín et al. 2007).

Odontopodisma rubripes – a species of European importance (Annex II, Habitats Directive) occurred regularly (>50 adults/ ha in mid-July) in margins of floodplain forests along the Tisa River. Hence, this distribution area is adjacent to the connected distribution area of this species in Hungary and Romania (Nagy 1991; Hochkirch et al. 2016).

A special group of rare species in the study area consists of pseudo-psammophilous species. The typical pseudo-psammophilous species of Afro-tropic origin *A. ungarica* was caught near Somotor village already in the 19-th century by Chyzer (1897), and still in 1951–1962 was found abundant by Mařan (1952a) and Gulička (1992, in litt.). In the sand dunes along the Slovak part of the Danube and Ipeľ River, the species is surviving in several sites (Krištín et al. 2004a, b, 2020). Small, isolated populations (< 20 adults/ ha) area surviving in sand dunes in Horeš, Somotor and Strážne areas, in some of them together with rare, *P. affinis*, *M. montana, Oedaleus decorus*, *M. antennatus* and other species.

The Mediterranean species *Platycleis affinis* was found in the same three sand-dune areas (e.g. in Horeš, Somotor and Strážne, > 10 ind.). The species is reaching the northern limit of its distribution range in Europe in Latorica area (cf. Hochkirch et al. 2016).

The E-European species *Montana montana* was found rather regular (six areas) in sand dunes and xerotherm habitats of Latorica area (Table 1), which is the stronghold of the species in Slovakia recently.

O. decorus, A. insubricus, and *Myrmeleotettix antennatus* are associated with well-preserved sandy plots, with high percentage of bare ground and scarce herbaceous vegetation. Their local abundance mostly does not exceed 20 adults/ ha, when *O. decorus* was found in one site only and reaches there the northern limit of its range. The species *A. insubricus* was found in Slovakia only after 60 years in 2019 just in Latorica area (Balla & Krištín 2019) and it is known in four sites recently (Table 1). The adults occur mainly in autumn (September- November) and spring (March-April). *M. antennatus* belongs to the endangered species, occurring only in Latorica and Danube areas within Slovakia (Krištín et al. 2020).

Three pseudo-psammophilous species (*Calliptamus barbarus*, *Celes variabilis*, *A. longipes*) were not found again in 1997–2020 in the Eastern Slovak Plain (and entire

Fig. 1 *Gampsocleis glabra (a) and Acrotylus insubricus (b) occur within Slovakia only in Latorica area recently (photo: M. Balla).*

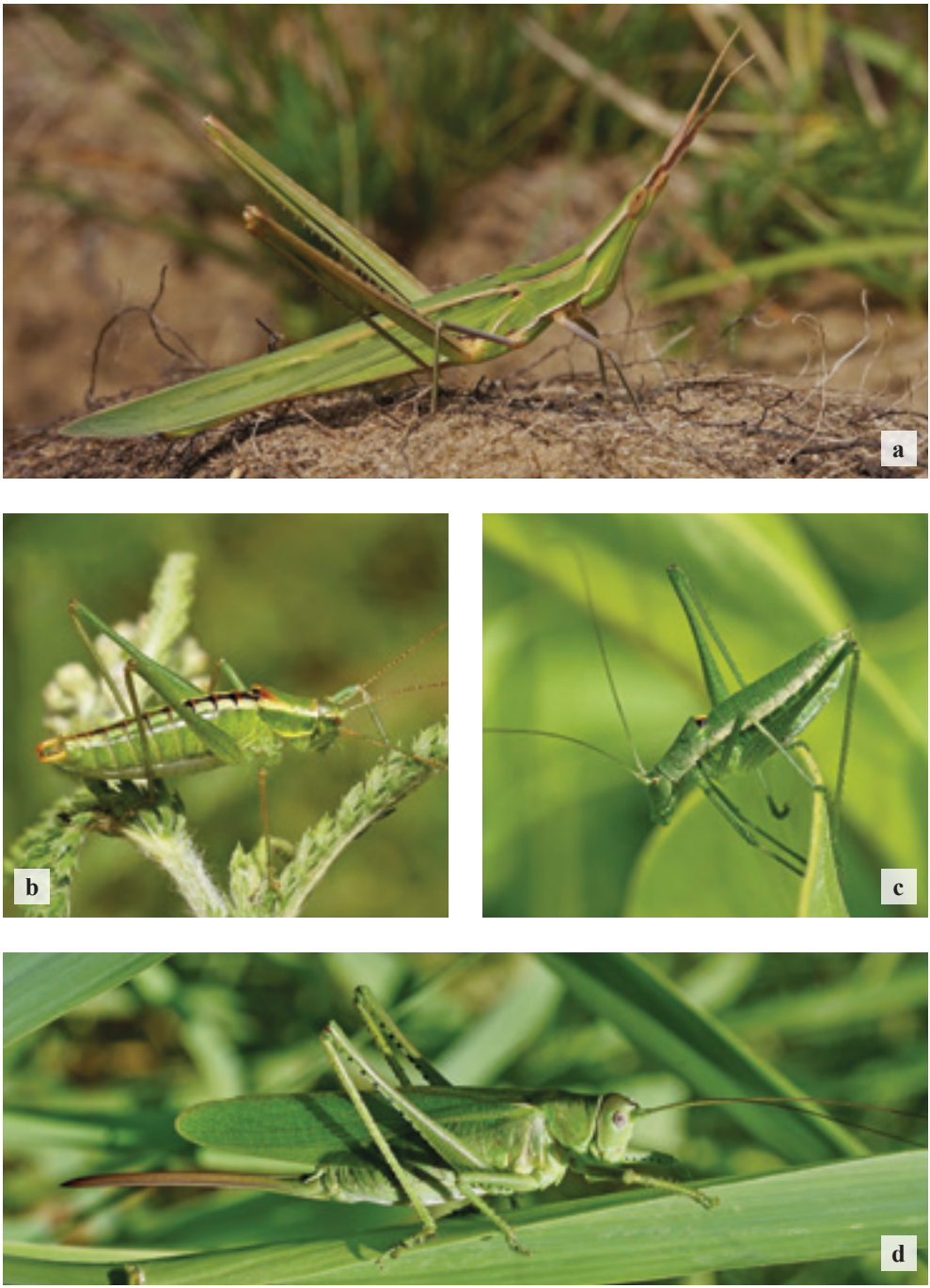

Fig. 2 *Examples of the species, having stronghold of their distribution within Slovakia in the Latorica area: Acrida ungarica (a), Poecilimon fussii (b), Leptophyes discoidalis (c) and Tettigonia caudata (d) (photo: M. Balla).*

Slovakia), while they were present 50 (Mařan 1954) or 40 years ago there (Gulička 1954, 1967, 1992). These species supposedly had the northern limit of their European distribution range in Slovakia. For the occurrence of these species as well as possible causes of their absence in the study area in the last 60 years see Krištín et al. (2004a, 2020).

The Latorica PLA area includes unique sites with high specific and well-preserved habitats, e.g. sandy dunes around Horeš, Svätuše, Strážne, Beša and Somotor area, wet grasslands and riparian vegetation in Latorica, Tisa and Bodrog Rivers embankments, forest steppes around Ladmovce, Tarbucka, Veľký kopec, Brehov. All these sites are highly endangered by human activities (intensive farming techniques, drainage, sand exploitation, etc.), cover very rare orthopteran species and should be protected for the future generations.

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Súhrn

Koníky, kobylky (Orthoptera) a modlivky (Mantodea) Chránenej krajinej oblasti Latorica

V rokoch 1997–2020 bolo na území CHKO Latorica zistených 76 druhov Orthoptera (59% zo všetkých 129 druhov zistených na Slovensku) a jeden druh modlivky. Tento počet druhov zaraďuje toto územie medzi druhovo najbohatšie na rovnokrídlovce na Slovensku. Zo zistených druhov bolo 34 druhov kobyliek (Ensifera) a 42 koníkov (Caelifera), ktoré dokumentujú hlavne stepný a trávnatý charakter územia. Dva druhy (*Acrotylus insubricus, Gampsocleis glabra*) boli zaznamenané v rámci Slovenska v posledných 25 rokoch len tam. Pre minimálne 9 druhov je územie veľmi významné z hľadiska ich výskytu na Slovensku a v Európe (*Isophya modesta, Poecilimon fussii, Leptophyes discoidalis, Platycleis affinis, Montana montana, Tettigonia caudata, Acrida ungarica, Myrmeleotettix antennatus, Chorthippus dichrous)*. Väčšina druhov sú xerotermnofilné a obývajú hlavne zachovalé habitaty piesočných dún, slanísk, xerických lesostepí, mokradí a mokrých lúk. Viaceré vzácne a ohrozené druhy boli tam zistené v relatívne vysokých početnostiach (napr. druh EU významu *Odontopodisma rubripes*, alebo druhy *Polysarcus denticauda, Oedaleus decorus*, ktoré odrážajú špecifické mikroklimatické podmienky v charakteristických habitatoch územia). V rámci zistených druhov sa zistilo 7 druhov v rámci troch kategórii ohrozenia (v kategórii CR 2 druhy = *P. fussii, A. insubricus*, EN 2 = *G. glabra, M. antennatus*, VU 3 = *I. modesta, O. rubripes, A. ungarica*) a 11 druhov v kategórii NT, Tab. 1) z 22 druhov v troch najvyšších kategóriách ohrozenia a 18 NT druhov zaradených do Červeného zoznamu Orthoptera Slovenska (Krištín et al. 2020). Všetky tieto druhy potvrdzujú mimoriadny význam pre biodiverzitu hmyzu Slovenska.

V 16 študovaných územiach CHKO Latorica sme zistili 28–54 druhov Orthoptera (priemer 40 / územie), modlivka bola zistená vo všetkých. Rozlíšili sme 5 hlavných skupín rovnokrídlovcov podľa biotopov: (i) druhy preferujúce piesočné duny a slaniská (15 druhov, napr. *P. affinis, G. glabra, A. insubricus, A. ungarica, M. antennatus*, *O. decorus, D. brevicollis*); (ii) lesostepné druhy (12, napr. *Ephippiger ephippiger, Platycleis grisea, Eumodicogryllus bordigalensis*, *Stenobothrus crassipes, Stenobothrus nigromaculatus*); (iii) druhy obývajúce mokrade, mokré lúky a pobrežnú vegetáciu pozdĺž vôd (18, napr. *Ruspolia nitidula, Conocephalus* spp., *Pteronemobius heydenii, Tetrix bolivari, Mecostethus parapleurus, Stetophyma grossum*); (iv) druhy lesných okrajov (13, napr. *P. fussii, Poecilimon schmidtii, I. modesta, I. stysi, L. discoidalis, Tetrix undulata, Gomphocerus rufus, O. rubripes*); (v) poly/ eurytopné druhy (19). Lokálne spoločenstvá Orthoptera sú tvorené hlavne s Panónskou a stredoeurópskou faunou (majú priamy kontakt s panónskou nížinou v Maďarsku). Študované územie zahrňuje unikátne lokality s vysoko špecifickými a zachovanými biotopmi, napr. pieskové duny okolo obcí Horeš, Svätuše, Strážne, Beša a Somotor, mokré lúky a pobrežná vegetácia v pobreží riek Latorica, Tisa a Bodrog, lesostepi okolo obcí Ladmovce, na kopcoch Tarbucka, Veľký kopec pri Kráľovskom Chlmci a Veľký vrch pri Brehove. Všetky tieto lokality a územia sú ohrozené ľudskými aktivitami (intenzívne hospodárske techniky, vysušovanie, ťažba piesku, atď.), zatiaľ ich obývajú vzácne spoločenstvá rovnokrídleho hmyzu a mali by byť chránené pre budúce generácie.

True bug fauna (Hemiptera: Heteroptera) of the Latorica Protected Landscape Area, Tarbucka Nature Reserve and adjacent localities – a literary review

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Abstract

The fauna of Heteroptera of the Latorica Protected Landscape Area, Tarbucka Nature Reserve and their adjacent localities is relatively poorly known despite the fact that nearly 1/4 of species known in Slovakia is documented from there. The main reason is namely lack of systematic research covering the complete spectrum of habitats. This review brings the overview of 232 published species supplemented by 27 new records from this area. Altogether, 259 species were known from the area until now. Three of them are included in the last Red List of Slovak Heteroptera: *Maccevethus caucasicus* (Kolenati, 1845) (EN), *Menaccarus arenicola* (Scholtz, 1847) (EN) and *Crypsinus angustatus* (Baerensprung, 1859) (CR). One species, *Stygnocoris faustus* Horváth, 1888 (Rhyparochromidae), is questionable for the territory of Slovakia and needs confirmation.

Key words: Heteroptera, East Slovakia, Latorica PLA, Tarbucka NR, faunistics

Introduction

The oldest known records of true bugs (Heteroptera) from the area of the Latorica Protected Landscape Area (PLA) and its surroundings were given by Horváth (1870, 1875, 1882, 1884, 1885, 1886, 1897, 1899, 1905, 1907) and Mocsáry (1875) from three last decades of the 19th and first decade of the 20th century. Some of these records (but not all of them) were cited in Balthasar (1937) and revised in Halászfy (1954, 1955, 1958), Soós (1959, 1973), Benedek (1968, 1969, 1970) and Vásárhelyi (1978) together with some further new records. The records provided by Hungarian authors were based on the material deposited especially in Natural History Museum in Budapest while the records of Czech (or few other) authors on their own material from the period of the first Czechoslovak Republic (Balthasar 1937; Hoberlandt 1944) or from the post-war years respectively from the late 20th century (Stehlík & Hoberlandt 1954; Roubal 1956, 1957, 1959, 1961, 1965a, b, 1969; Wróblewski 1960; Stehlík 1970, 1979; Štys 1972, 1974; Bozděchová 1973; Štusák 1978; Štys & Davidová

1979; Kokorďák 1982; Stehlík & Vavřínová 1991, 1993, 1994, 1995a, b, 1996, 1998a, b, 1999; Nejedlá 1997; Davidová-Vilímová & Podoubský 1999; Stehlík & Heiss 2001; Stehlík 2002; Rus 2005; Kment & Jindra 2008; Kment & Baňař 2010; Matocq & Pluot-Sigwalt 2012). Only one Slovak work, Gregor (1985), was focused especially on the Latorica PLA and provided a few records of Nepomorpha together with records of some other insects and animals. In the Hungarian and Czechoslovak periods, a numerous (but unsystematic) collectings were performed in the area, which were focused especially on several famous localities. However, the material from these collectings has never been examined in comprehensive way and many specimens are still waiting for the study, especially in the Czech museums (P. Kment, pers. comm.). The highest number of records was provided by Stehlík & Vavřínová (1991, 1993, 1994, 1995a, b, 1996, 1998a, b, 1999), Stehlík & Heiss (2001) and Stehlík (2002) in their series of the faunistical review of Slovak Heteroptera, which represents the part of results of the investigations realized by the Moravian Museum in the 1950–1980s. These papers include complete review of the infraorder Pentatomomorpha and families Reduviidae, Nabidae: Prostemmatinae, and Tingidae of Cimicomorpha. However, material of the remaining groups of Heteroptera is still waiting for examination in the Moravian Museum in Brno (P. Kment, pers. comm.). After the year 1990, almost any research is lacking except for some random visits of amateur entomologists (P. Kment, pers. comm.) and only four published records come from this period (Kment et al. 2003, 2013; Krištofík & Danko 2012). Some records are only indicated in the literature without any further details: Two points showed on a map of the distribution of *Coptosoma* (*C.*) *scutellatum* (Geoffroy, 1785) in the former Czechoslovakia in Davidová-Vilímová & Štys (1980) are clearly situated near the Latorica and Bodrog rivers, but without any exact locality data in the text of the paper (the authors stated the information about ca. 3000 examined specimens from the entire country). Water bugs (Heteroptera: Nepomorpha, Gerromorpha) are also mentioned in Koščo et al. (2006) as a part of trophic base of fishes in gravel pits of the Latorica River, but without mentioning any species name. Number of points are shown on the map of Slovakia including the area of East Slovak Plain in Reduciendo Klementová et al. (2015), but their exact records remain unpublished. All together, 232 species of Heteroptera from the Latorica area were published in period of 1870–2013. All of these records were only individualy captured and included into the widely focused works. No study focused exclusively on the Heteroptera fauna of the Latorica area was realized until now.

Material and methods

The species nomenclature and distribution data used to define the zoogeographical elements follow the catalogue of the Palaearctic Heteroptera (Aukema & Rieger 1995, 1996, 1999, 2001, 2006; Aukema et al. 2013) or later specialized papers (Lupoli 2017). Codes of Central European mapping grid (Ehrendorfer & Hamann 1965) follow Novák (1989).

Abbreviations of the examined collections: BMFC – Beskydy Museum, Frýdek-Místek, Czech Republic; CUPC – Department of Entomology, Faculty of Science, Charles University, Prague, Czech Republic; JVPC – Jitka Vilímová collection, Charles University, Prague, Czech Republic (to be deposited in NMPC); MMBC – Moravian Museum, Brno, Czech Republic; MMHC – Marion Mantič private collection, Hlučín, Czech Republic;

NMBS – Slovak National Museum, Bratislava, Slovakia (the Heteroptera collection of Jan Roubal); NMPC – National Museum, Prague, Czech Republic; SMLS – Slovak Museum of Nature Protection and Speleology, Liptovský Mikuláš, Slovakia; SMOC – Silesian Museum, Opava, Czech Republic; VURV – Research Institute of Crop Production, Prague-Ruzyně, Czech Republic; VZPC – Vladimír Zeman private collection, Přerov, Czech Republic; ZJPC – Zdeněk Jindra private collection, Prague, Czech Republic.

Abbreviations of zoogeografical elements: af – Afrotropical, ba – Balkan, ca – Central Asian, e – European, ea – East Asian, ek – East European-Kazakh, es – Eurosiberian, ha – Holarctic, hm – Holomediterranean, hp – Holopalaearctic, nm – North Mediterranean, nt – Neotropical, or – Oriental, pm – Ponto-Mediterranean, ses – South Eurosiberian, wes – West Eurosiberian, wm – West Mediterranean, wp – West Palaearctic.

Other abbreviations: ♂ – adult male, ♀ – adult female, ♂♂ – males, ♀♀ – females, L – larva (L1–5 – larva/e of the instar 1–5), br – brachypterous, ma – macropterous, mi – micropterous, sbr – subbrachypterous, NR – Nature Reserve; PLA – Protected Landscape Area.

List of localities

Each locality is accompanied by the citation(s) of a work(s), mentioning at least one species of Heteroptera. The Hungarian names of localities are shown in square brackets. Verbatim wording, older names and non-standard names are shown in quotation marks (if they are not the same as the official names of localities in Slovak/Hungarian).

Published localities inside the Latorica PLA and Tarbucka NR (or in their close proximity)

1 – "Latorica" [Latorca] – Roubal (1965b), Štys (1972) as "Latorica, bridge", Bozděchová (1973), Štys & Davidová (1979) in flood litter, Davidová-Vilímová & Štys (1980) [only as points on map of the former Czechoslovakia, clearly situated near the Latorica and Bodrog rivers], Matocq & Pluot-Sigwalt (2012) as "Latorica river, Latorica ost".

2 – "Latorica, near Latorica bridge, Boľ and Zatín" – Štys (1974).

3 – Rad [Rad] – Gregor (1985).

4 – Ladmovce [Ladamóc] – Nejedlá (1997), Kment et al. (2013).

5 – Leles [Lelesz] – Stehlík & Vavřínová (1995b), Nejedlá (1997), Stehlík (2002).

6 – Malá Tŕňa [Kistorony] – Benedek (1968).

7 – Somotor [Szomotor] – Horváth (1870, 1884, 1897, 1905, 1907), Hoberlandt (1944), Halászfy (1954, 1955, 1958), Benedek (1968, 1970), Štys (1974) as "Somotor, including Tarbucka Hill", Vásárhelyi (1978), (Kokorďák 1982) as "Somotor dead arm" and "Somotor main channel" (both 1967–1979), Stehlík & Vavřínová (1991, 1993, 1994, 1995a, 1996, 1999), Nejedlá (1997), Stehlík (2002), Rus (2005).

8 – Tarbucka [Tarbucka] – Stehlík & Hoberlandt (1954) as "Tarbucka u Vel. Horeša" (Veľký Horeš [Nagygéres] is a village ca. 9 km eastern from the Tarbucka Hill), Stehlík & Vavřínová (1993, 1994, 1995a, b, 1996, 1998a, 1999), Nejedlá (1997), Davidová-Vilímová & Podoubský (1999).

9 – Streda nad Bodrogom [Bodrogszerdahely], Tarbucka – Stehlík & Vavřínová (1994), Stehlík (2002), Kment et al. (2013) [this locality is mentioned as parts of Tarbucka

lying in the cadaster of Streda nad Bodrogom village because it was published as "Streda nad Bodrogom (Tarbucka)" or in the similar form].

10 – Viničky [Szőllőske] – Horváth (1897), Benedek (1969, 1970), Stehlík & Vavřínová (1991, 1993, 1994, 1995a, b, 1996, 1998a, 1999), Nejedlá (1997), Davidová-Vilímová & Podoubský (1999), Stehlík & Heiss (2001).

Published adjacent localities

11 – Biel [Bély] – Horváth (1897)

12 – Borša [Borsa] – Horváth (1897), Stehlík (1970, 1979), Gregor (1985) near Bodrog River, Stehlík & Vavřínová (1991, 1993, 1994, 1995a, b, 1996, 1998b, 1999), Stehlík (2002).

13 – Cejkov [Céke] – Horváth (1897) as "Czéke", Soós (1959), Benedek (1970), Nejedlá (1997).

14 – Čierna nad Tisou [Tiszacsernyő] – Balthasar (1937).

15 – Dobrá [Dobra] – Horváth (1897).

16 – Hrčeľ [Gercsely] – Horváth (1897), Soós (1959), Wróblewski (1960).

17 – Kráľovský Chlmec [Királyhelmec] – Horváth (1897) as "Király-Helmecz", Balthasar (1937), Roubal (1956, 1957, 1959, 1961, 1965a, b), Soós (1959), Roubal (1969) as "Slov. Kráľ. Chlmec", Štys (1974) as "Kráľ. Chlmec, including Nágy Hill", Štusák (1978), Stehlík & Vavřínová (1993, 1994, 1995a, 1996, 1998a, 1999), Nejedlá (1997), Davidová-Vilímová & Podoubský (1999), Stehlík (2002), Rus (2005), Kment & Jindra (2008), Kment & Baňař (2010), Matocq & Pluot-Sigwalt (2012) as "Nagy Hegy u Královský Chlumac [sic!]".

18 – Strážne [Őrös] – Stehlík & Vavřínová (1995a).

19 – Slovenské Nové Mesto [Kisújhely] – Roubal (1965a), Benedek (1969) as "Újhely", Stehlík & Vavřínová (1993, 1994, 1996).

20 – Sátoraljaújhely or "S.-A.-Ujhely" or "Ujhely" – Horváth (1870, 1875, 1882, 1885, 1886, 1897, 1899, 1905, 1907), Mocsáry (1875), Halászfy (1954), Soós (1959, 1973) (with collecting dates before 1918) – town divided into two towns between Hungary (Sátoraljaújhely) and Slovakia (Slovenské Nové Mesto [Kisújhely]) along the Roňava [Ronyva] River since 1918 – it is impossible to attribute the records exactly for one of the two countries.

21 – Streda nad Bodrogom village [Bodrogszerdahely] – Kment et al. (2003).

22 – Boťany [Battyán] – Krištofík & Danko (2012).

23 – Tisa River near Veľké Trakany [Nagytárkány] – Nejedlá (1997), Davidová-Vilímová & Podoubský (1999).

24 – Tisa River near Malé Trakany [Kistárkány] – Nejedlá (1997).

25 – Brehov [Imreg or Imbreg] – Nejedlá (1997).

26 – Svätuše (formerly Plešany) [Bodrogszentes] – Nejedlá (1997).

27 – Veľký Horeš [Nagygéres] – Nejedlá (1997).

Unpublished localities

A – Somotor [Szomotor], sands ca. 2 km eastern from the village, 48°24′10.70″N 21°50′26.94″E (7597), 10.VI.2018, sweeping of the very sparse ground vegetation and hand collecting, V. Hemala & M. Šoltís lgt.

B – Somotor [Szomotor], ca. 2 km eastern from the village, field path near the small bridge and gate of the sheep farm nearby the sands, 48°24′5.05″N 21°50′17.59″E (7597), 10.VI.2018, hand collected from the ground, V. Hemala lgt.

C – Tarbucka, near Malý Kamenec [Kiskövesd], small abandoned quarry and adjacent grassy slopes with shrubs and small trees, 48°21′25.91″N 21°47′1.11″E (7696), 10.VI.2018, sweeping of vegetation, V. Hemala & M. Šoltís lgt.

Note: Specimens of some species were examined in the museum collections and their locality details are fully stated at the given species in the Results.

Results – List of species

Nepidae

Nepa cinerea Linnaeus, 1758 – 7 (Kokorďák 1982); 12 (Gregor 1985) – hp.

Ranatra (*Ranatra*) *linearis* (Linnaeus, 1758) – 3 (Gregor 1985) ; 7 (Kokorďák 1982) – hp.

Micronectidae

Micronecta (*Micronecta*) *griseola* Horváth, 1899 – 16 (Wróblewski 1960) – e+pm.

Corixidae

Callicorixa praeusta praeusta (Fieber, 1848) – "Kr. Chlumec" (= Kráľovský Chlmec) (7597), 3.IV.1954, 1 ♂, J. Dlabola lgt., P. Kment det. (VURV) – es+ca.

Corixa punctata (Illiger, 1807) – 17, 20 (Soós 1959) – wp+ca.

Cymatia coleoptrata (Fabricius, 1777) – 17, 20 (Horváth 1897; Soós 1959); Leles (7598), dead arms of the Latorica river, 13.V.1950, 1 ♂ 2 ♀♀ (all br), J. L. Stehlík lgt., P. Kment det. (MMBC) – es+ca.

Hesperocorixa linnaei (Fieber, 1848) – 17, 20 (Soós 1959); Kráľovský Chlmec (7597), VIII.1960, 1 ♂ 1 ♀, Borůvka lgt., P. Kment det. (SMOC) – wp+ca.

Sigara (*Pseudovermicorixa*) *nigrolineata nigrolineata* (Fieber, 1848) – 13, 20 (Soós 1959) – wp.

Sigara (*Retrocorixa*) *limitata limitata* (Fieber, 1848) – 7, 13, 17, 20 (Soós 1959) – es+pm.

Sigara (*Retrocorixa*) *semistriata* (Fieber, 1848) – 13 (Horváth 1897; Soós 1959); 20 (Soós 1959) – es+ca.

Sigara (*Sigara*) *striata* (Linnaeus, 1758) – 17, 20 (Soós 1959); Boľ (7597), mesotrophic meadow near the channel of the Bodrog pumping station, 23.VI.1996, 1 ♂, M. Roháčová lgt. et det., P. Kment revid. (BMFC) – es+ca.

Sigara (*Subsigara*) *falleni* (Fieber, 1848) – 13, 17, 20 (Soós 1959); Leles (7598), dead arms of the Latorica river, 13.V.1950, 1 ♀, J. L. Stehlík lgt., P. Kment det. (MMBC); Somotor (7597), VII.1958, 1 ♂, Kocourek lgt., P. Kment det. (MMBC) – es+ca.

Sigara (*Vermicorixa*) *lateralis* (Leach, 1817) – 16, 17, 20 (Soós 1959); "Kr. Chlumec" (= Kráľovský Chlmec) (7597), 3.IV.1954, 4 ♀♀, J. Dlabola lgt., P. Kment det. (VURV) – hp+af (with overlap to India).

Naucoridae

Ilyocoris cimicoides cimicoides (Linnaeus, 1758) – 7 (Kokorďák 1982) – es.

Notonectidae

Notonecta (*Notonecta*) *glauca glauca* Linnaeus, 1758 – Kráľovský Chlmec (7597), VIII.1960, 3 spec., Borůvka lgt., P. Kment det. (SMOC) – hp.

Hebridae

Hebrus (*Hebrusella*) *ruficeps* Thomson, 1871 – 7 (Horváth 1884; Benedek 1970) – es+ca.

Hydrometridae

Hydrometra gracilenta Horváth, 1899 – 20 (Horváth 1899: original description of the species, "S.-A.-Ujhely" was one from six type localities mentioned there) – hp.

Veliidae

Microvelia (*Microvelia*) *reticulata* (Burmeister, 1835) – 10 (Benedek 1970 as "*Microvelia schneideri* (Scholtz), 1847") – es+ea.

Gerridae

Gerris (*Gerris*) *argentatus* Schummel, 1832 – 13 (Benedek 1970) – wp (with overlap to East Siberia and Mongolia).

Gerris (*Gerris*) *thoracicus* Schummel, 1832 – 13 (Benedek 1970) – wp.

Gerris (*Gerriselloides*) *asper* (Fieber, 1860) – 20 (Horváth 1897) – hm.

Saldidae

Chartoscirta cincta cincta (Herrich-Schaeffer, 1841) – Streda nad Bodrogom (7696), 21.III.1963, 1 ♀, no collector, V. Hemala 2020 det., J. Roubal coll. (NMBS) – wp+af (with overlap to East Siberia).

Saldula arenicola arenicola (Scholtz, 1847) – 7, 13 (Horváth 1897) – hp+af.

Saldula pallipes (Fabricius, 1794) – 7 (Benedek 1970); 13 (Horváth 1897) – ha.

Saldula pilosella pilosella (Thomson, 1871) – 7, 13, 20 (Horváth 1897); 13 (Benedek 1970) – hp.

Leptopodidae

Leptopus marmoratus (Goeze, 1778) – 10 (Horváth 1897) – hm.

Tingidae

Acalypta gracilis (Fieber, 1844) – 7 (Horváth 1897); 12 (Stehlík 2002); Ladmovce (7596), steppe, sifting, 21.V.2002, 1 ♀, M. Mantič lgt., P. Kment det. (MMHC) – es.

Acalypta marginata (Wolff, 1804) – Ladmovce (7596), steppe, sifting, 21.V.2002, 3 ♀♀, M. Mantič lgt., P. Kment det. (MMHC) – es.

Acalypta parvula (Fallén, 1807) – 20 (Horváth 1897) – wp.

Catoplatus carthusianus (Goeze, 1778) – 9 (Stehlík 2002); Veľký Kamenec, Tarbucka (7696), sweepings, 11.VI.2000, 3 ♂♂, P. Boža lgt., P. Kment det. (MMHC) – hm.

Copium clavicorne clavicorne (Linnaeus, 1758) – 12 (Stehlík 2002) – nm.
Dictyla echii (Schrank, 1782) – 7, 9, 12 (Stehlík 2002) – hp.
Dictyla humuli (Fabricius, 1794) – 5 (Stehlík 2002) – es.
Dictyla lupuli (Herrich-Schaeffer, 1837) – 7 (Horváth 1897) – es.
Dictyla rotundata (Herrich-Schaeffer, 1835) – 9, 12 (Stehlík 2002); 20 (Horváth 1897); Malý Horeš (7597), sweepings, 13.VI.2000, 2 ♀♀, P. Boža lgt., P. Kment det. (MMHC) – nm.
Dictyonota strichnocera Fieber, 1844 – 7 (Horváth 1897) – nm.
Galeatus affinis (Herrich-Schaeffer, 1835) – 7 (Horváth 1897) – es+ea.
Kalama tricornis (Schrank, 1801) – 7 (Stehlík 2002) – ha.
Lasiacantha capucina capucina (Germar, 1837) – 7, 9 (Stehlík 2002); Somotor (7597), sands, 12.VII.1951, 1 ♂, A. Hoffer lgt., P. Kment det. (NMPC); Veľký Kamenec, Tarbucka (7696), sweepings, 11.VI.2000, 2 ♂♂, P. Boža lgt., P. Kment det. (MMHC); Ladmovce (7596), steppe, sifting, 21.V.2002, 1 ♂, M. Mantič lgt., P. Kment det. (MMHC) – wes.
Lasiacantha hermani Vásárhelyi, 1978 – 7 (Horváth 1905, 1907 misidentified as "*Tingis gracilis* H.-Sch." or "*Lasiacantha gracilis* H.-Sch."; Vásárhelyi 1978 include the specimen misidentified as *L. gracilis* from Horváth's collection among paratypes in his description of *L. hermani*); 17 (Štusák 1978) – es.
Oncochila scapularis (Fieber, 1844) – 9 (Stehlík 2002); C: 1 ♂; Veľký Kamenec, Tarbucka (7696), sweepings, 11.VI.2000, 1 ♂, P. Boža lgt., P. Kment det. (MMHC) – ses.
Tingis (*Neolasiotropis*) *pilosa* Hummel, 1825 – Soľnička (7597), sand, sweeping, 7.VII.1999, 1 ♀, M. Mantič lgt., P. Kment det. (MMHC) – hp.
Tingis (*Tingis*) *angustata* (Herrich-Schaeffer, 1838) – 13, 20 (Horváth 1897) – wp.
Tingis (*Tingis*) *auriculata* (A. Costa, 1847) – 10 (Stehlík 2002); 20 (Horváth 1905) – wp.
Tingis (*Tingis*) *cardui* (Linnaeus, 1758) – 20 (Mocsáry 1875) – hp.
Tingis (*Tingis*) *crispata* (Herrich-Schaeffer, 1838) – 17 (Stehlík 2002) – ses+ea.
Tingis (*Tropidocheila*) *maculata* (Herrich-Schaeffer, 1838) – 9 (Stehlík 2002) – nm.

Miridae

Acetropis (*Acetropis*) *longirostris* Puton, 1875 – 2, 7, 17 (Štys 1974) – ek (expanding to the Pannonian Basin).
Adelphocoris lineolatus (Goeze, 1778) – 20 (Mocsáry 1875) – hp.
Adelphocoris seticornis (Fabricius, 1775) – 20 (Mocsáry 1875) – es+ca.
Adelphocoris reichelii (Fieber, 1836) – 20 (Horváth 1897) – es+ea.
Adelphocoris ticinensis (Meyer-Dür, 1843) – 10, 20 (Horváth 1897) – nm+ca.
Amblytylus nasutus (Kirschbaum, 1856) – 1 (Štys 1972); 1, 17 (Matocq & Pluot-Sigwalt 2012) – e.
Atractotomus magnicornis (Fallén, 1807) – 20 (Horváth 1897) – e.
Brachycoleus decolor Reuter, 1887 – C: 1 ♂ 2 ♀♀ – ses+ca.
Criocoris sulcicornis (Kirschbaum, 1856) – 10, 20 (Horváth 1897) – nm.
Deraeocoris (*Deraeocoris*) *ruber* (Linnaeus, 1758) – C: 1 ♂ 1 ♀ – wp.
Deraeocoris (*Deraeocoris*) *trifasciatus* (Linnaeus, 1767) – 20 (Horváth 1897) – e.
Hallodapus suturalis (Herrich-Schaeffer, 1837) – 7 (Horváth 1897) – hm+ca.
Halticus apterus apterus (Linnaeus, 1758) – Veľký Horeš env. (7697), 8.VII.1988, 1 ♂ (br), J. Vilímová lgt., P. Kment det. (JVPC) – wp+ca.

Halticus luteicollis (Panzer, 1804) – Borša, 2.VII.1961, 1 ♂ 1 ♀, V. Krejčí lgt., P. Kment det. (MMBC) – wp.
Heterocordylus (*Heterocordylus*) *genistae* (Scopoli, 1763) – Borša (7696), 18.VI.1961, 2 ♀♀, V. Krejčí lgt., P. Kment det. (MMBC); Borša (7696), 2.VII.1961, 2 ♀♀, V. Krejčí lgt., P. Kment det. (MMBC); Latorica river env., 10.VII.1988, 2 ♀♀, J. Vilímová lgt., P. Kment det. (NMPC) – e.
Leptopterna ferrugata (Fallén, 1807) – 20 (Mocsáry 1875) – es.
Lygus pratensis (Linnaeus, 1758) – 20 (Mocsáry 1875) – hp (except east parts).
Megalocoleus exsanguis (Herrich-Schaeffer, 1835) – 7 (Horváth 1897) – nm (with overlap to Central Europe and Carpathians).
Megalocoleus naso (Reuter, 1879) – 1 (Štys 1972, as *Amblytylus macedonicus* Wagner, 1956) – pm.
Melanotrichus schoberiae (Reuter, 1876) – 20 (Horváth 1897) – nm+ca.
Monosynamma bohemanni (Fallén, 1829) – 20 (Horváth 1897) – ha.
Myrmecoris gracilis (R. F. Sahlberg, 1848) – 7 (Horváth 1897) – es+ca.
Odontoplatys bidentulus (Herrich-Schaeffer, 1842) – 12 (Horváth 1897) – ba (with overlap to Carpathians).
Oncotylus (*Cylindromelus*) *setulosus* (Herrich-Schaeffer, 1837) – 10, 20 (Horváth 1897) – nm+ca.
Orthocephalus bivittatus Fieber, 1864 – 7, 20 (Horváth 1897) – es+ca.
Orthotylus (*Orthotylus*) *nassatus* (Fabricius, 1787) – 20 (Horváth 1897) – es+ca.
Orthotylus (*Orthotylus*) *virens* (Fallén, 1807) – 20 (Horváth 1897) – wes.
Phytocoris (*Ktenocoris*) *nowickyi* Fieber, 1870 – 20 (Horváth 1907) – es+ea.
Piezocranum simulans Horváth, 1877 – 20 (Horváth 1897) – ses.
Pilophorus clavatus (Linnaeus, 1767) – 20 (Horváth 1897) – es+ea.
Plagiognathus (*Plagiognathus*) *bipunctatus* Reuter, 1883 – 10, 20 (Horváth 1897) – wp (except North Africa).
Polymerus (*Poeciloscytus*) *asperulae* (Fieber, 1861) – 20 (Horváth 1897) – hm+ses.
Rhabdomiris striatellus striatellus (Fabricius, 1794) – 20 (Horváth 1897) – wp (except North Africa).
Salicarus (*Salicarus*) *roseri* (Herrich-Schaeffer, 1838) – 10 (Horváth 1897) – es+ca.
Sthenarus rotermundi (Scholz, 1847) – 20 (Horváth 1897) – e.
Trigonotylus caelestialium (Kirkaldy, 1902) – 1 (Bozděchová 1973) – ha (except North Africa).
Tuponia (*Chlorotuponia*) *prasina* (Fieber, 1864) – 15 (Horváth 1897) – pm+ca.

Nabidae

Alloeorhynchus (*Alloeorhynchus*) *flavipes* (Fieber, 1836) – 20 (Horváth 1897) – nm.
Himacerus (*Aptus*) *mirmicoides* (O. Costa, 1834) – C: 1 L4 – wp.
Nabis (*Dolichonabis*) *limbatus* Dahlbom, 1851 – 20 (Horváth 1897) – es.
Nabis (*Nabis*) *rugosus* (Linnaeus, 1758) – 19 (Benedek 1969) – es.
Prostemma (*Prostemma*) *guttula guttula* (Fabricius, 1787) – 10 (Benedek 1969) – hm.
Prostemma (*Prostemma*) *sanguineum* (Rossi, 1790) – 7 (Horváth 1897); Somotor (7597), 13.V.1965, 1 ♀ (br), P. Štys lgt. (CUPC) – hm+ca.

Anthocoridae

Anthocoris limbatus Fieber, 1836 – 20 (Horváth 1897) – es.
Dysepicritus rufescens (A. Costa, 1847) – 20 (Horváth 1897) – hm.
Orius (*Heterorius*) *majusculus* (Reuter, 1879) – 17 (Roubal 1969) – ha.
Temnostethus (*Temnostethus*) *pusillus* (Herrich-Schaeffer, 1835) – 10 (Horváth 1897) – e.

Cimicidae

Cimex hirundinis (Lamarck, 1816) – Viničky (7596), in the room of building, near the nest of the common house martin (*Delichon urbicum*), 20.V.2002, M. Mantič lgt., P. Kment det., 1 ♂ (NMPC), 1 ♂ 1 ♀ (MMHC) – es.
Cimex pipistrelli Jenyns, 1839 – 22 (Krištofík & Danko 2012) – es.

Reduviidae

Coranus (*Coranus*) cf. *subapterus* (De Geer, 1773) – 20 (Horváth 1897) – unverified identification (records published before the Putshkov's revisions (Putshkov 1982a,b) can belong to several different species).
Coranus (*Coranus*) *subapterus* (De Geer, 1773) – Somotor (7597), 12.IX.1951, 1 ♀ (br), Exc. M. N. Pragae lgt., P. Kment det. (ZJPC); Streda nad Bodrogom (7696), field groves, sweepings, 20.IX.2001, 1 ♂ (br), M. Mantič lgt., P. Kment det. (MMHC) – verified identification – – wes (probably also ca).
Empicoris culiciformis (De Geer, 1773) – 11 (Horváth 1897) – wp.
Peirates hybridus (Scopoli, 1763) – 9 (Kment et al. 2013); 17 (Rus 2005); Kráľovský Chlmec (7597), 27.IV.1955, 1 ♂, Smetana lgt., J. Roubal det. et coll. (NMBS); ditto, 29.IV.1955, 1 ♀, Smetana lgt., J. Roubal det. et coll. (NMBS); ditto, 17.IV.1959, 1 ♂, Reška lgt., J. Roubal det. et coll. (NMBS) – hm+ca.
Phymata crassipes (Fabricius, 1775) – 6 (Benedek 1968); 10, 12 (Stehlík & Vavřínová 1998a); Ladmovce (7596), 27.V.1974, 1 ♂, Přeučilová lgt., P. Kment det. (CUPC) – hp (except southeast areas).
Reduvius personatus (Linnaeus, 1758) – 14 (Balthasar 1937); 17 (Balthasar 1937; Stehlík & Vavřínová 1998a) – wp.
Rhynocoris (*Rhynocoris*) *iracundus* (Poda, 1761) – 7 (Benedek 1968); 8, 10, 12, 17 (Stehlík & Vavřínová 1998a); Streda nad Bodrogom env. (7696), 11.VII.1988, 1 ♀, J. Vilímová lgt. (JVPC); Ladmovce (7596), 26.V.1995, 2 ♀♀, Urban lgt., P. Kment det. (VURV) – ses+ca.

Aradidae

Aradus (*Aradus*) *betulae* (Linnaeus, 1758) – 10 (Stehlík & Heiss 2001); Kráľovský Chlmec env. (7597), 28.IV.1978, 1 ♀, J. Vilímová lgt. (JVPC) – es+ea.
Aradus (*Aradus*) *cinnamomeus* Panzer, 1806 – 10 (Horváth 1897) – wes.
Aradus (*Aradus*) *conspicuus* (Herrich-Schaeffer, 1835) – 20 (Horváth 1886) – wes.
Aradus (*Aradus*) *corticalis* (Linnaeus, 1758) – 7, 20 (Horváth 1886) – misidentified as *A.* (*A.*) *annulicornis* Fabricius, 1803 – es+ea.
Aradus (*Aradus*) *depressus depressus* (Fabricius, 1794) – 13 (Horváth 1886) – es.
Aradus (*Aradus*) *distinctus* Fieber, 1860 – Leles (7598), 21.VII.1954, 1 ♂, Smetana lgt., J. Roubal det. et coll. (NMBS) – ba+ee (with overlaps to Central Europe).

Aradus (*Aradus*) *versicolor* Herrich-Schaeffer, 1835 – 10, 20 (Horváth 1886); Somotor (7597), VII.1960, 1 ♂, J. Jelínek lgt., P. Kment det. (NMPC) – e+ca.

Lygaeidae

Horvathiolus superbus (Pollich, 1781) – 20 (Soós 1973) – nm+ca.

Kleidocerys resedae resedae (Panzer, 1797) – 8, 12 (Stehlík & Vavřínová 1996); Veľký Horeš env., 8.VII.1988, 1 ♀, J. Vilímová lgt. (CUPC) – es+ea.

Lygaeus equestris (Linnaeus, 1758) – 8, 10, 12 (Stehlík & Vavřínová 1996) – hp.

Lygaeus simulans Deckert, 1985 – 10 (Stehlík & Vavřínová 1996) – ses+ca.

Melanocoryphus albomaculatus (Goeze, 1778) – Kráľovský Chlmec (7597), 23.IV.1955, 1 ♀, Smetana lgt., J. Roubal det. et coll. (NMBS); ditto, 29.IV.1955, 1 ♂, Smetana lgt., J. Roubal det. et coll. (NMBS) – hm+ca.

Nysius ericae ericae (Schilling, 1829) – 8 (Stehlík & Vavřínová 1996) – hp+af.

Nysius helveticus (Herrich-Schaeffer, 1850) – 7, 20 (Horváth 1897); 12 (Stehlík & Vavřínová 1996); Malý Horeš (7597), sweepings, 13.VI.2000, 1 ♀, P. Bož a lgt., P. Kment det. (MMHC) – es+ca.

Nysius senecionis senecionis (Schilling, 1829) – 8, 10, 12 (Stehlík & Vavřínová 1996) – hm+ca.

Nysius thymi thymi (Wolff, 1804) – 8, 10, 12 (Stehlík & Vavřínová 1996); A: 2 ♂♂ 6 ♀♀ (1 pair in copula) – ha.

Ortholomus punctipennis (Herrich-Schaeffer, 1838) – 7, 10, 12, 19 (Stehlík & Vavřínová 1996); C: 3 ♂♂ 3 ♀♀ – es+ca.

Spilostethus saxatilis (Scopoli, 1763) – 12 (Stehlík & Vavřínová 1996) – hm+ca.

Cymidae

Cymus claviculus (Fallén, 1807) – 8, 12 (Stehlík & Vavřínová 1996); Viničky (7596), 20.IX.2001, 1 ♀, M. Mantič lgt., P. Kment det. (MMHC) – hp (except China and the Far East).

Blissidae

Dimorphopterus spinolae (Signoret, 1857) – 20 (Horváth 1882, 1897); C: 1 ♂ (br), 3 ♀♀ (br), 1 ♀ (ma); Veľký Kamenec, Tarbucka (7696), sweepings, 11.VI.2000, 1 ♂ 1 ♀ (both mi), P. Bož a lgt., P. Kment det. (MMHC) – es+ca.

Ischnodemus sabuleti (Fallén, 1826) – 8 (Stehlík & Vavřínová 1996); 20 (Mocsáry 1875); Kráľovský Chlmec (7597), 17.IV.1959, 1 ♂ 1 ♀, Reška lgt., J. Roubal det. et coll. (NMBS); Somotor (7597), 13.V.1965, 1 ♀ (br), P. Štys lgt. (CUPC) – wp+ca.

Geocoridae

Geocoris (*Geocoris*) *ater* (Fabricius, 1787) – 7, 12 (Stehlík & Vavřínová 1996); 17 (Roubal 1961); Leles, Kapoňa (7598), 22.VI.1993, 1 ♂ 1 ♀ (both br), Urban lgt., P. Kment det. (VURV) – es+ca.

Geocoris (*Geocoris*) *grylloides* (Linnaeus, 1761) – 7 (Horváth 1897) – es+ea.

Geocoris (*Piocoris*) *erythrocephalus* (Lepeletier & Serville, 1825) – C: 1 ♂ 1 ♀ 1 L4 – hm.

Oxycarenidae

Camptotelus lineolatus lineolatus (Schilling, 1829) – 8 (Stehlík & Vavřínová 1996); Somotor (7597), 12.IX.1951, 1 ♀, no collector, P. Štys det., J. Roubal coll. (NMBS); Kráľovský Chlmec env. (7597), 12.VII.1988, J. Vilímová lgt., 2 ♂♂ (NMPC), 3 ♂♂ (JVPC) – ses+ca.

Metopoplax origani (Kolenati, 1845) – 8 (Stehlík & Vavřínová 1996) – nm+ca.

Microplax interrupta (Fieber, 1837) – 7 (Horváth 1897) – hm+ca.

Oxycarenus (*Oxycarenus*) *lavaterae* (Fabricius, 1787) – 21 (Kment et al. 2003) – wm (invasive in Central Europe and Balkan Peninsula).

Oxycarenus (*Euoxycarenus*) *pallens* (Herrich-Schaeffer, 1850) – 8 (Stehlík & Vavřínová 1996); C: 1 ♂ – wp+ca.

Heterogastridae

Heterogaster affinis Herrich-Schaeffer, 1835 – 7, 10 (Stehlík & Vavřínová 1996); 20 (Horváth 1897); Kráľovský Chlmec env. (7597), 12.VII.1988, 1 ♂, J. Vilímová lgt. (JVPC) – hm+ca.

Heterogaster artemisiae Schilling, 1829 – 8, 12, 17 (Stehlík & Vavřínová 1996); C: 1 ♀ – hm+ca.

Heterogaster urticae (Fabricius, 1775) – 8 (Stehlík & Vavřínová 1996) – wp.

Platyplax salviae (Schilling, 1829) – 7, 8 (Stehlík & Vavřínová 1996) – hm+ca.

Rhyparochromidae

Aellopus atratus (Goeze, 1778) – Streda nad Bodrogom (7696), 21.III.1963, 1 ♀, no collector, V. Hemala 2020 det., J. Roubal coll. (NMBS); Malý Horeš (7597), sweepings, 13.VI.2000, 1 ♂, P. Boža lgt., P. Kment det. (MMHC) – hm+ca.

Aphanus rolandri (Linnaeus, 1758) – 17 (Stehlík & Vavřínová 1999) – wp+ca.

Beosus maritimus (Scopoli, 1763) – 10 (Stehlík & Vavřínová 1999); 17 (Roubal 1965a) – wp.

Drymus (*Sylvadrymus*) *ryeii* Douglas & Scott, 1865 – 17 (Roubal 1959) – wes.

Emblethis ciliatus Horváth, 1875 – Kráľovský Chlmec env. (7597), 12.VII.1988, 1 ♂, J. Vilímová lgt. (JVPC) – hm+ca.

Emblethis griseus (Wolff, 1802) – 12 (Stehlík & Vavřínová 1999) – wp+ca.

Emblethis verbasci (Fabricius, 1803) – Viničky near Streda nad Bodrogom, 11.VII.1988, 1 ♂, J. Vilímová lgt. (JVPC) – wp.

Eremocoris fenestratus (Herrich-Schaeffer, 1839) – 17 (Roubal 1956) – hm+ca.

Graptopeltus lynceus (Fabricius, 1775) – 7, 10, 12, 17 (Stehlík & Vavřínová 1999) – wp.

Ischnocoris hemipterus (Schilling, 1829) – 12 (Stehlík & Vavřínová 1998b) – nm.

Ischnocoris punctulatus Fieber, 1861 – 12 (Stehlík 1970) – nm+ca.

Megalonotus chiragra (Fabricius, 1794) – 1, 19 (Roubal 1965b) – wp+ca.

Megalonotus emarginatus (Rey, 1888) – 8 (Stehlík & Vavřínová 1999); 17 (Roubal 1965b) – e.

Megalonotus sabulicola (Thomson, 1870) – 7, 8 (Stehlík & Vavřínová 1999); 17 (Roubal 1965b) – ha.

Peritrechus gracilicornis Puton, 1877 – 12 (Stehlík & Vavřínová 1999) – hm+ca.

Peritrechus nubilus (Fallén, 1807) – 7 (Stehlík & Vavřínová 1999); 17 (Roubal 1959) – wp.

Plinthisus (*Plinthisomus*) *pusillus* (Scholz, 1847) – 7, 20 (Horváth 1897); Viničky (7596), 20.IX.2001, 1 ♀, M. Mantič lgt., P. Kment det. (MMHC) – es.
Plinthisus (*Plinthisus*) *brevipennis* (Latreille, 1807) – Viničky (7596), *Quercetum*, sifting, 20.IX.2001, M. Mantič lgt., P. Kment det., 1 ♀ (br) (NMPC), 1 ♂ 1 ♀ (both br) (MMHC) – wp.
Pterotmetus staphyliniformis (Schilling, 1829) – 7 (Hoberlandt 1944); 12 (Stehlík & Vavřínová 1999); Viničky near Streda nad Bodrogom (7596), 11.VII.1988, 1 ♂ 1 ♀ (both br), J. Vilímová lgt. (CUPC) – es+ca.
Raglius alboacuminatus alboacuminatus (Goeze, 1778) – 10 (Stehlík & Vavřínová 1999); 17 (Roubal 1959) – wp.
Raglius confusus (Reuter, 1886) – 8, 12 (Stehlík & Vavřínová 1999); C: 1 L4 – hm.
Rhyparochromus pini (Linnaeus, 1758) – 7, 12 (Stehlík & Vavřínová 1999) – hp.
Rhyparochromus vulgaris (Schilling, 1829) – 17 (Stehlík & Vavřínová 1999) – e+pm+ca.
Scolopostethus decoratus (Hahn, 1833) – 17 (Roubal 1959) – wp+ca.
Scolopostethus puberulus Horváth, 1887 – 10 (Horváth 1897) – e.
Sphragisticus nebulosus (Fallén, 1807) – 7 (Stehlík & Vavřínová 1999) – ha.
Stygnocoris cimbricus (Gredler, 1870) – Viničky (7596), 20.IX.2001, 1 ♀, M. Mantič lgt., P. Kment det. (MMHC) – es.
Stygnocoris faustus Horváth, 1888 – 20 (Horváth 1897) – occurrence of the species in Slovakia (and also in Hungary) is questionable and revision of Horváth's specimens is needed (see Péricart 1998, Stehlík & Vavřínová 1998b) – hm (with doubtful records in Central Europe).
Stygnocoris fuligineus (Geoffroy, 1785) – Streda nad Bodrogom (7696), field groves, sweepings, 20.IX.2001, 1 ♀, M. Mantič lgt., P. Kment det. (MMHC) – e+hm.
Stygnocoris rusticus (Fallén, 1807) – 12 (Stehlík & Vavřínová 1998b) – ha.
Stygnocoris sabulosus (Schilling, 1829) – 12 (Stehlík & Vavřínová 1998b), 20 (Horváth 1897) – ha.
Trapezonotus (*Trapezonotus*) *arenarius arenarius* (Linnaeus, 1758) – 8, 12, 17 (Stehlík & Vavřínová 1999) – es.
Tropistethus holosericeus (Scholz, 1846) – 12 (Stehlík & Vavřínová 1998b); Ladmovce (7596), steppe, sifting, 21.V.2002, 1 ♂ 1 ♀, M. Mantič lgt., P. Kment det. (MMHC) – e.
Xanthochilus quadratus (Fabricius, 1798) – 7, 8, 10, 12 (Stehlík & Vavřínová 1999); Kráľovský Chlmec (7597), IV.1955, 1 ♀, Smetana lgt., J. Roubal det. et coll. (NMBS) – wp+ca.

Piesmatidae
Piesma maculatum (Laporte, 1833) – 5, 8, 10 (Stehlík & Vavřínová 1995b) – hp.

Berytidae
Berytinus (*Berytinus*) *clavipes* (Fabricius, 1775) – C: 1 ♀ (sbr) – es.
Berytinus (*Lizinus*) *montivagus* (Meyer-Dür, 1841) – 12 (Stehlík & Vavřínová 1995b) – wp+ca.
Berytinus (*Lizinus*) *signoreti* (Fieber, 1859) – 20 (Horváth 1897) – e.
Neides tipularius (Linnaeus, 1758) – 20 (Horváth 1885) – wes+ca.

Pyrrhocoridae

Pyrrhocoris apterus (Linnaeus, 1758) – B: 1 ♂ (br) – wp+ca.

Pyrrhocoris marginatus (Kolenati, 1845) – 7 (Rus 2005); Kráľovský Chlmec (7597), IV.1955, 2 ♀♀, Smetana lgt., J. Roubal det. et coll. (NMBS) – nm+ca.

Stenocephalidae

Dicranocephalus agilis (Scopoli, 1763) – 12 (Stehlík & Vavřínová 1995a); Kráľovský Chlmec (7597), IV.1955, 1 ♀, Smetana lgt., J. Roubal det. et coll. (NMBS) – wp+ca.

Dicranocephalus medius (Mulsant & Rey, 1870) – 17 (Stehlík & Vavřínová 1995a) – ses+ea.

Coreidae

Bathysolen nubilus (Fallén, 1807) – 12 (Stehlík & Vavřínová 1995a); Kráľovský Chlmec (7597), IV.1955, 1 ♀, Smetana lgt., J. Roubal det. et coll. (NMBS) – es+ca.

Ceraleptus gracilicornis (Herrich-Schaeffer, 1835) – 12, 17 (Stehlík & Vavřínová 1995a); Kráľovský Chlmec (7597), 1955, 1 ♂ 1 ♀, Smetana lgt., J. Roubal det. et coll. (NMBS); Viničky (7596), *Quercetum*, sifting, 20.IX.2001, 1 ♂, M. Mantič lgt., P. Kment det. (MMHC) – hm.

Coreus marginatus marginatus (Linnaeus, 1758) – 7, 8, 12, 18 (Stehlík & Vavřínová 1995a); Kráľovský Chlmec (7597), IV.1955, 1 ♀, Smetana lgt., J. Roubal det. et coll. (NMBS) – wp+ca.

Coriomeris denticulatus (Scopoli, 1763) – 7, 8, 12, 17 (Stehlík & Vavřínová 1995a) – wp.

Coriomeris scabricornis scabricornis (Panzer, 1805) – 7, 8 (Stehlík & Vavřínová 1995a) – hp (except North Africa).

Enoplops scapha (Fabricius, 1794) – 12 (Stehlík & Vavřínová 1995a) – wp (except north parts).

Spathocera lobata (Herrich-Schaeffer, 1840) – 7, 12 (Stehlík & Vavřínová 1995a) – hm+ca.

Syromastus rhombeus (Linnaeus, 1767) – 8 (Stehlík & Vavřínová 1995a) – wp+ca.

Alydidae

Alydus calcaratus (Linnaeus, 1758) – 7, 8, 10, 12 (Stehlík & Vavřínová 1995a); C: 2 L5 – ha.

Camptopus lateralis (Germar, 1817) – 7 (Stehlík & Vavřínová 1995a); C: 1 L5; Somotor (7597), 24.VI.1952, 1 ♂, no collector, P. Kment det. (VURV); Veľký Kamenec, Tarbucka (7696), sweepings, 11.VI.2000, 1 ♂, P. Boža lgt., P. Kment det. (MMHC) – hm+ca+or.

Rhopalidae

Brachycarenus tigrinus Schilling, 1829 – 7 (Nejedlá 1997); 8 (Stehlík & Vavřínová 1995a, Nejedlá 1997); 17, "Piliš near Nové Mesto" (Nejedlá 1997) – hp.

Chorosoma gracile Josifov, 1968 – 7 (Nejedlá 1997) – pm+ca.

Chorosoma schillingii (Schilling, 1829) – 7 (Horváth 1897; Hoberlandt 1944; Nejedlá 1997) – wp+ca.

Corizus hyoscyami hyoscyami (Linnaeus, 1758) – 5, 7, 8 (Nejedlá 1997); 7, 8, 10 (Stehlík & Vavřínová 1995a); 17, 25 (Nejedlá 1997) – hp+or (except West Mediterranean).

Maccevethus caucasicus (Kolenati, 1845) – 17 (Kment & Baňař 2010); 20 (Horváth 1897) – nm+ca.

Myrmus miriformis miriformis (Fallén, 1807) – 1, 7 (Nejedlá 1997); 8, 10, 12 (Stehlík & Vavřínová 1995a); "Kiss Hegy near Kráľovský Chlmec", 10, 17, 25, 27 (Nejedlá 1997); A: 1 ♂; C: 2 ♂♂ 2 ♀♀ – es.

Rhopalus (*Aeschyntelus*) *maculatus* (Fieber, 1837) – 12 (Stehlík & Vavřínová 1995a); 20 (Horváth 1897) – es+ea.

Rhopalus (*Rhopalus*) *conspersus* (Fieber, 1837) – 7, 10, 12 (Stehlík & Vavřínová 1995a); "Baba near Somotor", 10, 13, 17, "Kiss Hegy near Kráľovský Chlmec", "Piliš" (Nejedlá 1997) – es.

Rhopalus (*Rhopalus*) *distinctus* (Signoret, 1859) – "Baba near Somotor", 7, 17, "Piliš" (Nejedlá 1997); 8 (Stehlík & Hoberlandt 1954); 20 (Horváth 1897); 25, 26 (Nejedlá 1997) – ses+ca.

Rhopalus (*Rhopalus*) *parumpunctatus* Schilling, 1829 – 7, 8, 12 (Stehlík & Vavřínová 1995a); "Baba near Somotor", "Piliš", 7, 8, 13, 17, 24, 25, 26 (as "Plešany") (Nejedlá 1997) – hp.

Rhopalus (*Rhopalus*) *rufus* Schilling, 1829 – 13 (Horváth 1897); "Piliš" (Nejedlá 1997) – Stehlík & Vavřínová (1995a) considered it a problematical species because of different opinions on its status (Putshkov (1962, 1986) considered it to be a form of *R. parumpunctatus* while Göllner-Scheiding (1978) considered it to be a closely related valid species). The species have only four known localities in Slovakia until now. – hm.

Rhopalus (*Rhopalus*) *subrufus* (Gmelin, 1790) – 7 (Nejedlá 1997); 10, 12 (Stehlík & Vavřínová 1995a); 13, 14, 17, 26 (Nejedlá 1997) – hp (except East Asia).

Stictopleurus abutilon (Rossi, 1790) – 7, 8, 10, 12, 17 (Stehlík & Vavřínová 1995a); "Baba near Somotor", "Piliš", 1, 5, 7, 13, 17, 25 (Nejedlá 1997); C: 1 ♀ – hp (except East Asia).

Stictopleurus crassicornis (Linnaeus, 1758) – "Latorica, bridge", 4 (Nejedlá 1997); 8, 12, 17 (Stehlík & Vavřínová 1995a); 17, 26 (Nejedlá 1997) – hp (except North Africa).

Stictopleurus punctatonervosus (Goeze, 1778) – "Latorica, bridge", 1, 4+10 (as "Ladmovce – Viničky") (Nejedlá 1997); 8, 12, 17 (Stehlík & Vavřínová 1995a); 19, 26 (Nejedlá 1997) – wp+ca.

Plataspidae

Coptosoma (*Coptosoma*) *scutellatum* (Geoffroy, 1785) – 7, 10, 12 (Stehlík & Vavřínová 1991); Latorica area (two points on a map near the Latorica and Bodrog rivers, without exact locality in the text) (Davidová-Vilímová & Štys 1980); C: 1 ♂; Kráľovský Chlmec env. (7597), 12.VII.1988, 2 ♂♂ 1 ♀, J. Vilímová lgt. (JVPC) – hp.

Cydnidae

Canthophorus dubius (Scopoli, 1763) – 7, 10, 12 (Stehlík & Vavřínová 1993); Kráľovský Chlmec (7597), 19.VII.1987, 1 ♀, Z. Pádr lgt. (JVPC) – e.

Canthophorus melanopterus melanopterus (Herrich-Schaeffer, 1835) – 7, 10, 12 (Stehlík & Vavřínová 1993) – hm+ca (with overlaps to Central Europe, Syria and Iran).

Cydnus aterrimus (Forster, 1771) – 8, 12 (Stehlík & Vavřínová 1993); 17 (Davidová-Vilímová & Podoubský 1999); 20 (Halászfy 1954); Streda nad Bodrogom (7696), field groves, sweepings, 20.IX.2001, 1 ♀, M. Mantič lgt., P. Kment det. (MMHC) – wp+ca+or.

Legnotus picipes (Fallén, 1807) – 7 (Stehlík & Vavřínová 1993); Streda nad Bodrogom env., 11.VII.1988, 3 ♀♀, J. Vilímová lgt. (JVPC) – es+ca.

Microporus nigritus (Fabricius, 1794) – 7 (Halászfy 1954; Stehlík & Vavřínová 1993); 8 (Davidová-Vilímová & Podoubský 1999); Tarbucka sands near Streda nad Bodrogom (7696), 16.X.1986, 1 ♂, J. Král lgt. (JVPC); Veľký Kamenec, Tarbucka (7696), sweepings, 11.VI.2000, 1 ♀, P. Boža lgt., P. Kment det. (MMHC); Streda nad Bodrogom (7696), field groves, sweepings, 20.IX.2001, 1 ♂, M. Mantič lgt., P. Kment det. (MMHC); Ladmovce (7596), steppe, sifting, 21.V.2002, 1 ♀, M. Mantič lgt., P. Kment det. (MMHC) – hp.

Sehirus luctuosus Mulsant & Rey, 1866 – 20 (Halászfy 1954) – wp+ca.

Sehirus morio (Linnaeus, 1761) – 7 (Horváth 1897); Veľký Kamenec, Tarbucka (7696), sweepings, 11.VI.2000, 1 ♀, P. Boža lgt., P. Kment det. (MMHC) – hm+ca (with overlaps to West and Central Europe and Siberia).

Tritomegas bicolor (Linnaeus, 1758) – 7 (Stehlík & Vavřínová 1993) – hp.

Tritomegas sexmaculatus (Rambur, 1839) – 10, 12, 17 (Stehlík & Vavřínová 1993) – nm (with overlaps to Central Europe and Iran).

Thyreocoridae

Thyreocoris scarabaeoides (Linnaeus, 1758) – 1 (Štys & Davidová 1979); 7, 12 (Stehlík & Vavřínová 1993) – es.

Scutelleridae

Eurygaster austriaca (Schrank, 1776) – 17 (Roubal 1965a; Stehlík & Vavřínová 1993); Borša (7696), 12.VII.1958, 1 ♀, Přívora lgt., A. Carapezza 2005 det. (NMPC); Veľký Kamenec, Tarbucka (7696), sweepings, 28.VIII.1991, 1 ♂, J. Král lgt., P. Kment det. (MMHC); Viničky (7596), *Quercetum*, sifting, 20.IX.2001, 1 ♂ 1 ♀, M. Mantič lgt., P. Kment det. (MMHC) – hm.

Eurygaster maura (Linnaeus, 1758) – 7, 8, 10, 12, 17, 19 (Stehlík & Vavřínová 1993); Streda nad Bodrogom env. (7696), 11.VII.1988, 3 ♂♂ 1 ♀, J. Vilímová lgt. (JVPC); Kráľovský Chlmec env. (7597), 12.VII.1988, 1 ♀, J. Vilímová lgt. (JVPC); Viničky (7596), *Quercetum*, sifting, 20.IX.2001, 2 ♂♂ 1 ♀, M. Mantič lgt., P. Kment det. (MMHC) – wp.

Eurygaster testudinaria testudinaria (Geoffroy, 1785) – 7, 12 (Stehlík & Vavřínová 1993) – hp.

Odontoscelis (*Odontoscelis*) *fuliginosa* (Linnaeus, 1761) – 7 (Stehlík & Vavřínová 1993) – wp+ca.

Odontotarsus purpureolineatus (Rossi, 1790) – 10 (Stehlík & Vavřínová 1993) – hm+ca.

Phimodera humeralis (Dahlmann, 1823) – 7 (Horváth 1897; Halászfy 1955, 1958) – wes.

Psacasta (*Cryptodontus*) *neglecta* (Herrich-Schaeffer, 1837) – Viničky near Streda nad Bodrogom (7596), 11.VII.1988, 1 ♀, J. Vilímová lgt. (JVPC) – nm.

Psacasta (*Psacasta*) *exanthematica exanthematica* (Scopoli, 1763) – 7, 8 (Stehlík & Vavřínová 1993); 20 (Horváth 1897); Veľký Kamenec, Tarbucka (7696), sweepings, 11.VI.2000, 1 ♂, P. Boža lgt., P. Kment det. (MMHC) – hm.

Pentatomidae

Aelia acuminata (Linnaeus, 1758) – 7, 8, 10, 12, 17, 19 (Stehlík & Vavřínová 1994); Streda nad Bodrogom env. (7696), 11.VII.1988, 1 ♀, J. Vilímová lgt. (JVPC) – hp (except Asian Far East).

Aelia rostrata Boheman, 1852 – 8, 10, 12, 17 (Stehlík & Vavřínová 1994); A: 1 ♂ 1 ♀; Ladmovce (7596), 7.V.2000, 1 ♂ 1 ♀, V. Zeman lgt., P. Kment det. (VZPC) – wp.

Antheminia lunulata (Goeze, 1778) – 7, 8, 10 (Stehlík & Vavřínová 1994); Ladmovce (7596), 27.V.1974, 1 ♀, Přeučilová lgt. (JVPC); Veľký Kamenec, Tarbucka (7696), sweepings, 11.VI.2000, 1 ♂, P. Boža lgt., P. Kment det. (MMHC) – wp.

Carpocoris (*Carpocoris*) *fuscispinus* (Boheman, 1851) – 7, 17, 19 (Stehlík & Vavřínová 1994) – hp.

Carpocoris (*Carpocoris*) *pudicus* (Poda, 1761) – 8 (Stehlík & Vavřínová 1994) – pm.

Carpocoris (*Carpocoris*) *purpureipennis* (De Geer, 1773) – 7, 8, 12, 17 (Stehlík & Vavřínová 1994); 20 (Mocsáry 1875); C: 1 ♂ 2 ♀♀ (1 ♀ freshly moulted) – hp.

Crypsinus angustatus (Baerensprung, 1859) – 20 (Horváth 1897) – pm+ses.

Dolycoris baccarum (Linnaeus, 1758) – 7, 9, 12, 17, 19 (Stehlík & Vavřínová 1994); 20 (Mocsáry 1875) – hp.

Eurydema (*Eurydema*) *oleracea* (Linnaeus, 1758) – 7, 8, 12, 17, 19 (Stehlík & Vavřínová 1994); 20 (Horváth 1897); C: 1 ♀; Streda nad Bodrogom env. (7696), 11.VII.1988, 2 ♂♂ 1 ♀, J. Vilímová lgt. (JVPC) – hp (except East Asia).

Eurydema (*Eurydema*) *ornata* (Linnaeus, 1758) – 7, 17 (Stehlík & Vavřínová 1994); 20 (Horváth 1897); Leles, Kapoňa (7598), 22.VI.1993, 1 ♂, Urban lgt., P. Kment det. (VURV) – hp+or.

Eurydema (*Horvatheurydema*) *fieberi* Fieber, 1837 – 12 (Stehlík & Vavřínová 1994); 17 (Kment & Jindra 2008); 20 (Horváth 1897) – hm+ca.

Eurydema (*Rubrodorsalium*) *ventralis* Kolenati, 1846 – 7, 10, 12 (Stehlík & Vavřínová 1994) – hm+es.

Eysarcoris aeneus (Scopoli, 1763) – 12 (Stehlík & Vavřínová 1994) – hp.

Graphosoma (*Graphosoma*) *italicum italicum* (O. F. Müller, 1766) – 8, 10, 12, 17 (Stehlík & Vavřínová 1993, as *G. lineatum*); Kráľovský Chlmec env. (7597), 12.VII.1988, 3 ♂♂ 4 ♀♀, J. Vilímová lgt. (JVPC); Leles (7598), 23.V.1997, 1 ♂, E. Janíková lgt., V. Hemala 2018 det. (SMLS) – wp+ca.

Holcostethus sphacelatus (Fabricius, 1794) – 10, 12 (Stehlík & Vavřínová 1994) – wm+nm.

Jalla dumosa (Linnaeus, 1758) – 20 (Horváth 1897) – hp.

Menaccarus (*Oploscelis*) *arenicola* (Scholtz, 1847) – 7 (Horváth 1897; Stehlík & Vavřínová 1993); 8 (Stehlík & Vavřínová 1993) – hm+ses.

Neottiglossa (*Neottiglossa*) *leporina* (Herrich-Schaeffer, 1830) – 8, 12, 17 (Stehlík & Vavřínová 1994); C: 3 ♂♂ 1 ♀; Kráľovský Chlmec (7597), 19.VII.1987, 1 ♂, Z. Pádr lgt. (JVPC); Streda nad Bodrogom env. (7696), 11.VII.1988, 1 ♂ 5 ♀♀, J. Vilímová lgt. (JVPC); Viničky near Streda nad Bodrogom (7596), 11.VII.1988, 2 ♂♂, J. Vilímová lgt. (JVPC); Kráľovský Chlmec (7597), 12.VII.1988, 2 ♀♀, J. Vilímová lgt. (JVPC) – es+ca+ea.

Neottiglossa (*Neottiglossa*) *pusilla* (Gmelin, 1790) – 8 (Stehlík & Vavřínová 1994) – es+ca+ea.

Palomena prasina (Linnaeus, 1761) – 12 (Stehlík & Vavřínová 1994); Kráľovský Chlmec (7597), 25.VII.1969, 1 ♀, Z. Pádr lgt. (JVPC) – hp (except East Asia).
Palomena viridissima (Poda, 1761) – 10, 20 (Horváth 1897) – hp.
Peribalus (*Peribalus*) *strictus strictus* (Fabricius, 1803) – 7, 8, 12, 17, 19 (Stehlík & Vavřínová 1994, as *Holcostethus vernalis*); Tisa (river), 26.V.1974, 1 ♀, Přeučilová lgt. (JVPC); Streda nad Bodrogom env. (7696), 11.VII.1988, 1 ♀, J. Vilímová lgt. (JVPC) – hp.
Piezodorus lituratus (Fabricius, 1794) – 8, 12, 19 (Stehlík & Vavřínová 1994); Ladmovce (7596), 27.V.1974, 1 ♂, Přeučilová lgt. (JVPC); Streda nad Bodrogom env. (7696), 11.VII.1988, 1 ♀, J. Vilímová lgt. (JVPC) – es+hm.
Pinthaeus sanguinipes (Fabricius, 1781) – 20 (Horváth 1897) – wp+ea (except North Africa).
Rhacognathus punctatus (Linnaeus, 1758) – Leles, near Latorica (7598), sweepings, 7.VII.1999, 1 ♂, M. Mantič lgt., P. Kment det. (MMHC) – wp+ea (except North Africa).
Rhaphigaster nebulosa (Poda, 1761) – 12 (Stehlík & Vavřínová 1994); 23 (Davidová-Vilímová & Podoubský 1999) – hm+ca.
Rubiconia intermedia (Wolff, 1811) – C: 2 ♂♂ – es.
Sciocoris (*Aposciocoris*) *microphthalmus* Flor, 1860 – 12 (Stehlík & Vavřínová 1993) – ha.
Sciocoris (*Sciocoris*) *cursitans cursitans* (Fabricius, 1794) – 7, 8, 12 (Stehlík & Vavřínová 1993); Somotor env., Tarbucka Hill (7696), 17.V.1965, 1 ♀, P. Štys lgt. (CUPC); Ladmovce (7596), 27.V.1974, 1 ♂, Přeučilová lgt. (JVPC); Kráľovský Chlmec env. (7597), 28.IV.1978, 1 ♀, J. Vilímová lgt. (JVPC); Kráľovský Chlmec env. (7597), 12.VII.1988, 1 ♀, J. Vilímová lgt. (JVPC); Streda nad Bodrogom env. (7696), 11.VII.1988, 1 ♂, J. Vilímová lgt. (JVPC); Veľký Kamenec, Tarbucka (7696), sweepings, 11.VI.2000, 1 ♀, P. Boža lgt., P. Kment det. (MMHC) – es+hm.
Sciocoris (*Sciocoris*) *distinctus* Fieber, 1851 – 7, 10, 20 (Horváth 1897); Latorica, Poľany (7597), Latorica river bank, 7.V.2000, 1 ♀, V. Zeman lgt., P. Kment det. (VZPC) – es+hm+ca.
Staria lunata (Hahn, 1835) – 8, 10, 12 (Stehlík & Vavřínová 1994); Viničky near Streda nad Bodrogom (7596), 11.VII.1988, 1 ♀, J. Vilímová lgt. (JVPC) – hm.
Ventocoris (*Ventocoris*) *rusticus* (Fabricius, 1781) – 7 (Stehlík & Vavřínová 1993) – pm.
Vilpianus galii (Wolff, 1802) – 8 (Stehlík & Vavřínová 1993); 10 (Davidová-Vilímová & Podoubský 1999); 12 (Stehlík & Vavřínová 1993); 17 (Davidová-Vilímová & Podoubský 1999); C: 3 ♂♂ 2 ♀♀; Streda nad Bodrogom env. (7696), 11.VII.1988, 1 ♀, J. Vilímová lgt. (JVPC); Viničky near Streda nad Bodrogom (7596), 11.VII.1988, 9 ♀♀, J. Vilímová lgt. (JVPC); Veľký Kamenec, Tarbucka (7696), sweepings, 11.VI.2000, 1 ♂, P. Boža lgt., P. Kment det. (MMHC) – hm+ca.
Zicrona caerulea (Linnaeus, 1758) – Somotor (7597), no date, 1 ♀, A. Hoffer lgt., P. Kment det. (NMPC); Malý Horeš (7597), sweepings, 13.VI.2000, 1 ♀, P. Boža lgt., P. Kment det. (MMHC) – ha+nt+or.

Acanthosomatidae

Acanthosoma haemorrhoidale haemorrhoidale (Linnaeus, 1758) – 8, 12 (Stehlík & Vavřínová 1993); Latorica – Boľ (7597), 28.V.1974, 1 ♂, Přeučilová lgt. (JVPC) – es.
Elasmucha grisea grisea (Linnaeus, 1758) – 17 (Stehlík & Vavřínová 1993) – es+ea.

Conclusions

In this study, the occurrence of 259 species of Heteroptera (27 species unpublished) was documented from the area of the Latorica Protected Landscape Area, Tarbucka Nature Reserve and their surroundings. This number represents ca 30% of all Heteroptera species known from Slovakia (860 species) (see Kment et al. 2013; Kment & Cunev 2013; Vétek & Rédei 2014; Novikmec et al. 2015; Reduciendo Klementová et al. 2015; Barta & Bibeň 2016; Cunev & Kment 2017; Hemala & Kment 2017; Zúbrik et al. 2019; Kment unpublished). In our study area, the highest number of evaluated species is represented by Eurosiberian (56) and West-Palaearctic (50) elements. These are followed by Holopalaearctic (40), Holomediterranean (37), North Mediterranean (18), European (16), Holarctic (13), South Eurosiberian (10), West-Eurosiberian (8), Ponto-Mediterranean (6), West-Mediterranean (3) and Balkan (2) species. The current number of species will probably increase because of the high probability for the new findings in the future (poorly documented area, proximity to the Hungarian and Ukrainian borders, expansion of invasive species, migration of species as a results of the climate change, etc.).

Three species are included in the Redlist of Slovak Heteroptera (Štepanovičová & Bianchi 2001): *Maccevethus caucasicus* (family Rhopalidae) and *Menaccarus arenicola* (Pentatomidae), both as endangered (EN), and *Crypsinus angustatus* (Pentatomidae) as critically endangered (CR). *Maccevethus caucasicus* is known from several localities in the Danubian Hills (most often found in the surroundings of Burda Hills), from three localities in the East Slovak Lowland and in only one record from Slovak Karst (Plešivecká planina Plateau) (reviewed in Kment & Baňař 2010). The species prefers locations with volcanic substrates (especially andesite), occasionally also the limestone, and in lowlands also the sediments with xerotermophilous vegetation (Stehlík & Vavřínová 1995a). *Menaccarus* (*Oploscelis*) *arenicola* is known only from seven localities in Slovakia, five from southwestern parts of the country (Danubian Hills, Záhorie Lowland) and two from East Slovak Lowland (both in our study area) (Stehlík & Vavřínová 1993, Štepanovičová & Bulánková 2008). It is very rare psamophilous species bound on blown sands with sparse grassy vegetation in altitudes between 100 and 270 m a.s.l. (Stehlík & Vavřínová 1993). *Crypsinus angustatus* is an extremely rare species known only from two localities in Slovakia (Stehlík & Vavřínová 1993), one of which (Sátoraljaújhely/Slovenské Nové Mesto) is questionable for the territory of Slovakia (Horváth 1897). The second known locality is Tvrdošovce in the Danubian Lowland (Stehlík & Vavřínová 1988). The species is trophicaly bound on plants from the family Brassicaceae (e.g. *Lepidium* sp., *Cardaria draba*, *Capsella bursa-pastoris*, etc.) and occurs on sands and salt meadows (see Stehlík & Vavřínová 1988, 1993).

Very questionable species for the territories of Slovakia and Hungary is *Stygnocoris faustus* (Rhyparochromidae), which is stated only from the locality Sátoraljaújhely in only one record older than 120 years (Horváth 1897, originaly stated as "S.-A.-Ujhely"). This old record very probably can be a misidentification of some other species of the genus *Stygnocoris* Douglas & Scott, 1865 because its nearest known localities lie relatively far away in the Balkan Peninsula, Italy and Spain (the species is known also from Morocco and Asian Turkey) (see Péricart 1998, 2001). Its record from the Slovak-Hungarian border seems to be very isolated for the Mediterranean species and therefore it needs the revision of the material from the Horváth's collection deposited in the Natural History Museum in

Budapest. Very similar situation was solved also in Austria, where the old literary record of *S. faustus* was also considered as questionable and later the material was revised and the specimen was recognized as *S. sabulosus* (Rabitsch 2003, 2004).

The locality Sátoraljaújhely is mentioned also at the number of other species of Heteroptera in Horváth's works. The town was situated in the inland of the former Hungarian Kingdom, but it lies at the Slovak-Hungarian border at the present time (larger part of the town lies in Hungary, smaller part in Slovakia). The collectors very probably walked around the whole town in those times. This locality record should be considered as valid for the whole town and its near surroundings and therefore it can not be clearly related or clearly excluded from the fauna of either of the both countries. The locality Sátoraljaújhely is often erroneously cited as "Slovenské Nové Mesto" by several authors despite the fact that Slovenské Nové Mesto as separate urban unit exists only since 1918 and previously it was only a small part of Sátoraljaújhely named Kisújhely. Therefore, the problem discussed above applies only to records older than 1918. Citating of these records under the name „Slovenské Nové Mesto" is inappropriate and can be misleading. All other species reported from Sátoraljaújhely before 1918 are known also from other records clearly situated in Slovakia, but 31 of them needs the confirmation for the occurrence in our study area: *Hydrometra gracilenta*, *Gerris* (*Gerriselloides*) *asper*, *Acalypta parvula*, *Tingis cardui*, *Phytocoris nowickyi*, *Adelphocoris lineolatus*, *A. seticornis*, *A. reichelii*, *Rhabdomiris striatellus*, *Lygus pratensis*, *Polymerus* (*Poeciloscytus*) *asperulae*, *Leptopterna ferrugata*, *Piezocranum simulans*, *Orthotylus* (*Orthotylus*) *nassatus*, *O.* (*O.*) *virens*, *Melanotrichus schoberiae*, *Atractotomus magnicornis*, *Monosynamma bohemanni*, *Sthenarus rotermundi*, *Pilophorus clavatus*, *Alloeorhynchus flavipes*, *Nabis* (*Dolichonabis*) *limbatus*, *Anthocoris limbatus*, *Dysepicritus rufescens*, *Aradus* (*Aradus*) *conspicuus*, *Neides tipularius*, *Berytinus* (*Berytinus*) *signoreti*, *Rhopalus distinctus*, *Sehirus luctuosus*, *Crypsinus angustatus*, *Pinthaeus sanguinipes* and *Jalla dumosa* (last records published in Mocsáry 1875; Horváth 1885, 1886, 1897, 1899, 1907 and Halászfy 1954).

During the short visit of several localities in June 2018, seven species new to the our study area were documented: *Deraeocoris ruber*, *Brachycoleus decolor*, *Geocoris* (*Piocoris*) *erythrocephalus*, *Berytinus* (*Berytinus*) *clavipes*, *Pyrrhocoris apterus* and *Rubiconia intermedia* (this paper). Three species new to the our study area were documented during the revision of the Heteroptera collection of Jan Roubal (*1880–†1971) deposited in NMBS: *Chartoscirta cincta cincta*, *Aradus* (*Aradus*) *distinctus* and *Melanocoryphus albomaculatus*. Further sixteen species new to the Latorica area were examined in the several collections deposited in the Czech museums or private collections (data provided by kindness of P. Kment): *Callicorixa praeusta praeusta*, *Notonecta* (*Notonecta*) *glauca glauca*, *Acalypta marginata*, *Tingis* (*Neolasiotropis*) *pilosa*, *Halticus apterus apterus*, *H. luteicollis*, *Heterocordylus* (*Heterocordylus*) *genistae*, *Oeciacus hirundinis*, *Emblethis ciliatus*, *E. verbasci*, *Plinthisus* (*Plinthisus*) *brevipennis*, *Stygnocoris cimbricus*, *S. fuligineus*, *Psacasta* (*Cryptodontus*) *neglecta*, *Rhacognathus punctatus* and *Zicrona caerulea* (this paper).

The area of the Latorica PLA and Tarbucka NR is relatively poorly documented despite the fact, that almost 1/3 of species known from Slovakia was found there. The vast majority of these species were found only sporadically and several decades ago. Additionally, numerous localities have never been visited for the purpose of true bug fauna research and

no faunistic study focused on Heteroptera has been done in this area. Occurrence of several species needs confirmation or revision of voucher specimens (see above) and further species are expected to be found in the area because they are known from the localities situated near the Slovak border in Hungary, e.g. *Ochetostethus opacus* (Scholtz, 1847) (Cydnidae) known from Pácin or *Tetraphleps bicuspis* (Herrich-Schaeffer, 1835) (Anthocoridae) known from Sátoraljaújhely-Széphalom (see Horváth 1897). Number of relatively common and ubiquitous species are lacking in the list of species in this paper (e.g. *Plea minutissima minutissima* Leach, 1817, *Hydrometra stagnorum* (Linnaeus, 1758)). The area of the Latorica PLA and Tarbucka NR has a high potential to bring the interesting records of true bugs and needs a systematic and more frequent research in the future.

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Súhrn

Fauna bzdôch (Hemiptera: Heteroptera) Chránenej krajinnej oblasti Latorica, Prírodnej rezervácie Tarbucka a priľahlých lokalít - literárny prehľad

Najstaršie známe nálezy bzdôch (Heteroptera) z CHKO Latorica a PR Tarbucka a ich okolia boli publikované v posledných dekádach 19. storočia a v prvej dekáde 20. storočia (Horváth 1870, 1875, 1882, 1884, 1885, 1886, 1897, 1899, 1905, 1907; Mocsáry 1875). Niektoré z týchto údajov (ale nie všetky) boli citované v práci Balthasar (1937) a revidované v prácach niekoľkých maďarských autorov (Halászfy 1954, 1955, 1958; Soós 1959, 1973; Benedek 1968, 1969, 1970; Vásárhelyi 1978) spolu s prispením niekoľkými ďalšími údajmi. Zatiaľ čo údaje publikované maďarskými autormi boli založené na zbierkovom materiáli uloženom najmä v Prírodovednom múzeum v Budapešti, údaje českých (a niekoľkých ďalších) autorov boli založené na ich vlastnom materiáli zozbieranom v období 1. ČSR (Balthasar 1937; Hoberlandt 1944) alebo v povojnových rokoch druhej polovice 20. storočia (Stehlík & Hoberlandt 1954; Roubal 1956, 1957, 1959, 1961, 1965a, b, 1969; Wróblewski 1960; Stehlík 1970, 1979; Štys 1972, 1974; Bozděchová 1973; Štusák 1978; Štys & Davidová

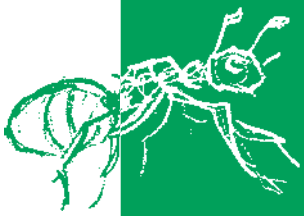
1979; Kokorďák 1982; Stehlík & Vavřínová 1991, 1993, 1994, 1995a, b, 1996, 1998a, b, 1999; Nejedlá 1997; Davidová-Vilímová & Podoubský 1999; Stehlík & Heiss 2001; Stehlík 2002; Rus 2005; Kment & Jindra 2008; Kment & Baňař 2010; Matocq & Pluot-Sigwalt 2012). Len jedna slovenská práca, Gregor (1985), bola zameraná špeciálne na CHKO Latorica a prispela niekoľkými údajmi vodných bzdôch z infraradu Nepomorpha spolu s údajmi o nálezoch niektorého ďalšieho hmyzu a stavovcov. V priebehu uhorských aj československých dôb bolo v oblasti vykonané množstvo nesystematických zberov, ktoré boli zamerané najmä na niekoľko známych lokalít. Materiál pochádzajúci z týchto zberov však nebol nikdy súhrnne spracovaný a množstvo zbierkových exemplárov dodnes čaká na determináciu, a to najmä v českých múzeách (P. Kment, pers. comm.). Najväčšie množstvo údajov bolo zaznamenané v sérii faunistických prác Stehlíka a Vavřínovej (1991, 1993, 1994, 1995a, b, 1996, 1998a, b, 1999), Stehlíka a Heissa (2001) a Stehlíka (2002) zameraných na bzdochy Slovenska, ktoré reprezentujú časť výsledkov prieskumov realizovaných na Slovensku pod záštitou Moravského zemského múzea v Brne v 50.–80. rokoch 20. storočia. Po roku 1990 sa už podobné prieskumy nezopakovali s výnimkou náhodných návštev amatérskych entomológov (P. Kment, pers. comm.) a iba štyri údaje boli publikované z tohto obdobia (Kment et al. 2003, 2013; Krištofík & Danko 2012). Spolu bolo v rokoch 1870–2013 publikovaných až 232 druhov bzdôch z CHKO Latorica a jej okolia (vrátane PR Tarbucka). Tento príspevok prináša prvý ucelený literárny prehľad v súčasnosti známej fauny bzdôch tejto oblasti. Okrem literárneho prehľadu sú v príspevku prezentované aj dosiaľ nepublikované faunistické údaje o niektorých druhoch bzdôch, z ktorých 27 je prvýkrát zaznamenaných v skúmanej oblasti. Počet momentálne známych druhov bzdôch CHKO Latorica, PR Tarbucka a ich okolia sa tak zvýšil na 259, čo predstavuje takmer 1/3 dosiaľ známej fauny bzdôch Slovenska.

Zloženie fauny bzdôch v oblasti z hľadiska ich zoogeografie je pomerne pestré; nachádza sa tu 56 eurosibírskych, 50 západopalearktických, 40 holopalearktických, 37 holomediterránnych, 18 severomediterránnych, 16 európskych, 13 holarktických, 10 juhoeurosibírskych, 8 západoeurosibírskych, 6 ponto-mediterránnych, 3 západomediteránne a 2 balkánske druhy. Tri druhy sú zaradené v Červenom zozname bzdôch Slovenska (Štepanovičová & Bianchi 2001): *Maccevethus caucasicus* (čeľaď Rhopalidae) a *Menaccarus arenicola* (Pentatomidae), obidve ako ohrozené (EN), a *Crypsinus angustatus* (Pentatomidae) ako kriticky ohrozený (CR). Veľmi sporným druhom pre územia Slovenska i Maďarska je *Stygnocoris faustus* (čeľaď Rhyparochromidae), ktorý uvedený vo viac než 120 rokov starej práci Horvátha (1897) z lokality "S.-A.-Ujhely" (= Sátoraljaújhely) v súčasnosti ležiacej v tesnej blízkosti slovensko-maďarskej štátnej hranice. Tento starý údaj je veľmi pravdepodobne chybným určením niektorého iného druhu rodu *Stygnocoris*, pretože jeho najbližšie známe lokality ležia pomerne ďaleko na Balkánskom polostrove, v Taliansku a Španielsku (druh je známy tiež z Maroka a Anatólie) (viď Péricart 1998, 2001). Údaj zo slovensko-maďarského pohraničia sa tak javí byť veľmi izolovaný v rámci rozšírenia tohto mediterránneho druhu a preto je nutné ho overiť revíziou materiálu z Horváthovej zbierky uloženej v Prírodovednom múzeu v Budapešti. Veľmi podobný prípad bol riešený v susednom Rakúsku, kde starý literárny údaj druhu *S. faustus* bol taktiež považovaný za sporný a neskôr po revízii zbierkového materiálu bol daný exemplár už správne identifikovaný ako *S. sabulosus* (Rabitsch 2003, 2004).

Lokalita Sátoraljaújhely bola spomenutá aj pri množstve ďalších druhov v Horváthovych

prácach z konca 19. a začiatku 20. storočia. Mesto v časoch Uhorska ležalo vo vnútrozemí krajiny, v súčasnosti však leží na slovensko-maďarskom pohraničí (väčšia časť pôvodného mesta na maďarskej, menšia na slovenskej strane). Entomológovia v tých časoch veľmi pravdepodobne zbierali okolo celého mesta, a preto by tento lokalitný údaj z tohto obdobia mal byť považovaný za platný pre celé mesto a jeho blízke okolie, čím takýto údaj nemožno jednoznačne vylúčiť ani jednoznačne pripísať faune jednej alebo druhej krajiny. Táto lokalita navyše bola často chybne citovaná ako "Slovenské Nové Mesto" niektorými autormi napriek tomu, že Slovenské Nové Mesto ako samostatná urbánna jednotka existuje až od roku 1918 a predtým bolo iba časťou mesta Sátoraljaújhely, v maďarčine nesúcou meno Kisújhely. Preto problém dvojitého priradenia údajov k faunám oboch štátov sa v prípade lokality Sátoraljaújhely týka iba údajov datovaných pred rokom 1918. Neskoršie datované nálezy už boli poväčšine presne lokalizované na slovenskej alebo maďarskej strane.

V CHKO Latorica ani PR Tarbucka sa zatiaľ nepodarilo zaznamenať niektoré druhy, ktoré sú známe z pomerne blízkych lokalít v Maďarsku a ich výskyt by v oblasti preto mohol byť pravdepodobný, napr. *Ochetostethus opacus* (čeľaď Cydnidae) uvádzaný z lokality Pácin alebo *Tetraphleps bicuspis* (Anthocoridae) známy zo Sátoraljaújhely, časti Széphalom (nachádzajúcej sa na maďarskej strane hranice) (viď Horváth 1897). Taktiež sa zatiaľ nepodarilo zaznamenať ani niektoré pomerne bežné a široko rozšírené druhy, ktoré sa v oblasti s vysokou pravdepodobnosťou nachádzajú, napr. *Plea minutissima minutissima* (Pleidae) alebo *Hydrometra stagnorum* (Hydrometridae). Výskum bzdôch v okolí CHKO Latorica, vrátane PR Tarbucka, má preto pomerne vysoký potenciál priniesť zaujímavé nálezy a oblasť by si rozhodne zaslúžila omnoho častejšie a systematickejšie prieskumy do budúcna.



The ants (Hymenoptera: Formicidae) of the Latorica Protected Landscape Area and its surroundings (South-eastern Slovakia)

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Abstract

Based on both the historical data and the processing of an extensive set of field samples, 72 species of ants were detected in the Latorica Protected Landscape Area and its surroundings within Eastern Slovak Plain and Zemplínske vrchy Mts. This relatively high diversity is caused by a mosaic of various environments, where unique dry grasslands and forests on andesitic or limestone massifs, as well as formations of aeolian sands, emerge from the plain with swamps, floodplain forests, pastures and fields. Most species of ants were found in preserved fragments of forest-steppe communities, including *Tetramorium indocile*, a new ant species for the Slovak fauna. Some other rare taxa live there too, e.g. *Ponera testacea*, *Temnothorax turcicus*, *Myrmica deplanata* or *Camponotus atricolor*. More attention was paid to sand dunes, where *Lasius psammophilus* locally occurs as a typical inhabitant of such an environment. However, the largest part of the area consists of a plain, largely anthropogenically influenced and inhabited by the most adaptable ants, especially *Solenopsis fugax, Tetramorium caespitum, T. immigrans, T. staerckei, Lasius niger* and *Formica rufibarbis*. Near rivers and swamps, *Myrmica gallienii, M. rubra* and *Lasius platythorax* were most often found. Conspicuous colonies of forest species like *Formica polyctena*, *F. rufa* and their hybrids were visible in oak-hornbeam forests in Zemplínske vrchy Mts. Arboricolous species, especially *Dolichoderus quadripunctatus*, *Lasius brunneus* or *Lasius fuliginosus*, were found scattered throughout the area on trees. Despite several known historical sites, the occurrence of the rare floodplain ant *Liometopum microcephalum* was not confirmed at present and this problem will need to be addressed in the future. Full list of all ant species related to the reference area with details on individual findings is presented in this paper. It is likely that the number of species from this first complex review will increase after a more detailed survey.

Key words: Latorica River, Zemplínske vrchy Mts., Eastern Slovak Plain, myrmecofauna, nature protection

Introduction

Relatively little data on ants is known from the presented area of the Latorica Protected Landscape Area (PLA) and its surroundings in the south-eastern tip of Slovakia (Fig. 1). In this context, the first published works date back more than 100 years ago (Mocsáry 1875, 1897; Chyzer 1902) when the studied region was a part of the Zemplín County within the former Hungary. In the oldest work, Mocsáry (1875) mentioned only one site and two ant species from this region. Several years later, the same author (Mocsáry 1897) investigated more sites, but instead of composing full list of ant species combined with locality data, he mentioned more detailed informations just for less widespread ants (according to the knowledge of that time). Chyzer (1902) presented an overview of all localities (mostly as the names of municipalities in Hungarian) for all ant species of the then Zemplín County. It is strange that the data from the apparently forgotten work of the Bardejov native Chyzer (1902) are incompletely mentioned just in the work of Záleský (1939) but are missing in any later comprehensive reviews of the ants of Slovakia (Soudek 1922; Werner 1989; Bezděčka 1996; Werner & Wiezik 2007). Remarkably, these data are richer (at least for the area of Zemplín County) than in the more frequently cited work of Mocsáry (1897), who himself presented several older Chyzer's data on other groups of insects. However, in the case of ants, the lists of both authors do not overlap completely, certain species are mentioned for one author and missing for the other author, and vice versa. Some species published at that time need to be evaluated carefully, as the taxonomy of ants has undergone major changes to date. Nevertheless, these historical works represent valuable evidence of the region's past from a myrmecological point of view. Later, only a few studies were published mentioning ants from some localities of today's Latorica PLA and the surroundings. In addition to the mentioned data of Alexander (Sándor) Mocsáry and Kornel Chyzer (usually without a more precise citation of their works), Záleský (1939) also presents a few other information on ants mostly from the collections of Augustin Hoffer and Lájos Biró. Wiezik (2007) processed the myrmecofauna in the vicinity of Ladmovce within the Zemplínske vrchy Mts. Some localities of the monitored stubble field communities of ants (Suvák 2007) also extended into the subject area of the Latorica PLA and its surroundings. Within the taxonomic analyzes of the genus *Tetramorium* (Wagner et al. 2017), selected data from the vicinity of Streda nad Bodrogom and Kráľovský Chlmec were processed too. Some of the samples from the above-mentioned works were also mentioned in more detail in later review (Werner & Wiezik 2007) or specific studies (Seifert 2012). It is likely that other myrmecologists in the area have also collected some samples of ants that were not published until finalization of this work. With respect to the size of the region and the diversity of the environment, all previous data on the myrmecofauna of the Latorica PLA represent only a fraction of the actual biodiversity. Moreover, much of this information is very old, and significant changes have taken place in the country since then. Therefore, a more detailed survey of the area was longer needed.

Material and methods

The territory of the Latorica PLA and the surroundings with the marked localities (both historical and new ones) is shown in Fig. 1. From the geomorphological point of view, a smaller part of the studied region consists of Zemplínske vrchy Mts. (localities near Cejkov,

Ladmovce (Fig. 2), Malá Bara, Malá Tŕňa, Slovenské Nové Mesto, Veľká Bara, Veľká Tŕňa, Viničky) with the SW outcrop of Eastern Slovak Upland (Lastovce, Luhyňa, Veľaty) in the west and of much larger eastern part which is formed by southern part of Eastern Slovak Plain (all other mentioned localities: Bačka, Beša, Biel, Boľ, Boťany, Brehov (Fig. 3), Čierna, Čierna nad Tisou, Drahňov, Hrušov, Klin nad Bodrogom, Kožuchov, Kráľovský Chlmec, Leles, Malčice, Malé Trakany, Malý Horeš (Fig. 4), Malý Kamenec, Nižný Žipov, Novosad, Poľany, Pribeník, Ptrukša (Fig. 5), Rad, Sirník, Somotor (Fig. 6), Strážne, Streda nad Bodrogom, Svätá Mária, Svätuše, Veľké Kapušany, Veľké Trakany, Veľký Kamenec, Vojany, Vojka, Zemplín, Zemplínske Hradište, Zemplínske Jastrabie, Zemplínske Kopčany, Zemplínsky Branč).

From historical point of view, the specific locality is Sátoraljaújhely (Mocsáry 1897) or Újhely (Mocsáry 1875; Chyzer 1902). Today, the larger part of this area is in Hungary and the smaller one under the name Slovenské Nové Mesto in Slovakia. It is difficult to assess which findings from that time relate to the studied region in Slovakia.

The Latorica PLA itself (Fig. 1) is located around the rivers Latorica, Ondava, Laborec and Bodrog. Basic data are presented on the websites (CHKO Latorica 2020). Its area is 23 198 ha. Original forests were not preserved but there are conditions for their recovery in some protected sites. Now there are fragments of various managed forests, willow-poplar forests in the immediate vicinity of the rivers, alluvial forests with oaks (Fig. 5), ashes and elms in more remote sites from riverbeds and some of the driest places are covered with xerothermic oak forests. Invasive trees, especially black locusts, are locally distributed. The area was strongly influenced by regulation of watercourses, applying drainage measures, and building a network of melioration canals in the years 1953 - 1965. Much of the territory is still used for agriculture (Fig. 3, 4, 6).

There are several small protected areas of three types: protected sites (PS: Bešiansky polder, Boršiansky les, Oborínske jamy, Veľký kopec), Nature Reserves (NR: Biele jazero, Boľské rašelinisko, Dlhé Tice, Horešské lúky, Krátke Tice, Poniklecová lúčka, Tarbucka, Veľké jazero, Zatínsky luh, Zemplínska jelšina) and National Nature Reserves (NNR: Botiansky luh, Kašvár (Fig. 2), Latorický luh, Tajba).

List of localities

1 – Beša, N 48.5329°, E 21.9420°, 97 m a.s.l., grassland on loamy soil.
2 – Beša – Bešiansky les, N 48,5107°, E 21,9386°, 105 m a.s.l., hard mixed floodplain forest outside the right bank of the Latorica river.
3 – Beša – Moľva, N 48.5222°, E 21.9587°, 101 m a.s.l., grassland with isolated trees on sands.
4 – Beša – Nová lúka, N 48.5301°, E 21.9373°, 99 m a.s.l., grassland with oaks.
5 – Beša – Veľký les, N 48.5258°, E 21.9795°, 102 m a.s.l., black lokust trees on sands.
6 – Biel – Viničný vrch, N 48.3985, E 22.0549, 110 m a.s.l., ruderal vegetation on sand dunes.
7 – Biel – Vresovište, N 48.3915°, E 21.0478°, 103 m a.s.l., grassland with shrubs and young trees.
8 – Boľ, N 48.4774°, E 21.9418, 100 m a.s.l., ruderal vegetation on sand dunes.

9 – Boľ – Boľské rašelinisko (NR), N 48.4475°, E 21.9521°, 101 m a.s.l., alder belt between peat bog and agrocoenoses.
10 – Boľ – Kanta, N 48.4799, E 21.950920, 110 m a.s.l., grassland on sand dunes, near cereal field.
11 – Borša – Káty, N 48.4056°, E 21.7181°, 138 m a.s.l., oak forest.
12 – Boťany – Botiansky luh (NNR) I, N 48.47581°, E 22.1049°, 107 m a.s.l., floodplain forest between embankment and river arm.
13 – Boťany – Botiansky luh (NNR) II, N 48.4744°, E 22.1067°, 112 m a.s.l., riparian forest near the left bank of the Latorica River.
14 – Boťany – Latorický luh (NNR), N 48.4638°, E 22.1167°, 111 m a.s.l., hard floodplain forest with oaks and hornbeams.
15 – Brehov – Veľký vrch I, steppe with andesite rocks.
16 – Brehov – Veľký vrch II, N 48.4943°, E 21.8082°, 191 m a.s.l., dry grassland with bushes at the NW edge of the hill.
17 – Cejkov – alluvium of stream, N 48.45446°, E 21.7407°, 206 m a.s.l., bank of stream in woodland (hornbeams, alders, oaks, beeches, field maples).
18 – Cejkov – Bocianí vrch, N 48.4617°, E 21.7445°, 253 m a.s.l., oak forest with meadows and roads.
19 – Cejkov – hornbeam forest, N 48.45441°, E 21.7411°, 208 m a.s.l., woodland (*Carpineto – Quercetum*).
20 – Cejkov – saddle.
21 – Cejkov – Tokajský vrch, N 48.4814°, E 21.7656°, 160 m a.s.l., dense shrub cover.
22 – Cejkov – Vakovec, N 48,4622°, E 21,7917°, 132 m a.s.l., transition zone between meadow and oak forest.
23 – Černochov – Čierna hora, N 48.404°, E 21.7569°, 343 m a.s.l., oak forest.
24 – Čierna nad Tisou – Stará Tisa, N 48.4258°, E 22.1304°, 100 m a.s.l., border of arable land.
25 – Drahňov – Spodný les, N 48.5703°, E 21.9607°, 95 m a.s.l., border of arable land.
26 – Hrušov, N 48.4349°, E 21.8631°, 115 m a.s.l., sandy grassland.
27 – Hrušov – Bottová, N 48.4349°, E 21.8887°, 115 m a.s.l., sandy grassland touching arable land with loamy soil.
28 – Hrušov – Dlhé Tice (NR), N 48.4354°, E 21.8544°, 98 m a.s.l., grassland along the bank of marshland (former riverbed).
29 – Hrušov – Prudký, N 48.44515°, E 21.86852°, 100 m a.s.l., dry grassland with isolated trees on sandy dune, near arable land.
30 – Klin nad Bodrogom, N 48.3825°, E 21.7160°, 161 m a.s.l., a belt of willow trees between river arm and meadow, on fluvial sediments.
31 – Kráľovský Chlmec – Ereš, N 48.43666°, E 21.9552°, 131 m a.s.l., fragment of lowland woodland.
32 – Kráľovský Chlmec – Fejséš, N 48.4319°, E 22.0074°, 112 m a.s.l., transition zone between arable land, grassland and black locust stand on sand dunes.
33 – Kráľovský Chlmec – park, N 48.4220°, E 21.9798°, 115 m a.s.l., maintained park with lawn and trees in the city.
34 – Kráľovský Chlmec – unspecified.

35 – Kráľovský Chlmec – Veľký kopec, N 48.4187°, E 21.9631°, 260 m a.s.l., dry grassland with rocks.
36 – Ladmovce – Dlhá hora, N 48.4314°, E 21.7735°, 237 m a.s.l., forest – free stand with shrubby and grass – herbaceous vegetation.
37 – Ladmovce – Hatfa I, grassland with shrubs on carbonates.
38 – Ladmovce – Hatfa II, N 48.4228°, E 21.7601°, 180 m a.s.l., abandoned vineyards.
39 – Ladmovce – Kašvár (NNR), N 48.41954°, E 21.7757°, 161 m a.s.l., xerothermic grassland with bushes on limestone bedrock (Fig. 2).
40 – Leles, N 48.4605°, E 22.0384°, 110 m a.s.l., sand dunes with sparse ruderal vegetation, isolated trees and shrubs, sand mine, waste disposal.
41 – Leles – bridge over the river Latorica, N 48.5007°, E 22.0534°, 100 m a.s.l., grassland near parking area, ruderal vegetation, poplar trees.
42 – Leles – Kapoňa, N 48.4601°, E 22.0547°, 105 m a.s.l., isolated trees and bushes on sand dunes.
43 – Leles – St. Gotthard bridge, N 48.4673°, E 22.0164°, 101 m a.s.l., grassland, row of poplar trees.
44 – Malá Bara – Brezina, N 48.4303°, E 21.7462°, 170 m a.s.l., oak forest.
45 – Malá Tŕňa – Chotárny vrch, N 48,4608°, E 21,7129°, 410 m a.s.l., oak forest.
46 – Malá Tŕňa – Káty, N 48.4334°, E 21.6987°, 141 m a.s.l., field border.
47 – Malá Tŕňa – Mlynky, N 48.4498°, E 21.6671°, 122 m a.s.l., border of peach orchard.
48 – Malé Trakany – Tisa, N 48.3948°, E 22.1446°, 105 m a.s.l., meadow with isolated trees, fluvial sands.
49 – Malý Horeš – Dupalisko, N 48.4137°, E 21.9410°, 125 m a.s.l., sand dunes with sparse vegetation.
50 – Malý Horeš – Horešské lúky (NR), N 48.40561°, E 21.9565°, 96 m a.s.l., grassland within depression (salt marsh) in grounded riverbed.
51 – Malý Horeš – Húšťava, N 48.40118°, E 21.9666°, 104 m a.s.l., fragment of lowland forest with oak, fragments of former river arms.
52 – Malý Horeš – Poniklecová lúčka (NR): N 48.41237°, E 21.9454°, 119 m a.s.l., dry grassland on sand.
53 – Malý Horeš – Viničné pivnice, N 48.4120°, E 21.9453°, 124 m a.s.l., mosaic of pastures, fields, grasslands with shrubs on sands (Fig. 4).
54 – Poľany – Čierny les, N 48.4838°, E 21.9687°, 100 m a.s.l., hard floodplain forest with predominated oak.
55 – Poľany – Podzáhrada, N 48.4730°, E 22.0067°, 102 m a.s.l., agricultural land.
56 – Pribeník – Koháň, N 48.3798°, E 21.9845°, 108 m a.s.l., grassland and trees on sandy soil.
57 – Ptrukša – floodplain forest at the river Latorica III, N 48.4742°, E 22.1205°, 102 m a.s.l., riparian forest at the right bank of the Latorica River.
58 – Ptrukša – Mokraď, N 48.4885°, E 22.0799°, 102 m a.s.l., grassland along river dam.
59 – Rad – Esenka, N 48.4790°, E 21.8434°, 97 m a.s.l., river bank.
60 – Sirník, N 48.5125°, E 21.8037°, 147 m a.s.l., sparse vegetation on rocky substrate.
61 – Sirník – Moľva, N 48.5221°, E 21.8170°, 111 m a.s.l., border of sand mine.
62 – Somotor – Kukuričné pole, N 48.3950°, E 21.8185°, 128 m a.s.l., field border.

63 – Somotor – Malé jazerné, N 48.4040°, E 21.8410°, 105 m a.s.l., pasture with isolated fruit trees on sand dunes, with drier elevated sites and wetter depressions.
64 – Somotor – Malodňa, N 48.4068°, E 21.7962°, 104 m a.s.l., andesite mine.
65 – Somotor – Somotorská hora, N 48.4082°, E 21.8041°, 141 m a.s.l., dry grassland with bushes on a flat top of the hill, locally with andesite rocks.
66 – Somotor – Véč, N 48.4109°, E 21.8246°, 101 m a.s.l., agricultural land with belts of trees and bushes (Fig. 6).
67 – Strážne – Opátsky piesok, N 48.3894°, E 21.8551°, 98 m a.s.l., mosaic of grasslands and pastures with poplar, willow and black locust trees on elevated sand dunes or in terrain depressions.
68 – Streda nad Bodrogom – Katroň, N 48.3618°, E 21.7169°, 100 m a.s.l., flat sand dune with ruderal vegetation.
69 – Streda nad Bodrogom – Tarbucka (NR), N 48.37069°, E 21.7843°, 189 m a.s.l., dry grassland with bushes on sandy soil.
70 – Streda nad Bodrogom – Tarbucka – saddle, old oaks, deep litter.
71 – Streda nad Bodrogom – Tarbucka – top of the hill, N 48.3625°, E 21.7887°, 265 m a.s.l., rocky dry grassland with bushes at the top of the andesite hill.
72 – Streda nad Bodrogom – Tarbucka – Veterné piesky, N 48.3716°, E 21.7833°, 182 m a.s.l., meadow with isolated shrubs, sand dunes.

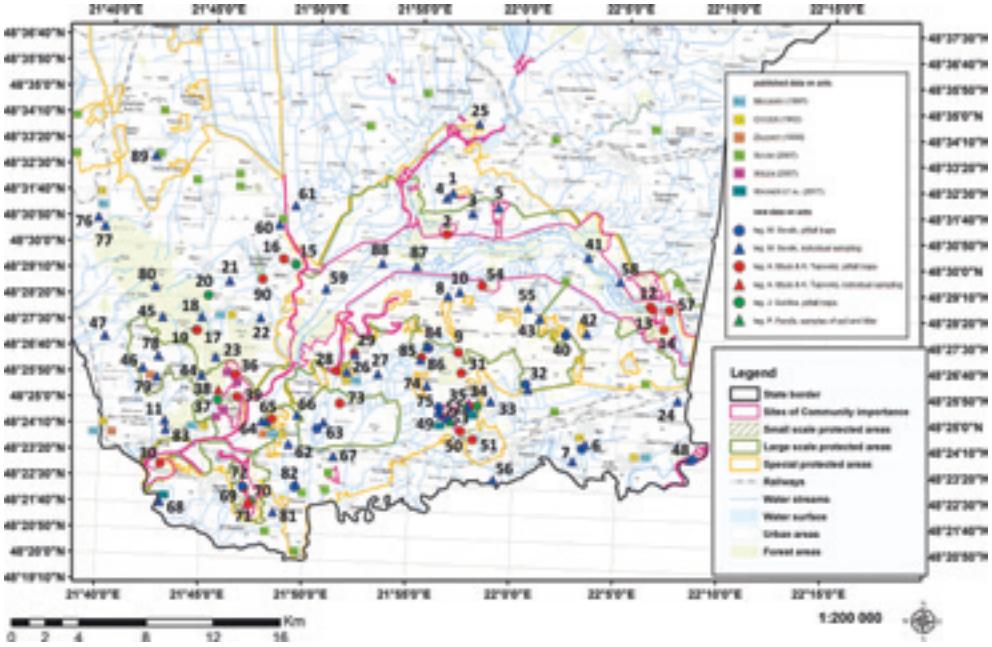

Fig. 1 *Map of sampling sites, as well as an estimate of the location of historical sites from the literature.*

Fig. 2 *Forest-steppe locality on limestones (NNR Kašvár) is one of the most species-rich sites in the Latorica PLA. Among others, a rare ant species Temnothorax turcicus was recorded in this environment. Other species found at this site: Messor structor, Myrmica deplanata, M. schencki, M. specioides, Temnothorax albipennis, T. parvulus, T. unifasciatus, Tapinoma subboreale, Camponotus aethiops, C. fallax, Formica clara, Lasius alienus, L. bombycina (photo: M. Suvák).*

Fig. 3 *Hills or artificial elements protruding from a wider plane are landmarks for several species of ants at the time of swarming. E.g., in the top part of Veľký vrch Hill near Brehov (left at the back), many males of at least five species of the genus Myrmica were captured in pitfall traps about 100 m above the surrounding plain. Besides of the species typical for dry forest-steppe habitats (M. deplanata, M. schencki, M. sabuleti), also males of moist-loving ant M. gallienii were recorded. Some of males were difficult to determine (the most probably M.specioides, possibly also M.rugulosa or M.curvithorax. All the mentioned winged Myrmica individuals were flying here probably from the surrounding area during nuptial flights synchronized in time and space (photo: M. Suvák).*

Fig. 4 *The aeolian sand dunes at Malý Horeš are a typical environment for ants of the species Lasius psammophilus. Other species found at this site: Myrmica sabuleti, M. specioides, Solenopsis fugax, Tetramorium sp., Formica clara, F. cunicularia, F. rufibarbis, Lasius bombycina (photo: M. Suvák).*

Fig. 5 *Large oaks, such as these at Latorica near Ptrukša, represent suitable conditions for several so-called arboricolous species of ants, but some other "terrestrial" species often climb to the crowns for food too (photo: M. Suvák).*

73 – Svätá Mária – Biele jazero (NR), N 48.4180°, E 21.8585°, 95 m a.s.l., wet meadow, ecotone of pasture and marshland.
74 – Svätuše – andesite mine, N 48.4290°, E 21.9280°, 160 m a.s.l., sparse vegetation at the border of the andesite mine.
75 – Svätuše – Vinohrady, N 48.4179°, E 21.9384°, 135 m a.s.l., grassland with isolated shrubs on sands with rocks, locally with dead wood and waste.
76 – Veľaty – Sadové, N 48.5132°, E 21.6577°, 195 m a.s.l., meadow, forest border.
77 – Veľaty – Veľatský les, N 48.5086°, E 21.6634°, 228 m a.s.l., meadow at forest margin.
78 – Veľká Bara – Lada, N 48.4400°, E 21.7106°, 200 m a.s.l., field border near vineyard.
79 – Veľká Bara – Pilis, N 48.4287°, E 21.7103°, 270 m a.s.l., rocky slope with grass.
80 – Veľká Tŕňa – Rozhľadňa, N 48.4772°, E 21.7061°, 440 m a.s.l., oak forest with clearings.
81 – Veľký Kamenec – castle ruine, N 48.3585°, E 21.8085°, 139 m a.s.l., andesite hill with sparse vegetation.
82 – Veľký Kamenec – sand mine, N 48.3723°, E 21.8252°, 105 m a.s.l., ruderal vegetation on sand dune with rocks, around sand mine and former cemetary.
83 – Viničky – Irma, N 48.4007°, E 21.7191°, 145 m a.s.l., sparse vegetation and solitary trees between buildings.
84 – Vojka – Čikóška, N 48.4495°, E 21.9281°, 120 m a.s.l., young black locust stand with high grass near cereal field border, on sand dunes.
85 – Vojka – Veľké jazero (NR), N 48.4442°, E 21.9227°, 113 m a.s.l., ecotone of marshland bank and agrocoenoses (field).
86 – Vojka – Veľké jazero – sand mine, N 48.4428°, E 21.9218°, 106 m a.s.l., sand mine and its surroundings from bare soil through low ruderal vegetation to shrubs and trees.
87 – Zatín – Dolný les, N 48.4928°, E 21.9155°, 99 m a.s.l., river dam, excavated clay.
88 – Zatín – Liesková, N 48.4938°, E 21.8879°, 95 m a.s.l., willows near river dam.
89 – Zemplínsky Branč – Pastvisko, N 48.5470°, E 21.7017°, 116 m a.s.l., field border.
90 – Zemplínske Jastrabie – Zemplínska jelšina (NR), N 48.48315°, E 21.7920°, 109 m a.s.l., fragment of riparian and bog forest among fields.

Unprocessed and unpublished findings of ants from the reference area, which are presented in this work as a new data, come from several sources (with position of sites presented in Fig. 1):

1. My own samples (leg. M. Suvák) were collected occasionally during visits to this area in the years 2003 - 2020. Most of the gained material is the result of individual sampling where various small plastic containers were used with ethyl acetate vapours to kill the collected ants resulting in dry samples stored in the labelled vials. Other samples gathered from pitfall traps were also included. The respective pitfall traps were glass jars with a hole diameter of 5 cm and a depth of about 10 cm installed in a series of 5 pieces with a spacing of about 5 m in one site for a short time (25.-28.VIII.2008) on sand dunes. About 96% alcohol with glycerol was used as the fixing fluid. After sorting the contents, the ants were placed in smaller labelled plastic containers with alcohol.

2. Samples obtained from co-workers from the Department of Zoology, Institut of Biology and Ecology, P. J. Šafárik University in Košice and Institute of Soil Biology, Academy of Sciences of the Czech Republic (leg. A. Mock & K. Tajovský). Within the extensive research

of invertebrates, they installed sets of pitfall traps in the years 2008 - 2011. About 10 cm high plastic containers with an upper diameter of 7 cm, filled with 4% formaldehyde were used. The contents were sorted according to taxonomic groups of invertebrates, placed in 75% gasoline-alcohol and sent to the appropriate specialists for determination.

3. Older samples probably from pitfall traps collected in the years 1948 - 1961 (leg. J. Gulička, revid. A. Mock) deposited in plastic vials with fixation liquid.

4. Samples from soil and litter (2008, 2012, leg. P. Fenďa, revid. A. Mock) stored in plastic vials with fixation liquid, from Tarbucka Hill and Malý Horeš.

All the mentioned samples are stored in the Botanical Garden of P. J. Šafárik University in Košice.

For proper determination of the samples, a binocular lens with a magnification of up to 320-times were used. It enabled the accurate measurement of the dimensions of individual structures of ant bodies. The basic determination of the ant specimens followed the work of Seifert (2018) and Czechowski et al. (2012). For specific taxa, it was necessary to use other works focused specifically on some genera or groups of species, such as in genera *Myrmica* (Seifert 1988b), *Tetramorium* (Schlick-Steiner et al. 2006; Wagner et al. 2017), *Temnothorax* (Csösz et al. 2015) and *Plagiolepis* (Faber 1969; Seifert 2020a).

The nomenclature of presented ant species corresponds to Seifert (2018).

Results and discussion

Species published in the past under different names were reclassified under currently valid names. Taxa marked with asterisk (*) were not counted to the total number of species due to supposed misidentifications. As a result, published data (Mocsáry 1875, 1897; Chyzer 1902; Záleský 1939; Suvák 2007; Wiezik 2007; Wagner et al 2017) represent 45 accepted species, 9 of them were not found in actual research. On the other hand, from previously unpublished samples of 7 058 ant individuals (leg. A. Mock, K. Tajovský, M. Suvák, J. Gulička, P. Fenďa), 62 species were determined (det. M. Suvák), 28 of them were new for this region. Together, 72 different ant species from 19 genera and 4 subfamilies were registered in Latorica PLA and its surroundings to the date. This number means about 2/3 of known myrmecofauna in Slovakia.

Ant species are presented in alphabetical order within subfamilies. A brief presentation of selected characteristics of individual taxa follows mainly the work of Seifert (2018). Individual records are separated by semicolons. Already published data (historical records) are presented with full names of localities and references (authors and years). New data (so far unpublished records) usually contains available details on localities (code number with colon), date, additional site characteristics, number of ant individuals in a sample (☿☿ - workers, ♀♀ - gynes (queens, reproductive female caste), ♂♂ - males), type of sampling (if other than individual) and names of collectors.

Annotated checklist of ant species (Formicidae) in the Latorica PLA and its surroundings

Ponerinae

Ponera coarctata (Latreille, 1802) – Bačka: Chyzer (1902); Slovenské Nové Mesto (?):

Mocsáry (1897), Chyzer (1902); Veľká Bara-Pilis: Záleský (1939, leg. A. Hoffer) – inconspicuous species forming specific nests with a small number of individuals. Due to the predominantly underground way of life, it is recorded less often than would correspond to its actual occurrence.

Ponera testacea Emery, 1895 – 47: 12.VIII.2003, under stone, 1 ☿, leg. M. Suvák – more rare thermophilic species of xerothermic grasslands.

Myrmicinae

Aphaenogaster subterranea (Latreille, 1798) – Ladmovce-Baba: Wiezik (2007) – common species of warmer deciduous forests, but sometimes also inhabiting xerothermic grasslands with shrubs. It moves mainly in the litter and underground, so the occurrence of this species is often underestimated.

Messor structor (Latreille, 1798) – 39: 22.IV.-21.X.2008, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 21.X.2008-28.V.2009, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 74: 9.IX.2008, 2 ☿☿, leg. M. Suvák; 75: 9.IX.2008, 2 ☿☿, nest, leg. M. Suvák; Ladmovce-Baba: Wiezik (2007); Ladmovce-Tardika: Wiezik (2007); Slovenské Nové Mesto (?): Chyzer (1902, as *Aphaenogaster structor*); Záleský (1939, leg. L. Biró) – it typically occurs in drier grass communities with a proportion of protruding bare rocks or loose stones. It is a primarly granivorous species, known for searching, transferring and storing plant seeds, especially grasses and herbs in steppe and forest-steppe areas.

Myrmecina graminicola (Latreille, 1802) – 16: 28.V.-14.X.2009, 2 ☿☿, 1 ♂, pitfall traps, leg. A. Mock & K. Tajovský; 14.X.2009-27.IV.2010, 1 ☿, 2 ♀♀, pitfall traps, leg. A. Mock & K. Tajovský; 28: 29.V.-13.X.2009, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 36: 28.IV.-13.X.2010, 3 ♀♀, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 65: 29.V.-13.X.2009, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; Cejkov: Chyzer (1902); Veľká Bara-Pilis: Záleský (1939, leg. A. Hoffer) – it inhabits a very wide range of habitats with sufficient temperature, from open grass communities to deciduous forests, including urban greenery. It usually moves more slowly than other species of ants, twisting into a ball when attacked, while being protected by a hard cuticle and propodeal spines.

Myrmica curvithorax Bondroit, 1920 – 6: 25.IV.2007, 1 ☿, leg. M. Suvák; 40: 25.-28.VIII.2008, 3 ☿☿, pitfall traps, leg. M. Suvák; 65: 29.V.-13.X.2009, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 73: 13.X.2009-29.IV.2010: 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský – in Central Europe, ants of this species have been usually identified in the past as *Myrmica salina* Ruzsky, 1905, or *Myrmica slovaca* Sadil, 1952. The current valid name according to Seifert (2018) is *Myrmica curvithorax* Bondroit, 1920. It is a species very tolerant of extreme changes in humidity and temperature, withstanding also the strong salinity of the soil.

Myrmica deplanata Emery, 1921 – 16: 28.V.-14.X.2009, 7 ♂♂, pitfall traps, leg. A. Mock & K. Tajovský; 39: 21.X.2008-28.V.2009, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 82: 28.VIII.2008: 1 ♂, leg. M. Suvák – probably the most thermophilic species of the genus *Myrmica* in this reference area, usually occurring in little-affected steppe localities with sparse vegetation and a certain proportion of protruding rocks or bare soil.

Myrmica gallienii Bondroit, 1920 – 16: 28.V.-14.X.2009, 41 ♂♂, pitfall traps, leg. A. Mock & K. Tajovský; 30: 27.V.-13.X.2009, 6 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 40:

25.IV.2007, 1 ♀, leg. M. Suvák; 41: 10.IX.2008, 1 ♀, leg. M. Suvák; 57: 27.V.-14.X.2009, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 14.X.2009-27.IV.2010, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 59: 5.VIII.2006, 1 ☿, leg. M. Suvák; Nižný Žipov: Suvák (2007); Ptrukša: Suvák (2007) – very hygrophilous species that also tolerates high water level in the ground. It usually occurs in wet meadows. Among all presented species of ants, it is the best adapted to floods. During swarming, winged individuals can occurr also in untypical sites (Fig. 3).

Myrmica rubra (Linnaeus, 1758) – 2: 28.V.-15.X.2009: 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 9: 23.IV.-22.X.2008: 380 ☿☿, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 22.X.2008-26.V.2009: 29 ☿☿, 2 ♀♀, pitfall traps, leg. A. Mock & K. Tajovský; 12: 27.V.-14.X.2009, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 13: 27.V.-14.X.2009, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 14: 23.IV.-23.X.2008, 3 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 28: 13.X.2009-29.IV.2010, 84 ☿☿, 2 ♂♂, pitfall traps, leg. A. Mock & K. Tajovský; 40: 25.-28.VIII.2008, 4 ☿☿, pitfall traps, leg. M. Suvák; 48: 18.IX.2007, 3 ☿☿, 1 nest, leg. M. Suvák; 25.-28.VIII.2008, 3 ☿☿, pitfall traps, leg. M. Suvák; 50: 24.IV.-21.X.2008, 25 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 21.X.2008-26.V.2009, 4 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 54: 25.V.-14.X.2011, 7 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 56: 10.IX.2008, 2 ☿☿, leg. M. Suvák; 57: 27.V.-14.X.2009, 3 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 14.X.2009-27.IV.2010, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 73: 26.V.-13.X.2009, 24 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 13.X.2009-29.IV.2010, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 84: 25.-28.VIII.2008, 1 ☿, pitfall traps, leg. M. Suvák; 85: 29.IV.-12.X.2010, 659 ☿☿, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 12.X.2010-24.V.2011, 136 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 90: 22.IV.-21.X.2008, 21 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 21.X.2008-28.V.2009, 6 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; Novosad I: Suvák (2007); Viničky: Chyzer (1902) – adaptable species with a wide occurrence mainly in open, but partly also in forested areas, including anthropogenically affected areas. It has optimal conditions in mesophilic to humid communities, avoiding only the most extreme xerothermic localities. Within the studied area, it belonged to the most common species of the genus *Myrmica* in wetter places. It also tolerates floods, although not as much as *M. gallienii*.

Myrmica ruginodis Nylander, 1846 – 17: 28.IV.-12.X.2010, 5 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 12.X.2010-24.V.2011, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 19: 29.IV.-12.X.2010, 23 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 12.X.2010-24.V.2011, 7 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 31: 30.IV.-12.X.2010, 7 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 12.X.2010-24.V.2011, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský – usually moisture-loving species, mostly in the middle and higher altitudes in forests and wet meadows. It also less frequently occurs in lowland forests, where it is often displaced by *M. rubra*, which is better able to withstand higher temperatures and floods.

Myrmica rugulosa Nylander, 1849 – Viničky: Mocsáry (1897) – thermophilic species occurring in open grasslands with lower vegetation, often in anthropogenically affected localities. Though not found in recent samples but known from other close parts of the Eastern Slovak Plain (Hriadky, Bánovce nad Ondavou) (Suvák 2007).

Myrmica sabuleti Meinert, 1861 – 8: 11.IX.2008, 1 ☿, leg. M. Suvák; 16: 28.V.-14.X.2009, 3 ☿☿, 5 ♂♂, pitfall traps, leg. A. Mock & K. Tajovský; 14.X.2009-27.IV.2010: 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 26: 18.IX.2007, 3 ☿☿, leg. M. Suvák; 28: 29.V.-13.X.2009, 4 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 35: 12.X.2010-24.V.2011, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 36: 13.X.2010-25.V.2011, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 38: 31.V.2005, 1 ☿, leg. A. Mock; 40: 25.IV.2007, 1 ☿, leg. M. Suvák; 25.-28.VIII.2008, 8 ☿☿, pitfall traps, leg. M. Suvák; 50: 24.IV.-21.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 53: 28.VIII.2009, 2 ♀♀, leg. M. Suvák; 69: 25.IV.-21.X.2008, 4 ☿☿, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 71: 25.IV.-21.X.2008, 1 ♀, 2 ♂♂, pitfall traps, leg. A. Mock & K. Tajovský; 84: 25.-28.VIII.2008, 33 ☿☿, pitfall traps, leg. M. Suvák; 90: 22.IV.-21.X.2008, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; Ladmovce-Baba: Wiezik (2007); Ladmovce-Tardika: Wiezik (2007) – usually a common species of xerothermic sites with a wide ecological valence (Fig. 7).

Myrmica scabrinodis Nylander, 1846 – 14: 23.IV.-23.X.2008, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 17: 12.X.2010-24.V.2011, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 28: 29.V.-13.X.2009, 71 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 50: 24.IV.-21.X.2008, 10 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 63: 19.VI.2007, 13 ☿☿, leg. M. Suvák; 69: 25.IV.-21.X.2008, 1 ☿, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 73: 26.V.-13.X.2009, 49 ☿☿, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 13.X.2009-29.IV.2010, 4 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 84: 25.-28.VIII.2008, 4 ☿☿, pitfall traps, leg. M. Suvák; Slovenské Nové Mesto?: Chyzer (1902); Somotor: Chyzer (1902) – moisture-loving species inhabiting mostly wet meadows and its ecotones. It usually avoids forest stands or, conversely, open xerothermic habitats. According to Seifert (2018), its more frequent reported occurrence in the older literature is probably caused by confusions with similar species of *M. specioides* and *M. sabuleti*.

Myrmica schencki Viereck, 1903 – 16: 28.V.-14.X.2009, 48 ☿☿, 11 ♂♂, pitfall traps, leg. A. Mock & K. Tajovský; 14.X.2009-27.IV.2010, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 36: 28.IV.-13.X.2010, 26 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 39: 22.IV.-21.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 65: 29.V.-13.X.2009, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 69: 25.IV.-21.X.2008, 10 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 21.X.2008-27.V.2009, 4 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 72: 25.-28.VIII.2008, 10 ☿☿, pitfall traps, leg. M. Suvák – thermophilic species of open xerothermic habitats with lower vegetation. It does not usually occur in more strongly anthropogenically affected localities.

Myrmica specioides Bondroit, 1918 – 16: 28.V.-14.X.2009, 7 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 35: 30.IV.-12.X.2010, 5 ☿☿, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 12.X.2010-24.V.2011, 9 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 36: 13.X.2010-25.V.2011, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 39: 21.X.2008-28.V.2009, 7 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 52: 24.IV.-22.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 22.X.2008-26.V.2009, 11 ☿☿, 4 ♀♀, pitfall traps, leg. A. Mock & K. Tajovský; 53: 25.-28.VIII.2008, 12 ☿☿, pitfall traps, leg. M. Suvák; 28.VIII.2009, 1 ♀, leg. M. Suvák; 63: 25.-28.VIII.2008, 9 ☿☿, pitfall traps, leg. M. Suvák; 65: 19.VI.2007, 1 ☿, leg. M. Suvák; 9.IX.2008, 1 ♀, leg. M. Suvák; 29.V.-13.X.2009, 41 ☿☿, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 13.X.2009-28.

IV.2010, 1 ☿, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 69: 25.IV.-21.X.2008, 24 ☿☿, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 21.X.2008-27.V.2009, 8 ☿☿, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 72: 25.-28.VIII.2008, 9 ☿☿, pitfall traps, leg. M. Suvák; 75: 25.-28.VIII.2008, 1 ♀, pitfall traps, leg. M. Suvák; 83: 9.IX.2008, 1 ☿, leg. M. Suvák – xerothermic species of open habitats with sparse vegetation. Although this species was not mentioned in older papers, within our collected material it belonged to the most common species of the genus *Myrmica* living in dry rocky and sandy elevated sites.

**Myrmica sulcinodis* Nylander, 1846 – Slovenské Nové Mesto?: Chyzer (1902) – in Central Europe, it is specific species inhabiting higher elavated areas, usually in mountains, although in northern parts of Europe it also occurs in the open habitats of humid lowlands. Therefore, the cited finding (Chyzer 1902) is quite surprising in the presented area and it was probably based on misidentification.

Solenopsis fugax (Latreille, 1798) – 6: 25.-28.VIII.2008, 67 ☿☿, pitfall traps, leg. M. Suvák; 8: 11.IX.2008, 1 ♀, leg. M. Suvák; 10: 23.IV.2007, 4 ☿☿, 1 nest, leg. M. Suvák; 11.IX.2008, 12 ☿☿, 1 ♀, 4 ♂♂, leg. M. Suvák; 16: 28.V.-14.X.2009, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 14.X.2009-27.IV.2010, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 26: 18.IX.2007, 2 ☿☿, 2 ♀♀, 19 ♂♂, nest, leg. M. Suvák; 27: 18.IX.2007, 1 ♀, leg. M. Suvák; 28: 29.V.-13.X.2009: 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 29: 13.X.2010-24.V.2011, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 24.V.-14.X.2011, 15 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 34: 20.VII.1948, 6 ☿☿, pitfall traps, leg. J. Gulička; 35: 17.III.1961, 28 ☿☿, pitfall traps, leg. J. Gulička; 28.VIII.2009, 1 ☿, leg. M. Suvák; 40: 25.-28.VIII.2008, 21 ☿☿, pitfall traps, leg. M. Suvák; 42: 22.X.2008, 3 ♀♀, leg. M. Suvák; 48: 25.-28.VIII.2008, 3 ☿☿, pitfall traps, leg. M. Suvák; 52: 24.IV.-22.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 53: 24.IV.2008, 2 ☿☿, leg. P. Fenďa; 25.-28.VIII.2008, 6 ☿☿, pitfall traps, leg. M. Suvák; 28.VIII.2009, 1 ☿, nest, leg. M. Suvák; 54: 25.V.-14.X.2011, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 61: 20.IX.2007, 2 ☿☿, nest, leg. M. Suvák; 63: 25.-28.VIII.2008, 4 ☿☿, pitfall traps, leg. M. Suvák; 64: 19.VI.2007, 3 ☿☿, nest, leg. M. Suvák; 65: 19.VI.2007, 20 ☿☿, leg. M. Suvák; 29.V.-13.X.2009, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 67: 23.IV.2007, 2 ☿☿, nest, leg. M. Suvák; 69: 25.IV.-21.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 21.X.2008-27.V.2009, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 71: 25.IV.-21.X.2008, 5 ☿☿, 1 ♂, pitfall traps, leg. A. Mock & K. Tajovský; 72: 25.-28.VIII.2008, 14 ☿☿, pitfall traps, leg. M. Suvák; 75: 25.-28.VIII.2008, 3 ☿☿, pitfall traps, leg. M. Suvák; 77: 6.IX.2018, 2 ♂♂, leg. M. Suvák; 82: 23.IV.2007, 1 ☿, leg. M. Suvák; 25.-28.VIII.2008, 47 ☿☿, pitfall traps, leg. M. Suvák; 84: 25.-28.VIII.2008, 8 ☿☿, pitfall traps, leg. M. Suvák; 86: 20.IX.2007, 6 ☿☿, 2 ♂♂, nest, leg. M. Suvák; Ladmovce-Baba: Wiezik (2007); Ladmovce-Tardika: Wiezik (2007); Slovenské Nové Mesto (?): Chyzer (1902); Somotor: Chyzer (1902) – this small yellow species is one of the most widespread in the studied area, as it inhabits almost all open xerothermic localities, whether natural or anthropogenically influenced. It often forms nests near the nests of larger species of ants, especially of the genus *Lasius*, where it penetrates and feeds on their eggs and larvae (so-called cleptobiosis).

Stenamma debile (Förster, 1850) – 17: 28.IV.-12.X.2010, 4 ☿☿, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 12.X.2010-24.V.2011, 5 ☿☿, 4 ♀♀, pitfall traps, leg. A. Mock

& K. Tajovský; 19: 29.IV.-12.X.2010, 2 ☿☿, 2 ♀♀, pitfall traps, leg. A. Mock & K. Tajovský; 12.X.2010-24.V.2011, 1 ☿, 4 ♀♀, pitfall traps, leg. A. Mock & K. Tajovský; 31: 30.IV.-12.X.2010, 4 ☿☿, 7 ♀♀, pitfall traps, leg. A. Mock & K. Tajovský; 12.X.2010-24.V.2011, 6 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 51: 24.IV.-22.X.2008, 7 ☿☿, 2 ♀♀, pitfall traps, leg. A. Mock & K. Tajovský; 22.X.2008-26.V.2009, 3 ♀♀, pitfall traps, leg. A. Mock & K. Tajovský; 70: 10.VI.2012, 2 ☿☿, leg. P. Fenďa; Cejkov: Mocsáry (1897, as *S. westwoodi*); Chyzer (1902, as *S. westwoodi*) – common species of temperate deciduous forests. It moves slowly, avoids conflict with other ants and after disturbance it usually reacts by immobilization.

**Stenamma westwoodi* Westwood, 1839 – Cejkov: Mocsáry (1897); Chyzer (1902) – according to the accepted revision, *S. westwoodi* has a limited occurrence to Western Europe (Dubois 1998, Seifert 2018), while a very similar species of *S. debile* occurs in a much larger area. Samples previously determined in our territory as *S. westwoodi* are in fact a species of *S. debile* (Werner & Wiezik 2007).

Temnothorax affinis (Mayr, 1855) – 7: 22.VIII.2008, 1 ☿, leg. M. Suvák – it usually nests in trees or lying dead wood, less frequently in scree on ground in open limestone sites. Therefore, we can find it in a wide range of environments with sufficient temperature, from drier steppe localities to flooded forests, often also on isolated trees in urban environments.

Temnothorax albipennis (Curtis, 1854) – 36: 28.IV.-13.X.2010, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 13.X.2010-25.V.2011, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 39: 21.X.2008-28.V.2009, 3 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; Ladmovce-Tardika: Wiezik (2007) – it occurs in xerothermic localities, from more open habitats, through bush-covered places to lighter forests.

Temnothorax clypeatus (Mayr, 1853) – 63: 19.VI.2007, apple tree, 1 ☿, leg. M. Suvák – typical arboricolous species that usually nests under the bark or in the wood of living or dead trees.

Temnothorax crassispinus (Karavajev, 1926) – 9: 23.IV.-22.X.2008: 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 22.X.2008-26.V.2009, 1 ☿, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 14: 23.IV.-23.X.2008, 3 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 23.X.2008-27.V.2009, 6 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 17: 12.X.2010-24.V.2011, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 28: 29.V.-13.X.2009: 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 31: 30.IV.-12.X.2010, 4 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 32: 25.-28.VIII.2008, 18 ☿☿, pitfall traps, leg. M. Suvák; 51: 24.IV.-22.X.2008, 2 ☿☿, 2 ♀♀, pitfall traps, leg. A. Mock & K. Tajovský; 54: 25.V.-14.X.2011, 3 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 70: 10.VI.2012, 47 ☿☿, leg. P. Fenďa; 84: 25.-28.VIII.2008, 1 ☿, pitfall traps, leg. M. Suvák; 85: 29.IV.-12.X.2010, 19 ☿☿, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 12.X.2010-24.V.2011, 5 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 90: 22.IV.-21.X.2008, 3 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; Biel: Chyzer (1902, as *T. nylanderi*) – common species of mesophilic to slightly dry deciduous forests. According to Seifert (2018), its occurrence in flooded areas is limited by the frequency of floods if they occur more frequently than once every 5 years.

**Temnothorax nylanderi* (Förster, 1850) – Biel: Chyzer (1902) – West Palearctic species that does not occur in Central Europe. The corresponding parapatric species is *T. crassispinus*

in our countries (Czechowski et al 2002., Werner & Wiezik 2007). Therefore, all older findings from our territory marked as *T. nylanderi* the most probably represent the species *T. crassispinus*.

Temnothorax parvulus (Schenck, 1852) – 16: 28.V.-14.X.2009, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 36: 28.IV.-13.X.2010, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 39: 21.X.2008-28.V.2009, 10 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský – thermophilic species of light deciduous, especially oak forests.

Temnothorax saxonicus (Seifert, 1955) – 32: 19.IX.2007, base of isolate pine tree in black locust stand, 1 ☿, leg. M. Suvák – xerothermophilic species, whose nests, however, do not occur in direct sunlight, but usually in the shade of trees and shrubs. Some authors (Csösz et al. 2015) consider *T. saxonicus* to be synonymous with *Temnothorax tergestinus* (Finzi, 1928) but according to Seifert (2018) they are different species.

Temnothorax turcicus (Santschi, 1934) – 39: 21.X.2008-28.V.2009, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský – rare species that is usually found in xerothermic habitats in low sparse forests, or in transition zones with grass communities and shrubs (Fig. 2). It usually inhabits trees and shrubs with plenty of dead wood.

Temnothorax unifasciatus (Latreille, 1798) – 32: 25.-28.VIII.2008, 1 ☿, pitfall traps, leg. M. Suvák; 39: 22.IV.-21.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 21.X.2008-28.V.2009, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 83: 9.IX.2008, 1 ☿, leg. M. Suvák – it inhabits various types of environments with sufficiently xerothermic conditions, from open, through shrubby to forest communities.

Tetramorium caespitum (Linnaeus, 1758) – Ladmovce-Baba: Wiezik (2007); Ladmovce-Baba-Kašvár: Wiezik (2007); Ladmovce-Dlhá hora: Wiezik (2007); Ladmovce-Tardika: Wiezik (2007); Leles: Chyzer (1902); Leles-Borzva: Suvák (2007); Malčice: Suvák (2007); Malý Kamenec: Suvák (2007); Novosad II: Suvák (2007); Sirník: Suvák (2007); Slovenské Nové Mesto?: Chyzer (1902); Strážne I: Suvák (2007); Veľký Kamenec: Suvák (2007); Veľký Kamenec-Pácin: Suvák (2007); Veľké Kapušany-Veškovce: Suvák (2007); Zemplínske Kopčany: Suvák (2007). These previous findings published under the name *T. caespitum*, if not verified, may in fact represent some other cryptic species of the genus *Tetramorium*.

Following samples determined as *T. caespitum* have already been verified using morphometric analysis according to the current concept for *Tetramorium caespitum*/*impurum* complex:

16: 28.V.-14.X.2009, 4 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 20: 16.III.1961, 2 ☿☿, pitfall traps, leg. J. Gulička; 26: 18.IX.2007, 2 ☿☿, leg. M. Suvák; 32: 19.IX.2007, 2 ☿☿, nest, leg. M. Suvák; 37: 18.III.1961, 5 ☿☿, pitfall traps, leg. J. Gulička; 48: 18.IX.2007, 1 ☿, leg. M. Suvák; 64: 19.VI.2007, 4 ☿☿, nest, leg. M. Suvák; 65: 19.VI.2007, 2 ☿☿, leg. M. Suvák; 72: 25.-28.VIII.2008, 11 ☿☿, pitfall traps, leg. M. Suvák; 75: 19.IX.2007, 2 ☿☿, nest, leg. M. Suvák; 86: 20.IX.2007, 2 ☿☿, nest, leg. M. Suvák; Kráľovský Chlmec-Vel'ký kopec: Wagner et al. (2017, leg. M. Suvák); Malý Horeš-Viničné pivnice: Wagner et al. (2017, leg. M. Suvák); Vojany: Suvák (2007, checked later) – occurs in various xerothermic localities of both natural and urban environments. On sandy substrates it dominates over *Tetramorium impurum* (Förster 1850), on heavier clay soils it is usually the opposite situation. According to the current concept (Schlick-

Steiner et al. 2006, Wagner et al. 2017, Seifert 2018), the occurrence of about 8 species of the genus *Tetramorium* is possible in our territory. Some of them are extremely difficult to distinguish based on morphological features. Determination of such similar species usually requires quality optical equipment for analysing of at least 2-3 workers from one nest. Slightly different keys can be used based of various morphometric signs (Steiner et al 2006; Wagner et al 2017; Seifert 2018), but in all cases such determination is very time consuming. For example, the electronic key (Haider 2020) based on the work of Wagner et al. (2017) requires up to 33 input parameters for each worker according to precisely defined criteria. As in the past the individual cryptic species of the *Tetramorium caespitum*/*impurum* complex were not distinguished, all findings identified as *T. caespitum* (or *T. impurum*) should be taken with caution until the relevant samples are re-analyzed (if they are still preserved). Even then, however, there is a certain probability of error, e.g. according to Wagner et al (2017) for each individual worker, the accuracy of determination is 88.0%, and for two workers from a common nest it is on average 97.4%. In this context, it is necessary to take into account the results of the determination, especially for the most similar species, such as *T. caespitum, T. hungaricum, T. impurum, T. immigrans, T. indocile* and *T. staerckei*. In the case of samples from pitfall traps, there is a real possibility that captured very similar-looking workers of the genus *Tetramorium* may not belong to the same species and should be evaluated separately. An analysis of nearby nests in some localities showed that sometimes very similar species can indeed coexist within the same locality. Therefore, the determination of samples taken directly from nests has a higher reliability than of individual workers collected by other methods. Due to the extreme time-consuming determination, only a part of the workers of the genus *Tetramorium* were yet analyzed in detail from the reference area, though these ants belonged to the most frequent representatives of myrmecofauna there.

Tetramorium immigrans Santschi, 1927 – 27: 18.IX.2007, 1 ☿, leg. M. Suvák; 38: 31.V.2005, 4 ☿☿, leg. A. Mock; 40: 25.IV.2007, 4 ☿☿, 1 nest, leg. M. Suvák; 20.VI.2007, 1 ☿, leg. M. Suvák; 20.IX.2007, 1 ☿, nest, leg. M. Suvák; 60: 20.IX.2007, 2 ☿☿, nest, leg. M. Suvák; 61: 20.IX.2007, 2 ☿☿, nest, leg. M. Suvák; 82: 19.VI.2007, 4 ☿☿, leg. M. Suvák; 86: 20.VI.2007, 5 ☿☿, 1 nest, leg. M. Suvák; 20.IX.2007, 2 ☿☿, nest, leg. M. Suvák – corresponds to the species *Tetramorium* sp. E according to Schlick-Steiner et al. (2006). It is an ant of semi-dry and dry grassy areas, often on rocky and sandy surfaces. It also occurs very often synanthropically, i.e. in ruderal areas, parks, gardens, along roads and railways.

Tetramorium indocile Santschi, 1927 – 65: 19.VI.2007, 2 ☿☿, 1 ♀, 1 ♂, nest, leg. M. Suvák – according to Schlick-Steiner et al. (2006), it is a species then tentatively referred to as *Tetramorium* sp. C, later identified as *T. indocile* (Csősz et al. 2014, Wagner et al. 2017). Slightly thermophilic species of very dry areas. In Central Europe, found only rarely in steppe localities with sparse grass vegetation and rocks, sandy pastures or vineyards. This is the first documented occurrence in Slovakia. Results of morphometric analysis of the workers was in accordance with the morphological features of the male from the common nest.

Tetramorium moravicum Kratochvíl, 1941 – 79: 27.VII.2009, 6 ☿☿, nest, leg. M. Suvák; Ladmovce-Baba: Wiezik (2007) – occurs in markedly xerothermic localities, often on rocky slopes with steppe vegetation. Sometimes it also inhabits anthropogenically influenced areas, vineyards, ruderal sites.

Tetramorium staerckei Kratochvil,1944 – 6: 25.IV.2007, 1 ☿, leg. M. Suvák; 25.-28. VIII.2008, 6 ☿☿, pitfall traps, leg. M. Suvák; 26: 8.IX.2007, 3 ☿☿, nest, leg. M. Suvák; 27: 18.IX.2007, 2 ☿☿, nest, leg. M. Suvák; 29: 13.X.2010-24.V.2011, 11 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 32: 9.IX.2007, 2 ☿☿, nest, leg. M. Suvák; 40: 25.IV.2007, 3 ☿☿, leg. M. Suvák; 20.VI.2007, 1 ☿, leg. M. Suvák; 61: 20.IX.2007, 2 ☿☿, nest, leg. M. Suvák; 65: 19.VI.2007, 2 ☿☿, leg. M. Suvák; 67: 23.IV.2007, 2 ☿☿, nest, leg. M. Suvák; 75: 19.IX.2007: 2 ☿☿, nest, leg. M. Suvák; 82: 23.IV.2007, 2 ☿☿, nest, leg. M. Suvák; 19.VI.2007, 3 ☿☿, nest, leg. M. Suvák; 86: 20.VI.2007, 1 ☿, nest, leg. M. Suvák; 20.IX.2007, 5 ☿☿, 2 nests, leg. M. Suvák; Streda nad Bodrogom-Katroň: Wagner et al. (2017, leg. M. Suvák) – is a species formerly known as *Tetramorium* sp. D (Schlick-Steiner et al. 2006). A very thermophilic ant of drier grass communities, sand dunes, pastures, road embankments, heaps of stones, abandoned vineyards and the like.

Dolichoderinae

Bothriomyrmex communistus Santschi, 1919 – Ladmovce-Tardika: Wiezik (2007), Seifert (2012) – after a revision of the genus *Bothriomyrmex* (Seifert 2012), the sample from Wiezik (2007), originally designated as *Bothriomyrmex gibbus* Soudek, 1925, was reclassified to *B. communistus* (directly mentioned sample as: „Tardica, 18.IV.2006 [48.416 °, 21.767 °, 150 m]“, although altitude differs). It is one of the temporarily socially parasitic species occurring in the same xerothermic grass communities, often on a carbonate base, as their host ants of the genus *Tapinoma*.

Dolichoderus quadripunctatus (Linnaeus, 1771) – 2: 28.V.-15.X.2009, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 3: 25.IV.2007, apricot tree, 1 ☿, leg. M. Suvák; 30: 27.V.-13.X.2009, 3 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 31: 30.IV.-12.X.2010, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 40: 20.IX.2007, walnut tree, 1 ☿, leg. M. Suvák; 48: 18.IX.2007, 2 ☿☿, 1 nest, leg. M. Suvák; 25.VIII.2008, 1 ☿, leg. M. Suvák; 59: 5.VIII.2006, 1 ♀, leg. M. Suvák; 63: 19.VI.2007, walnut tree, 1 ☿, leg. M. Suvák; 90: 22.IV.-21.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; Cejkov: Mocsáry (1897); Novosad I: Suvák (2007); Slovenské Nové Mesto (?): Chyzer (1902); Somotor: Chyzer (1902); Viničky: Chyzer (1902) – arboricolous species (Fig. 8) of warmer areas occurring not only in forest complexes, but also on solitary trees in parks and gardens. Nests can be formed in the cavities of wood and twigs of many species of deciduous trees, especially oaks, walnuts, poplars, cherries and lindens. According to Seifert (2018), the occurrence recorded on the ground is strongly underestimated due to the predominant movement of this species in the treetops.

Liometopum microcephalum (Panzer, 1798) – Slovenské Nové Mesto (?): Mocsáry (1897); Somotor: Mocsáry (1897); Chyzer (1902); Trakany: Mocsáry (1897); Chyzer (1902); Viničky: Mocsáry (1897); Chyzer (1902) – rare species, typically associated with old trees, especially oaks, deserves special mention. It is known not only from light oak forests with clearings, from old parks or karst areas, but often from floodplain forests in flooded areas. The Slovak name of this species („mravec lužný“ = a floodplain ant) is also related to this fact. At large rivers, it can form very numerous societies conspicuous by the movement of a high number of workers, with a significant ecological impact on the environment. With a little practice, *L. microcephalum* is easily distinguishable even by

a layman with the naked eye. With respect to the above, it should be an iconic species of the Latorica PLA. Unfortunately, the current survey has not confirmed its occurrence in this region. In the past, Mocsáry (1897) and Chyzer (1902) mentioned several localities of this interesting ant from today's territory of SE Slovakia: Slovenské Nové Mesto, Somotor, Viničky, Trakany. In addition, the nearby Pácin was mentioned, which is a village in Hungary immediately beyond the current border. Záleský (1939) also mentioned Malé Ozorovce referring to K. Chyzer, but this was probably a wrong reference. As for Trakany, Mocsáry (1897) and Chyzer (1902) mentioned "Tárkány" within Zemplín County. It was more probably Veľké Trakany and Malé Trakany (Nagy Tárkány and Kis Tárkány), not a more well-known village Tárkány in the Esztergom-Komárno County, as some later authors may have assumed and did not mention this locality in Slovakia (e.g. Záleský 1939). These flood ants disappeared also from other localities in Slovakia mentioned by Záleský (1939) in the past (e.g. Košice, Silická planina). At present, Petráková (2016) dealt with distribution of *L. microcephalum* within Europe, but she also failed to confirm its current occurrence in the eastern part of Slovakia. At the same time, this species is still present in the west of Slovakia, especially in the vicinity of the Danube (Purkart et al. 2019). The nearest Slovak locality of its current occurrence is probably near Lučenec (Petráková 2016), which is about 155 km from the Latorica PLA. However, Hungarian localities are closer, e.g. Túristvándi (Gallé 2005) about 50 km from the studied area. It is questionable what changes caused the disappearance of *L. microcephalum* from SE Slovakia. There were certainly more negative human interventions in the country, for example chemical pollution or reduction of original stands. Specific biotic influences may also have played a role, e.g. competition of a similarly dominant ant *L. fuliginosus* (Petráková & Schlaghamerský 2014, Seifert 2018), which commonly occurs here, or other natural enemies. However, unknown factors could also work, which would require a more detailed analysis. This species can still survive overlooked in hardly accessible areas of Latorica PLA, though it seems to be quite improbable with respect to its conspicuous lifestyle. Nevertheless, it seems that more sites with suitable trees would be found within the Latorica PLA and the reintroduction of this species could be considered.

Tapinoma erraticum (Latreille, 1798) – 16: 28.V.-14.X.2009, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 36: 28.IV.-13.X.2010, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; Ladmovce-Baba: Wiezik (2007); Trakany: Chyzer (1902) – typical species of sunny habitats, inhabiting very dry to slightly humid conditions. It usually avoids sandy substrates and urban areas.

Tapinoma subboreale Seifert, 2011 – 39: 21.X.2008-28.V.2009, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 65: 29.V.-13.X.2009, 4 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 69: 25.IV.-21.X. 2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 21.X.2008-27.V.2009, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 71: 25.IV.-21.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 72: 25.-28.VIII.2008, 9 ☿☿, pitfall traps, leg. M. Suvák; 79: 27.VII.2009, 1 ☿, leg. M. Suvák; Ladmovce-Baba-Kašvár: Wiezik (2007); Ladmovce-Dlhá hora: Wiezik (2007); Ladmovce-Tardika: Wiezik (2007) – in the past, individuals of this species from our territory were referred to as *Tapinoma ambiguum* Emery, 1925. *T. subboreale* differs from *T. erraticum* by preferring a sandy or gravelly base, otherwise it requires similarly sunny habitats.

Formicinae

Camponotus aethiops (Latreille, 1798) – 36: 28.IV.-13.X.2010, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 37: 18.III.1961, 1 ☿, pitfall traps, leg. J. Gulička; 39: 21.X.2008-28.V.2009, 6 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 71: 25.IV.-21.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 79: 27.VII.2009, 1 ☿, nest, leg. M. Suvák; Ladmovce-Baba: Wiezik (2007); Ladmovce-Baba-Kašvár: Wiezik (2007); Ladmovce-Dlhá hora: Wiezik (2007); Ladmovce-Tardika: Wiezik (2007) – species of dry and warm grass communities with isolated shrubs, or the edges of oak forests, often on limestones.

Camponotus atricolor (Nylander 1849) – 65: 19.VI.2007, 6 ☿☿, 1 nest, leg. M. Suvák; 13.X.2009-28.IV.2010, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 79: 27.VII.2009, 2 ☿☿, leg. M. Suvák – species of xerothermic grass communities, with similar requirements as *C. piceus*, is therefore considered by some authors (Werner & Wiezik 2007) to be identical. According to Seifert (2018), these are different species and the findings mentioned above from the Latorica PLA show signs corresponding to *C. atricolor*.

Camponotus fallax (Nylander, 1856) – 9: 23.IV.-22.X.2008: 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 29: 20.IX.2007, walnut tree, 1 ☿, leg. M. Suvák; 31: 30.IV.-12.X.2010, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 32: 19.IX.2007, isolate pine tree in black locust stand, 2 ☿☿, leg. M. Suvák; 39: 21.X.2008-28.V.2009, 12 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 85: 29.IV.-12.X.2010, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; Slovenské Nové Mesto (?): Chyzer (1902, as *Camponotus marginatus* Latr.) – thermophilic tree species occuring mainly in deciduous forests, but also in parks. It nests mostly in dead wood.

**Camponotus lateralis* (Olivier, 1792) – Slovenské Nové Mesto (?): Chyzer (1902) – thermophilic species of the southern areas of Europe, which probably does not occur in our country. Although its rare occurrence has been reported elsewhere in Slovakia, it is assumed as a misidentification of the species (Werner & Wiezik 2007).

Camponotus ligniperda (Latreille, 1802) – 36: 28.IV.-13.X.2010, 16 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 13.X.2010-25.V.2011, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; Ladmovce-Baba: Wiezik (2007); Slovenské Nové Mesto (?): Chyzer (1902) – thermophilic species of lighter deciduous or mixed forests, but also of xerothermic grass communities with shrubs. It can build nests not only in various types of wood, but also under stones or in rock crevices.

Camponotus piceus (Leach, 1825) – 71: 25.IV.-21.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; Ladmovce-Baba: Wiezik (2007); Ladmovce-Baba-Kašvár: Wiezik (2007); Ladmovce-Dlhá hora: Wiezik (2007); Ladmovce-Tardika: Wiezik (2007); Veľká Bara-Pilis: Záleský (1939, leg. A. Hoffer) – this species of xerothermic grassland communities occurs often on a limestone base but, within the studied area, also on volcanic bedrock.

**Camponotus sylvaticus* (Olivier, 1792) – Slovenské Nové Mesto (?): Mocsáry (1897); Chyzer (1902); Viničky: Chyzer (1902) – species known mainly from the Mediterranean area and its older published findings in our country are probably based on misidentifications (Werner & Wiezik 2007).

Camponotus vagus (Scopoli 1763) – 83: 9.IX.2008, on cherry tree, 1 ☿, leg. M. Suvák; Slovenské Nové Mesto (?): Chyzer (1902) – usually occurs on forest edges and clearings with its nests mainly in wood.

Colobopsis truncata (Spinola, 1808) – 63: 19.VI.2007, apple tree, 1 ♀, leg. M. Suvák; 19.VI.2007, walnut tree, 1 ☿, leg. M. Suvák; 83: 9.IX.2008, cherry tree, 1 ☿, leg. M. Suvák; Cejkov: Mocsáry (1897); Slovenské Nové Mesto (?): Mocsáry (1897); Chyzer (1902) – occurs mainly in deciduous forests or on individual trees (especially oaks and walnuts), where it forms nests in cavities in wood or twigs. Compared to our other ant species, it is unique in that it creates morphologically significantly different castes of workers. The most striking are the workers with a roughened cylindrical front part of the head, which acts as a plug closing the entrance to the nest.

Formica clara Forel, 1886 – 29: 13.X.2010-24.V.2011, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 32: 25.-28.VIII.2008, 1 ☿, pitfall traps, leg. M. Suvák; 35: 30.IV.-12.X.2010, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 12.X.2010-24.V.2011, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 39: 22.IV.-21.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 49: 9.IX.2008, 1 ☿, leg. M. Suvák; 52: 24.IV.-22.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 22.X.2008-26.V.2009, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 53: 25.-28.VIII.2008, 5 ☿☿, pitfall traps, leg. M. Suvák; 63: 19.VI.2007, 1 ☿, leg. M. Suvák; 25.-28.VIII.2008, 4 ☿☿, pitfall traps, leg. M. Suvák; 65: 19.VI.2007, 1 ☿, leg. M. Suvák; 69: 25.IV.-21.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 72: 25.-28.VIII.2008, 2 ☿☿, pitfall traps, leg. M. Suvák; 79: 27.VII.2009, 1 ☿, leg. M. Suvák; 86: 20.VI.2007, 2 ☿☿, leg. M. Suvák – very thermophilic species, especially of steppe areas within grassy communities on sands and limestones, but also occurs in open ruderal sites.

Formica cunicularia Latreille, 1798 – 6: 25.-28.VIII.2008, 4 ☿☿, pitfall traps, leg. M. Suvák; 8: 11.IX.2008, 1 ☿, nest, leg. M. Suvák; 10: 23.IV.2007, 1 ☿, leg. M. Suvák; 28: 29.V.-13.X.2009, 9 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 13.X.2009-29.IV.2010: 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 32: 25.-28.VIII.2008, 1 ☿, pitfall traps, leg. M. Suvák; 36: 28.IV.-13.X.2010, 13 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 40: 20.VI.2007, 1 ♀, 2 ☿☿, nest, leg. M. Suvák; 25.-28.VIII.2008, 13 ☿☿, pitfall traps, leg. M. Suvák; 41: 13.VIII.2003, 4 ☿☿, leg. M. Suvák; 43: 17.VIII.2003: 1 ☿, leg. M. Suvák; 47: 12.VIII.2003, 1 ☿, leg. M. Suvák; 49: 9.IX.2008, 1 ☿, leg. M. Suvák; 50: 24.IV.-21.X.2008, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 53: 25.-28.VIII.2008, 6 ☿☿, pitfall traps, leg. M. Suvák; 28.VIII.2009, 2 ☿☿, leg. M. Suvák; 52: 22.X.2008-26.V.2009, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 58: 17.VIII.2003, 1 ☿, leg. M. Suvák; 61: 20.IX.2007, 1 ☿, nest, leg. M. Suvák; 63: 19.VI.2007, 4 ☿☿, leg. M. Suvák; 25.-28.VIII.2008, 11 ☿☿, pitfall traps, leg. M. Suvák; 65: 19.VI.2007, 1 ☿, leg. M. Suvák; 67: 23.IV.2007, 4 ☿☿, 2 nests, leg. M. Suvák; 69: 25.IV.-21.X.2008, 4 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 82: 23.IV.2007, 1 ☿, leg. M. Suvák; 84: 25.-28.VIII.2008, 2 ☿☿, pitfall traps, leg. M. Suvák; 86: 20.IX.2007, 1 ☿, leg. M. Suvák; 10.IX.2008, 3 ☿☿, nest, leg. M. Suvák; Čierna: Suvák (2007); Ladmovce-Dlhá hora: Wiezik (2007); Ladmovce-Tardika: Wiezik (2007); Novosad I: Suvák (2007); Slovenské Nové Mesto (?): Mocsáry (1875); Veľké Kapušany-Veškovce: Suvák (2007); Veľký Kamenec: Suvák (2007); Vojany: Suvák (2007) – species of mildly warm and drier communities also occurring in open ruderal and more frequently disturbed localities.

Formica fusca Linnaeus, 1758 – 36: 28.IV.-13.X.2010, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 13.X.2010-25.V.2011, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský;

Slovenské Nové Mesto (?): Chyzer (1902) – occurs in a wider range of habitats from open to slightly shaded environments, while avoiding extremes.

Formica gagates Latreille, 1789 – 18: 9.VI.2018, 3 ☿☿, leg. M. Suvák; 36: 28.IV.-13.X.2010, 4 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 13.X.2010-25.V.2011, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; Ladmovce-Baba: Wiezik (2007); Ladmovce-Tardika: Wiezik (2007); Slovenské Nové Mesto (?): Mocsáry (1897); Chyzer (1902) – thermophilic species (Fig. 9) preferring lighter deciduous forests and their edges.

Formica polyctena Förster, 1850 – 11: 25.III.2018: 5 ☿☿, nest, leg. M. Suvák; 36: 28.IV.-13.X.2010, 15 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 44: 25.III.2018, 7 ☿☿, nest, leg. M. Suvák; 45: 10.VI.2012, 8 ☿☿, 2 nests, leg. M. Suvák – out of the so-called forest ants forming large hilly nests, it is the most common species in Slovakia. Compared to the related species *F. rufa*, it shows a greater tendency to penetrate inside of the forest stands and a stronger affinity for *Picea abies* but is also common in deciduous stands.

Formica polyctena x *rufa* – 22: 24.VII.2018, 4 ☿☿, nest, leg. M. Suvák; 36: 13.X.2010-25.V.2011, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 45: 10.VI.2012: 5 ☿☿, 2 nests, leg. M. Suvák; 25.III.2018: 7 ☿☿, nest, leg. M. Suvák; 6.IX.2018: 5 ☿☿, nest, leg. M. Suvák; 80: 10.VI.2012: 6 ☿☿, 2 nests, leg. M. Suvák – in the Zemplínske vrchy Mts., 12 selected nests of the so-called forest ants (*Formica* s. str.) were analysed. Phenotypically pure forms of *F. polyctena* were found in 4 nests, *F. rufa* in 1 nest (Fig. 10) and the other 7 nests represented hybrids of *F. polyctena* x *rufa* with defined intermediate features according to Seifert (2018).

Formica pratensis Retzius, 1783 – 18: 9.VI.2018, 5 ☿☿, nest, leg. M. Suvák; 21: 24.VII.2018, 3 ☿☿, nest, leg. M. Suvák; 24: 11.IX.2020, 2 ☿☿, nest, leg. M. Suvák; 25: 8.IX.2004, 1 ☿, leg. M. Suvák; 28: 29.V.-13.X.2009, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 40: 25.IV.2007, 2 ☿☿, nest, leg. M. Suvák; 25.-28.VIII.2008, 426 ☿☿, pitfall traps, leg. M. Suvák; 46: 10.VI.2012, 2 ☿☿, nest, leg. M. Suvák; 47: 12.VIII.2003, 1 ☿, leg. M. Suvák; 50: 24.IV.-21.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 62: 9.VI.2018, 4 ☿☿, nest, leg. M. Suvák; 66: 25.VIII.2008, 2 ☿☿, nest (Fig. 6), leg. M. Suvák; 69: 25.IV.-21.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 76: 29.XII.2018, 7 ☿☿, 2 nests, leg. M. Suvák; 78: 10.VI.2012, 2 ☿☿, nest, leg. M. Suvák; 79: 27.VII.2009, 1 ☿, nest, leg. M. Suvák; 82: 23.IV.2007, 2 ☿☿, leg. M. Suvák; 89: 13.VIII.2003, 3 ☿☿, leg. M. Suvák; Cejkov: Chyzer (1902); Ladmovce-Baba: Wiezik (2007); Ladmovce-Dlhá hora: Wiezik (2007); Ladmovce-Tardika: Wiezik (2007); Lastovce: Suvák (2007); Slovenské Nové Mesto (?): Chyzer (1902) – unlike other related species of the subgenus *Formica* s. str., *F. pratensis* inhabits more open drier grassy communities with possible shrubs or isolated trees (Fig. 6). There it usually forms lower above-ground nests from coarser plant material.

Formica rufa Linnaeus, 1761 – 23: 9.VI.2018, 4 ☿☿, nest (Fig. 10), leg. M. Suvák – typical species of forest community (Fig. 10) that can form tall nesting piles of plant material. In contrast to the related species *F. polyctena*, these nests are more common at the edges of forest stands than inside.

Formica rufibarbis, Fabricius 1793 – 3: 25.IV.2007: 1 ☿, leg. M. Suvák; 6: 25.IV.2007, 5 ☿☿, 2 nests, leg. M. Suvák; 25.-28.VIII.2008, 9 ☿☿, pitfall traps, leg. M. Suvák; 10.IX.2008, 3 ☿☿, nest, leg. M. Suvák; 8: 11.IX.2008, 1 ☿, nest, leg. M. Suvák; 10:

23.IV.2007, 1 ☿, leg. M. Suvák; 11.IX.2008, 2 ☿☿, nest, leg. M. Suvák; 26: 18.IX.2007, 2 ☿☿, nest, leg. M. Suvák; 29: 20.IX.2007, 1 ☿, leg. M. Suvák; 13.X.2010-24.V.2011, 4 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 32: 19.IX.2007, 1 ☿, leg. M. Suvák; 33: 12.VIII.2003, 2 ☿☿, leg. M. Suvák; 35: 28.VIII.2009, 3 ☿☿, nest, leg. M. Suvák; 30.IV.-12.X.2010, 3 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 40: 25.IV.2007, 13 ☿☿, 1 nest, leg. M. Suvák; 20.VI.2007, 1 ☿, leg. M. Suvák; 20.IX.2007, 1 ☿, leg. M. Suvák; 25.-28.VIII.2008, 25 ☿☿, pitfall traps, leg. M. Suvák; 10.IX.2008, 3 ☿☿, nest, leg. M. Suvák; 41: 12.VIII.2003, 2 ☿☿, leg. M. Suvák; 13.VIII.2003, 1 ☿, leg. M. Suvák; 8.IX.2004, 2 ☿☿, leg. M. Suvák; 48: 18.IX.2007, 1 ☿, leg. M. Suvák; 49: 9.IX.2008, 7 ☿☿, 1 nest, leg. M. Suvák; 52: 24.IV.-22.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 22.X.2008-26.V.2009, 3 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 53: 25.-28.VIII.2008, 16 ☿☿, pitfall traps, leg. M. Suvák; 63: 19.VI.2007, 2 ☿☿, leg. M. Suvák; 25.-28.VIII.2008, 1 ☿, pitfall traps, leg. M. Suvák; 65: 19.VI.2007, 3 ☿☿, leg. M. Suvák; 9.IX.2008, 1 ☿, leg. M. Suvák; 29.V.-13.X.2009, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 68: 27.IX.2009, 1 ☿, leg. M. Suvák; 69: 25.IV.-21.X.2008, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 74: 9.IX.2008, 2 ☿☿, leg. M. Suvák; 75: 9.IX.2008, 2 ☿☿, leg. M. Suvák; 82: 23.IV.2007, 1 ☿, leg. M. Suvák; 19.VI.2007, 1 ☿, nest, leg. M. Suvák; 83: 14.VIII.2003, 4 ☿☿, leg. M. Suvák; 86: 20.VI.2007, 1 ☿, leg. M. Suvák; 20.IX.2007, 1 ☿, leg. M. Suvák; 87: 8.IX.2004, 1 ☿, leg. M. Suvák; Čierna: Suvák (2007); Kožuchov: Suvák (2007); Ladmovce-Tardika: Wiezik (2007); Sirník: Suvák (2007); Slovenské Nové Mesto (?): Chyzer (1902); Somotor: Chyzer (1902); Veľký Kamenec-Pácin: Suvák (2007); Viničky: Chyzer (1902); Zemplínske Kopčany: Suvák (2007) – the environmental requirements for this species are between the mildly thermophilic *F. cunicularia* and the highly thermophilic *F. clara*. Compared to them, it is more common on sands and open ground with a less developed herbaceous layer. It also penetrates more into the built areas.

Formica sanguinea Latreille, 1798 – 6: 25.-28.VIII.2008, 11 ☿☿, pitfall traps, leg. M. Suvák; 35: 30.IV.-12.X.2010, 4 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 61: 20.IX.2007, 4 ☿☿, nest, leg. M. Suvák; 69: 25.IV.-21.X.2008, 195 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 21.X.2008-27.V.2009, 45 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 72: 25.-28.VIII.2008, 7 ☿☿, pitfall traps, leg. M. Suvák; 75: 9.IX.2008, 1 ☿, leg. M. Suvák; 79: 27.VII.2009, 1 ☿, nest, leg. M. Suvák; 86: 20.VI.2007, 1 ☿, leg. M. Suvák; Slovenské Nové Mesto (?): Chyzer (1902) – eurypotent species inhabiting a wide range of usually sunny localities from lowlands to mountainous locations. It is known as an optional slave-maker (dulotic) species, which uses all species of the subgenus *Serviformica* in its vicinity, thus creating mixed nests.

Lasius alienus (Förster, 1850) – 16: 28.V.-14.X.2009, 176 ☿☿, 2 ♀♀, pitfall traps, leg. A. Mock & K. Tajovský; 14.X.2009-27.IV.2010, 36 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 35: 28.VIII.2009, 1 ☿, nest, leg. M. Suvák; 30.IV.-12.X.2010, 58 ☿☿, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 12.X.2010-24.V.2011, 56 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 36: 28.IV.-13.X.2010, 86 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 13.X.2010-25.V.2011, 38 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 39: 22.IV.-21.X.2008, 17 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 21.X.2008-28.V.2009, 12 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 71: 25.IV.-21.X.2008,

153 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 79: 27.VII.2009, 3 ☿☿, nest, leg. M. Suvák; 81: 23.IV.2007, 1 ☿, leg. M. Suvák; 85: 12.X.2010-24.V.2011, 14 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; Ladmovce-Baba: Wiezik (2007); Ladmovce-Dlhá hora: Wiezik (2007); Ladmovce-Tardika: Wiezik (2007); Slovenské Nové Mesto (?): Chyzer (1902) – is usually a part of some xerothermic open communities or light forests. Older findings marked with this name must be evaluated with regard to some later taxonomic works related to this genus (Seifert 1992, Seifert & Galkowski 2016, Seifert 2020b). In our circumstances, this applies to the species *L. alienus, L. paralienus, L. bombycina* and *L. psammophilus*, which all may have been included in the past under the then common name *L. alienus*.

Lasius balcanicus Seifert, 1988 / *Lasius distinguendus* (Emery, 1916) – 20: 16.III.1961, 1 ☿, pitfall traps, leg. J. Gulička; 35: 25.X.1961, 2 ☿☿, pitfall traps, leg. J. Gulička; 75: 19.IX.2007: 2 ☿☿, 1 nest, leg. M. Suvák; 9.IX.2008, 3 ☿☿, 1 nest, leg. M. Suvák – these two species are indistinguishable based on the morphology of the workers, for reliable determination it is necessary to take a sample of queens from the nest. Both species occur in warm open steppe localities. As for *L. distinguendus*, the confirmed host species is *L. paralienus* and *L. platythorax*, other species are likely. In the case of *L. balcanicus*, *L. paralienus* is also thought to be the main host based on indirect data.

Lasius bicornis (Förster, 1850) – Veľaty: Mocsáry (1897); Chyzer (1902, as *L. incisus* Schenck.) – is located in wetter deciduous forests, but also in grassland communities with individual older trees and in parks. Its host species is the most probably *L. brunneus*.

Lasius bombycina Seifert & Galkowski 2016 – 39: 21.X.2008-28.V.2009, 344 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 52: 24.IV.-22.X.2008, 81 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 22.X.2008-26.V.2009, 226 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 53: 25.-28.VIII.2008, 20 ☿☿, pitfall traps, leg. M. Suvák; 64: 19.VI.2007, 1 ☿, nest, leg. M. Suvák; 65: 19.VI.2007, 13 ☿☿, 3 nests, leg. M. Suvák; 9.IX.2008, 3 ☿☿, leg. M. Suvák; 29.V.-13.X.2009, 161 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 13.X.2009-28.IV.2010, 29 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 69: 25.IV.-21.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 74: 9.IX.2008, 2 ☿☿, leg. M. Suvák; 75: 19.IX.2007, 2 ☿☿, nest, leg. M. Suvák; 9.IX.2008, 4 ☿☿, 1 nest, leg. M. Suvák – occurs in grassy xerothermic communities. Until recently, it was not distinguished from *L. paralienus* (Seifert & Galkowski 2016).

Lasius brunneus (Latreille, 1798) – 2: 28.V.-15.X.2009, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 3: 25.IV.2007, on oak trunk, 1 ☿, leg. M. Suvák; 9: 23.IV.-22.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 22.X.2008-26.V.2009: 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 12: 27.V.-14.X.2009, 4 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 13: 27.V.-14.X.2009, 8 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 14: 23.X.2008-27.V.2009, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 17: 28.IV.-12.X.2010, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 12.X.2010-24.V.2011, 5 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 19: 29.IV.-12.X.2010, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 30: 27.V.-13.X.2009, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 31: 30.IV.-12.X.2010, 10 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 51: 24.IV.-22.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 54: 25.V.-14.X.2011, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 67: 23.IV.2007, on willow, 1 ☿, leg.

M. Suvák; 85: 29.IV.-12.X.2010, 5 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 90: 22.IV.-21.X.2008, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 21.X.2008-28.V.2009, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; Slovenské Nové Mesto (?): Chyzer (1902); Viničky: Chyzer (1902) – very widespread species, especially in forest environments. It usually nests in wood or under the bark of trees and branches, preferring deciduous trees. However, it often builds nests in various materials including buildings.

Lasius citrinus Emery, 1922 – Ladmovce-Tardika: Wiezik (2007); Somotor: Záleský (1939, as *Lasius affinis*, leg. A. Hoffer) – occurs in more thermophilic forest communities (especially in oak stands) and on their edges. Temporary social parasite of *L. brunneus*.

Lasius emarginatus (Olivier, 1792) – 83: 9.IX.2008, 2 ☿☿, leg. M. Suvák; Cejkov: Chyzer (1902); Viničky: Chyzer (1902) – in natural conditions, it occurs mainly in sunny open rocky localities or in lighter deciduous forests (Fig. 9). However, it is also well adapted to live in the urban habitats.

Lasius flavus (Fabricius, 1782) – 28: 29.V.-13.X.2009, 5 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 32: 19.IX.2007, 5 ☿☿, nest, leg. M. Suvák; 40: 25.IV.2007, 8 ☿☿, nest, leg. M. Suvák; 63: 19.VI.2007, 1 ☿, nest, leg. M. Suvák; Ladmovce-Baba: Wiezik (2007); Novosad I: Suvák (2007); Slovenské Nové Mesto?: Mocsáry (1897); Vojany: Suvák (2007) – it prefers more humid soils of open grassland communities, where it often forms numerous above-ground nest mounds from soil particles.

Lasius fuliginosus (Latreille, 1798) – 9: 23.IV.-22.X.2008, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 28: 13.X.2009: 1 ☿, leg. A. Mock; 29.V.-13.X.2009: 174 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 13.X.2009-29.IV.2010: 92 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 29: 20.IX.2007, walnut tree, 1 ☿, leg. M. Suvák; 32: 19.IX.2007, poplar tree, 1 ☿, leg. M. Suvák; 36: 28.IV.-13.X.2010, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; Slovenské Nové Mesto (?): Mocsáry (1875); Chyzer (1902) – inhabits an environment with different types of trees in forests and parks, as well as isolated trees in open habitats. This ant species usually creates the so-called cardboard nests in the cavities of trees or under their roots. It produces chemical signals capable of repelling other dominant species of ants from the environment. *L. fuliginosus* uses the various ants from the subgenus *Chthonolasius* to establish the nest by temporal parasitism. Seifert (2018) lists the following host species and their hybrids as confirmed: *L. umbratus, L. sabularum, L. jensi* x *umbratus, L. meridionalis* x *umbratus* and *L. bicornis*, others are not excluded.

Lasius jensi Seifert, 1982 – 16: 28.V.-14.X.2009, 4 ♀♀, pitfall traps, leg. A. Mock & K. Tajovský; 36: 13.X.2010: 1 ♀, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský – thermophilic species that prefers drier grass communities. As a temporary social parasite, when establishing a nest, it mainly uses the ants of the species *L. alienus*, probably also *L. psammophilus*.

Lasius mixtus (Nylander, 1846) – Viničky: Mocsáry (1897); Chyzer (1902) – occurs in meadows, pastures and in lighter forests. It is a temporary social parasite of *L. flavus*, *L. platythorax* and probably also of *L. niger*.

Lasius myops Forel, 1894 – 49: 9.IX.2008, 2 ☿☿, 2 nests, leg. M. Suvák; 52: 24.IV.-22.X.2008, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 22.X.2008-26.V.2009, 8 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 65: 19.VI.2007, 2 ☿☿, 1 nest, leg. M. Suvák; 75: 19.IX.2007, 3 ☿☿, nest, leg. M. Suvák; 9.IX.2008, 1 ☿, leg. M. Suvák; Ladmovce-Baba: Wiezik (2007); Ladmovce-Baba-Kašvár: Wiezik (2007); Ladmovce-Tardika: Wiezik

(2007) – compared to the related species *L. flavus*, *L. myops* prefers significantly drier and warmer localities with xerothermic grassland communities.

Lasius niger (Linnaeus 1758) – 1: 25.IV.2007, 2 ☿☿, 1 nest, leg. M. Suvák; 3: 25.IV.2007, 11 ☿☿, 4 nests, leg. M. Suvák; 4: 25.IV.2007, 5 ☿☿, 2 nests, leg. M. Suvák; 5: 20.IX.2007, 2 ☿☿, 1 nest, leg. M. Suvák; 6: 25.IV.2007, 15 ☿☿, 4 nests, leg. M. Suvák; 25.-28. VIII.2008, 4 ☿☿, pitfall traps, leg. M. Suvák; 8: 11.IX.2008, 5 ☿☿, 1 nest, leg. M. Suvák; 10: 23.IV.2007: 1 ☿, leg. M. Suvák; 11.IX.2008, 12 ☿☿, 4 nests, leg. M. Suvák; 27: 18.IX.2007, 5 ☿☿, 2 nests, leg. M. Suvák; 28: 29.V.-13.X.2009, 155 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 13.X.2009-29.IV.2010: 9 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 29: 20.IX.2007, 8 ☿☿, 3 nests, leg. M. Suvák; 13.X.2010-24.V.2011, 20 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 32: 19.IX.2007, 2 ☿☿, 1 nest, leg. M. Suvák; 33: 12.VIII.2003, 1 ☿, leg. M. Suvák; 40: 25.IV.2007, 46 ☿☿, 7 nest, leg. M. Suvák; 20.IX.2007, 6 ☿☿, 1 nest, leg. M. Suvák; 25.-28.VIII.2008, 3 ☿☿, pitfall traps, leg. M. Suvák; 41: 12.VIII.2003, 2 ☿☿, leg. M. Suvák; 13.VIII.2003, 2 ☿☿, leg. M. Suvák; 8.IX.2004, 1 ☿, leg. M. Suvák; 42: 22.X.2008, 1 ☿, 1 nest, leg. M. Suvák; 48: 18.IX.2007, 6 ☿☿, 2 nests, leg. M. Suvák; 25.-28.VIII.2008, 22 ☿☿, pitfall traps, leg. M. Suvák; 50: 24.IV.-21.X.2008, 8 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 55: 22.X.2008, 1 ☿, leg. M. Suvák; 56: 10.IX.2008, 2 ☿☿, 1 nest, leg. M. Suvák; 57: 27.V.-14.X.2009, 16 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 14.X.2009-27.IV.2010, 4 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 61: 20.IX.2007: 5 ☿☿, 2 nests, leg. M. Suvák; 63: 19.VI.2007, 3 ☿☿, 2 nests, leg. M. Suvák; 25.-28.VIII.2008, 22 ☿☿, pitfall traps, leg. M. Suvák; 67: 23.IV.2007, 5 ☿☿, leg. M. Suvák; 68: 27.VII.2009, 1 ☿, 1 nest, leg. M. Suvák; 73: 26.V.-13.X.2009, 20 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 13.X.2009-29.IV.2010, 7 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 75: 19.IX.2007, 2 ☿☿, 1 nest, leg. M. Suvák; 25.-28.VIII.2008, 3 ☿☿, pitfall traps, leg. M. Suvák; 9.IX.2008, 1 ☿, leg. M. Suvák; 82: 23.IV.2007, 5 ☿☿, 1 nest, leg. M. Suvák; 19.VI.2007, 1 ☿, 1 nest, leg. M. Suvák; 25.-28.VIII.2008, 11 ☿☿, pitfall traps, leg. M. Suvák; 84: 20.VI.2007, 2 ☿☿, 1 nest, leg. M. Suvák; 25.-28.VIII.2008, 4 ☿☿, pitfall traps, leg. M. Suvák; 86: 20.VI.2007, 3 ☿☿, 2 nests, leg. M. Suvák; 20.IX.2007, 3 ☿☿, 1 nest, leg. M. Suvák; 10.IX.2008, 7 ☿☿, 3 nests, leg. M. Suvák; 88: 8.IX.2004, 1 ☿, leg. M. Suvák; Čierna: Suvák (2007); Dobrá: Suvák (2007); Ladmovce-Baba: Wiezik (2007); Ladmovce-Baba-Kašvár: Wiezik (2007); Ladmovce-Dlhá hora: Wiezik (2007); Lastovce: Suvák (2007); Leles: Chyzer (1902); Leles-Borzva: Suvák (2007); Malčice: Suvák (2007); Malý Kamenec: Suvák (2007); Nižný Žipov: Suvák (2007); Novosad I: Suvák (2007); Ptrukša: Suvák (2007); Slovenské Nové Mesto?: Mocsáry (1875); Chyzer (1902); Strážne II: Suvák (2007); Veľké Kapušany-Veškovce: Suvák (2007); Veľký Kamenec: Suvák (2007); Vojany: Suvák (2007); Zemplínsky Branč I, II: Suvák (2007) – very adaptable species widespread mainly in more open anthropogenically influenced environments, where it also tolerates more frequent mechanical disturbance of the soil. Older findings need to be assessed with respect to the later differentiation of a similar species of *L. platythorax* (Seifert 1991).

Lasius nitidigaster Seifert, 1996 – 35: 28.VIII.2009, 2 ☿☿, nest, leg. M. Suvák; 52: 24.IV.-22.X.2008, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 65: 29.V.-13.X.2009, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 75: 19.IX.2007, 7 ☿☿, nest, leg. M. Suvák

– this species usually inhabits grassy steppe communities on various backgrounds. It is thought that the host species here could be *L. bombycina*.

Lasius paralienus Seifert, 1992 – Ladmovce-Tardika: Wiezik (2007) – given that so far all my ant specimens from the reference area identified in the past (before 2016) as *L. paralienus* were reclassified as *L. bombycina* after inspection, the finding above (Wiezik 2007) should also be verified. However, the occurrence of *L. paralienus* with similar environmental requirements cannot be excluded here.

Lasius platythorax, Seifert 1991 – 9: 23.IV.-22.X.2008, 8 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 22.X.2008-26.V.2009: 8 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 12: 27.V.-14.X.2009, 7 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 13: 27.V.-14.X.2009, 3 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 14: 23.X.2008-27.V.2009, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 30: 27.V.-13.X.2009, 33 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 31: 30.IV.-12.X.2010, 5 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 50: 24.IV.-21.X.2008, 16 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 21.X.2008-26.V.2009, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 54: 25.V.-14.X.2011, 2 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 67: 23.IV.2007, 3 ☿☿, 1 nest, leg. M. Suvák; 70: 10.VI.2012, 6 ☿☿, leg. P. Fenďa; 73: 26.V.-13.X.2009, 51 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 13.X.2009-29.IV.2010, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 75: 19.IX.2007, 2 ☿☿, nest, leg. M. Suvák; 85: 29.IV.-12.X.2010, 7 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 12.X.2010-24.V.2011, 9 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 90: 22.IV.-21.X.2008, 68 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 21.X.2008-28.V.2009, 14 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 27.IV.2010, 2 ☿☿, leg. A. Mock & K. Tajovský – it is found mainly in deciduous forests, as well as in marshy areas, although regular floods limit its occurrence. *L. platythorax* is usually replaced by the related species *L. niger* in mesophilic meadows and in more intensively man-affected environments.

Lasius psammophilus Seifert, 1992 – 26: 18.IX.2007, 3 ☿☿, nest, leg. M. Suvák; 49: 9.IX.2008, 4 ☿☿, 1 nest, leg. M. Suvák; 52: 24.IV.-22.X.2008, 55 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 22.X.2008-26.V.2009, 91 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 53: 24.IV.2008, 12 ☿☿, leg. P. Fenďa; 25.-28.VIII.2008, 114 ☿☿, pitfall traps, leg. M. Suvák; 28.VIII.2009, 3 ☿☿, 1 nest, leg. M. Suvák; 65: 9.VI.2007, 1 ☿, leg. M. Suvák; 69: 25.IV.-21.X. 2008, 165 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 21.X.2008-27.V.2009, 12 ☿☿, pitfall traps, leg. A. Mock & K. Tajovský; 72: 25.-28. VIII.2008, 41 ☿☿, pitfall traps, leg. M. Suvák – it occurs mainly in xerothermic grassland communities on sandy and gravelly ground. In such conditions, *L. psammophilus* clearly dominates the species *Lasius niger*, unless these communities are regularly mechanically influenced by humans (Seifert 2018). Therefore, in the case of most sand dunes in and around the Latorica PLA, *L. niger* predominates, while *L. psammophilus* is limited to smaller, less disturbed fragments.

Lasius umbratus (Nylander, 1846) – 28: 29.V.-13.X.2009, 1 ☿, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; 73: 26.V.-13.X.2009, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; Hrušov: Mocsáry (1897); Chyzer (1902); Slovenské Nové Mesto (?): Mocsáry (1897) – it inhabits various types of open and forest environment, the decisive factor is the occurrence of potential host species, which are mainly *L. niger*, *L. platythorax*, more rarely *L. brunneus*, and it is assumed that *L. psammophilus* too. Older findings marked

as *L. umbratus* need to be assessed especially with respect to the later revision of the subgenus *Chthonolasius* (Seifert 1988a, 1990, 1997).

Plagiolepis pygmaea (Latreille, 1798) – Hrušov: Chyzer (1902); Ladmovce-Baba: Wiezik (2007); Ladmovce-Dlhá hora: Wiezik (2007); Ladmovce-Tardika: Wiezik (2007); Slovenské Nové Mesto?: Chyzer (1902) – strongly xerothermophilic species of steppe communities with sparse grass vegetation and individual trees or shrubs.

Plagiolepis taurica Santschi, 1920 – 15: 18.III.1961, 21 ☿☿, pitfall traps, leg. J. Gulička; 34: 20.VII.1948, 1 ☿, pitfall traps, leg. J. Gulička; 65: 19.VI.2007, 1 ☿, 1 ♂, leg. M. Suvák; 9.IX.2008, 7 ☿☿, 1 nest, leg. M. Suvák; 79: 27.VII.2009, 5 ☿☿, nest, leg. M. Suvák; 81: 23.IV.2007, 1 ☿, leg. M. Suvák – the name *P. taurica* is an older synonym for an ant species known until recently as *Plagiolepis vindobonensis* Lomnicki 1925. It occurs mainly in very xerothermic grassland communities, especially on limestones, in the Pannonian Basin also on sands. Compared to *P. pygmaea*, it prefers places with a higher proportion of bare gravel or rocky surface.

Polyergus rufescens (Latreille, 1798) – 40: 25.IV.2007, 1 ☿, nest, leg. M. Suvák; 10.IX.2008, 1 ☿, nest, leg. M. Suvák; 50: 24.IV.-21.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 52: 24.IV.-22.X.2008, 1 ☿, pitfall traps, leg. A. Mock & K. Tajovský; 71: 25.IV.-21.X.2008, 1 ♀, pitfall traps, leg. A. Mock & K. Tajovský; Somotor: Záleský (1939, leg. A. Hoffer); Viničky: Mocsáry (1897); Chyzer (1902) – well known obligatory slave-making (dulotic) species (Fig. 11) of various drier to slightly moist grass communities, where it requires a sufficient number of host ants of the subgenus *Serviformica*.

Conclusion

The work provides compilation of information on ants in the Latorica Protected Landscape Area (PLA) and its surroundings. The reference area consists of the southern part of the Eastern Slovak Plain and the Zemplínske vrchy Mts. with the southwestern outcrop of the Eastern Slovak Uplands. High species diversity of ants is given here by combination of warmer climate with a wide range of habitats - from dry steppes to wetlands or flooded areas, from open sunny habitats to forest environments, as well as the occurrence of aeolian and fluvial sands, protruding limestone or andesite formations. Until now, however, this area was very poorly examined from a myrmecological point of view, when, in addition to the oldest data from the former Hungary, only some local information has been published so far. Moreover, some of these works (Chyzer 1902) were forgotten and not used later, so the state of knowledge on myrmecofauna from this area seemed to be even worse than it actually was.

After processing of the extensive set of hitherto unpublished samples gathered from various naturalists, the state of knowledge has shifted significantly now. Out of all 7 058 sampled individuals of ants (leg. A. Mock, K. Tajovský, M. Suvák, J. Gulička, P. Fenďa), 62 species were determined (det. M. Suvák). In the previous studies (Mocsáry 1875, 1897; Chyzer 1902; Záleský 1939; Suvák 2007; Wiezik 2007; Wagner et al 2017), 45 accepted taxa were published for this region so far. The combination of these data reveals 72 different species of ants registered for the Latorica PLA and the surroundings to the date. This represents about 2/3 of the species of myrmecofauna in Slovakia. It can be expected that after a more detailed survey of some sites, this rate will increase, as far several relatively common species are still missing in the list, and conversely, some rarer and hidden ones require a special approach to be found.

Fig. 6 *Nests of Formica pratensis are often found along borders of arable land, like here near Somotor (photo: M. Suvák).*

Fig. 7 *Wingless queen Myrmica sabuleti on the sands near Malý Horeš (photo: M. Suvák).*

Fig. 8 *One of the most colourful ants is the four-spotted ant (Dolichoderus quadripunctatus). It is an abundant species in trees throughout the study area (photo: M. Suvák).*

Fig. 9 *The combat of the workers Lasius emarginatus and Formica gagates, ant species occurring in lighter forests, especially on the southern slopes of the Zemplínske vrchy Mts. (photo: M. Suvák).*

Fig. 10 *Smaller Formica rufa nest at stump in oak stand in Zemplínske vrchy Mts. (locality Černochov - Čierna hora) (photo: M. Suvák).*

Fig. 11 *The most famous "slave-maker" ant species Polyergus rufescens occurs in several sunny localities within the Latorica PLA and its surroundings (photo: M. Suvák).*

From the identified taxa, *Tetramorium indocile* represents a new species for the myrmecofauna of Slovakia. It was found in the top parts of the Somotor Hill with dry grassland communities and andesite boulders. The most species-rich communities of ants occur just in the preserved fragments of steppes and forest-steppes with a protruding rocky base, where some other rarer species were found, e.g. *Temnothorax turcicus*. Aeolian sands are a relatively widespread habitat in this area, but only some more well-preserved parts are inhabited by specialized species like *Lasius psammophilus*. More disturbed drier environments were typical by the occurrence of ubiquitous highly adaptable species, especially *Solenopsis fugax*, *Tetramorium caespitum*, *T. immigrans*, *T. staerckei, Formica rufibarbis*, *F. cunicularia*, *Lasius niger* and, in wetter sites, also *Myrmica rubra*. It is similar in other mostly open areas with more frequent anthropogenic influence, such as fields, vineyards, dams lining riverbeds, areas of raw material extraction, municipalities. Of the terrestrial species, *Myrmica gallienii* is the best adapted to more frequent floods. *Temnothorax crassispinus* and *Stenamma debile* are common in forest stands on the ground, and numerous hilly nests of the species *Formica polyctena*, *Formica rufa* and their hybrids occur in the Zemplínske vrchy Mts.. A special group consists of arboricolous species of ants inhabiting the trunks or crowns of trees, the most common of which in this area are *Dolichoderus quadripunctatus, Lasius brunneus* and *Lasius fuliginosus*.

The specifics of this country are a large plain, from which rise sand dunes and andesite hills (Fig. 3). These, as well as artificial elements such as church towers or other tall buildings, represent important landmarks for several species of ants, whose winged stages move towards them from a wide area during swarming. In the case of ants of the genus *Myrmica*, such swarms can be formed by large numbers of individuals from up to 6 species simultaneously (Radchenko & Elmes 2010) and similar events apparently occur also in the study area.

This first more comprehensive view of the myrmecofauna of the Latorica PLA and adjacent areas presents the basis for more detailed local studies, which should further expand the set of species. In addition, there are also excellent conditions for the study of the other phenomena of life of the ants, their relationships with other species and the environment in general. From the nature protection point of view, the examined area is a combination of very valuable fragments of the original environment, balanced land management, but also negative impacts. Disappointing is the absence of the rare flood ant (*Liometopum microcephalum*), the dominant species with affinity to old trees. About 100 years ago, it was recorded in several localities in this area, but at present, despite efforts, it has not yet been found. It is questionable to what extent this situation is manageable today but the return of *L. microcephalum* can be a challenge for management of Latorica PLA in the future. On the other hand, there are several other rare species and communities of ants, and even the "common" ones are of great ecological importance due to their abundance. Overall, this landscape complex is a very interesting area by its natural values and as a source of education for the general public.

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Súhrn

Mravce (Hymenoptera: Formicidae) Chránenej krajinnej oblasti Latorica a jej okolia (juhovýchodné Slovensko)

Práca prináša súhrn informácií o výskyte mravcov v oblasti CHKO Latorica a priľahlého okolia. Ide o územie pozostávajúce z južnej časti Východoslovenskej roviny na východe a Zemplínskych vrchov s juhozápadným výbežkom Východoslovenskej pahorkatiny na západe. Kombináciou teplejších klimatických pomerov so širokým rozsahom habitatov - od suchých stepí po mokrade a zaplavované územia, od otvorených slnečných stanovíšť po lesné prostredie, ako aj výskyt viatych pieskov, vystupujúcich vápencových, či andezitových formácií, boli vytvorené vhodné predispozície pre vysokú druhovú diverzitu mravcov. Doteraz bolo toto územie z myrmekologického hľadiska veľmi slabo preskúmané, keď okrem najstarších dát ešte z bývalého Uhorska boli doteraz publikované len ojedinelé lokálne informácie. Niektoré z týchto prác (Chyzer 1902) boli dokonca zabudnuté a nevyužívané, takže neskoršie prehľady myrmekofauny z tejto oblasti sa javili ešte chudobnejšie a stav poznania ešte horší, ako tomu bolo v skutočnosti.

Vďaka spracovaniu rozsiahleho súboru doteraz nepublikovaných vzoriek získaných od rôznych prírodovedcov sa stav problematiky posunul výrazne vpred. Celkovo bolo zo všetkých vzoriek 7 058 jedincov mravcov (leg. A. Mock, K. Tajovský, M. Suvák, J. Gulička, P. Fenďa) determinovaných 62 druhov (det. M. Suvák). V doterajšej literatúre (Mocsáry 1875, 1897; Chyzer 1902; Záleský 1939; Suvák 2007; Wiezik 2007; Wagner et al 2017) bolo pre tento región publikovaných doteraz 45 dnes akceptovaných druhov. Z kombinácie týchto dát vyplýva 72 rôznych druhov mravcov pre územie CHKO Latorica a blízkeho okolia. To predstavuje okolo 2/3 druhov myrmekofauny Slovenska. Možno očakávať, že po podrobnejšom prieskume niektorých lokalít tento stav ešte vzrastie, keďže tu zatiaľ nebolo zaznamenaných niekoľko relatívne bežných druhov, a naopak, niektoré vzácnejšie a skryté si vyžadujú osobitný prístup.

Zo zistených taxónov predstavuje *Tetramorium indocile* nový druh pre myrmekofaunu Slovenska. Bol nájdený vo vrcholových častiach Somotorskej hory so suchomilnými trávnymi spoločenstvami a vystupujúcimi andezitovými balvanmi. Druhovo najbohatšie spoločenstvá mravcov boli zistené práve v zachovalých fragmentoch stepí a lesostepí s vystupujúcim skalnatým podkladom, kde sa našli aj ďalšie vzácnejšie druhy, ako napr.

Temnothorax turcicus. Viate piesky sú pomerne rozšíreným habitatom v tomto území, ale len na niektorých zachovalejších častiach sa vyskytujú aj zodpovedajúce špecializované druhy mravcov, akým je *Lasius psammophilus*. Viac narušané suchšie prostredia osídlili všadeprítomné veľmi adaptabilné druhy, najmä *Solenopsis fugax*, *Tetramorium caespitum*, *T. staerckei*, *T. immigrans*, *Formica rufibarbis*, *F. cunicularia, Lasius niger*, na vlhkejších miestach aj *Myrmica rubra*. Podobne je to aj na väčšine ostatných, prevažne otvorených plochách s častejším antropogénnym vplyvom, ako sú polia, vinice, hrádze lemujúce korytá riek, oblasti ťažby surovín, obce. Zo zemných druhov je na častejšie záplavy najlepšie adaptovaný druh *Myrmica gallienii*. V lesných porastoch sú na zemi najčastejšie *Temnothorax crassispinus* a *Stenamma debile*, v Zemplínskych vrchoch sa vyskytujú aj početné kopovité hniezda druhov *Formica polyctena*, *Formica rufa* a ich hybridov. Osobitnú skupinu tvoria arborikolné druhy mravcov osídľujúce kmene alebo koruny stromov. V danej oblasti k najčastejším z nich patrili najmä *Dolichoderus quadripunctatus, Lasius brunneus* a *Lasius fuliginosus*.

Špecifikom tejto krajiny je rozsiahla rovina, z ktorej vystupujú ojedinelé vyvýšeniny, od pieskových dún až po andezitové kopce, tzv. exoty (Fig. 3). Tie, podobne ako aj umelé prvky typu stožiarov, či kostolných veží, predstavujú významné orientačné body pre viaceré druhy mravcov, ktorých okrídlené štádiá sa k nim v čase rojenia sťahujú zo širokého okolia. V prípade mravcov rodu *Myrmica* môžu byť takéto roje tvorené veľkými počtami jedincov až zo 6 druhov súčasne (Radchenko & Elmes 2010) a podobné udalosti sa zjavne dejú aj v skúmanej oblasti.

Tento prvý komplexnejší pohľad na myrmekofaunu CHKO Latorica a priľahlých oblastí predstavuje základ pre podrobnejšie lokálne štúdie, ktoré by mali prezentovaný súbor druhov ešte rozšíriť. Okrem toho sú tu tiež výborné podmienky pre štúdium iných javov zo života mravcov, ich vzťahov k iným druhom a k prostrediu vôbec. Z pohľadu ochrany prírody je skúmané územie kombináciou veľmi hodnotných fragmentov pôvodného prostredia, vyvážene obhospodarovaných území, ale aj negatívnych vplyvov. Sklamaním je absencia vzácneho mravca lužného (*Liometopum microcephalum*), dominantného druhu viazaného na staré stromy. Pred cca 100 rokmi bol v rámci tohto územia zaznamenaný na niekoľkých lokalitách, ale v súčasnosti sa ho napriek snahe zatiaľ nepodarilo nájsť. Je otázne, nakoľko je tento stav ovplyvniteľný dnes, ale návrat lužného mravca *L. microcephalum* môže predstavovať výzvu do budúcnosti pre správu CHKO Latorica. Na druhej strane sa tu vyskytuje niekoľko iných vzácnych druhov a spoločenstiev mravcov, a aj tie „bežné“ majú vzhľadom na svoju početnosť veľký ekologický význam. Celkovo predstavuje tento krajinný komplex mimoriadne zaujímavé územie pre svoje prírodné hodnoty a ako zdroj poučenia aj pre širokú verejnosť.

Butterflies and moths (Lepidoptera) of the Latorica Protected Landscape Area

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Abstract

The paper comprehensively summarizes the knowledge about the occurrence of lepidopteran species in the Latorica Protected Landscape Area (PLA) and the surrounding area (Eastern Slovak Plain or Medzibodrožie, and partly Zemplínske vrchy Mts.). Despite the relatively attractive natural conditions in this area, more intense interest in the study of Lepidoptera occurred only after World War II, resp. after 1990. The most visited were attractive localities, where most species of Lepidoptera were found, e.g. Kašvár National Nature Reserve, Tarbucka Nature Reserve, Medový vrch, Latorický luh, Strážne. During the whole period, 1,593 species of Lepidoptera from 70 families were found in the studied area. Several faunistically important species were found in the Latorica PLA – *Vespina slovaciella*, *Monochroa inflexella, Dichomeris barbella, Coleophoria sergiella, Tecmerium perplexum, Cochylimorpha woliniana*, and *Idaea elongaria*. As the landscape lies in a warm lowland area, there are many species associated with a warm and dry environment, e. g. *Scolitantides orion*, *Glaucopsyche alexis*, *Libythea celtis*, *Brenthis hecate*, *Melitaea trivia*, *Hyponephele lycaon*, *Hyles euphorbiae*, *Phaiogramma etruscaria*, *Ocneria rubea*, *Chelis maculosa*, *Odice arcuinna*, *Catocala hymenaea*, *Cucullia fraudatrix*, *Schinia cognata*, *Periphanes delphinii*, etc. On the other hand, in the Latorica and Bodrog river basins there are many wetlands and water areas, where we can find typical hygrophilous species, e.g. *Limnaecia phragmitella*, *Atremaea lonchoptera*, *Clepsis spectrana*, *Lycaena hippothoe*, *Phengaris teleius*, *Chilo phragmitellus*, *Calamatropha paludella*, *Schoenobius gigantellus*, *Donacaula forficella*, *Acentria ephemerella*, *Parapoynx stratiotata*, *P. stagnalis*, *Nymphula nitidulata*, *N. nymphaeta*, *Scopula corrivalaria*, and *Nycteola asiatica*.

Diurnal Lepidoptera (butterflies), of which 115 species have been identified, are well researched. Among them were rare species, e.g. *Carcharodus orientalis*, *Libythea celtis*, *Argynnis pandora*, *Nymphalis xanthomelas*, *Neptis sappho* and especially *Euphydryas maturna*. Unfortunately, some are already missing in the Latorica PLA – *Pieris mannii*, *Leptidea morsei*, *Colias myrmidone.* From the zoogeographical point of view, the distribution pattern of most species was Palaearctic – 416, then West-Palaearctic – 409, European 190, and Eurosiberian – 163. Species from the south of Europe – Mediterranean (48 species) and Ponto-Mediterranean (39 species) – were also significantly represented.

Key words: Lepidoptera, Eastern Slovak Plain, faunistical data, zoogeography, habitat preference

Introduction

In former times, the area of Medzibodrodžie, where the Latorica Protected Landscape Area (PLA) is located, was not in the centre of attention of lepidopterologists. Until 1960, there was not any research devoted to the Lepidoptera of this area. There is some old published information on the occurrence of individual species of Lepidoptera, e.g. *Odontopera bidentata* (Ábafi-Aigner et al. 1896), *Zerynthia polyxena* (Vángel 1905), *Plebejus argyrognomon* (Abafi-Aigner 1910), *Ochlodes sylvanus* (Abafi-Aigner 1912), *Aporia crataegi* (Šeda 1936), and some of them were devoted to the occurrence of more important species, e.g. *Pieris mannii* (Moucha 1956) or *Argynnis pandora* (Moucha 1959). Individual data from this area until 1960, from various periodicals, or just collected by private collectors, were summarized by Hrubý (1964) in his compendium. The overview also included a part of a larger dataset of lepidopteran occurrences from the area of the Eastern Slovak Plain, and mainly from the localities of Cejkov, Zemplín, and Slovenské Nové Mesto, or Leles, which can be found in the study by Moucha & Novák (1960). For several years, these entomologists passed through the important localities in Slovakia and published their results. Reiprich (1977) later summarized several other data. Results of Š. Seďa, who intensively collected the samples in the area of Malá Tŕňa which were not published but provided to A. Reiprich. In the 1980s, Z. Laštůvka made many field trips to the area of Malý Kamenec and published the results in several studies (Laštůvka 1982, 1983; Laštůvka et al. 1982). Mainly these data for the years 1973 to 1984 and some few others, unpublished, were then summarized by Reiprich & Okáli (1988, 1989a, 1989b). A certain breakthrough and increase in interest in the study of lepidopterofauna occurred after the East Slovak nature conservation camp in Borša in 1985. During this camp, several surveys were conducted, the results of which were published in the proceeding (Jászay 1985; Panigaj 1985). Subsequently, in the period from 1990 to 2003, the Latorica PLA and the adjacent localities were visited by several lepidopterologists (F. Kuraj, Z. Tokár, Ignác and Ivan Richter, M. Harman, Ľ. Panigaj), who did not publish their results separately, but provided them for the needs of this monograph. Before that, however, they were used in the work of Reprich (1987, 1988, 1989) but without mention of exact localities, only as "Východoslovenská rovina plain". Ig. Richter was the only one who published a list of butterflies found in this area from 1985 to 2005 in the proceeding of XXIX East Slovak nature conservation camp, which occurred in Hatfa near Viničky (Richter 2005). It already represented 923 species at that time, however, they were

listed without specific localities, mentioned only as South Zemplín. Significant findings from this research then appeared continuously in a series of contributions by Tokár et al. (1996, 1999, 2002) or Panigaj & Reiprich (1998). Information about Lepidoptera from this area was published by the authors in some atlases/identification guides or monographs – Slamka (1997), Elsner et al. (1999), Bělin (2003), Tokár et al. (2003), Laštůvka A. et al. (2018). Representatives of the Zygaenidae family were studied in eastern Slovakia by the authors Hogyová & Mihóková (2003), who present data from the Latorica PLA. Butterflies of similar xerothermic habitats as in the Latorica PLA, were studied by Panigaj (2003). Employees of the Latorica PLA Administration, S. Miňová and M. Balla also took part in the monitoring of butterflies from the Latorica PLA and adjacent areas. Although their results were not published, they were included in the internal reports of the State Nature Conservancy (SNC SR), e.g. Miňová & Balla (2010–2015), resp. in its database (KIMS – Complex Information and Monitoring System). Most of their data is also included in this inventory. The first more comprehensive study was the contribution of Panigaj (2005), which summarized the results of his own, albeit short-term, research on Lepidoptera from 2003.

In 2008, the monograph of "Medzibodrožie" landscape management was published (Terek et al. 2008), where, within the description of the fauna, Koščo et al. (2008) also mention butterflies and moths, but only from the Hungarian side. Increased attention was paid to butterfly species. For example, near Malá and Veľká Tŕňa villages, E. Gimová studied butterfly fauna within the diploma thesis (Gimová 2009), K. Kalánová in 2017 worked in the protected area of Veľký Kopec near Kráľovský Chlmec and the results were included in her diploma thesis (Kalánová 2018). Ľ. Panigaj supplemented her results with additional data and a separate paper was created (Kalánová & Panigaj 2018). Following this research, Panigaj & Kalivoda (2019) studied the distribution of *Brenthis hecate* in Slovakia. In 2015, within the implementation of the project "Care for protected areas", attention was paid to several protected areas within the Latorica PLA – Boršiansky les, Čičarovský les, Malý Horeš and Veľký Kopec. Paper based on this monitoring internal report (Panigaj 2015) was iniciated by the State Nature Conservancy. The results of long-term research of Lepidoptera in the Protected Areal Boršanský les forest were summarized by Panigaj (2020).

Material and methods

The collection of data on the occurrence of Lepidoptera from the studied area was performed according to standard entomological methodologies. Day active Lepidoptera were monitored by direct observation and collected by the entomological net. Species with night activity were captured by artificial light sources at night, either using a stable capture device, or powered directly from the mains electrical supply, a portable electric generator, in recent years also mobile, semi-automatic traps with 12 V battery or power banks have been widely used. To a lesser extent, some special species have been identified by the presence of ingestions, or the adult forms have been preserved from juvenile stages. The captured lepidopteran species are mostly in the private collections of the authors of this article. The findings are followed by information about habitat preference, if known, which is determined by several sources (Macek et al. 2007, 2008, 2012, 2015):

ubiquitous – generalist able to live in all kinds of habitats including ruderal sites, farmlands and urban areas

mesophilous 1 – species of open non-forested habitats, especially of mesophilous flower-rich meadows

mesophilous 2 – species preferring transitory zones between woodland and non-wooded habitats, such as forest meadows, clearings, etc.

mesophilous 3 – species of woodland habitats

xerothermophilous 1 – species of dry and warm non-wooded habitats, most often thriving on short-sward xerophilous grassland and „steppes"

xerothermophilous 2 – as above, but inhabiting sites with longer sward and some proportion of shrubs or trees at their sites (i. e., "forest-steppe")

xerothermophilous 3 – species of xerophilic (pine) forests on a sandy base (pine relicts)

hygrophilous 1 – species of open, waterlogged habitats – wet meadows, salt marshes, reeds

hygrophilous 2 – species of waterlogged forest stands – wet spruces, floodplain stands, alders, riparian stands

hygrothermophilous – species inhabiting thermophilic wetland habitats

tyrphophilous – species living on peatlands of all types.

According to the mentioned sources, we also add the character of the distribution of the given species (Beneš et al. 2002; Macek et al. 2007, 2008, 2012, 2015):

Cosmopolitan – distributed in the majority of continents, including invasive species

Holarctic – distributed (including invasive) in both Palaearctic and Holarctic regions

Palaeotropical – distributed in both Palaearctic region and Old World tropics

Palaearctic – distributed from Northern Africa through Europe to Eastern Asia

West-Palaearctic – distribution limited to the Western half of the Palaearctic region, often including Northern Africa

Transpalaearctic – distributed in most of Palaearctic region

Eurosiberian – distributed from Europe to Siberia, not reaching Eastern Asia (including species with disjunct areas)

European – distribution limited to Europe

Mediterranean – extended to the Mediterranean and Central Asia, and extending northwards to Central/Northern Europe

Atlanto-Mediterranean – distribution in western parts of the Mediterranean and Western Europe; only partly reaching Central Europe

Ponto-Mediterranean – distributed mainly in South-eastern Europe and Asia Minor, extending to the Middle East and Central Asia.

Due to the lack of data, species in some families are not characterized according to habitat preference and zoogeographical distribution (Alucitidae, Pyralidae, Crambidae).

List of localities

The localities, where the data in this article comes from, belong mainly to the territory of the Latorica PLA, the others are from the area of Medzibodrožie, eventually of the orographic unit Východoslovenská rovina plain. Several of them are from the Zemplínske vrchy Mts. We do not analyze the natural conditions of this area. It is a subject of a separate article at the beginning of the monograph. The list of localities is arranged alphabetically. The first code indicates orographic unit – ZVM means Zemplínske vrchy Mts., ESP Východoslovenská

rovina (Eastern Slovak Plain). Protected areas are designated – NNR – National Nature Reserve, NR – Nature Reserve, PA – Protected Area. The numbering of localities is identical to the markers on the map (Fig. 1). The following is the numerical code of the Databank of Slovak Fauna, altitude, geographical coordinates roughly in the middle of the locality and a brief description of habitat conditions, or closer location. Every single locality is identifiable on commonly used maps and also in a real space using geographical coordinates. Sites, for which there is a larger amount of data, are replaced in the text by abbreviations listed at the end of the characteristics of a given locality.

1 – **Avaš (Sírnik)** – ESP – 7496 – 115 m a. s. l., N48°31.438' E21°48.981', a large grassy hill to the west above the village with groups of shrubs, and steppe to forest-steppe vegetation, with the remains of vineyards (Fig. 2).

2 – **Beša-Moľva** – ESP – 7497 – 98 m a.s.l., N48°31.358' E21°57.257', wet meadows on a sandy base, south of the village, to the embankment at Latorica.

3 – **Borša** – ESP – 7596 – 100 m a.s.l., N48°23.139' E21°42.413', willow-poplar floodplain forest with oak on the shore of Bodrog, at the southern end of the village.

4 – **Boršiansky les PA (Borša)** – ESP – 7596 – 110 m a.s.l., N48°23.299' E21°42.503' willow-poplar forest with sessile oak (*Q. petraea*) and the rest of the Bodrog River blind arm (Fig. 3). In the text as BL.

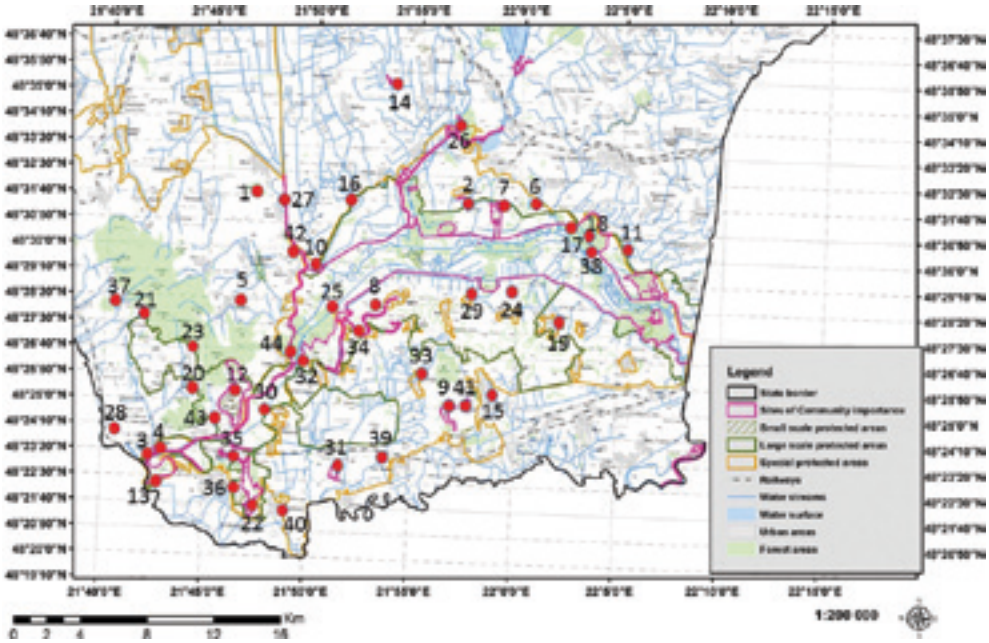

Fig. 1 *Map of the investigated area Latorica PLA. The red circles represent sites with numbers according to the list of localities. The map was prepared by J. Černecký.*

5 – Cejkov – ESP – 7596 – 155 m a.s.l., N48°27.936' E21°45.868', the wide surrounding of the village – literary data, in the text as C.

6 – Čičarovce – ESP – 7498 – 100 m a.s.l., N48°30.948' E21°59.495', wet meadows to the west of the village, known as Čičarovské meadows. The locality overlaps with the locality Čičarovský les forest (Fig. 4).

7 – Čičarovský les (Beša, Čičarovce) – ESP – 7498 – 97 m a.s.l., N48°31.476' E21°59.302', the transition area between large wet meadows with scattered trees and floodplain forest on a sandy base.

8 – Dlhé Tice NR (Zatín) – ESP – 7597 – 97 m a.s.l., N48°28.234' E21°53.521', the blind arm of Latorica River with riparian vegetation, gradually overgrown, in the vicinity of mesophilic meadows.

9 – Chlmecké kopce (Malý Horeš) – ESP – 7597 – 115 m a.s.l., N48°24.726' E21°56.462', extensive hilly areas of xerothermic character, north of the village M. Horeš and west of the NR Poniklecová lúčka, with removed shrub vegetation, partly fields, and forest enclaves (Fig. 5).

10 – Kamenná Moľva – ESP – 7597 – 97 m a.s.l., N48°29.453' E21°50.626', wet meadows with groups of willows, overgrown dikes, partially mowed (Fig. 6). In the text as KM.

11 – Kapušianske Kľačany – ESP – 7498 – 100 m a.s.l., N48°29.52' E22°4.779', meadows south of the village to the dam at Latorica**.**

12 – Kašvár NNR (Ladmovce) – ESP – 7596 – 175 m a.s.l., N48°24.402' E21°45.225', shrub-steppe overgrowths of xerothermic vegetation on a limestone base, relatively rapidly overgrown with shrubs. In some sources, the site is referred to as Ladmovce (Fig. 7, 8). In the text as K.

13 – Klin nad Bodrogom – ESP –7696 – 95 m a.s.l., N48°22.948' E21°43.039', floodplain forest around the blind arm of Bodrog with aquatic vegetation (Fig. 9).

14 – Kopčianske slanisko NR (Kopčany) – ESP – 7397 – 100 m a.s.l., N48°35.462' E21°53.387', location of saline soils with relict halophilic plant species. Although outside the area of main interest, the locality is mentioned for the significance and completion of flora and fauna (Fig. 10).

15 – Kráľovský Chlmec – ESP – 7597 – 120 m a.s.l., N48°25.386' E21°58.672', localization is only approximate, old literature data. In the text as KCH.

16 – Kucany – ESP – 7497 – 99 m a.s.l., N48°31.556' E21°52.107', the area of the embankment, south of the village, in the vicinity of waterlogged meadows with individual trees.

17 – Latorica-most/bridge – ESP – 7598 – 100 m a.s.l., N48°30.064' E22°3.197', floodplain forests along the Latorica River, north-west and south-east of the state road.

18 – Latorický luh – ESP – 7598 – 103 m a.s.l., N48°29.44' E22°4.115', waterlogged floodplain forest at the embankment around Latorica River, south-east of the Latorica-bridge locality Fig. 11). In the text as LL.

19 – Leles – ESP – 7598 – 100 m a.s.l., N48°27.48' E22°2.068', close surrounding of the village, a locality known from literary sources.

20 – Malá Bara – ZVM – 7596 – 170 m a.s.l., N48°25.136' E21°44.249', dry meadows with groups of shrubs, used as pastures, in the vicinity of smaller wooded hills.

21 – Malá Tŕňa – ZVM – 7596 – 220 m a.s.l., N48°27.374' E21°41.342', a mixture of

habitats on the east of the village, local name Teplá stráň, meadows, shrubs, forest with predominant oak. In text as MT.

22 – Malý Kamenec – ESP – 7696 – 127 m a.s.l., N48°21.338' E21°47.133', mainly the southern slopes of Tarbucka NR, forest-steppe, overgrown, also with woody plants on andesite bedrock.

23 – Medový vrch (Černochov) – ZVM – 7596 – 250 m a.s.l., N48°26.612' E21°44.36', the boundary of the deciduous forest and the slope, which was in the past, in a considerable degree of succession, rich plant communities, close vineyards (Fig. 12). In the text as **MV**.

24 – Poľany – ESP – 7597 – 97 m a.s.l., N48°28.872' E22°0.098', wet meadows around the road to Latorica with hygrophilous vegetation, frequent groups of willows, alders and poplars.

25 – Rad – ESP – 7597 – 102 m a.s.l., N48°27.987' E21°50.954', grassland around the field road behind the village, towards the dam.

26 – Raškovský luh – ESP – 7497 – 102 m a.s.l., N48°34.035' E21°56.508', smaller, wet meadows in the floodplain, south of the road.

27 – Sírnik – ESP – 7496 – 115 m a.s.l., N48°31.384' E21°48.867', low hill, east of the village behind the Ondava River, grassy, with a steppe to a forest-steppe character.

28 – Slovenské Nové Mesto – ESP – 7596 – 99 m a.s.l., N48°24.092' E21°40.325', localization is approximate, the locality is known from literary sources. In the text as SNM.

29 – Solnička – ESP – 7597 – 99 m a.s.l., N48°28.501' E21°57.191', wet meadows to the left of the road to the village Boľ.

30 – Somotor – ESP – 7596 – 140 m a.s.l., N48°24.449' E21°47.942', an extensive sand dune with sparse vegetation, partially grazed, unique species of small Lepidoptera, but also other insects. In the text as SO.

31 – Strážne – ESP – 7697 – 97 m a.s.l., N48°22.746' E21°51.416', grasslands used as pastures, on a sandy base with groups of trees and shrubs, in the field of wetlands (Fig. 13).

32 – Svätá Mária – ESP – 7597 – 105 m a.s.l., N48°26.409' E21°49.337', floodplain forest around the dam along Bodrog River.

33 – Svätuše – ESP – 7597 – 115 m a.s.l., N48°25.363' E21°55.922', steppe meadows with scattered agates on the south of the village and several sand quarries on the west of the village.

34 – Svinice – ESP – 7597 – 100 m a.s.l., N48°27.239' E21°52.331', flood barrier with unmaintained shrubs, on the southwest of the village.

35 – Tajba NNR (Streda nad Bodrogom) – ESP – 7696 – 100 m a.s.l., N48°23.183' E21°46.348', floodplain forest, wetlands and water areas (Fig. 14).

36 – Tarbucka NR (Streda nad Bodrogom) – ESP – 7696 – 178 m a.s.l., N48°22.297', E21°46.963', on the western slopes of the hill, windy sands on andesite, advancing succession of shrubs and trees, unique entomofauna communities. In some sources, the locality is referred to as Streda nad Bodrogom, or as M. Kamenec. In the text as T.

37 – Veľká Tŕňa – ZVM – 7596 – 250 m a.s.l., N48°28.011' E21°41.437', a larger, uncultivated meadow, gradually overgrown with shrubs, surrounded by forest, with oaks.

38 – Veľké Kapušany – ESP – 7498 – 96 m a.s.l., N48°29.771' E22°4.442', floodplain between the dam and the stream of Latorica River, on the opposite side a floodplain forest. Abundant *Vespina slovaciella*. In the text as VK.

39 – Veľký Horeš – ESP – 7697 – 102 m a.s.l., N48°23.276' E21°53.857', meadow communities west of the village, especially in the spring considerably waterlogged meadows of slightly salty type, borders with floodplain forest trees.

40 – Veľký Kamenec – ESP – 7696 – 120 m a.s.l., N48°21.524' E21°48.527', xerothermic slopes of the castle hill, rocks, low vegetation (Fig. 15).

41 – Veľký kopec PA (Kráľovský Chlmec) – ESP – 7597 – 245 m a.s.l., N48°25.141' E21°57.666', ridge west of the town, steppe to forest-steppe vegetation with agate trees.

42 – Veľký vrch (Brehov) – ESP – 7596 – 215 m a.s.l., N48°30.95' E21°47.49', grassy to shrubby-steppe slope with old vineyards and a quarry.

43 – Viničky – ESP – 7596 – 127 m a.s.l., N48°24.326' E21°45.197', meadow and steppe places with groups of shrubs along the road to Hatfa (former spa). Even old literary data. In the text as V.

44 – Zemplín – ESP – 7596 – 100 m a.s.l., N48°26.553' E21°48.734', floodplain forest, wet and water areas. The locality is also mentioned in older sources. In the text as Z.

Results

The list of species and systematics of the order Lepidoptera is conceived in the sense of the work by Pastorális et al. (2013). Only in a few cases have the names been modified according to the latest knowledge, then the original names, whether genus or species, are in parentheses. After the complete name of the species, the known localities of occurrence are listed chronologically from the oldest. For each site, the abbreviation of the author of the information/collector is given in parentheses in the form (in alphabetical order):

Marcel Harman – MH, František Kuraj – Kj, Slávka Miňová – SM, Ľubomír Panigaj – Pj, Ignác Richter – IR, Zdenko Tokár – ZT. M. Balla, B. Endel, Z Laštůvka and Ivan Richter also contributed individual data. For such data, we also add the date of collection or observation of the species.

In some cases, the numerical abbreviation of the literary source is given after the name of the locality, if the data have already been published, and in the case of a larger number of identified species. As far as individual data are concerned, the classic citation remains in the text. The numbers of publications are as follows (the complete citation of the thesis is in the literature review):

1 – Hrubý (1964) – data up to 1960
2 – Moucha & Novák (1960) – data for the years 1946–1960
3 – Reiprich (1977) – data for the years 1961–1972
3a – Reprich & Okáli (1988) – data for the years 1973–1984
3b – Reiprich & Okáli (1989a) – data for the years 1973–1984
3c – Reiprich & Okáli (1989b) – data for the years 1973–1984
4 – Jászay (1985)
5 – Panigaj (1985)
6 – Panigaj (2005)

Fig. 2 *Xerotic hill Avaš above the village Sírnik, 1. 5. 2010 (photo: Ig. Richter).*

Fig. 3 *Interior of the Boršiansky les locality, 19. 4. 2019 (photo: Ľ. Panigaj).*

Fig. 4 *Wet meadows near Čičarovce, 26. 6. 2013 (photo: M. Balla).*

Fig. 5 *Chlmecké kopce hills (Horešské lúky meadows). used as pasture, 6. 5. 2016 (photo: M. Balla).*

Fig. 6 *Locality Kamenná Moľva – Latorica basin, 30. 8. 2011 (photo: M. Balla).*

Fig. 7 *Xerothermic vegetation with shrubs in the locality of Kašvár, 18. 8. 2007 (photo: Ľ. Panigaj).*

Fig. 8 *Detailed view of the overgrown slopes of the Kašvár locality, 26. 4. 2020 (photo: Z. Tokár).*

Fig. 9 *Klin nad Bodrogom – Kováčske lúky meadows, 24. 7. 2015 (photo: M. Balla).*

Fig. 10 *Halophytic vegetation on the Kopčianske slanisko salt marsh, 7. 6. 2015 (photo: Z. Tokár).*

Fig. 11 *Interior of a forest stand in Latorický luh, 29. 7. 2014 (photo: M. Balla).*

Fig. 12 *Lepidoptera-rich locality Medový vrch hill above the village Černochov, 29. 4. 2018 (photo: Z. Tokár).*

Fig. 13 *Locality Strážne - Opátske piesky sands, 30. 5. 2011 (photo: M. Balla).*

Fig. 14 *Wetland locality Tajba, 17. 10. 2013 (photo: M. Balla).*

Fig. 15 *Typical landscape of the Latorica Protected Landscape Area, in the middle of the castle ruins in Veľký Kamenec, 18. 8. 2007 (photo: M. Balla).*

7 – Gimová (2009) – data for the years 2004–2007
8 – Kalánová & Panigaj (2018) – data for the years 2017–2018
9 – Panigaj (2020) – data for the years 2015–2019

For some species, a note is given on the significance of the occurrence, abundance, or other points of interest. The first record for the territory of Slovakia is marked with an asterisk (*).

List of species

Micropterigidae

Micropterix tunbergella (Fabricius, 1787) – MV 2. 5. 2002 (IR) – mesophilous 2 and 3 – Eurosiberian.

Eriocraniidae

Dyseriocrania subpurpurella (Haworth, 1828) – MV 2. 5. 2003 (IR) – mesophilous 1– European.

Hepialidae

Triodia sylvina (Linnaeus, 1761) – MT (3a); Beša-Moľva (6); Raškovský luh 7. 9. 2013 (Pj); BL (9) – mesophilous to mild xerothermophilous 1 and 2 – West-Palaearctic.

Korscheltellus lupulinus (Linnaeus, 1758) – K 15. 5. 2010 (MH) – mesophilous 2 – West-Palaearctic.

Nepticulidae

Stigmella aceris (Frey, 1857) – Sírnik 22. 8. 2003 (IR) – mesophilous 2 and 3 – European.

Stigmella anomalella (Goeze, 1783) – LL 2. 6. 1990 (ZT) – mesophilous 1 to 3 – Eurosiberian.

Stigmella viscerella (Stainton, 1853) – LL 4. 6. 1992 (ZT); MV 1.7.2002 (IR) – mesophilous – European.

Stigmella thuringiaca (Petry, 1904) – K 29. 6. 1996, 27. 5. 1999, 7. 5. 2000 (ZT); Sírnik 5. 6. 2003 (IR) – xerothermophilous 1 – European.

Stigmella rolandi van Nieukerken, 1990 – K 13. 5. 1995, 2. 7. 1993 (ZT); MV 3. 8. 2003 (IR) – xerothermophilous 1 and 2 – West-Palaearctic.

Stigmella paradoxa (Frey, 1858) – 30. 4. 1993, 10. 6. 2000 (ZT); MV 7. 5. 2003 (IR) – mesophilous 2 – European.

Stigmella regiella (Herrich-Schäffer, 1855) – LL 4. 6. 1992 (ZT) – mesophilous 2 and 3 – European.

Stigmella crataegella (Klimesch, 1936) – MV 22. 8. 2002 (IR) – mesophilous 2 – European.

Stigmella hybnerella (Hübner, 1796) – K 2. 7. 1993 (ZT); MV 5. 6. 2003 (IR) – mesophilous 2 – Eurosiberian.

Stigmella mespilicola (Frey, 1856) – T 6. 6. 2003 (IR) – mesophilous 2 – European.

Stigmella carpinella (Heinemann, 1862) – MV 1. 5. 2005 (IR) – mesophilous 3 – European.

Stigmella perpygmaeella (Doubleday, 1859) – MV 7. 5. 2003 (IR) – mesophilous 1 and 2 – European.

Stigmella atricapitella (Haworth, 1828) – K 15. 5. 1993 (ZT) – mesophilous 2 to xerothermophilous 2 – West-Palaearctic.
Stigmella basiguttella (Heinemann, 1862) – MV 3. 8. 2003 (IR) – mesophilous 2 and 3 – Eurosiberian?
Stigmella svenssoni (Johansson, 1971) – MV 3. 8. 2003 (IR) – mesophilous 3 – European.
Stigmella dorsiguttella (Johansson, 1971) – K 5.-6., 7.-8. 1993-1994 (ZT) abundant (Tokár et al. 1996), 10. 8. 1996 (ZT); MV 5. 6. 2003 (IR) – mesophilous 3 – European.
Stigmella ruficapitella (Haworth, 1828) – MV 7. 5. 2002 (IR), 7. 5. 2032 (ZT) – mesophilous 2 – European.
Stigmella zangherii (Klimesch, 1951) – K 10.7.1993 (ZT) – mesophilous 2 to xerothermophilous 2 – West-Palaearctic.
Acalyptris loranthella (Klimesch, 1937) – MV 29. 7. 2002 (IT) – mesophilous to xerothermophilous 2 and 3 – European.
Glaucolepis (=Trifurcula) melanoptera (van Nieuk. et Puplesis, 1991) – K 29. 7. 1992, 19. 7. 2003 (ZT); MV 3. 8. 2003 (IR) – mesophilous 2 – Ponto-Mediterranean?
Glaucolepis (=Trifurcula) magna (Z. et A. Laštůvka, 1997) – K 28. 5. 1999 (IR), 7. 5. 2000 (ZT) (Ladmovce in Tokár et al. (2002)), 26. 4. 2020 (ZT) – xerothermophilous 1 – European.
Trifurcula eurema (Tutt, 1899) – MV 21. 8. 2003 (IR) – mesophilous 1 – European.
Trifurcula subnitidella (Duponchel, 1843) – Sírnik 8. 5. 2003 (IR) – mesophilous 1 – West-Palaearctic.
Trifurcula josefklimeschi van Nieukerken, 1990 – MV 5. 6. 2003 (IR) – xerothermophilous 1 – European.
Bohemannia pulverosella (Stainton, 1849) – MV 7. 5. 2003 (IR) – mesophilous 2 – European.
Etainia (=Ectoedemia) louisella (Sircom, 1849) – LL 4.6.1992; K 10. 6. 2000 (ZT); MV 21. 8. 2003 (IR) – mesophilous 2 – West-Palaearctic.
Fomoria (=Ectoedemia) septembrella (Stainton, 1849) – V 10. 7. 1993 (Kj); K 16. 8. 1997 (ZT); MV 1. 7. 2002 (IR) – mesophilous 1 – West-Palaearctic.
Zimmermannia (=Ectoedemia) amani (Svensson, 1966) – LL 7. 6. 2003 (ZT) – mesophilous 2 – European.
Zimmermannia (=Ectoedemia) atrifrontella (Stainton, 1851) – MV 21. 8. 2003 (IR) – mesophilous 2 – European.
Zimmermannia (Ectoedemia) longicaudella Klimesch, 1953 – LL 2. 6. 1990 (ZT) – mesophilous 2 – European.
Ectoedemia turbidella (Zeller, 1848) – K 9. 5. 1993, 14. 5. 1994, 13. 5. 1995 (ZT) – mesophilous 2, 3 – European.
Ectoedemia caradjai (Groschke, 1944) – K 10. 7. 1994 (ZT) (Ladmovce in Tokár et al. 1996)) – mesophilous 2 – Ponto-Mediterranean.
Ectoedemia albifasciella (Heinemann, 1871) – LL 2. 6. 1990, 21. 6. 1991, 4. 6. 1992 (ZT); MV 5. 6. 2003 (IR) – mesophilous 2 – European.
Ectoedemia contorta van Nieukerken, 1985 – LL 7. 6. 2003 (ZT) – mesophilous 2 – European.
Ectoedemia subbimaculella (Haworth, 1828) – LL 4. 6. 1992 (ZT); MV 5. 6. 2003 (IR) – mesophilous 3 – European.
Ectoedemia heringi (Toll, 1934) – LL 4. 6. 1992 (ZT) – mesophilous 2 – European.

Ectoedemia liechtensteini (Zimmermann, 1944) – MV 5. 6. 2003 (IR) – mesophilous 2 – European.
Ectoedemia angulifasciella (Stainton, 1849) – MV 1. 7. 2002 (IR) – mesophilous 1 – European.

Opostegidae
Opostega salaciella (Treitschke, 1833) – LL 7. 6. 2003 (ZT); T 28. 5. 1999 (ZT), 29. 5. 1999 (IR, Bělín 2003) – xerothermophilous 2 – West-Palaearctic.
Pseudopostega auritella (Hübner, 1813) – LL 7. 6. 2003 (ZT); Klin nad Bodrogom 27. 5. 2005 (IR) – hygrophilous 1 – Eurosiberian.

Heliozelidae
Antispila metallella (Denis et Schiffermüller, 1775) – Sírnik 1. 5. 2003 (IR) – mesophilous 2 – European.
Antispila treitschkiella (Fischer von Röslerstamm, 1843) – K 10. 7. 1999 (ZT) – mesophilous 2 to xerothermophilous 2 – European.

Adelidae
Nemophora degeerella (Linnaeus, 1758) – V (1); T 2. 6. 2000 (IR) – mesophilous 2 and 3 – West-Palaearctic.
Nemophora pfeifferella (Hübner, 1813) – V 10. 7. 1993 (Kj) – mesophilous 1 – European.
Nemophora cupriacella (Hübner, 1819) – K 5. 8. 1999 (ZT); MV 3. 8. 2003 (IR) – xerothermophilous 1 – European.
Nemophora violellus (Herrich-Schäffer in Stainton, 1851) – SO 29. 6. 2001 (IR) – mesophilous 1 – European.
Nemophora prodigellus (Zeller, 1853) – K 5. 8. 1999 (IR) – xerothermophilous 1 – European.
Nemophora fasciella (Fabricius, 1775) – SNM (1) – xerothermophilous to mesophilous 1 – European.
Nemophora minimella (Denis et Schiffermüller, 1775) – V 29. 7. 1992 (Kj); K 2. 7. 1993, 10. 7. 1999 (ZT) – xerothermophilous to mesophilous 1 – European.
Nemophora dumerilella (Duponchel, 1839) – MV 1. 7. 2002 (IR) – xerothermophilous to mesophilous 1 – European.
Adela violella (Denis et Schiffermüller, 1775) – BL (9) – mesophilous 2 – Eurosiberian.
Adela reaumurella (Linnaeus, 1758) – MV 29. 4. 2018 (ZT); MT (3a) – mesophilous 2 – Eurosiberian.
Adela croesella (Scopoli, 1763) – V 15. 5. 1993 (Kj); K 14. 5. 1994, 15. 7. 1995 (ZT), 29. 5. 2004 (IR) – mesophilous 2 – Eurosiberian.
Cauchas fibulella (Denis et Schiffermüller, 1775) – Borša 15. 5. 1993 (Kj); K 13. 5. 1995 (ZT) – mesophilous 1 – West-Palaearctic.
Cauchas rufimitrella (Scopoli, 1763) – V 15. 5. 1993 (Kj); T 30. 4. 2000
(IR); MV 29. 4. 2018 (ZT) – mesophilous 1 and 2 – European.
Nematopogon schwarziellus Zeller, 1839 – V 13. 5. 1993 (Kj) – mesophilous 3 – Eurosiberian.
Nematopogon metaxella (Hübner, 1813) – V 14. 5. 1994 (Kj); T 28. 5. 1999 (IR); BL (9) – mesophilous 3 – Eurosiberian (or West-Palaearctic).

Nematopogon pilella (Denis et Schiffermüller, 1775) – K 14. 5. 1994, 26. 4. 2020 (ZT) – mesophilous 2 and 3 – Eurosiberian.
Nematopogon swammerdamella (Linnaeus, 1758) – C (2); T 30. 4. 2004 (IR); K 26. 4. 2020 (ZT) – mesophilous 3 – West-Palaearctic.
Nematopogon robertella (Clerck, 1759) – C (2) – mesophilous 3 to tyrphophilous – West-Palaearctic.

Incurvariidae
Vespina slovaciella (Zagulajev et Tokár, 1990) – LL 16. 6. 1989, 21. 6. 1991, 4. 6. 1992 (ZT); T 12. 6. 2000 (Kj); VK 2. 6. 2000 (IR) – mesophilous 2 – European (Fig. 16).
Incurvaria masculella (Denis et Schiffermüller, 1775) – K 30. 4. 2000 (ZT); MV 2. 4. 2002 (IR) – mesophilous 2 and 3 – Eurosiberian (or West-Palaearctic).
Incurvaria oehlmanniella (Hübner, 1796) – LL 21. 6. 1991 (ZT) – mesophilous 2 and 3 – European.

Prodoxidae
Lampronia morosa Zeller, 1852 – K 13. 5. 1995 (ZT); MV 2. 5. 2002 (IR) – xerothermophilous 2 – European.
Lampronia luzella (Hübner, 1817) – BL (9) – mesophilous 2 – European.

Tischeriidae
Tischeria ekebladella (Bjerkander, 1795) – Borša 15. 5. 1993, V 19. 7. 1993 (Kj); VK 2. 6. 2000 (IR) – mesophilous 2 and 3 – European.
Tischeria dodonaea Stainton, 1858 – VK 2. 6. 2002 (IR) – mesophilous 2 and 3 – European.
Coptotriche marginea (Hawort, 1828) – LL 27. 7. 1991 ex.l. (ZT); T 28. 5. 1999 (Kj, IR) – mesophilous 2 – West-Palaearctic.
Coptotriche heinemanni (Wocke, 1871) – LL 6. 6. 1992 (ZT); V 10. 7. 1993 (Kj); MV 7. 5. 2003 (IR) – mesophilous 1 – West-Palaearctic.
Coptotriche gaunacella (Duponchel, 1843) – K 29. 7. 1992 (ZT); MV 7. 5. 2003 (IR), 20. 8. 2016, 29. 4. 2018 (ZT) – mesophilous 2 – European.
Coptotriche angusticollella (Duponchel, 1843) – K 17. 8. 1992 (ZT); SO 4. 8. 2001 (IR) – mesophilous 2 – European (West-Palaearctic?).

Millieriidae
Millieria dolosalis (Heydenreich, 1851) – Borša 22. 5. 1992, V 14. 5. 1994 (Kj) – xerothermophilous to mesophilous 1 and 2 – European (Mediterranean?).

Psychidae
Taleporia tubulosa (Retzius, 1783) – V 18. 6. 1994 (Kj); K 1. 6. 1999 (IR) – mesophilous 3 – West-Palaearctic.
Bijugis pectinella (Denis et Schiffermüller, 1775) – MV 10. 6. 2004 (IR) – mesophilous 1 – West-Palaearctic.
Psyche crassiorella Bruand, 1952 – T 16. 5. 2000 ex pupae (Iv. Richter) – xerothermophilous – West-Palaearctic.

Rebelia herrichiella Strand, 1912 – K 16. 6. 1995 (IR); MV 7. 5. 2003 (IR); LL 7. 6. 2003; Kopč. slanisko 7.6.2015 (ZT) – xerothermophilous 2 – West-Palaearctic.
Epichnopteryx plumella (Denis et Schiffermüller, 1775) – K 29. 4. 2000 (IR); C (2); KM (6); MV 2. 5. 2003, 29. 4. 2018 (ZT) – hygrophilous to xerothermophilous – Palaearctic.
Ptilocephala muscella (Denis et Schiffermüller, 1775) – MV 9. 5. 2009 (ZT) – xerothermophilous 1 – Continental.
Sterrhopterix fusca (Haworth, 1809) – BL (9) – mesophilous 2 – Palaearctic.

Tineidae
Infurcitinea albicomella (Stainton, 1851) – K 29. 6. 1996, 13. 7. 1996 (ZT); T 3. 8. 2001 (IR) – xerothermophilous 2 – European.
*Infurcitinea finali*s Gozmány, 1959 – V 19. 7.1 993, Borša 24. 6. 1992 (Kj); MV 3. 8. 2005 (IR) – xerothermophilous 2 – West-Palaearctic.
Triaxomera parasitella (Hübner, 1796) – SNM (1); LL 4. 6. 1992 (ZT); MV 5. 6. 2003 (IR); BL (9) – mesophilous 3 – West-Palaearctic.
Nemapogon cloacella (Haworth, 1828) – V 18. 6. 1994 (Kj) – mesophilous 3 – Holarctic.
Nemapogon gliriella (Heyden, 1865) – LL 4. 6. 1992 (ZT) (Tokár et al. 1996); MV 5. 6. 2003 (IR) – mesophilous 3 – West-Palaearctic.
Nemapogon koenigi Căpuşe, 1967 (= *wolffiella* Karsholt et Nielsen, 1976) – V 19. 7. 1993 (Kj) – mesophilous to hygriphilous 2 – West-Palaearctic.
Nemapogon inconditella (Lucas, 1956) – Borša 24. 6. 1992, V 29. 7. 1992 (Kj); K 29. 6. 1996 (ZT); V 1.8.2005 (IR) – xerothermophilous 3 – West-Palaearctic.
Nemapogon variatella (Clemens, 1859) – Z 15. 7. 1995; K 10. 8. 1996 (ZT); MV 1. 7. 2002 (IR) – mesophilous 3 – Holarctic. House pest.
Nemapogon fungivorellus (Benander, 1939) – V 10. 7. 1993 (Kj) – mesophilous 3 – West-Palaearctic.
Neurothaumasia ankerella (Mann, 1867) – K 11. 6. 2000 (Kj) – xerothermophilous 3 – West-Palaearctic.
Cephimallota crassiflavella Bruand, 1851 – K 2. 7. 1993 (ZT) – as *C. angusticostella* in Tokár et al. (1996) – xerothermophilous 2 – West-Palaearctic.
Reisserita relicinella (Herrich-Schäffer, 1853) – K 29. 6. 1996 (ZT); MV 29. 7. 2002 (IR) – xerothermophilous 2 – European (West-Palaearctic?).
Trichophaga tapetzella (Linnaeus, 1758) – K 13. 5. 1995 (ZT, Kj) – synanthropic – Cosmopolitan.
Tinea pellionella (Linnaeus, 1758) – K 13. 7. 1995 (ZT) – synantropic? – Cosmopolitan.
Tinea trinotella Thunberg, 1794 – V 10. 7. 1992 (Kj); MV 1. 7. 2002 (IR) – mesophilous 2 – Eurosiberian.
Tinea omichlopis Meyrick, 1928 – K 17. 8. 1992 (ZT) (Tokár et al. 1996), 10. 8. 1996, 16. 5. 1997, 26. 4. 2020 (ZT) – xerothermophilous? – Eurosiberian.
Niditinea fuscella (Linnaeus, 1758) – K 13. 7. 1996 (ZT) – mesophilous 3, synanthropic – Holarctic.
Monopis laevigella (Denis et Schiffermüller, 1775) – T 30. 4. 2000 (IR); BL (9) – mesophilous 3 – Holarctic. House pest.

Monopis weaverella (Scott, 1858) – T 9. 5. 2003 (IR) – mesophilous 3 – Eurosiberian.
Monopis obviella (Denis et Schiffermüller, 1775) – MV 1. 7. 2002 (IR) – mesophilous 2 – Holarctic.
Monopis imella (Hübner, 1813) – K 13. 5. 1995, 26. 4. 2020 (ZT), 28. 5. 1999 (IR) – mesophilous? (ubiquitous) – Transpalaearctic.
Monopis monachella (Hübner, 1796) – V 19. 7. 1993 (Kj); K 17. 9. 1999 (IR) – ubiquitous – Cosmopolitan.
Monopis fenestratella (Heyden, 1863) – V 29. 7. 1992 (Kj) – mesophilous 2 – European.
Ateliotum hungaricellum Zeller, 1839 – K 10. 7. 1993, 15. 7. 1995 (ZT); V 10. 7. 1993 (Kj) – xerothermophilous 1 – West-Palaearctic.
Euplocamus anthracinalis (Scopoli, 1763) – MT (3a); V 27. 5. 1999, T 28. 5. 1999 (Kj, ZT); BL (9) – xerothermophilous 2 – West-Palaearctic.

Roeslerstammiidae
Roeslerstammia erxlebella (Fabricius, 1787) – MV 29. 7. 2002 (IR), 2. 5. 2003 (ZT) – mesophilous 2 – Eurosiberian.

Bucculatricidae
Bucculatrix albedinella (Zeller, 1839) – V 30. 7. 2005 (IR) – mesophilous 2 – Palaearctic.
Bucculatrix bechsteinella (Scharfenberg, 1805) – K 30. 4. 1992, 26. 4. 2020 (ZT); V 15. 5. 1993 (Kj); T 28. 6. 2001 (IR); MV 2. 5. 2009 (ZT) – mesophilous 2 – Holarctic.
Bucculatrix cristatella (Zeller, 1839) – K 15. 5. 1993, 10. 7. 1999 (ZT); T 30. 4. 2000 (IR) – mesophilous to xerothermophilous 1 – West-Palaearctic.
Bucculatrix frangutella (Goeze,1783) – MV 2. 5. 2002 (IR) – mesophilous 2 – Palaearctic.
Bucculatrix noltei Petry, 1912 – V 15. 7. 1995 (Kj) – mesophilous 1, 2 – European.
Bucculatrix thoracella (Thunberg, 1794) – LL 4. 6. 1991 (ZT); MV 1. 7. 2002 (IR) – mesophilous 2 and 3 – Palaearctic.
Bucculatrix ulmella Zeller, 1848 – K 15. 5. 1993, 24. 8. 2002; MV 29. 7. 2002 (ZT), 3. 8. 2005 (IR) – mesophilous 2, 3 – West-Palaearctic.

Gracillariidae
Parectopa ononidis (Zeller, 1839) – T 28. 5. 1999, V 28. 5. 1999 (Kj); MV 3. 8. 2003 (IR) – xerothermophilous 1 and 2 – West-Palaearctic.
Parectopa robiniella Clemens, 1863 – T 28. 5. 1999 (IR, ZT) – xerothermophilous 2 – originally Nearctic – introduced to Europe.
Micrurapteryx kollariella (Zeller, 1839) – K 30. 4. 2000 (ZT); MV 3. 8. 2005 (IR) – mesophilous 2 – West-Palaeacrctic.
Caloptilia alchimiella (Scopoli, 1763) – V 14. 5. 1994 (Kj); MV 2. 5. 2002 (IR); BL (9) – mesophilous 2 and 3 – West-Palaearctic.
Caloptilia semifascia (Haworth, 1828) – MV 1. 7. 2002 (IR) – mesophilous 2 – West-Palaearctic.
Caloptilia cuculipennella (Hübner, 1795) – K 5. 8. 1999 (ZT) – mesophilous 2 – Eurosiberian.

Caloptilia stigmatella (Fabricius, 1781) – K 27. 5. 2000 (IR) – mesophilous to hygrophilous 2 – Holarctic.
Caloptilia fidella (Reutti, 1853) – MV 2. 5. 2005 (IR) – mesophilous to hygrophilous 2 – West-Palaearctic.
Gracillaria syringella (Fabricius, 1794) – K 30. 4. 2000 (ZT) – mesophilous 2 – West-Palaearctic, introduced to North America.
Sabulopteryx limosella (Duponchel, 1843) – V 29. 7. 1992 (Kj) – xerothermophilous 1 – West-Palaearctic.
Aspilapteryx tringipennella (Zeller, 1839) – K 27. 5. 1999, 26. 4. 2020 abundant (ZT); V 14. 5. 1994 (Kj) – mesophilous 1 – West-Palaearctic.
Calybites phasianipennella (Hübner, 1813) – V 29. 7. 1992 (Kj) – mesophilous 2 – Palaearctic (Oriental).
Calybites quadrisignella (Zeller, 1839) – K 13. 7. 1996 (ZT) – mesophilous 2 – West-Palaearctic?
Euspilapteryx auroguttella (Stephens, 1835) – V 15. 7. 1995 (Kj) – mesophilous 2 – Eurosiberian.
Ornixola caudulatella (Zeller, 1839) – K 10. 6. 2000 (ZT) – mesophilous 2 to hygrophilous – Eurosiberian.
Parornix anglicella (Stainton, 1850) – K 10. 7. 1993 (ZT) (in Tokár et al. 1996 as *Parornix* sp.); LL 6. 6. 1991 (ZT) – mesophilous 2 – West-Palaearctic.
Parornix finitimella (Zeller, 1850) – V 15. 5. 1993 (Kj); K 5. 8. 1999 (ZT) – xerothermophilous to mesophilous 2 – West-Palaearctic.
Parornix torquillella (Zeller, 1850) – V 29. 7. 1992 (Kj); K 30. 4. 2000, 26. 4. 2020 (ZT) – xerothermophilous to mesophilous 2 – West-Palaearctic.
Parornix tenella (Rebel, 1919) – K 30. 4. 1993 (ZT) (Tokár et al. 1996), 13. 5. 1995, 10. 8. 1996 (ZT) – xerothermophilous to mesophilous 2 – European.
Cameraria ohridella Deschka et Dimič, 1986 – Borša 7.-8. 2018 (Pj) – mesophilous 2 – European. Pest of *Aesculus hippocastanum*.
Macrosaccus robiniella (Clemens, 1859) – T 17. 9. 1999 (IR) – mesophilous 2 – originally Nearctic – introduced to Europe.
Phyllonorycter harrisella (Linnaeus, 1761) – LL 21. 6. 1991 (ZT); MV 29. 7. 2002 (IR) – mesophilous 2 and 3 – West-Palaearctic?
Phyllonorycter delitella (Duponchel, 1843) – MV 29. 7. 2002 (IR); K 24. 8. 2002 (ZT) – mesophilous 2 – European.
Phyllonorycter dubitella (Herrich-Schäffer, 1855) – K 14. 5. 1994 (ZT) – mesophilous 2 and 3 – European.
Phyllonorycter quercifoliella (Zeller, 1839) – LL 21. 6. 1991 (ZT); K 30. 4. 1993 (ZT); MV 1. 5. 2005 (IR) – mesophilous 2 and 3 – European?
Phyllonorycter roboris (Zeller, 1839) – LL 29. 6. 1991 (ZT); V 13. 5. 1995 (Kj) – mesophilous 2 and 3 – West-Palaearctic.
Phyllonorycter mannii (Zeller, 1846) – K 14. 5. 1994 (ZT) – mesophilous 2 – European.
Phyllonorycter muelleriella (Zeller, 1839) – Leles (3); Borša 15. 5. 1993, V 15. 5. 1993 (Kj) – mesophilous 2 and 3 – European.

Phyllonorycter. maestingella (Müller, 1764) – K 14. 5. 1994 (ZT); MV 1. 5. 2005 (IR) – mesophilous 2 – European.
Phyllonorycter corylifoliella (Hübner, 1796) – MV 21. 8. 2003 (IR) – mesophilous 2 and 3 – West-Palaearctic.
Phyllonorycter schreberella (Fabricius, 1781) – LL 21. 6. 1991 (ZT); V 15. 7. 1995 (Kj, IR) – mesophilous 2 and 3 – West-Palaearctic.
Phyllonorycter cerasicolella (Herrich-Schäffer, 1855) – LL 16. 6. 1989 (ZT) – mesophilous 2 – West-Palaearctic.
Phyllonorycter spinicolella (Zeller, 1846) – V 18. 6. 1994 (Kj); MV 1. 5. 2005 (IR) – mesophilous 2 – West-Palaearctic.
Phyllonorycter blancardella (Fabricius, 1781) – MV 2. 5. 2003 (IR) – mesophilous 2 – West-Palaearctic.
Phyllonorycter sagitella (Bjerkander, 1790 – T 27. 9. 1999 (ZT) – mesophilous 2 and 3 – Eurosiberian.
Phyllonorycter comparella (Duponchel, 1843) – SO 6. 10. 2001 (IR) – mesophilous to hygrophilous 2 – West-Palaearctic.
Phyllonorycter populifoliella (Treitschke, 1833) – K 11. 6. 2000 (Kj) – mesophilous 2 and 3 – West-Palaearctic.
Phyllonorycter acerifoliella (Zeller, 1839) – V 15. 5. 1993 (Kj); MV 1. 7. 2002 (IR) – mesophilous 2 and 3 – West-Palaearctic.
Phyllonorycter insignitella (Zeller, 1846) – K 17. 9. 1999 (IR) – mesophilous 1 – West-Palaearctic.
Phyllonorycter fraxinella (Zeller, 1846) – MV 29. 4. 2018 (ZT) – mesophilous 2 to xerothermophilous 2 – European

Yponomeutidae
Scythropia crataegella (Linnaeus, 1767) – K 29. 7. 1992 (ZT); MV 3. 8. 2003 (IR) – mesophilous 2 – European.
Yponomeuta evonymella (Linnaus, 1758) – Poľany (6); Chlmecké kopce 11. 6. 2015 (Pj); BL (9) – mesophilous 2 and 3 – Transpalaearctic.
Yponomeuta plumbella (Denis et Schiffermüller, 1775) – T 10. 7. 1992, V 19. 7. 1993 (Kj, IR); Dlhé Tice (6); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous 2 – West-Palaearctic.
Yponomeuta irrorella (Hübner, 1796) – VK 7. 6. 2003 (IR) – xerothermophilous 2 – West-Palaearctic.
Yponomeuta sedella Treitschke, 1832 – Borša (5); MV 29. 4. 2010 (IR) – xerothermophilous 2 – Eurosiberian.
Swammerdamia caesiella (Hübner, 1796) – K 28. 5. 1999 (IR) – mesophilous 2 and 3 – Holarctic.
Swammerdamia pyrella (Villers, 1789) – MV 2. 5. 2002 (IR) – mesophilous 2 – Holarctic.
Swammerdamia compunctella (Herrich-Schäffer, 1855) – T 12. 6. 2000 (Kj, IR) – mesophilous 2 – West-Palaearctic.
Pseudoswammerdamia combinella (Hübner, 1786) – K 29. 4. 2000 (IR) – mesophilous 2 – West-Palaearctic.

Paraswammerdamia albicapitella (Scharfenberg, 1805) – Sírnik 1. 8. 2002 (IR) – mesophilous 2 – West-Palaearctic.
Paraswammerdamia nebulella (Goeze, 1783) – LL 2. 6. 1990, K 18. 6. 1994 (ZT); V 18. 6. 1994 (Kj); Sírnik 28. 5. 2005 (IR) – mesophilous 2 – West-Palaearctic.
Niphonympha dealbatella (Zeller, 1847) – MV 3. 8. 2003 (IR); BL (9) – xerothermophilous to mesophilous 3 – European.

Argyresthiidae
Argyresthia glaucinella Zeller, 1839 – MV 5. 6. 2003 (IR) – mesophilous 2 and 3 – European.
Argyresthia spinosella Stainton, 1849 – Sírnik 28. 5. 2005 (IR) – mesophilous 2 – European.
Argyresthia conjugella Zeller, 1839 – T 28. 6. 2001 (IR) – mesophilous 2 – Eurosiberian.
Argyresthia pulchella Lienig et Zeller, 1846 – MV 5. 6. 2003 (IR) – mesophilous 2 – European.
Argyresthia pruniella (Clerck, 1759) – C (2); K 5. 8. 1999 (IR) – mesophilous 2 – West-Palaearctic.
Argyresthia bonnetella (Linnaeus, 1758) – V 18. 6. 1994 (Kj) – mesophilous 1 and 2 – European.
Argyresthia albistria (Haworth, 1828) – LL 21. 6. 1991 (ZT); Latorica-bridge 3. 7. 1992 (Pj) – mesophilous 2 – European.

Plutellidae
Plutella xylostella (Linnaeus, 1758) – K 25. 5. 2012 (IR); BL (9) – ubiquitous – Cosmopolitan.

Glyphipterigidae
Orthotelia sparganella (Thunberg, 1788) – T 28. 6. 2001 (IR) – hygrophilous 1 – European.
Glyphipterix thrasonella (Scopoli, 1763) – VK 7. 6. 2003 (IR) – hygrophilous 1 – European.
Glyphipterix equitella (Scopoli, 1763) – K 27. 5. 1999 (ZT), 17. 9. 1999 (IR FK) – xerothermophilous 2 – European.
Glyphipterix schoenicolella Boyd, 1859 – LL 4. 6. 1992 (ZT) – hygrophilous 1 – European.

Ypsolophidae
Ypsolopha mucronella (Scopoli, 1763) – V 13. 5. 1995 (Kj); MV 2. 5. 2002 (IR) – mesophilous to hygrophilous 2 – Eurosiberian.
Ypsolopha falcella (Denis et Schiffermüller, 1775) – K 27. 5. 2000 (IR) – mesophilous 2 and 3 – European.
Ypsolopha lucella (Fabricius, 1775) – LL 16. 6. 1989 (ZT) – mesophilous 2 and 3 – West-Palaearctic.
Ypsolopha scabrella (Linnaeus, 1761) – V 29. 7. 1992 (Kj); K 14. 5. 1994, 29. 6. 1996 (ZT); Streda n. Bodr. 28. 6. 2001 (IR) – mesophilous 2 – European.
Ypsolopha horridella (Treitschke, 1835) – K 4. 7. 1992 (ZT); V 10. 7. 1993 (Kj); MV 1. 7. 2002 (IR) – mesophilous 2 – West-Palaearctic.
Ypsolopha parenthesella (Linnaeus, 1761) – LL 21. 6. 1991 (ZT); BL (9) – mesophilous 2 and 3 – Eurosiberian.
Ypsolopha ustella (Clerck, 1759) – SNM (1); K 2. 7. 1993 (ZT); K 11. 6. 2000 (Kj) – mesophilous 2 and 3 – European.

Ypsolopha vittella (Linnaeus, 1758) – V 13. 7. 1994 (Kj); K 15. 7. 1995 (ZT) – mesophilous 2 and 3 – Holarctic.
Ypsolopha persicella (Fabricius, 1787) – MT (3a); MV 4. 10. 2002 (IR) – xerothermophilous to mesophilous 2 – European.
Ypsolopha alpella (Denis et Schiffermüller, 1775) – SNM (1) – mesophilous 2 and 3- European.
Ypsolopha sylvella (Linnaeus, 1767) – MV 1. 7. 2002 (IR); BL (9) – mesophilous 2 and 3 – European.
Ypsolopha sequella (Clerck, 1759) – MV 27. 7. 2002 (IR) ; BL (9) – mesophilous 2 and 3 – European.
Ypsolopha chazariella (Mann, 1866) – MV 1. 7. 2003 (IR) – mesophilous 2 and 3 – European.

Bedelliidae
Bedellia somnulentella (Zeller, 1847) – K 5. 8. 1999 (ZT); MV 2. 5. 2002 (IR) – xerothermophilous to mesophilous 1 – Cosmopolitan.

Lyonetiidae
Leucoptera lotella (Stainton, 1759) – K 15. 5. 1993, 24. 8. 2002; MV 2. 5. 2003, 29. 4. 2018 (ZT); 3. 8. 2003 (IR); T. 11. 7. 1996 (Kj) – xerothermophilous 1 – European.
Leucoptera malifoliella (Costa, 1836) – K 15. 5., 10. 7. 1993 (ZT); MV 1. 7. 2002 (IR) – mesophilous 2 – Eurosiberian.
Leucoptera heringiella Toll, 1938 – K 10. 7. 1993 (ZT); T 9. 5. 2003 (IR) – xerothermophilous 2 – European.
Leucoptera aceris (Fuchs, 1903) – MV 3. 8. 2005 (IR) – mesophilous 2 – European.
Leucoptera sinuella (Reutti, 1853) – MV 2. 5. 2003 (IR) – mesophilous 2 – Eurosiberian.
Lyonetia prunifoliella (Hübner, 1796) – LL 2. 6. 1990 (ZT) – mesophilous 2 – Eurosiberian.

Douglasiidae
Tinagma perdicella Zeller, 1839 – V 15. 5. 1993 (Kj); K 16. 5. 1997, 7. 5., 26. 4. 2020 (ZT) – mesophilous 2 – European.
Tinagma ocnerostomellum (Stainton, 1850) – V 18. 6. 1994, K 11. 6. 2000 (Kj) – xerothermophilous to mesophilous 1 – West-Palaearctic.
Tinagma balteolella (Fischer von Röslerstamm, 1841) – K 16. 5. 1997; MV 2. 5. 2003 (ZT); T 28. 5. 1999 (Kj) – xerothermophilous to mesophilous 1 – European.
Klimeschia transversella (Zeller, 1839) – V 15. 5. 1993 (Kj, ZT); MV 2. 5. 2003, K 14. 5. 1994, 26. 4. 2020 abundant (ZT) – xerothermophilous 1 – European.

Autostichidae
Oegoconia novimundi (Busck, 1915) – T 27. 7. 2000 (IR) (Streda nad Bodrogom in Tokár et al. 2002) – mesophilous 2 and 3? – Holarctic?
Oegoconia uralskella Popescu-Gorj et Căpuşe, 1965 – V 29. 7. 1992 (Kj) – xerothermophilous 1 and 2 – West-Palaearctic.
Oegoconia deauratella (Herrich-Schäffer, 1854) – V 10. 7. 1993 (Kj) – xerothermophilous 1 and 2 – West-Palaearctic.

Oegoconia caradjai Popescu-Gorj et Capuse, 1965 – K 2.7., 10. 7. 1993, 10. 8. 1996 (ZT) – xerothermophilous 2 – West-Palaearctic.
Apatema whalleyi Popescu-Gorj et Căpuşe, 1965 – K 2. 7., 15. 7. 1993, 15. 7. 1995, 29. 6. 1996, 16. 8. 1997 (Tokár et al. 2002) – xerothermophilous 1 and 2 – Ponto-Mediterranean?
Apatema mediopallidum Walsingham, 1900 – MV 1. 7. 2002 (IR) – xerothermophilous 1 and 2 – West-Palaearctic.

Lecithoceridae
Lecithocera nigrana (Duponchel, 1836) – V 29. 7. 1992 (Kj); K 10. 7. 1993, 19. 7. 2003 (ZT); MV 1. 7. 2002 (IR) – xerothermophilous to mesophilous 2 – West-Palaearctic.

Oecophoridae
Promalactis (= Bisigna) procerella (Denis et Schiffermüller, 1775) – LL 7. 6. 2003 (ZT) – mesophilous 2 and 3 – Transpalaearctic.
Schiffermuelleria schaefferella (Linnaeus, 1758) – C (2); Borša 15. 5. 1993 (Kj), LL 6. 6. 1991 (ZT) – mesophilous 2 and 3 – West-Palaearctic.
Metalampra cinnamomea (Zeller, 1839) – MV 29. 7. 2002 (ZT) – mesophilous 2 and 3 – West-Palaearctic.
Kasyniana diminutella (Rebel, 1931) – K 15. 7. 1995 (ZT) (Tokár et al. 2002) – xerothermophilous 2 – European.
Endrosis sarcitrella (Linnaeus,1758) – V 15. 5. 1993 (Kj) – synanthropic – Cosmopolitan.
Borkhausenia fuscescens (Haworth, 1828) – MV 21. 8. 2003 (IR) – mesophilous 2 and 3 – Holarctic.
Crassa tinctella (Hübner, 1796) – V 14. 7. 1994 (Kj) – mesophilous 2 and 3 – West-Palaearctic.
Crassa unitella (Hübner, 1796) – Borša (5); V 10. 7. 1993, T 12. 6. 2000 (Kj), 2. 6. 2000 (IR); BL (9) – mesophilous 2 – West-Palaearctic.
Batia internella Jäckh, 1972 – Klin nad Bodrogom 6. 7. 1996 (IR); K 10. 7. 1993, 19. 7. 2003 (Tokár et al. 2005) – mesophilous 2 and 3 – West-Palaearctic.
Batia lambdella (Donovan, 1793) – K 27. 5. 2000 (IR) – xerothermophilous 2 and 3 – West-Palaearctic.
Epicallima formosella (Denis et Schiffermüller, 1775) – K 10. 7. 1993, 13. 7. 1996 (ZT); MV 1. 7. 2000 (IR) – mesophilous 2 and 3 – Holarctic.
Oecophora bractella (Linnaeus, 1758) – BL (9) – mesophilous 2 and 3 – West-Palaearctic.
Harpella forficella (Scopoli, 1763) – K 15 7. 1995 (ZT); BL (9) – mesophilous 3 – West-Palaearctic.
Dasycera oliviella (Fabrucius, 1794) – V 10. 7. 1993 (Kj) – xerothermophilous to mesophilous 3 – West-Palaearctic.
Minetia crinitus (Fabricius, 1798) – T 28. 6. 2001 (IR) – xerothermophilous 1 – European.
Minetia labiosella (Hübner, 1810) – MV 1. 7. 2002 (IR) – xerothermophilous to mesophilous 1 – West-Palaeacrtic.
Pleurota marginella (Denis et Schiffermüller, 1775) – V 15. 5. 1993 (Kj); K 15. 5. 1993 abundant, 16. 5. 1997, 7. 5. 2000 (ZT) (Tokár et al. 2005), 26. 4. 2020 abundant (ZT) – xerothermophilous to mesophilous 1 – West-Palaearctic.

Pleurota pyropella (Denis et Schiffermüller, 1775) – SNM, V (1); V 29. 7. 1992, T 28. 5. 1999 (Kj); SO 1. 5. 2002 (IR); T 15. 5. 1993, 14. 5. 1994, 13. 5. 1995, 27. 5. 1999 (ZT) (Streda nad Bodrogom in Tokár et al. 2005) – mesophilous 1 – Transpalaearctic.

Pleurota proteella Staudinger, 1880 (= *malatya* Back, 1973) – K 2. 7. 1993, 13. 7. 1996 (Ladmovce in Tokár et al. 2005) – xerothermophilous 1 and 2 – Transpalaearctic.

Holoscolia huebneri Koçak, 1980 – Borša 22. 5. 1992, V 14. 7. 1994 (Kj); K 29. 6. 96 (ZT) and 27. 5. 2000 (IR) – mesophilous 1 and 2 – West-Palaearctic.

Chimabachidae

Diurnea lipsiella (Denis et Schiffermüller, 1775) – MV 22. 1. 2003 (IR); BL (9) – mesophilous 2 and 3 – West-Palaearctic.

Lypusidae

Lypusa maurella (Denis et Schiffermüller, 1775) – Z (1); V 14. 5. 1994 (Kj); K 14. 5. 1994, 26. 4. 2020 abundant (ZT); T 9. 5. 2003 (IR) – mesophilous to hygrophilous 2 – West-Palaearctic.

Pseudatemelia flavifrontella (Denis et Schiffermüller, 1775) – T 9. 5. 2003 (IR, Streda nad Bodrogom in Tokár et al. 2005) – mesophilous 3 – West-Palaearctic.

Pseudatemelia subochreella (Doubleday, 1859) – MV 5. 6. 2003 (IR) – xerothermophilous 3 – West-Palaearctic.

Peleopodidae

Carcina quercana (Fabricius, 1775) – V 15. 7. 1995, T 10. 7. 1993 (Kj, IR); Beša-Moľva (6); BL (9) – mesophilous to xerothermophilous 2 and 3 – West-Palaearctic.

Depressariidae

Semioscopis steinkellneriana (Denis et Schiffermüller, 1775) – KM (6); BL (9) – xerothermophilous to mesophilous 2 – Eurosiberian.

Semioscopis strigulana (Denis et Schiffermüller, 1775) – KCH (3b) – mesophilous 2 and 3 – Eurosiberian.

Luquetia lobella (Denis et Schiffermüller, 1775) – V 13. 7. 1994 (Kj); LL 23. 6. 1989 (ZT); T 6. 6. 2003 (IR) – xerothermophilous 2 – Eurosiberian.

Agonopterix liturosa (Haworth, 1811) – K 16. 5. 1997, 10. 6. 2000 (ZT) – mesophilous – Eurosiberian.

Agonopterix quadripunctata (Wocke, 1857) – K 24. 8. 2002 (ZT) – mesophilous 1 – Transpalaearctic.

Agonopterix purpurea (Haworth, 1811) – T 27. 7. 2000 (IR) – xerothermophilous 1 – Transpalaearctic.

Agonopterix propinquella (Treitschke, 1835) – MV 1. 7. 2002 (IR); BL (9) – mesophilous 1 and 2 – Transpalaearctic.

Agonopterix arenella (Denis et Schiffermüller, 1775) – SNM (1); Klin nad Bodrogom 27. 5. 2005 (IR) – xerothermophilous to mesophilous 1 and 2 – Transpalaearctic.

Agonopterix ciliella (Stainton, 1849) – MV 1. 7. 2002 (IR) – mesophilous to hygrophilous 2 – European.

Agonopterix curvipunctosa (Haworth, 1811) – Sírnik 8. 5. 2003 (IR) – mesophilous 3 – West-Palaearctic.
Agonopterix assimilella (Treitschke, 1832) – K 5. 5. 1999 (IR) – mesophilous 1 – West-Palaearctic.
Agonopterix pallorella (Zeller, 1839) – K 17. 9. 1999 (ZT); T 12. 6. 2000 (Kj); MV 3. 8. 2003 (IR) – xerothermophilous to mesophilous 1 – Transpalaearctic.
Agonopterix hippomarathri (Nickerl, 1864) – K 2. 7. 1993 (ZT) – xerothermophilous 1 and 2 – West-Palaearctic.
Agonopterix nervosa (Haworth, 1811) – Borša (5); MV 4. 10. 2002 (IR) – xerothermophilous 1 and 2 – Holarctic.
Agonopterix alstromeriana (Clerk, 1759) – K 5. 8. 1999 (IR) – mesophilous 2 – Transpalaearctic.
Agonopterix cnicella (Treitschke, 1832) – V. Kamenec 11. 6. 2003 (IR) – xerothermophilous to mesophilous 2 – West-Palaearctic.
Agonopterix furvella (Treitschke, 1832) – V 10. 6. 2000 (Kj) – xerothermophilous to mesophilous 2 – West-Palaearctic.
Depressaria pimpinellae Zeller, 1839 – K 10. 7., 17. 9. 1999 (ZT); MV 1. 7. 2002 (IR) – mesophilous 1 – Eurosiberian.
Depressaria radiella (Goeze, 1783) – BL (9) – mesophilous 2 – Holarctic.
Depressaria daucella (Denis et Schiffermüller, 1775) – Borša (3b); T 27. 7. 2000 (IR); BL (9) – mesophilous 1 and 2 – Holarctic.
Depressaria ultimella Stainton, 1849 – BL (9) – hygrophilous 1 – Transpalaearctic.
Depressaria pulcherimella (Stainton, 1849) – K 10. 6. 2000 (ZT) – xerothermophilous 2 – Eurosiberian.
Depressaria douglasella Stainton, 1849 – K 29. 6. 1996, 17. 9. 1999 (ZT, IR) – mesophilous 1 – West-Palaearctic.
Depressaria chaerophylli (Zeller, 1839) – K 14. 5. 1994, 13. 5. 1995 (ZT) – mesophilous 2 – Transpalaearctic.
Depressaria emeritella Stainton, 1849 – MV 21. 8. 2003 (IR) – mesophilous 2 – West-Palaearctic.
Depressaria marcella Rebel, 1901 – Sírnik 1. 8. 2002 (IR) – mesophilous 1 – West-Palaearctic.
Depressaria depressana (Fabricius, 1775) – T 27. 7. 2000 (IR) – xerothermophilous 1 and 2 – Transpalaearctic.

Ethmiidae

Ethmia dodecea (Haworth, 1828) – LL 7. 6. 2003 (ZT); K 27. 5. 2000 (IR), 10.6.2000 (ZT) – mesophilous 2 – West-Palaearctic.
Ethmia quadrillella (Goeze, 1783) – V 29. 7. 1992 (Kj); SO 2. 8. 2002 (IR); Dlhé Tice (6); BL (9) – xerothermophilous to mesophilous 2 – West-Palaearctic.
Ethmia pusiella (Linnaeus, 1758) – SNM (1) – xerothermophilous 1 and 2 – Transpalaearctic.
Ethmia terminella Fletcher, 1938 – V 10. 7. 1993 (Kj, ZT); K 27. 5. 2000 (IR) – mesophilous 1 and 2 – West-Palaearctic.
Ethmia bipunctella (Fabricius, 1775) – V 10. 7. 1993 (Kj); K 14. 5. 1994 (ZT); SO 2. 8. 2002 (IR); Dlhé Tice (6) – xerothermophilous to mesophilous 2 – West-Palaearctic.

Cosmopterigidae

Pancalia leuwenhoekella (Linnaeus, 1761) – K 30. 4. 1993, 15. 7. 1995, 26. 4. 2020 abundant (ZT); V 15. 5. 1993 (Kj); MV 2. 5. 2003 (IR) – mesophilous 1 and 2 – Transpalaearctic.

Limnaecia phragmitella Stainton, 1851 – Borša (3); V 15. 5. 1993 (Kj); MV 1. 7. 2002 (IR); BL (9) – hygrophilous 1 – Cosmopolitan.

Cosmopterix orichalcea Stainton, 1861 – T 30. 4. 2000 (IR) – mesophilous 1 and 2 – Transpalaearctic.

Pyroderces argyrogrammos (Zeller, 1847) – K 8. 7., 10. 7. 1993 (ZT); T 12. 6. 2000, V 10. 7. 1993 (Kj); K 27. 5. 2000 (IR) – xerothermophilous 1 and 2 – West-Palaearctic.

Eteobalea anonymella (Riedl, 1965) – K 18. 7. 1992, 26. 4. 2020 abundant (ZT); V 10. 7. 1993 (Kj); MV 2. 5. 2002 (IR) – mesophilous 1 and 2 – West-Palaeacrtic.

Sorhagenia rhamniella (Zeller, 1839) – V 29. 7. 1992 (Kj); K 18. 6. 1994 (ZT); LL 7. 6. 2003 (ZT); MV 5. 6. 2003 (IR) – mesophilous 2 and 3 – West-Palaearctic.

Sorhagenia lophyrella (Douglas, 1846) – Sírnik 5. 6. 2003 (IR) – mesophilous 2 and 3 – West-Palaearctic.

Gelechiidae

Megacraspedus dolosellus (Zeller, 1839) – K 27. 5. 2000 (IR) – xerothermophilous 1 and 2 – Eurosiberian.

Megacraspedus binotella (Duponchel, 1843) – MV 2. 5. 2003, 9. 5. 2009 (ZT), 27. 5. 2004 (IR) – xerothermophilous 2 – European.

Aristotelia subdecurtella (Stainton, 1859) – K 5. 8. 1999 (IR) (Tokár et al. 2002) – mesophilous 2 to hygrophilous 1 – Palaearctic.

Aristotelia subericinella (Duponchel, 1843) – K 29. 7. 1992, 2. 7. 1993, 29. 6. 1996 (ZT) (Elsner et al. 1999), 27. 5., 10. 6. 2000 (IR, ZT) – xerothermophilous 2 – Eurosiberian.

Chrysoesthia verrucosa Tokár, 1999 – MV 2. 5. 2003 (ZT, IR), 8. 5. 2003, 9.5.2009, 29. 4. 2018 (ZT) – as a new species for science described from Hodějovice (Czech Republic) and the Slovak locality Sitno (Elsner et al. 1999). MV is the second known locality in Slovakia – mesophilous 2 – European.

Chrysoesthia sexguttella (Thunberg, 1794) – K 14. 5. 1994 (ZT); Veľký Horeš 9. 5. 2003 (IR) – mesophilous 1, 2 – Holarctic.

Xystophora carchariella (Zeller, 1839) – MV 2. 5. 2002 (IR) – mesophilous 2 – Palaearctic.

Xystophora pulveratella (Herrich-Schäffer, 1854) – K 14. 5. 1994, 30. 4. 2000 (ZT), 29. 4. 2000 (IR); MV 2. 5. 2003 (ZT) – mesophilous 1, 2 – Eurosiberian.

Atremaea lonchoptera Staudinger, 1871 – T 28. 6. 2001 (IR); Dlhé Tice (6); BL (9) – hygrophilous 1 – Eurosiberian.

Isophrictis striatella (Denis et Schiffermüller, 1775) – K 27. 5. 2000 (IR) – ubiquitous – Holarctic.

Metzneria paucipunctella (Zeller, 1839) – K 15. 7. 1995 (ZT) (Elsner et al. 1999); T 28. 6. 2001 (IR) – mesophilous 1, 2 – Holarctic.

Metzneria. neuropterella (Zeller, 1839) – K 29. 7. 1992, 10. 7. 1993 (ZT); MV 3. 8. 2003 (IR); BL (9) – mesophilous 2 – Palaearctic.

Metzneria aestivella (Zeller, 1839) – K 2. 7., 10. 7. 1993, 13. 7. 1996 (ZT) (Elsner et al. 1999); MV 1. 7. 2002 (IR) – mesophilous 2 to xerothermophilous 2 – European.

Metzneria ehikeella Gozmány, 1954 – V 30. 7. 2005 (IR) – xerothermophilous 1 – Palaearctic.
Metzneria metzneriella (Stainton, 1851) – K 29. 6. 1996 (ZT); MV 1. 7. 2002 (IR) – mesophilous 1, 2 – Eurosiberian.
Apodia bifractella (Duponchel, 1843) – K 29. 6. 1996 (ZT) (Elsner et al. 1999); MV 10. 6. 2004 (IR) – mesophilous 2 to xerothermophilous 2 – West-Palaearctic.
Ptocheuusa abnormella (Herrich-Schäffer, 1854) – K 29. 6. 1996 (ZT), 27. 6. 2000 (IR) – xerothermophilous 1 – European.
Monochroa rumicetella (Hofmann, 1868) – MV 21. 8. 2003 (IR) – mesophilous 1, 2 – European.
Monochroa sepicolella (Herrich-Schäffer, 1854) – T 30. 4. 2000 (IR) – xerothermophilous 2 – Eurosiberian.
Monochroa elongella (Heinemann, 1870) – LL 7. 6. 2003 (ZT) – mesophilous 2 – Eurosiberian.
**Monochroa inflexella* Svensson, 1992 – 18. 6. 1994 (ZT) (Tokár et al. 1996 – as the first record from Slovakia); T 18. 6. 1998 (IR) (Streda nad Borogom in Tokár et al. 2002); Sírnik 5. 6. 2003 (IR); also Kopč. slanisko 7. 6. 2015 (ZT) – xerothermophilous 1 and 2 – European.
Monochroa hornigi (Staudinger, 1883) – K 27. 5. 2000 (IR) – ubiquitous – Palaearctic.
Monochroa palustrella (Douglas, 1850) – K 18. 6. 1994 (ZT); K (Ladmovce in Tokár et al. 1996; Elsner et al. 1999) – hygrophilous 1 – Eurosiberian.
Monochroa sp. – K 29. 6. 1996 (ZT); T 18. 6. 1998 (Iv. Richter) as *Monochroa sp.* in Elsner et al. (1999), hitherto undescribed species.
Oxypteryx (= Eulamprotes) wilkella (Linnaeus, 1758) – K 29. 7. 1992, 10. 7. 1993, 10. 8. 1996 (ZT), 5. 8. 1999 (IR); Sírnik 22. 8. 2003 (ZT) – xerothermophilous 1 and 2 – Palaearctic.
Oxypteryx (= Eulamprotes) superbella (Zeller, 1839) – SO 1. 5. 2002 (IR) – xerothermophilous 1 and 2 – Eurosiberian.
Oxypteryx (= Eulamprotes) atrella (Denis et Schiffermüller, 1775) – K 10. 8. 1996 (ZT), 27. 5. 2000 (IR) – mesophilous 2 – Palaearctic.
Oxypteryx (= Eulamprotes) plumbella (Heinemann, 1870) – Sírnik 22. 8. 2003 (ZT) – xerothermophilous 2 – European.
Bryotropha domestica (Haworth, 1828) – K 13. 7. 1996, 5. 8. 1999 (ZT) (Ladmovce in Elsner et al. 1999); SO 4. 8. 2001 (IR) – ubiquitous – West-Palaearctic.
Bryotropha terrella (Denis et Schiffermüller, 1775) – K 29. 7. 1992, 5. 8. 1999, LL 7. 6. 2003 (ZT); VK 7. 6. 2003 (IR) – mesophilous 1, 2 – European.
Bryotropha affinis (Havorth, 1828) – K 18. 6. 1994, 15. 7. 1995 (ZT) – xerothermophilous 1 and 2 – European.
Bryotropha desertella (Douglas, 1850) – K 17. 8. 1992, 27. 5. 1999 (ZT); Sírnik 1. 8. 2001 (IR) – mesophilous 1 to xerothermophilous 2 and 3 – Palaearctic.
Bryotropha senectella (Zeller, 1839) – K 10. 7. 1993, 16.8.1997, 5.8.1999, 10. 6. 2000 (ZT); V 1. 8. 2005 (IR) – mesophilous 2, 3 – European.
Bryotropha similis (Stainton, 1854) – T 3. 8. 2001 (IR) – mesophilous 2 – Holarctic.
Coleotechnites piceaella (Kearfott, 1903) – K 18. 6. 1994 (ZT) – ubiquitous – Holarctic.
Exoteleia dodecella (Linnaeus, 1758) – K 15. 7. 1995 (ZT) – ubiquitous – Holarctic.

Recurvaria nanella (Denis et Schiffermüller, 1775) – V 30. 7. 2005 (IR) – ubiquitous – Holarctic.
Recurvaria leucatella (Clerck, 1759) – T 27. 7. 2000 (IR) – ubiquitous – West-Palaearctic.
Stenolechia gemmella (Linnaeus, 1758) – LL 20. 8. 1992 (ZT); BL (9) – mesophilous 3 – European.
Stenolechiodes pseudogemmellus Elsner, 1995 – MV 2. 5. 2002 (IR) – mesophilous 3 – Ponto-Mediterranean.
Parastenolechia nigrinotella (Zeller, 1847) – MV 3. 5. 2002 (ZT) – xerothermophilous 2 – Mediterranean.
Teleiodes vulgella (Denis et Schiffermüller, 1775) – K 18. 6. 1994, 29. 6. 1996 (ZT) (Ladmovce in Elsner et al. 1999); K 27. 5. 2000 (IR) – mesophilous 2 – West-Palaearctic.
Teleiodes wagae (Nowicki, 1860) – MV 1. 7. 2002 (IR) – mesophilous 2 – West-Palaearctic.
Teleiodes luculella (Hübner, 1813) – MV 3. 5. 2002 (ZT), 3. 8. 2005 (IR) – mesophilous 2 – West-Palaearctic.
Teleiodes diffinis (Haworth, 1828) – K 28. 5., 5. 8. 1999 (ZT, IR) – mesophilous 1 and 2 – West-Palaerctic.
Carpatolechia aenigma Sattler, 1983 – MV 3. 8. 2005 (IR) – mesophilous 2 – European.
Carpatolechia fugitivella (Zeller, 1839) – K 18. 6. 1994 (ZT) – mesophilous 2 and 3 – Palaearctic.
Carpatolechia fugacella (Zeller, 1839) – K 15. 7. 1995 (ZT) – mesophilous 2 and 3 – European.
Pseudotelphusa scalella (Scopoli, 1763) – MV 7. 5. 2003 (IR) – mesophilous 2 – ?
Altenia scriptella (Hübner, 1796) – MV 3. 5. 2002, 2. 5. 2003 (ZT); T 9. 5. 2003 (IR) – mesophilous 2 to xerothermophilous 2 – West-Palaearctic.
Gelechia scotinella Herrich-Schäffer, 1854 – MV 1. 7. 2002 (IR) – mesophilous 2 to xerothermophilous 2 – European.
Gelechia nigra (Haworth, 1828) – K 15. 7. 1995 (ZT); MV 1. 7. 2002 (IR) – mesophilous 2 and 3 – European.
Gelechia muscosella Zeller, 1839 – BL (9) – mesophilous 3 to hygrophilous 2 – Palaearctic.
Gelechia turpella (Denis et Schiffermüller, 1775) – VK (3b); K 29. 6. 1996 (ZT); Klin nad Bodrogom 6. 7. 1996 (IR); Poľany (6); BL (9) – mesophilous 2, 3 – Palaearctic.
Gelechia sestertiella Herrich-Schäffer, 1854 – V 1. 8. 2005 (IR) – mesophilous 2 – European.
Psoricoptera gibbosella (Zeller, 1839) – MV 3. 8. 2005 (IR) – mesophilous 2 – Palaearctic.
Mirificarma maculatella (Hübner, 1796) – K 2. 7. 1993 (ZT); V 1. 8. 2005 (IR) – mesophilous 2 – West-Palaearctic.
Mirificaria eburnella (Denis et Schiffermüller, 1775) – K 18. 6. 1994 (ZT), 16. 6. 1995 (Iv. Richter), 18. 6. 1995 (FK), 27. 5. 2000 (IR) – xerothermophilous 2 – Holarctic.
Mirificaria lentiginosella (Zeller, 1839) – MV 21. 8. 2003 (IR) – xerothermophilous 1 and 2 – West-Palaearctic.
Sophronia semicostella (Hübner, 1813) – T 6. 6. 2003 (IR) – mesophilous 1 and 2 – West-Palaearctic.
Sophronia grandii Hering, 1933 (= *ascalis* Gozmány, 1951) – MV 1. 7. 2002 (IR) – mesophilous 2 to xerothermophilous 2 – European.

Sophronia humerella (Denis et Schiffermüller, 1775) – K 18. 6. 1994, 27. 5. 1999 (ZT), 27. 5. 2000 (IR) – mesophilous 1, 2 to xerothermophilous 2 – West-Palaearctic.
Sophronia sicariellus (Zeller, 1839) – K 29. 6. 1996 (ZT) (Ladmovce in Elsner et al. 1999); T 28. 6. 2003 (IR) – mesophilous 2 to xerothermophilous 2 – European.
Chionodes distinctella (Zeller, 1839) – K 10. 7. 1993, 13. 7. 1996 (ZT); Sírnik 1. 8. 2002 (IR) – xerothermophilous 1, 2 – West-Palaearctic.
Chionodes fumatella (Douglas, 1850) – T 3. 8. 2001 (IR) – mesophilous 2 to xerothermophilous 2 – West-Palaearctic.
Aroga velocella (Duponchel, 1838) – T 2. 6. 2000 (IR); K 26. 4. 2020 (ZT) – xerothermophilous 2, 3 – West-Palaearctic.
Aroga flavicomella (Zeller, 1839) – K 13. 5. 1995, 16. 5. 1997, 30. 4. 2000 (ZT); T 30. 4. 2000 (IR) – mesophilous 2 to xerothermophilous 2 – Palaearctic.
Filatima spurcella (Duponchel, 1843) – Sírnik 28. 5. 2005 (IR) – mesophilous 2 to xerothermophilous 2 – West-Palaearctic.
Neofriseria peliella (Treitschke, 1835) – K 16. 6. 1995 (IR) – mesophilous – West-Palaearctic.
Athrips rancidella (Herrich-Schäffer, 1854) – K 2. 7., 31. 7. 1993, 29. 6., 13. 7. 1996 (Ladmovce in Tokár et al. 1996; Elsner et al. 1999), 10. 7. 1999, 10. 6. 2000, 29. 6. 2003 (ZT); T 28. 6. 2001 (IR) – mesophilous 2 to xerothermophilous 2 – Holarctic.
Athrips mouffetella (Linnaeus, 1758) – T 28. 6. 2001 (IR) – mesophilous 2 to xerothermophilous 2 – Holarctic.
Athrips nigricostella (Duponchel, 1842) – K 15. 5. 1993, 16. 5. 1997 (ZT) (Ladmovce in Elsner et al. 1999), 19. 7. 2003 (ZT), 29. 4. 2000 (IR); MV 7. 5. 2003 (ZT) – xerothermophilous 1 and 2 – West-Palaearctic.
Scrobipalpa acuminatella (Sircom, 1850) – K 14. 5. 1994, 29. 6. 1996 (ZT) – mesophilous 1 to xerothermophilous 1 – Palaearctic.
Scrobipalpa chrysanthemella (E. Hofmann, 1867) – K 14. 5. 1994 (ZT) – mesophilous 1 to xerothermophilous 1, 2 – West-Palaearctic.
Scrobipalpa proclivella (Fuchs, 1886) – K 13. 5. 1995, 13. 7. 1996 (ZT); MV 29. 4. 2010 (IR) – mesophilous 1 to xerothermophilous 1, 2 – Eurosiberian.
Scrobipalpa obsoletella (Fischer von Röslerstamm, 1841) – K 14. 5. 1994 (ZT) – ubiquitous – Holarctic.
Scrobipalpa arenbergeri Povolný, 1973 – T, K 29-30. 4. 2000 (Iv. Richter), 7. 5. 2000 (ZT) (Tokár et al. 2002); MV 7. 5. 2003 (IR) – xerothermophilous 1 and 2 – Eurosiberian.
Scrobipalpa artemisiella (Treitschke, 1833) – K 29. 7. 1992, 29. 6. 1996 (ZT); SO 4. 8. 2001 (IR) – xerothermophilous 1, 2 – Palaearctic.
Scrobipalpa erichi Povolný, 1964 – SO 4. 8. 2001 (IR) – hygrophilous 1 – Palaearctic.
Scrobipalpa atriplicella (Fischer von Röslerstamm, 1841) – BL (9) – mesophilous 1 xerothermophilous 3 – Holarctic.
Cosmardia moritzella (Treitschke, 1835) – MV 5. 6. 2003 (IR) – mesophilous 2 – West-Palaearctic.
Klimeschiopsis kiningerella (Duponchel, 1843) – K. 3. 8. 2000 (J. Liška) (Tokár et al. 2002) – xerothermophilous 2 to hygrophilous 1 – European.
Caryocolum fischerella (Treitschke, 1833) – Klin nad Bodrogom 6. 7. 1996 (IR) – mesophilous 1 and 2 – European.

Caryocolum leucomelanella (Zeller, 1839) – Sírnik 22. 8. 2003 (IR) – xerothermophilous 1, 2 – Palaearctic.
Caryocolum blandella (Douglas, 1852) – MV 1. 7. 2002 (IR) – mesophilous 2 and 3 to xerothermophilous 2 – Eurosiberian.
Caryocolum vicinella (Douglas, 1851) – K 29. 6. 1996, 5. 8. 1999 (ZT) – mesophilous 2 to xerothermophilous 2 – European.
Caryocolum proxima (Haworth, 1828) – K 15. 7. 1995 (ZT); T 2. 6. 2000 (IR) – mesophilous 1, 2 – Holarctic.
Caryocolum tricolorella (Haworth, 1812) – MV 1. 7. 2002 (IR) – mesophilous 2 to xerothermophilous 2 – European.
Caryocolum kroesmanniella (Herrich-Schäffer, 1854) – K 5. 8. 1999 (IR) – mesophilous 2 to xerothermophilous 2 – European.
Stomopteryx remissella (Zeller, 1847) – K 24. 8. 2002 (ZT) – xerothermophilous 1 and 2 – European.
Aproaerema sangiella (Stainton, 1863) – K 17. 8. 1992, 10. 6. 2000; T 28. 5. 1999, LL 7. 6. 2003 (ZT); Sírnik 1. 8. 2002 (IR) – xerothermophilous 1 and 2 – European.
Aproaerema coronillella (Treitschke, 1833) – K 29. 7. 1992, 2. 7. 1993, 18. 6. 1994, 13. 7. 1996 13. 7. 1996 (ZT), 17. 9. 1999 (IR) – mesophilous 2 to xerothermophilous 2 – West-Palaearctic.
Aproaerema cinctella (Clerck, 1759) – SO 4. 8. 2001 (IR) – mesophilous 2 to xerothermophilous 2 – Eurosiberian.
Aproaerema wormiella (Wolff, 1958) – K 17. 8. 1992 (ZT), Sírnik 1. 8. 2002 (IR) – xerothermophilous 1, 2 – Palaearctic.
Aproaerema taeniolella (Zeller, 1839) – K 29 .6. 1996, 19. 7. 2003 (ZT), MV 3. 8. 2003 (IR) – mesophilous 2 to xerothermophilous 2 – West-Palaearctic.
Aproaerema vinella (Bankes, 1898) – MV 7. 5. 2003 (ZT), 2. 5. 2002 (IR) – xerothermophilous 1, 2 – West-Palaearctic.
Aproaerema anthyllidella (Hübner, 1813) – K 2. 7. 1993, 26. 4. 2020 abundant (ZT, IR) – ubiquitous – Holarctic.
Iwaruna klimeschi Wolff, 1958 – K 17. 8. 1992, 5-7. 1993-1994 (ZT) abundant (Ladmovce in Tokár et al. 1996), 29. 6., 5. 7. 1996, 5. 8. 1999 (ZT); Sírnik 1. 5. 2002 (IR); MV 3. 5. 2002 (ZT) – mesophilous 2 to xerothermophilous 2 – European.
Anacampsis populella (Clerck, 1759) – KCH, Z (3); K 10. 7. 1990 (ZT); Klin nad Bodrogom 2. 8. 2005 (IR); BL (9) – mesophilous 2 and 3 – Palaearctic.
Anacampsis blattariella (Hübner, 1796) – MV 3. 8. 2003 (IR) – mesophilous 2, 3 – Palaearctic.
Anacampsis timidella (Wocke, 1887) – K 13. 7. 1996 (ZT) – mesophilous 2 and 3 – ?
Anacampsis obscurella (Denis et Schiffermüller, 1775) – K 29. 6. 1996 (ZT) (Ladmovce in Elsner et al. 1999), 10. 6. 2000 (ZT) – mesophilous 2 to xerothermophilous 2 – West-Palaearctic.
Anarsia lineatella Zeller, 1839 – K 18. 6. 1994 (ZT); MV 29. 7. 2002 (IR) – mesophilous 2 to xerothermophilous 2 – Cosmopolitan.
Anarsia spartiella (Schrank, 1802) – MV 21. 8. 2005 (IR) – xerothermophilous 2 – Eurosiberian.

Hypatima rhomboidella (Linnaeus, 1758) – Čičarovský les 6. 8. 2015 (Pj) – mesophilous 2, 3 – Palaearctic.

Nothris verbascella (Denis et Schiffermüller, 1775) – K 17. 9. 1999 (ZT); SO 30. 5. 2002 (IR) – mesophilous 2 to xerothermophilous 2 – Palaearctic.

Dichomeris derasella (Denis et Schiffermüller, 1775) – K 16. 5. 1997, 28. 5. 1999 (ZT, IR) – mesophilous 2 to xerothermophilous 2 – Palaearctic.

Dichomeris limosellus (Schläger, 1849) – VK 7. 6. 2003 (IR); BL (9) – mesophilous 1 to xerothermophilous 2 – European.

Dichomeris rasilella (Herrich-Schäffer, 1854) – K 15. 7. 1995 (ZT); SO 2. 8. 2007 (IR) – mesophilous 2 to xerothermophilous 2 – Palaearctic.

**Dichomeris barbella* (Denis et Schiffermüller, 1775) – K 30. 4. 2000 (Iv. Richter) (Ladmovce in Tokár et al. 2002 as a new species for Slovakia); MV 1. 7. 2002 (IR), 2. 5. 2003 (ZT) – xerothermophilous 2 – Ponto-Mediterranean.

Dichomeris alacella (Zeller, 1839) – Klin nad Bodrogom 2. 8. 2005 (IR) – mesophilous 2 – West-Palaearctic.

Brachmia dimidiella (Denis et Schiffermüller, 1775) – LL 6. 6. 1991 (ZT); K 17. 8. 1992, 27. 5., 5. 8. 1999 (ZT), 28. 5. 1999 (IR) (Ladmovce in Elsner et al. 1999); Poľany (6) – xerothermophilous 1, 2 – West-Palaearctic.

Helcystogramma triannulella (Herrich-Schäffer, 1854) – K 17. 9. 1999 (IR) – ubiquitous – Palaearctic.

Helcystogramma lutatella (Herrich-Schäffer, 1854) – K 10. 8. 1996 (ZT); MV 1. 7. 2002 (IR), 29. 7. 2002 (ZT) – mesophilous 2 to xerothermophilous 2 – West-Palaearctic.

Helcystogramma albinervis (Gerasimov, 1929) – VK 7. 6. 2003 (IR) – mesophilous 2 to hygrophilous 2 – European.

Helcystogramma arulensis (Rebel, 1929) – SO 4. 8. 2001 (IR) (Tokár et al. 2002); LL 7. 6. 2003 (ZT); VK 7. 6. 2003 (IR) – hygrophilous 1 and 2 – European.

Acompsia cinerella (Clerck, 1759) – K 29. 6. 1996 (ZT); Z, Klin nad Bodrogom 27. 5. 2005 (IR); BL (9) – mesophilous 1, 2 – Palaearctic.

Pexicopia malvella (Hübner, 1805) – K 15. 7. 1995 (ZT); Klin nad Bodrogom 27.5. 2005 (IR) – mesophilous 2 to xerothermophilous 2 – Cosmopolitan.

Batrachedridae

Batrachedra praeangusta (Haworth, 1828) – Borša 24. 6. 1992, V 10. 6. 2000, T 12. 6. 2000 (Kj) – mesophilous 2 and 3 – Holarctic.

Coleophoridae

Metriotes lutarea (Haworth, 1828) – MV 2. 5. 2003 (ZT), 2. 5. 2005 (IR) – mesophilous 3 – European.

Coleophora albella (Thunberg, 1788) – MV 2. 5. 2002 (IR, ZT) – xerothermophilous to mesophilous 1 and 2 – Transpalaearctic.

Coleophora lutipennella (Zeller, 1838) – K 3. 7. 1993 (ZT) – mesophilous 2 and 3 – West-Palaearctic.

Coleophora ochripennella (Zeller, 1849) – K 18. 6. 1994 (ZT) – mesophilous 2 – West-Palaearctic.

Coleophora gryphipennella (Hübner, 1796) – Sírnik 28. 5. 2005 (IR) – mesophilous 2 – Eurosiberian.
Coleophora flavipennella (Duponchel, 1843) – LL 16. 6. 1989, 16. 6., 21. 6. 1991, 8. 6. 1992 (ZT); K 10. 6. 2000 (ZT); MV 3. 8. 2003 (IR) – mesophilous 2 and 3 – West-Palaearctic.
Coleophora adjectella Herrich-Schäffer, 1861 – K 15. 7. 1995 (ZT) (Ladmovce in Tokár et al. 1999) – mesophilous 2 – European.
Coleophora milvipennis (Zeller, 1839) – LL 21. 6. 1991 (ZT); K 7. 7. 1999 (IR) – mesophilous 2 and 3 – Eurosiberian.
Coleophora badiipennella (Duponchel, 1843) – K 25. 5., 1. 6. 2000 ex larvae (ZT) – mesophilous 2 – Holarctic.
Coleophora limosipennella (Duponchel, 1843) – LL 22. 6. 1989 (ZT) – mesophilous 2 – West-Palaearctic.
Coleophora spinella (Schrank, 1802) – T 28. 6. 2001 (IR) – mesophilous 2 – Holarctic.
Coleophora prunifoliae (Doets, 1944) – LL 16. 6. 1989 (ZT); K 30. 4. 2000 (ZT), 21. 5. 2000 (IR) – mesophilous 2 – West-Palaearctic.
Coleophora cecidophorella Oudejans, 1972 – MV 3. 8. 2005 (IR) – mesophilous 1 – West-Palaearctic.
Coleophora trigeminella Fuchs, 1881 – Sírnik 5. 6. 2003 (IR) – mesophilous 2 – West-Palaearctic.
Coleophora lusciniaepennella (Treitschke, 1833) – Klin nad Bodrogom 6. 7. 1996 (IR) – mesophilous to hygrophilous 2 – West-Palaearctic.
Coleophora prunifoliae Doets, 1944 – K 4. 6. 1992 (ZT); V 19. 7. 1993 (Kj); K 21. 5. 2000 (IR) – mesophilous 2 – West-Palaearctic.
Coleophora trifolii (Curtis, 1832) – V 18. 6. 1994 (Kj) – mesophilous 1 – Transpalaearctic (also in North America).
Coleophora alcyonipennella (Kollar, 1832) – K 5. 8. 1999 (IR) – mesophilous 1 and 2 – Transpalaearctic (also in Australia and N. Zealand).
Coleophora hemerobiella (Scopoli, 1763) – K 10. 7. 1999 (ZT); MV 3. 8. 2005 (IR) – mesophilous 2 – West-Palaearctic.
Coleophora medelichensis Krone, 1908 – K 2. 7. 1993, 29. 6. 1996, 13. 7. 1996 (ZT); MV 21. 8. 2003 (IR) – xerothermophilous 1 – European.
Coleophora colutella (Fabricius, 1794) – K, V 18. 6. 1994 (ZT, Kj) – mesophilous 1 and 2 – European (West-Palaearctic?).
Coleophora trifariella Zeller, 1849 – MV 5. 6. 2003 (IR) – mesophilous 2 – European.
Coleophora saturatella Stainton, 1850 – V 18. 6. 1994 (Kj) – xerothermophilous to mesophilous 2 – Eurosiberian.
Coleophora bilineatella Zeller, 1849 – K 10. 6. 2000 (ZT) – xerothermophilous 1 – European.
Coleophora niveicostella Zeller, 1839 – V 15. 5. 1993 (Kj); Sírnik 5. 6. 2003 (IR) – xerothermophilous 1 – West-Palaearctic.
Coleophora albicostella (Duponchel, 1842) – V 18. 6. 1994 (Kj); K 26. 4. 2020 (ZT) – xerothermophilous 1 and 2 – West-Palaearctic.
**Coleophora sergiella* Falkovitsh, 1979 – K 8. 6. 1992, 15. 5. 1993, 14. 5., 18. 6. 1994, 16. 5. 1997, 7. 5. 2006 (ZT) (Ladmovce in Tokár et al. 1999 – as the first record from Slovakia); 28. 5. 1999 (IR) – xerothermophilous 1 – Eurosiberian.

Coleophora squamella Constant, 1885 – K 15. 5. 1993 (ZT) (Ladmovce in Tokár et al. 1996); MV 10. 6. 2004 (IR) – xerothermophilous 1 – European.
Coleophora albidella (Denis et Schiffermüller, 1775) – K 2. 7. 1993 (ZT) – mesophilous to hygrophilous 2 – Eurosiberian.
Coleophora congeriella Staudinger, 1859 – MV 10. 6. 2004 (IR) – xerothermophilous 1 – West-Palaearctic.
Coleophora anatipenella (Hübner, 1796) – T 28. 6. 2001(IR) – mesophilous 2 – Eurosiberian.
Coleophora kuehnella (Goeze, 1783) – MV 5. 6. 2003 (IR) – mesophilous 2 and 3 – West-Palaearctic.
Coleophora ibipennella Zeller, 1849) – K 18. 6. 1994 (ZT) (Ladmovce Tokár et al. 1996, as *C. betulella*); T 28. 6. 2001 (IR) – mesophilous 2 and 3 – West-Palaearctic.
Coleophora ballotella (Fischer von Röslerstamm, 1841) – V 10. 6. 2000 (Kj) – mesophilous 2 – West-Palaearctic.
Coleophora betulella Heinemann et Wocke, 1877 – V 18. 7. 1995 (Kj) – mesophilous 2 – Eurosiberian.
Coleophora zelleriella Heinemann, 1854 – MV 1. 7. 2002 (IR) – mesophilous to hygrophilous 2 – Transpalaearctic.
Coleophora brevipalpella Wocke, 1874 – VK 7. 6. 2001 (IR) – xerothermophilous 1 – Eurosiberian.
Coleophora virgatella Zeller, 1849 – V 15. 5. 1993 (Kj); K 29. 6. 1996, Sírnik 22. 8. 2003 (ZT) – xerothermophilous 1 – West-Palaearctic.
Coleophora mareki Tabell et Baldizzone, 2014 – K 10.7., 5. 8. 1999 (ZT); Sírnik 5. 6. 2003 (IR) – xerothermophilous 1 and 2 – European.
Coleophora serpylletorum Hering, 1889 – V 9. 7. 1992(Kj); K 18. 6. 1994 (ZT) – xerothermophilous 1 and 2 – West-Palaearctic.
Coleophora gallipennella (Hübner, 1796) – V 10. 6. 2000 (Kj); K 18. 6. 1994, 21. 5. 2000 (ZT, IR) – mesophilous 2 – Eurosiberian.
Coleophora coronillae Zeller, 1849 – K 15. 7. 1995 (ZT); Sírnik 5. 6. 2003 (IR) – xerothermophilous 1 – West-Palaearctic.
Coleophora vibicigerella Zeller, 1839 – V 18. 6. 1994 (Kj) – xerothermophilous 1 – Transpalaearctic.
Coleophora conspicuella Zeller, 1849 – MV 1. 7., 29. 7. 2002 (IR, ZT) – xerothermophilous 1 – Transpalaearctic.
Coleophora fuscociliella Zeller, 1849 – V 29. 7. 1992 (Kj); K 14. 5. 1994, 16. 5. 1997, 7. 5. 2000 (ZT); T 29. 5. 1999 (IR) – xerothermophilous 1 and 2 – West-Palaearctic.
Coleophora pseudoditella Baldizzone et Patzak, 1983 – Sírnik 8. 5. 2003 (IR) – xerothermophilous 1 – Eurosiberian.
Coleophora vibicella (Hübner, 1813) – C (3b); T 28. 6. 2001 (IR) – xerothermophilous 1 and 2 – Eurosiberian.
Coleophora vicinella Zeller, 1849 – V 16. 7. 1993 (Kj); K 15. 7. 1995, 10. 6. 2000 (ZT) (Ladmovce in Tokár et al. 1999) – xerothermophilous to mesophilous 2 – West-Palaearctic.
Coleophora lixella Zeller, 1849 – Sírnik 5. 6. 2003 (IR) – xerothermophilous to mesophilous 1 – West-Palaearctic.

Coleophora ochrea (Haworth, 1828) – K 17. 8. 1992 (ZT) – xerothermophilous 2 – West-Palaearctic.
Coleophora ornatipennella (Hübner, 1796) – V 14. 5. 1994 (Kj); T 29. 5. 1999 (IR) – mesophilous 1 – Transpalaearctic.
Coleophora hartigi Toll, 1941 – MV 3. 5. 2002, 7. 5. 2003 (ZT, IR) – mesophilous 2 – West-Palaearctic.
Coleophora vulnerariae Zeller, 1839 – K 25. 5. 2012 (IR) – xerothermophilous 1 – European.
Coleophora pennella (Denis et Schiffermüller, 1775) – K 10. 7. 1999, 27. 5. 2000, 10. 6. 2000 (IR, ZT) – mesophilous 1 – West-Palaearctic.
Coleophora caespititiella Zeller, 1839 – VK 2. 6. 2000 (IR) – mesophilous to hygrophilous 1 – West-Palaearctic.
Coleophora tamesis Waters, 1929 – K. 5. 8. 1999 (ZT) (Ladmovce in Tokár et al. 2002) – mesophilous to hygrophilous 1 – Transpalaearctic.
Coleophora glaucicolella Wood, 1892 – T 28. 6. 2001 (IR) – mesophilous to hygrophilous 1 – Holarctic.
Coleophora otidipennella (Hübner, 1817) – K 13. 5. 1995 (ZT); MV 29. 4. 2010 (IR) – mesophilous 1 and 2 – Transpalaearctic.
Coleophora taeniipennella Herrich-Schäffer, 1855 – K 5. 8. 1999 (IR, ZT) – mesophilous to hygrophilous 1 – West-Palaearctic.
Coleophora therinella Tengström, 1848 – K 2. 7. 1993, 24. 8. 2002 (ZT); MV 21. 8. 2003 (IR) – mesophilous 1 – Eurosiberian.
Coleophora saxicolella (Duponchel, 1843) – T 3. 8. 2001 (IR) – mesophilous 1 – West-Palaearctic.
Coleophora motacillella Zeller, 1849 – T 3. 8. 2001 (IR) – mesophilous 1 – Eurosiberian.
Coleophora sternipennella (Zetterstedt, 1839) – K 16. 8. 1997, 5. 8. 1999 (ZT); MV 3. 8. 2005 (IR) – mesophilous 1 – Eurosiberian.
Coleophora versurella Zeller, 1849 – K 17. 8. 1992, 18. 6. 1994 (ZT); Klin nad Bodrogom 2. 8. 2005 (IR) – mesophilous 1 – West-Palaearctic (Oriental?).
Coleophora vestianella (Linnaeus, 1758) – K 17. 8. 1992 (ZT) – mesophilous 1 – Transpalaearctic.
Coleophora absinthii Wocke, 1877 – MV 29. 4. 2010 (IR) – mesophilous 1 – Eurosiberian.
Coleophora chrysanthemi Hofmann, 1869 – K 10. 7. 1999, 30. 4. 2000 (ZT) (Ladmovce in Tokár et al. 2002); MV 29. 4. 2010 (IR) – xerothermophilous 1 – European.
Coleophora galbulipennella (Zeller, 1838) – K 13. 7. 1996 (ZT) – mesophilous 1 and 2 – Eurosiberian.
Coleophora peribenanderi Toll, 1943 – Klin nad Bodrogom 2. 8. 2005 (IR) – mesophilous 1 – Eurosiberian.
Coleophora trochilella (Duponchel, 1843) – V 18. 6. 1994 (Kj); MV 3. 8. 2003 (IR) – mesophilous 1 – European.
Coleophora striatipennella Nylander, 1848 – K 16. 5. 1997 (ZT); MV 3. 8. 2005 (IR) – mesophilous to hygrophilous 1 – Transpalaearctic.
Coleophora albicans Zeller, 1849 – K 18. 6. 1994 (ZT) (Ladmovce in Tokár et al. 1996 as *C. artemisella*); MV 1. 7. 2002 (IR) – xerothermophilous 1 – West-Palaearctic.

Coleophora argentula (Stephens, 1834) – K 15. 5. 1993, 14. 5. 1994, 5. 8. 1999, MV 29. 7. 2002 (ZT), 3. 8. 2003 (IR) – xerothermophilous 1 – Eurosiberian.
Coleophora pseudorepentis Toll, 1960 – LL 16. 6. 1989 (ZT), K 29. 6. 1996 (Kj) (Ladmovce in Tokár et al. 1999), 10. 6. 2000 (ZT) (Tokár et al. 2002) – xerothermophilous 1 – European.
Coleophora adspersella Benander, 1939 – K 16. 8. 1997 (ZT) – mesophilous 1 – Eurosiberian.
Coleophora granulatella Zeller, 1849 – V 30. 7. 2005 (IR) – xerothermophilous 1 – Eurosiberian.
Coleophora dianthi Herrich-Schäffer, 1855 – T 28. 5. 1989 (ZT), 12. 6. 2000 (IR, Kj); MV 7. 5. 2003 (ZT) – xerothermophilous 1 – West-Palaearctic.
Coleophora nutantella Mühlig et Frey, 1857 – K 13. 5. 1995, MV 7. 5. 2003 (ZT) – xerothermophilous – Eurosiberian.
Coleophora bucovinella Nemes, 1968 (before recorded as *albilineella*) – T 6. 6. 2003 (IR) – mesophilous 1 to xerothermophilous 1 – European
Coleophora silenella Herrich-Schäffer, 1855 – T 2003 (IR) – xerothermophilous 1 – Transpalaearctic.
Coleophora niveistrigella Wocke, 1877 – T 2. 6. 2000 (IR) – xerothermophilous 1 – West-Palaearctic.
Coleophora clypeiferella Hofmann, 1871 – SO 4. 8. 2001 (IR) – mesophilous 1 – Eurosiberian.
Coleophora unipunctella Zeller, 1849 – T 3. 8. 2001 (IR) – mesophilous 1 – European
Coleophora preisseckeri Toll, 1942 – K 29. 7. 1992, 10. 8. 1996 (ZT) (Ladmovce in Tokár et al. 1999); Sírnik 5. 6. 2003 (IR) – ? – European?

Elachistidae
Perittia herrichiella (Herrich-Schäffer, 1855) – K 27. 5. 2000 (IR) (Ladmovce in Tokár et al. 2002) – mesophilous 2 and 3 – Holarctic.
Stephensia brunnichella (Linnaeus, 1767) – K 10. 7. 1993, 16. 5. 1997, 26. 4. 2020; MV 7. 5. 2003 (ZT) – mesophilous 2 and 3 – West-Palaearctic.
Elachista elsaella Traugott-Olsen, 1988 (= *svenssoni* Traugott-Olsen, 1988) – K 10. 7. 1993 (ZT) (Ladmovce in Tokár et al. 1996), 30. 4. 2000, 24. 8. 2002 (ZT) – mesophilous 1 and 2 – West-Palaearctic.
Elachista albifrontella Hübner, 1818) – K 10. 7. 1999, Kopč. slanisko 21. 5. 1994 (ZT) – mesophilous – Eurosiberian.
Elachista albidella (Nylander, 1848) – LL 7. 6. 2003 (ZT); Z 31. 7. 2005 (IR) – mesophilous to hygrophilous 1 – Holarctic.
Elachista anserinella Zeller, 1839 – K 15. 5. 1993, 7. 5. 2000, MV 2. 5. 2003 (ZT); V 15.5.1993 (Kj); MV 2. 5. 2002 (IR) – xerothermophilous to mesophilous 1 and 2 – Eurosiberian.
Elachista argentella (Clerck, 1759) – V 13. 5. 1995, Borša 15. 5. 1993 (Kj); Sírnik 28. 5. 2002 (IR) – mesophilous 1 and 2 – West-Palaearctic.
Elachista bedellella (Sircom, 1848) – V 15. 5. 1993, T 28. 5. 1999 (Kj, ZT); K 28. 5. 1999 (IR), 24. 8. 2002 (ZT) – mesophilous 1 – European.
Elachista bisulcella (Duponchel, 1843) – MV 3. 5. , 29. 7. 2002 (ZT), 3. 8. 2003 (IR) – mesophilous 1 and 2 – Eurosiberian.

Elachista canapennella (Hübner, 1813) – K 29. 4. 2000 (IR) – mesophilous 1 and 2 – Eurosiberian.
Elachista cingillella (Herrich-Schäffer, 1855) – MV 9. 5. 2003 (IR) – mesophilous 2 and 3 – West-Palaearctic.
Elachista consortella (Stainton, 1851) – V 18. 6. 1994 (Kj) – mesophilous 1 and 2 – West-Palaearctic.
Elachista dispunctella (Duponchel, 1843) – V 10. 7. 1993 (Kj); T 28. 5. 1999, MV 2. 5., 9. 5. 2003 (ZT, IR) – xerothermophilous 1 and 2 – West-Palaearctic.
Elachista gleichenella (Fabricius, 1781) – K 27. 5. 1999 (ZT); MV 2. 5. 2003 (IR) – mesophilous 2 and 3 – West-Palaearctic.
Elachista geminatella (Herrich-Schäffer, 1855) (before recorded as *E. regificella*) – V 14. 7. 1994 (Kj) – mezophilous 1 to xerothermophilous 1 – European.
Elachista griseella (Duponchel, 1843) – Kopč. slanisko 12. 5. 1994 (Pj) (Panigaj & Reiprich 1998) – xerothermophilous 2 – Eurosiberian.
Elachista herrichii Frey, 1859 – K 30. 4. 1993 (ZT); V 14. 5. 1994 (Kj); T 30. 4. 2000 (IR) – xerothermophilous to mesophilous 1 and 2 – West-Palaearctic.
Elachista liskai Kaila, 2011 – V. Kamenec 9. 5. 2003 (IR); Kopč. slanisko 21. 5. 1994 (ZT) – mesophilous 1 and 2? – European?
Elachista dispilella Zeller, 1839 (= *manni* Traugott-Olsen, 1990) – K, MV 4-8. 1991–1994 abundant (ZT) (Tokár et al. 1996), K 26. 4. 2020 abundant (ZT); T 9. 5. 2003 (IR) – mesophilous 1 and 2 – West-Palaearctic.
Elachista nitidulella (Herrich-Schäffer, 1855) – V 14. 5. 1994, Borša 15. 5. 1993 (Kj); K 15. 5., 10. 7. 1993, 8. 5., 14. 5. 1994, T 4. 8. 2000 (ZT); MV 7. 5. 2003 (IR, ZT); Kopč. slanisko 21. 5. 1994, 22. 8. 2003 (ZT) – mesophilous 1 – West-Palaearctic.
Elachista poae Stainton, 1855 – SO 4. 8. 2001 (IR) – hygrophilous 1 – West-Palaearctic.
Elachista pollinariella Zeller, 1839 – V 15. 5. 1993 (Kj); Klin nad Bodrogom 27. 5. 2005 (IR) – mesophilous 1 – West-Palaearctic.
Elachista pullicomella Zeller, 1839 – K 19. 6. 1996, 16. 5. 1997, 30. 4. 2000 (ZT); MV 2. 5. 2003, 9. 5. 2009 (ZT, IR); V 27. 5. 1999; T 28. 5. 1999 (Kj) – mesophilous 1 – West-Palearctic.
Elachista squamosella (Duponchel, 1843) – K 30. 4. 1993, 26. 4. 2020 abundant (ZT); V 14. 5. 1994 (Kj); MV 5. 6. 2003 (IR) – mesophilous to xerothermophilous 2 – Eurosiberian.
Elachista utonella Frey, 1856 – K 14. 5. 1994, LL 7. 6. 2003 (ZT, IR) – hygrophilous 1 and 2 – Eurosiberian.

Parametriotidae
Blastodacna hellerella (Duponchel, 1838) – Sírnik 28. 5. 2005 (IR) – mesophilous 2 – West-Palaearctic.
Blastodacna atra (Haworth, 1828) – LL 21. 6. 1991 (ZT); MV 5. 6. 2003 (IR) – mesophilous 2 – West-Palaearctic.
Spuleria flavicaput (Haworth, 1828) – T, K 30. 4. 2000 (IR, ZT) – mesophilous 2 – West-Palaearctic.
Dystebenna stephensi (Stainton, 1849) – Borša 24. 6. 1992 (Kj) – xerothermophilous to mesophilous 3 – West-Palaearctic.

Fig. 16 *Vespina slovaciella, Latorický luh, 4. 6. 2014 (photo: Z. Tokár).*

Fig. 17 *Zygaena cynarae, Kašvár, 15. 8. 2007 (photo: Ľ. Panigaj).*

Fig. 18 *Argynnis pandora, Klin n. Bodrog., 14. 6. 2015 (photo: M. Balla).*

Fig. 19 *Neptis sappho, Čičarovce (photo: M. Balla).*

Fig. 20 *„Natura" species Euphydryas maturna, Latorica PLA, 2. 5. 2019 (photo: M. Balla).*

Fig. 21 *Dysgonia algira, migrating species, Strážne, 18. 7. 2017 (photo: M. Balla).*

Haplochrois albanica Rebel et Zerny, 1932 – MV 3. 8. 2003 (IR) – mesophilous 2 and 3? – European.
Haplochrois ochraceella (Rebel, 1903) – K 2. 7. 1993 (ZT); V 10. 7. 1993 (Kj); MV 1. 7. 2002 (IR) – mesophilous 2 and 3 – European or West-Palaearctic.

Momphidae
Mompha propinquella (Stainton, 1851) – MV 5. 6. 2003 (IR) – mesophilous to hygrophilous 2 – West-Palaearctic.
Mompha divisella Herrich-Schäffer, 1854 – MV 2. 5. 2002 (IR) – mesophilous 2 – West-Palaearctic.
Mompha epilobiella (Denis et Schiffermüller, 1775) – T 27. 7. 2000 (IR) – mesophilous – West-Palaearctic.

Blastobasidae
Blastobasis phycidella (Zeller, 1839) – K 15. 5. 1993 (ZT); V 10. 7. 1993 (Kj); T 28. 6. 2001 (IR) – mesophilous 2 and 3 – Eurosiberian.
Blastobasis glandulella Riley, 1841 (= *huemeri* Sinev, 1993) – MV 1. 7. 2002 (IR); BL (9) – xerothermophilous to mesophilous 3 – Nearctic. Originally North American species, invasively spreading through Europe since 1980 (Laštůvka et al. 2018).
**Tecmerium perplexum* Gozmány, 1957 – K 15. 7. 1995 (ZT) (Ladmovce in Tokár et al. 1999 as the first record from Slovakia); MV 1. 7. 2002 (IR) – xerothermophilous 1 and 2 – European.

Stathmopodidae
Stathmopoda pedella (Linnaeus, 1761) – Tajba 13. 6. 1986 (IR) – mesophilous to hygrophilous 2 – Transpalaearctic.

Scythrididae
Scythris seliniella (Zeller, 1839) – K 15. 5. 1993, 26. 4. 2020 abundant (ZT); T 28. 5. 1999 (Kj); MV 5. 6. 2003 (IR) – xerothermophilous? – Eurosiberian.
Scythris potentillella (Zeller, 1847) – T 2. 6. 2000 (IR) – xerothermophilous to mesophilous 1 – West-Palaearctic.
Scythris bifissella (O. Hofmann, 1889) – K 27. 5. 1999 (FK), V, T 28. 5. 1999, 2. 6. 2000 (IR), 4. 8. 2000 (ZT, G. Elsner) (Tokár et al. 2002) – xerothermophilous ? – Eurosiberian.
Scythris hungaricella Rebel, 1917 – K 17. 8. 1992, 24. 8. 2002 (ZT); MV 21. 8. 2003 (IR) – xerothermophilous – South-East-European?
Scythris tributella (Zeller, 1847) – K 18. 6. 1994 (Kj) (Ladmovce in Tokár et al. 1996); Kopč. slanisko 29. 7. 2002 (IR) – xerothermophilous? – West-Palaearctic.
Scythris podoliensis Rebel, 1938 – T 12. 6. 2000 (Kj) (Streda nd Bodrogom in Tokár et al. 2002) – xerothermophilous? – South-East-European?
Parascythris muelleri Mann, 1871 – K 24. 8. 2002 (ZT) – xerothermophilous – West-Palaearctic.

Pterolonchidae

Pterolonche inspersa Staudinger, 1859 – K 29. 7. 1992, 29. 6. 1996 (ZT) (Ladmovce in Tokár et al. 1996); T 12. 6. 2000 (Kj) – xerothermophilous 1 and 2 – West-Palaearctic.

Alucitidae

Alucita hexadactyla Linnaeus, 1758 – V 29. 7. 1992 (Kj).

Alucita grammodactyla Zeller, 1841 – V 29. 7. 1992 (Kj); K 29. 7. 1992, 15. 5. 1993, 14. 5. 1994, 15. 7. 1995, 27. 5., 17. 9. 1999 (ZT), 28. 5. 1999 (IR).

Alucita desmodactyla Zeller, 1847 – V 18. 6. 1994 (Kj); K 17. 9. 1999 (ZT); Sírnik 22. 8. 2003 (IR).

Pterophoridae

Agditis adactyla (Hübner, 1819) – M. Kamenec (Laštůvka et al. 1982); K 19. 8. 1996 (ZT).

Gillmeria pallidactyla (Haworth, 1811) – MV 1. 7. 2002 (IR).

Stenoptilia pterodactyla (Linnaeus, 1761) – C (2); MV 2. 5. 2002 (IR).

Stenoptilia bipunctidactyla (Scopoli, 1763) – K 28. 5. 1999 (IR).

Stenoptilia stigmatoides Sutter et Skyva, 1992 – K 16. 8. 1997 (ZT) (Ladmovce in Tokár et al. 2002).

Stenoptilia annadactyla Sutter, 1988 – K 27. 5. 1999, 7. 5. 2000 (ZT), 17. 9. 1999 (IR).

Stenoptilia gratiolae (Gibeaux et Nel, 1990) – K 29. 7. 1992 (ZT).

Stenoptilia pelidnodactyla (Stein, 1837) – MV 29. 7. 2002 (ZT).

Cnaemidophorus rhododactyla (Denis et Schiffermüller, 1775) – MT (3b); V 18. 6.1 994 (Kj); K 15. 6. 1995 (ZT); Klin n. Bodr. 18. 6. 1998 (IR); Veľký kopec 2. 8. 2015 (Pj).

Oxyptilus pilosellae (Zeller, 1841) – K 29. 7. 1992, 17. 9. 1999 (ZT, IR).

Oxyptilus parvidactyla Haworth, 1811 – Borša (5); V 13. 7. 1994 (Kj); Sírnik 5. 6. 2003 (IR).

Oxyptilus chrysodactyla (Denis et Schiffermüller, 1775) – K 2. 7. 1993 (ZT).

Crombrugghia distans (Zeller, 1847) – K 14. 5. 1994 (ZT); V 18. 6. 1994 (Kj); Klin nad Bodrogom 27. 5. 2005 (IR).

Crombrugghia tristis (Zeller, 1841) – SNM (1); Borša (5); LL 8. 9. 1991 (ZT); MV 2. 8. 2003 (IR).

Geina didactyla (Linnaeus, 1758) – K 18. 6. 1994, MV 9. 5. 2009 (ZT); MV 5. 6. 2003 (IR).

Capperia celeusi (Frey, 1886) – V 15. 5. 1995 (Kj); K 15. 7. 1995, 27. 5. 2000 (ZT, IR).

Pterophorus pentadactyla (Linnaues, 1758) – Dlhé Tice (6); BL (9).

Merrifieldia leucodactyla (Denis et Schiffermüller, 1775) – Sírnik 1. 8. 2002 (IR).

Merrifieldia tridactyla (Linnaeus, 1758) – V (1), 18. 6. 1994 (Kj); K 16. 6. 1995 (IR).

Merrifieldia malacodactylus (Zeller, 1847) – V. Kamenec (2).

Calyciphora albodactylus (Fabricius, 1794) – K 29. 7. 1992, 19. 7. 2003 (ZT).

Adaina microdactyla (Hübner, 1813) – MV 7. 5. 2003 (ZT); Klin nad Bodrogom 27. 5. 2005 (IR).

Emmelina monodactyla (Linnaeus, 1758) – Borša, K (5); MV 4. 10. 2002 (IR).

Carposinidae

Caprosina scirrhosella Herrich-Schäffer, 1854 – V 29. 7. 1992 (Kj); K 2. 7. 1993, 10. 6. 1996 (ZT); T 17. 6. 1998 (IR).

Epermeniidae

Epermenia insecurella (Stainton, 1854) – K 14. 5. 1994, 30. 4. 2000 (ZT), 29. 4. 2000 (IR).

Epermenia chaerophyllella (Goeze, 1783) – K 14. 5. 1994 (ZT).

Epermenia petrusellus (Heylaerts, 1883) – K 17. 9. 1999 (IR) (Ladmovce in Tokár et al. 2002); MV 10. 6. 2004 (IR).

Epermenia pontificella (Hübner, 1796) – V, K 15. 5. 1993 (Kj, ZT); MV 5. 6. 2003 (IR); MV 9. 5. 2009 (ZT).

Epermenia iniquellus (Wocke, 1867) – MV 29. 7. 2002 (IR).

Ochromolopis ictella (Hübner, 1813) – K 24. 8. 2002, MV 7. 5. 2003 (ZT).

Choreutidae

Prochoreutis myllerana (Fabricius, 1794) – V 30. 7. 2005 (IR).

Tortricidae

Phtheochroa pulvillana (Herrich-Schäffer, 1851) – T 17. 6. 1998 (IR) – xerothermophilous 1 and 2 – European.

Cochylimorpha elongana (Fischer von Röslerstamm, 1839) – K 28. 5. 1999, 5. 7. 2000 abundant (ZT, IR) (Ladmovce in Tokár et al. 2002) – xerothermophilous 1 – West-Palaearctic.

**Cochylimorpha woliniana* (Schleich, 1868) – K 2. 7. 1993, 18. 6. 1994 (ZT, K. Larsen) (Ladmovce in Tokár et al. 1996 – as the first record from Slovakia) – xerothermophilous 1 – European.

Cochylimorpha straminea (Haworth, 1811) – K 16. 5. 1997, 27. 5. 1999 (ZT); Sírnik 1. 8. 2002 (IR) – xerothermophilous 1 – West-Palaearctic.

Cochylimorpha alternana (Stephens, 1834) – K 5. 8. 1999 (ZT) – xerothermophilous 1 and 2 to mesophilous – West-Palaearctic.

Phalonidia manniana (Fischer von Röslerstamm, 1839) – Klin nad Bodrogom 27. 5. 2005 (IR); BL (9) – mesophilous 1 to hygrophilous – Palaearctic.

Phalonidia contractana (Zeller, 1847) – T 28. 6. 2001 (IR) – mesophilous 1 and 2 – West-Palaearctic.

Gynnidomorpha alismana (Ragonot, 1883) – K 5. 8. 1999 (ZT); Sírnik 8. 5. 2003 (IR) – mesophilous 1 – European.

Agapeta hamana (Linnaeus, 1758) – Borša (5); Klin nad Bodrogom 18. 6. 1998 (IR); BL (9) – mesophilous 1 and 2 – West-Palaearctic.

Agapeta zoegana (Linnaeus, 1767) – MV 3. 8. 2003 (IR); Poľany abundant (6) – mesophilous 1 – West-Palaearctic.

Eupoecilia angustana (Hübner, 1799) – Borša (5); T 6. 6. 2003 (IR) – xerothermophilous 1 – Palaearctic.

Eupoecilia ambiguella (Hübner, 1796) – T 30. 4. 2000 (IR) – xerothermophilous 2 and 3 – Transpalaearctic.

Aethes hartmanniana (Clerck, 1759) – K 30. 4. 1993, 26. 4. 2020 abundant (ZT); MV 1. 7. 2002 (IR) – mesophilous 1 – European.

Aethes williana (Brahm, 1791) – K 27. 9. 1992, 16. 5. 1997 (ZT); Sírnik 1. 8. 2002 (IR) – mesophilous 1 and 2 – West-Palaearctic.

Aethes margarotana (Duponchel, 1836) – Sírnik 1. 5. 2003 (IR); MV 2. 5. 2003 (ZT); Poľany (6) – mesophilous 1 – European ? (Central Asia).
Aethes triangulana (Treitschke, 1835) – MV 7. 5. 2003 (ZT, IR) – mesophilous 1 – Transpalaearctic.
Aethes francillana (Fabricius, 1794) – MV 29. 7. 2002 (ZT); BL (9) – mesophilous 1 – West-Palaearctic.
Aethes smeathmanniana (Fabricius, 1781) – Borša (5); T. 3. 8. 2001 (IR); Kopč. slanisko 21. 5. 1994 (ZT) – mesophilous 1 and 2 – Holarctic.
Aethes tesserana (Denis et Schiffermüller, 1775) – MV 1. 7. 2002 (IR) – mesophilous 1 – West-Palaearctic.
Aethes flagellana (Duponchel, 1836) – K 10. 7. 1993 (ZT) (Ladmovce in Tokár et al. 1999); V 30. 7. 2005 (IR) – mesophilous 1 – West-Palaearctic.
Aethes beatricella (Walsingham, 1898) – MV 1. 7. 2002 (IR) – mesophilous 1 – West-Palaearctic.
Aethes bilbaensis (Rössler, 1877) – K 15. 7. 1995, 10. 8. 1996; T 4. 8. 2000 (ZT), 3. 8. 2001 (IR); MV 29. 7. 2002 (ZT) – xerothermophilous 1 – West-Palaearctic.
Cochylidia rupicola (Curtis, 1834) – MV 5. 6. 2003 (IR) – xerothermophilous to mesophilous 1 – West-Palaearctic.
Cochylidia implicitana (Wocke, 1856) – K 10. 8. 1996 (ZT); Sírnik 1. 8. 2002 (IR) – mesophilous 1 – European (Central Asia).
Cochylis roseana (Haworth, 1811) – Kopč. slanisko 29. 7., 1. 8. 2002 (ZT, IR) – mesophilous 1 – West-Palaearctic.
Cochylis flaviciliana (Westwood, 1854) – MV 3. 8. 2003 (IR) – mesophilous 1 – West-Palaearctic.
Cochylis hybridella (Hübner, 1813) – K 15. 7. 1995, 29. 6. 1996, 5. 8. 1999 (ZT); T 28. 6. 2001 (IR) – mesophilous 1 – Palaearctic.
Cochylis posterana Zeller, 1847 – C (2); Kopč. slanisko 21. 5. 1994, K 10. 8. 1996, 16. 8. 1997, 26. 4. 2020 (ZT); T 30. 4. 2000 (IR) – mesophilous 1 – West-Palaearctic.
Falseuncaria ruficiliana (Haworth, 1811) – K 29. 7. 1992, 18. 6. 1994, 5. 8. 1999 (ZT); K, T 30. 4. 2000 (ZT, IR) – mesophilous 1 – West-Palaearctic.
Tortrix viridana (Linnaeus, 1758) – V (1); Borša (5); BL (9) – xerothermophilous 3 – West-Palaearctic.
Aleima loeflingiana (Linnaeus, 1758) – V (1); BL (9) – mesophilous 3 – West-Palaearctic?
Acleris forsskaleana (Linnaeus, 1758) – VK (3b), 19. 6. 1988 (IR); Poľany (6) – mesoophilous 2 and 3 – European.
Acleris bergmanniana (Linnaeus, 1758) – K 27. 5. 2000 (IR) – mesophilous 2 – Palaearctic.
Acleris sparsana (Denis et Schiffermüller, 1775) – K 5. 8. 1999 (IR) – mesophilous 2 and 3 – West-Palaearctic.
Acleris rhombana (Denis et Schiffermüller, 1775) – SNM (1) – mesophilous 2 and 3 – West-Palaearctic.
Acleris umbrana (Hübner, 1799) – MV 1. 7. 2002 (IR) – mesophilous 2 and 3 – Palaearctic.
Acleris cristana (Denis et Schiffermüller, 1775) – MV 3. 8. 2005 (IR) – mesophilous 2 and 3 – Palaearctic.

Acleris variegana (Denis et Schiffermüller, 1775) – T 28. 6. 2000 (IR); BL (9) – mesophilous 2 – European.
Acleris hastiana (Linnaeus, 1758) – Z 31. 7. 2005 (IR) – mesophilous to hygrophilous 2 – Holarctic.
Acleris permutana (Duponchel, 1836) – Sírnik 22. 8. 2003 (IR); K 7. 9. 2017 (M. Weidlich) – mesophilous 2 – West-Palaearctic.
Acleris scabrana (Denis et Schiffermüller, 1775) – BL (9) – hygrophilous 2 – Palaearctic.
Acleris kochiella (Goeze, 1783) – KCH (3) – mesophilous 3 – Palaearctic.
Xerocnephasia rigana (Sodoffsky, 1829) – Sírnik 28. 5. 2005 (IR) – xerothermophilous 1 – Palaearctic.
Neosphaleroptera nubilana (Hübner, 1799) – K 23. 5. 1995 ex. l. (ZT); MV 10. 6. 2004 (IR) – xerothermophilous 2 – European.
Doloploca punctulana (Denis et Schiffermüller, 1775) – Sírnik 8. 5. 2003 (IR) – xerothermophilous 2 – European.
Eana incanana (Stephens, 1852) – K 5. 8. 1999 (IR) – mesophilous 1 and 2 – West-Palaearctic.
Cnephasia incertana (Treitschke, 1835) – LL 6. 6. 1991, Kopč. slanisko 21. 5. 1994 (ZT), T 28. 5. 1999 (IR) – mesophilous 2 and 3 – West-Palaearctic.
Cnephasia abrasana (Duponchel, 1843) – LL 2. 6. 1990, 6. 6. 1991, 7. 6. 2003 (ZT) – xerothermophilous to mesophilous 2 – West-Palaearctic.
Cnephasia stephensiana (Doubleday, 1849) – LL 2. 6. 1991, 2. 6. 1991 (ZT); Sírnik 5. 6. 2003 (IR) – mesophilous 1 and 2 – Palaearctic.
Cnephasia alticolana (Herrich-Schäffer, 1851) – T 28. 5. 1994, 28. 6. 2001 (ZT, IR); LL 7.6.2003 (ZT) – mesophilous 2 – European.
Cnephasia asseclana (Denis et Schiffermüller, 1775) – LL 6. 6. 1991 (ZT); T 2. 6. 2000 (IR) – mesophilous 1 and 2 – West-Palaearctic.
Cnephasia ecullyana Réal, 1951 – K 18. 6. 1994 (ZT); T 5. 7. 1996 (Iv. Richter) (Streda nad Bodrogom in Tokár et al. 2002) – xerothermophilous 2 – European.
Cnephasia genitalana Pierce et Metcalfe, 1922 – T 28. 6. 2001 (IR) – mesophilous 1 – European.
Cnephasia pumicana (Zeller, 1847) – LL 22. 6. 1989, K 15. 5. 1993, 18. 6. 1994 (ZT) – mesophilous 1 – West-Palaearctic.
Cnephasia communana (Herrich-Schäffer, 1851) – C (2); MV 2. 5. 2002 (IR) – mesophilous 1 and 2 – West-Palaearctic.
Pseudargyrotoza conwagana (Fabricius, 1775) – Borša (5); T 27. 7. 2000 (IR); K 19. 7. 2003 (ZT) – mesophilous 2 and 3 – Palaearctic.
Epagoge grotiana (Fabricius, 1781) – LL 16. 6. 1989 (ZT) – mesophilous 2 and 3 – West-Palaearctic.
Paramesia gnomana (Clerck, 1759) – Klin nad Bodrogom 18. 6. 1998 (IR); BL (9) – mesophilous 2 and 3 – West-Palaearctic.
Philedone gerningana (Denis et Schiffermüler, 1775) – K 29. 6. 1996, 16. 8. 1997, 17. 9. 1999 (ZT, IR) – mesophilous 1 and 2 – Palaearctic.
Capua vulgana (Frölich, 1828) – T 30. 4. 2000 (IR); BL (9) – mesophilous 2 and 3 – Palaearctic.

Choristoneura hebenstreitella (Müller, 1764) – BL (9) – mesophilous 2 and 3 – European.
Archips betulana (Hübner, 1787) – K 27. 5. 2000 (IR) – mesophilous 3 – Palaearctic.
Archips podana (Scopoli, 1763) – Leles (3); VK 19. 6. 1988 (IR); LL 8. 6. 1990, 17. 9. 1999 (ZT); Dlhé Tice (6); Čičarovský les 2. 7. 2015 (Pj) – mesophilous 2 and 3 – European.
Archips xylosteana (Linnaeus, 1758) – MV 5. 6. 2003 (IR); BL (9) – mesophilous 2 and 3 – Palaearctic.
Archips rosana (Linnaeus, 1758) – K 18. 6. 1994 (ZT); Veľký kopec 2. 8. 2015 (Pj) – mesophilous 2 – Palaearctic.
Argyrotaenia ljungiana (Thunberg, 1797) – MV 21. 8. 2003 (IR) – mesophilous 1 and 2 – Palaearctic.
Ptycholoma lecheana (Linnaeus, 1758) – Klin nad Bodrogom 25. 5. 2005 (IR) – mesophilous 3 – European.
Pandemis cerasana (Hübner, 1786) – LL 2. 6. 1990 (ZT); Sírnik 1. 8. 2002 (IR); Dlhé Tice (6) –mesophilous 3 – Palaearctic.
Pandemis cinnamomeana (Treitsche, 1830) – BL 17. 8. 2019 (9) – mesophilous 3 – Palaearctic.
Pandemis heparana (Denis et Schiffermüller, 1775) – Klin nad Bodrogom 18. 6. 1998 (IR); BL (9) – mesophilous 2 and 3 – Palaearctic.
Syndemis musculana (Hübner, 1799) – T 30. 4. 2000 (IR) – mesophilous 3 – Palaearctic.
Aphelia paleana (Hübner, 1793) – VK 19. 6. 1988 (IR) – hygrophilous 1 – Palaearctic.
Aphelia ferugana (Hübner, 1793) – K 27. 5. 2000 (IR) – xerothermophilous 1 – Palaearctic.
Aphelia viburnana (Denis et Schiffermüller, 1775) – MV 21. 8. 2003 (IR) – mesophilous 1 and 2 – Palaearctic.
Clepsis rurinana (Linnaeus, 1758) – MV 3. 8. 2003 (IR); Beša-Moľva (6) – mesophilous 1 and 2 – Palaearctic (Oriental?).
Clepsis spectrana (Treitschke, 1830) – Borša (5), VK 7. 6. 2003 (IR); Dlhé Tice (6); BL 17. 8. 2019 (9) – hygrophilous 1 to tyrphophilous – Palaearctic.
Clepsis pallidana (Fabricius, 1776) – K 17. 8. 1992, 24. 8. 2002 (ZT); SO 4. 8. 2001 (IR) – xerothermophilous to mesophilous 1 – Palaearctic.
Adoxophyes orana (Fischer von Röslerstamm, 1834) – K 16. 8. 1997 (ZT); Sírnik 1. 8. 2002 (IR) – mesophilous 2 and 3 – Palaearctic.
Isotrias hybridana (Hübner, 1817) – V (1) – mesophilous 3 – European.
Bactra furfurana (Haworth, 1811) – K 27. 5. 2000 (IR) – hygophilous 1 to tyrphophilous – Palaearctic.
Endothenia gentianaeana (Hübner, 1799) – Borša 1. 5. 2002 (IR); BL (9) – mesophilous 1 – Palaearctic.
Endothenia oblongana (Haworth, 1811) – K 28. 5. 1999 (IR) – mesophilous 1 – European.
E. marginana (Haworth, 1811) – MV 1. 7. 2002 (IR); Poľany (6) – mesophilous 1 – Palaearctic.
Endothenia nigricostana (Haworth, 1811) – LL 7. 6. 2003 (ZT) – mesophilous 1 to hygrophilous – Palaearctic.
Endothenia quadrimaculana (Haworth, 1811) – SO 4. 8. 2001 (IR); Dlhé Tice (6); BL (9) – mesophilous 1 – Palaearctic.
Eudemis porphyrana (Hübner, 1799) – Klin nad Bodrogom 18. 6. 1998 (IR) – mesophilous 2 and 3 – Palaearctic.

Eudemis profundana (Denis et Schiffermüller, 1775) – K 2. 7. 1993 (ZT); MV 1. 7. 2001 (IR) – mesophilous 3 – West-Palaearctic.
Pseudosciaphila branderiana (Linnaeus, 1758) – Klin nad Bodrogom 27. 5. 2005 (IR) – mesophilous 2 and 3 – Holarctic.
Apotomis lineana (Denis et Schiffermüller, 1775) – Klin nad Bodrogom 27. 5. 2005 (IR) – mesophilous 2 – Palaearctic.
Hedya salicella (Linnaeus, 1758) – BL (9) – mesophilous 2 and 3 – Palaearctic.
Hedya nubiferana (Hawort, 1811) – BL (9) – mesophilous 2 and 3 – Holarctic.
Hedya pruniana (Hübner, 1799) – SNM (1); T 9. 5. 2003 (IR) – mesophilous 2 and 3 – Palaearctic.
Hedya ochroleucana (Frölich, 1828) – MV 21. 8. 2003 (IR) – mesophilous 2 – Palaearctic.
Metendothenia atropunctana (Zetterstedt, 1839) – Kopč. slanisko 21. 5. 1994 (ZT); MV 7. 5. 2003 (IR); – mesophilous 3 – Palaearctic.
Celypha rufana (Scopoli, 1763) – K 16. 8. 1997 (ZT); SO 2. 8. 2002 (IR) – mesophilous 1 – Palaearctic.
Celypha striana (Denis et Schiffermüller, 1775) – SO 2. 8. 2002 (IR); Dlhé Tice 20. 7. 2003 (6); BL 26. 7. 2018 (9) – mesophilous 1 – Palaearctic.
Celypha cespitana (Hübner, 1817) –MV 3. 8. 2003 (IR) – mesophilous 1 – Holarctic.
Celypha rivulana (Scopoli, 1763) – V (1), 31. 7. 2005 (IR) – mesophilous 1 and 2 – Palaearctic.
Celypha aurofasciana (Haworth, 1811) – Kopč. slanisko 1. 8. 2002 (IR) – mesophilous 3 – West-Palaearctic.
Lobesia botrana (Denis et Schiffermüller, 1775) – MV 21. 8. 2003 (IR) – mesophilous 2 – West-Palaearctic.
Lobesia abscisana (Doubleday, 1849) – K 5. 8. 1999 (IR); LL 7. 6. 2003 (ZT) – mesophilous 1 to hygrophilous – European.
Lobesia reliquana (Hübner, 1825) – T 30. 4. 2000 (IR) – mesophilous 2 and 3 – Palaearctic.
Lobesia bicinctana (Duponchel, 1844) – SO 2. 8. 2002 (IR) – xerothermophilous 1 to mesophilous 1 – Palaearctic?
Lobesia artemisiana (Zeller, 1847) – MV 29. 7. 2002 (IR) – xerothermophilous 1 – European?
Ancylis laetana (Fabricius, 1775) – MV 2. 5. 2002 (IR) – mesophilous 2 and 3 – Palaearctic.
Ancylis comptana (Frölich, 1828) – K 17. 8. 1992 (ZT); MV 1. 5. 2003 (IR) – xerothermophilous to mesophilous 1 – Holarctic.
Ancylis upupana (Treitschke, 1835) – VK 19. 6. 1988 (IR) – mesophilous 3 – Palaearctic.
Ancylis unculana (Haworth, 1811) – K 29. 4. 2000 (IR) – mesophilous 2 – Palaearctic.
Ancylis apicella (Denis et Schiffermüller, 1775) – K 10. 7. 1993, 29. 4. 2000 (ZT, IR) – mesophilous to hygrophilous 2 – Palaearctic.
Ancylis badiana (Denis et Schiffermüller, 1775) – Kopč. slanisko 1. 8. 2002 (IR); Dlhé Tice (6) – mesophilous 1 – Palaearctic.
Ancylis achatana (Denis et Schiffermüller, 1775) – T 28. 6. 2001 (IR) – mesophilous 2 – West-Palaearctic.
Ancylis mitterbacheriana (Denis et Schiffermüler,1775) – C, SNM (2); T 17. 6. 1998 (IR) – mesophilous 3 – European?.
Eriopsela quadrana (Hübner, 1813) – MV 2. 5. 2003 (IR) – mesophilous 1 – Palaearctic.

Thiodia citrana (Hübner, 1799) – Sírnik 5. 6. 2003 (IR) – mesophilous to xerothermophilous 1 – Palaearctic.
Thiodia torridana (Lederer, 1859) – K 10. 7. 1993 (ZT) – xerothermophilous 1 – Palaearctic
Rhopobota stagnana (Denis et Schiffermüller, 1775) – SO 4. 8. 2001 (IR) – xerothermophilous 1 – West-Palaearctic.
Rhopobota naevana (Hübner, 1817) – VK 7. 6. 2003 (IR) – mesophilous 2 – Holarctic.
Spilonota ocellana (Denis et Schiffermüller, 1775) – Leles (3); T 28. 6. 2001 (IR) – mesophilous 2 to hygrophilous/tyrphophilous? – Holarctic.
Loxoterma lacunana (Denis et Schiffermüller, 1775) – BL (9), MV 7. 3. 2003 (ZT) – mesophilous 1 – Palaearctic.
Epinotia festivana (Hübner, 1799) – MV 3. 8. 2003 (IR) – mesophilous 2 and 3 – West-Palaearctic.
Epinotia nisella (Clerck, 1759) – K 5. 8. 1999 (IR) – mesophilous 2 and 3 – Holarctic.
Epinotia immundana (Fischer von Röslerstamm, 1839) – K 14. 5. 1994 (ZT); BL (9) – hygrophilous 2 – West-Palaearctic.
Zeiraphera isertana (Fabricius, 1794) – MV 1. 7. 2002 (IR) – mesophilous 3 – Palaearctic.
Phaneta pauperana (Duponchel, 1842) – MV 2. 5. 2003 (IR) – mesophilous 2 – West-Palaearctic.
Pelochrista caecimaculana (Hübner, 1799) – MV 1. 7. 2002 (IR) – mesophilous to xerothermophilious 1 – West-Palaearctic.
Pelochrista infidana (Hübner, 1824) – Beša-Moľva 6. 9. 2015 (B. Endel) – mesophilous 1 – Central and West-Palaearctic.
Eucosma obumbratana (Lienig et Zeller, 1846) – VK 7. 6. 2003 (IR) – mesophilous 1 – Palaearctic.
Eucosma hohenwartiana (Denis et Schiffermüller, 1775) – Borša (5); K 10. 7. 1993 (ZT); T 30. 4. 2000 (IR) – mesophilous 1 – Palaearctic.
Eucosma cana (Haworth, 1811) – BL 7. 7. 2018 (9) – mesophilous 1 – Palaearctic.
Eucosma balatonana (Osthelder, 1937) – SO 4. 8. 2001 (IR) – mesophilous to xerothermophilous 1 – West-Palaearctic.
Eucosma aemulana (Schläger, 1849) – T 27. 7. 2000 (IR) – mesophilous 1 – Palaearctic.
Eucosma lacteana (Treitschke, 1835) – Borša (5) – mesophilous to hygrophilous 1 – European?
Eucosma albidulana (Herrich–Schäffer, 1851) – K 5. 8. 1999 (ZT); T 3. 8. 2001 (IR); MV 29. 7. 2002 (ZT); Poľany (6) – xerothermophilous 1 – Palaearctic. Halophyt.
Eucosma metzneriana (Treitschke, 1830) – K 18. 6. 1994, 16. 5. 1997; T 27. 5. 1999, 28. 6. 2001 (ZT, IR) – mesophilous to xerothermophilous 1 – Palaearctic.
Eucosma wimmerana (Treitschke, 1835) – K 27. 5. 1999 (ZT); T 28. 5. 1999 (IR) – mesophilous to xerothermophilous 1 – West-Palaearctic.
Eucosma conterminana (Guenée, 1845) – K 15. 7. 1995 (ZT); SO 2. 8. 2002 (IR) – mesophilous 1 – Palaearctic.
Eucosma pupillana (Clerck, 1759) – K 15. 7. 1995, 16. 8. 1997, 5. 8. 1999 (ZT); MV 3. 8. 2003 (IR) – mesophilous to xerothermophilous 1 – West-Palaearctic.
Gypsonoma minutana (Hübner, 1799) – Klin nad Bodrogom 6. 7. 1996 (IR) – mesophilous 2 and 3 – Palaearctic.

Gypsonoma dealbana (Frölich, 1828) – Klin nad Bodrogom 18. 6. 1998 (IR) – mesophilous 3 – Palaearctic.
Epiblema scutulana (Denis et Schiffermüller, 1775) – LL 4. 6. 1992, K 13. 5. 1995, Kopč. slanisko 21. 5. 1994 (ZT); MV 1. 7. 2002 (IR); KM (6) – mesophilous 1 – Palaearctic.
Epiblema cirsiana (Zeller, 1843) – MV 2. 5. 2003 (IR) – mesophilous 1 – Palaearctic.
Epiblema foenella (Linnaeus, 1758) – SNM (1); VK (3b); Borša (5); Klin nad Bodrogom 18. 6. 1988 (IR); Poľany, Dlhé Tice (6); BL (9) – mesophilous 1 – Palaearctic (Oriental?).
Epiblema turbidana (Treitschke, 1835) – BL (9) – mesophilous to hygrophilous 1 – West-Palaearctic.
Epiblema hepaticana (Treitschke, 1835) – K 14. 5. 1994 (ZT) – mesophilous 2 and 3 – West-Palaearctic.
Epiblema graphana (Treitschke, 1835) – K 27. 5. 1999 (ZT) – mesophilous 1 – West-Palaearctic.
Epiblema costipunctana (Haworth, 1811) – MV 2. 5. 2002 (IR) – mesophilous 1 – European.
Epiblema junctana (Herrich-Schäffer, 1856) – VK 7. 6. 2003 (IR) – hygrophilous 1 – Palaearctic.
Epiblema similana (Denis et Schiffermüller, 1775) – MV 10. 6. 2004 (IR) – mesophilous 2 and 3 – West-Palaearctic.
Epiblema inulivora Meyrick, 1932 – Sírnik 5. 6. 2003 (IR) – mesophilous 1 – West-Palaearctic.
Notocelia cynosbatella (Linnaeus, 1758) – C (2); Klin nad Bodrogom 18. 6. 1998 (IR) – mesophilous 2 – Palaearctic.
Notocelia roborana (Denis et Schiffermüller, 1775) – MV 1. 7. 2002 (IR) – mesophilous 2 – Palaearctic.
Notocelia incarnatana (Hübner, 1800) – T 17. 6. 1998 (IR) – mesophilous 2 – Palaearctic.
Notocelia rosaecolana (Doubleday, 1850) – T 29. 5. 1999 (IR); BL (9) – mesophilous 2 – Palaearctic.
Notocelia trimaculana (Haworth, 1811) – T 6. 6. 2003 (IR) – mesophilous 2 – Palaearctic.
Notocelia uddmanniana (Linnaeus, 1758) – Chlmecké kopce 11. 6. 2015 (Pj); BL (9) – mesophilous 2 – West-Palaearctic.
Pseudococcyx turionella (Linnaeus, 1758) – K 13. 5. 1995 (ZT) – mesophilous 3 – Palaearctic. Species prefers coniferous forests. The occurence is interesting.
Gravitarmata margarotana (Heinemann, 1863) – MV 2. 5. 2003 (ZT) (Tokár et al. 2010) – mesophilous 3 – Palaearctic. The species prefers coniferous forests.
Dichrorampha gruneriana (Herrich-Schäffer, 1851) – MV 5. 6. 2003 (IR) – xerothermophilous 1 – West-Palaearctic.
Dichrorampha cinerascens Danilevsky, 1948 – LL 6. 6.1991 (ZT) – mesophilous 1 – West-Palaearctic.
Dichrorampha acuminatana (Lienig et Zeller, 1846) – K 16. 8. 1997 (ZT) – mesophilous 1 – West-Palaearctic.
Dichrorampha simpliciana (Haworth, 1811) – K 16. 8. 1997 (ZT); SO 2. 8. 2002 (IR) – mesophilous 1 – Palaearctic.
Dichrorampha sequana (Hübner, 1799) – K 15. 5. 1993 (ZT); MV 10. 6. 2004 (IR) – mesophilous 1 – Palaearctic.

Dichrorampha alpinana (Treitschke, 1830) – V (1); T 28. 6. 2001 (IR) – mesophilous 1 – Palaearctic.
Dichrorampha petiverella (Linnaeus, 1758) – V (1); Borša (5); T 27. 7. 2000 (IR) – mesophilous 1 – Palaearctic.
Dichrorampha obscuratna (Wlff, 1955) – MV 10. 6. 2004 (IR) – mesophilous 1 – Eurosiberian.
Cydia ilipulana Walsingham, 1903 – MV 1. 7. 2002 (IR) – mesophilous 1 – European.
Cydia medicaginis (Kuznetsov, 1962) – K 10. 7. 1993 (ZT) – mesophilous 1 – Eurosiberian.
Cydia pactolana (Zeller, 1840) – T 30. 4. 2000 (IR) – mesophilous 3 – Palaearctic. Caterpillar lives on conifers.
Cydia pomonella (Linnaeus, 1758) – MT (3b); Borša (5); K 15. 7. 1995 (ZT) – mesophilous 2 and 3 – West-Palaearctic.
Cydia pyrivora (Danilevsky, 1947) – K 13. 7. 1994 (Kj) (Ladmovce in Tokár et al. 1996) – mesophilous 2 and 3 – Eurosiberian.
Cydia splendana (Hübner, 1799) – Borša (5); K 10. 7. 1993 (ZT); Sírnik 1. 8. 2002 (IR); BL (9) – mesophilous 2 and 3 – West-Palearctic.
Cydia inquinatana (Hübner, 1800) – LL 4. 6. 1992 (ZT) – mesophilous 3 – Eurosiberian.
Lathronympha strigana (Fabricius, 1775) – Borša, V, K (5); T 17. 9. 1999 (IR) – mesophilous 1 – West-Palaearctic.
Grapholita compositella (Fabricius, 1775) – V. Kamenec 2. 5. 2002 (IR) – mesophilous 1 – Palaearctic.
Grapholita pallifrontana (Lienig et Zeller, 1846) – K 13. 5. 1995 (ZT); SO 1. 5. 2002 (IR) – mesophilous to xerothermophilous 1 – Palaearctic.
Grapholita coronillana (Lienig et Zeller, 1846) – K 30. 4., 27. 5. 2000 (ZT, IR) – mesophilous 2 – West-Palaearctic.
Grapholita caecana (Schläger, 1847) – MV 29. 4. 2005 (IR) – mesophilous to xerothermophilous 1 – Palaearctic.
Grapholita discretana (Wocke, 1861) – Borša 2. 5. 2003 (IR) – mesophilous 2 – Palaearctic.
Grapholita gemmiferana (Treitschke, 1835) – T 29. 5. 1999 (IR) – mesophilous 2 and 3 – Palaearctic.
Grapholita funebrana (Treitschke, 1835) – K 14. 5. 1994 (ZT); T 30. 4. 2000 (IR) – mesophilous 2 and 3 – Palaearctic.
Grapholita tenebrosana (Duponchel, 1843) – K 27. 5. 1999 (Kj); T 30. 4. 2000 (IR) – mesophilous 2 and 3 – Palaearctic.
Grapholita janthinana (Duponchel, 1835) – K 3. 7. 1993, MV 2. 5. 2003 (ZT); T 3. 8. 2001 (IR) – mesophilous 2 and 3 – Palaearctic.
Pammene insulana (Guenée, 1845) – MV2. 5. 2003 (ZT) – mesophilous 3 – Palaearctic.
Pammene argyrana (Hübner, 1799) – MV 2. 5. 2003 (ZT, IR) – mesophilous 3 – European.
Pammene albuginana (Guenée, 1845) – MV 7. 5. 2003 (IR) – mesophilous 3 – European.
Pammene fasciana (Linnaeus, 1761) – MV 2. 5. 2003 (IR) – mesophilous 3 – European.
Pammene suspectana (Lienig et Zeller, 1846) – MV 7. 5. 2003 (ZT) – mesophilous 3 – West-Palaearctic.
Pammene rhediella (Clerck, 1759) – K 13. 5. 1995 (ZT); MV 2. 5. 2003 (IR) – mesophilous 2 and 3 – West-Palaearctic.
Strophedra nitidana (Fabricius, 1794) – VK 2. 6. 2000 (IR) – mesophilous 3 – Palaearctic.

Brachodidae

Brachodes appendiculata (Esper, 1783) – T 12. 6. 1993 (IR).

Cossidae

Cossus cossus (Linnaeus, 1758) – MT (3a); Klin nad Bodrogom 6. 7. 1996 (IR); Dlhé Tice (6); BL (9) – mesophilous 1 and 2 – Palaearctic.

Zeuzera pyrina (Linnaeus, 1761) – K 15. 7. 1995 (ZT) – mesophilous 2 – Palaearctic.

Phragmataecia castaneae (Hübner, 1790) – M. Kamenec (3a); V 10. 7.1 996 (Kj); Strážne 23. 7. 2009 (MH) – hygrophilous 1 – Palaearctic.

Parahypopta caestrum (Hübner, 1808) – Beša-Moľva 16. 6. 2012 (MH) – xerothermophilous 1 – Mediterranean.

Sesiidae

Sesia apiformis (Clerck, 1759) – M. Kamenec (Laštůvka 1982); T 10. 7. 1992 (Kj) – mesophilous 2 and 3 – West-Palaearctic (Holarctic?).

Eusphecia melanocephala (Dalman, 1816) – M. Kamenec 1. 8. 1981 traces of feeding on the *Populus tremula* (Z. Laštůvka) – mesophilous 2 and 3 – Eurosiberian

Paranthrene tabaniformis (Rottemburg, 1775) – M. Kamenec 1. 8. 1981 (Z. Laštůvka) – mesophilous 2 and 3 – Holarctic

Synanthedon tipuliformis (Clerck, 1759) – MT (3a) – mesophilous 2 – West-Palaearctic.

Synanthedon myopaeformis (Borkhausen, 1789) – M. Kamenec 28. 7. 1976 (Z. Laštůvka) – mesophilous 2 and 3 – West-Palaearctic.

Bembecia ichneumoniformis (Denis et Schiffermüller, 1775) – C, SNM (3a) – in the original source (Laštůvka 1982) listed as *B. scopigera* and the locality „Celkov"; K 19. 7. 2003 (ZT); MV 3. 8. 2003 (IR) – xerothermophilous 1 – West-Palaearctic.

Bembecia albanensis (Rebel, 1918) – M. Kamenec 1. 8. 1981 (Z. Laštůvka) – xerothermophilous to mesophilous 1 – West-Palaearctic.

Bembecia scopigera (Scopoli, 1763) – M. Kamenec 1. 8. 1981 (Z. Laštůvka); Sírnik 1. 8. 2002 (IR) – xerothermophilous 1 – West-Palaearctic.

Pyropteron triannuliformis (Freyer, 1843) – V 10. 7. 1993 (Kj) – xerothermophilous 1 – Ponto-Mediterranean.

Chamaesphecia dumonti Le Cerf, 1922 – SNM (Laštůvka 1983); SO 29. 6. 2001 (IR) – xerothermophilous 1 – Ponto-Mediterranean.

Chamaesphecia annellata (Zeller, 1847) – M. Kamenec 28. 7. 1976 (Z. Laštůvka); V 10. 7. 1993 (Kj) – xerothermophilous 1 and 2 – Ponto-Mediterranean.

Chamaesphecia leucopsiformis (Esper, 1800) – M. Kamenec 29. 7. 1975 larvae, 25. 8. 1975 1 M, 6. 9. 1975 1 F (Laštůvka 1982) – xerothermophilous 1 – European.

Chamaesphecia empiformis (Esper, 1783) – M. Kamenec 28. 7. 1976 (Z. Laštůvka), C (Laštůvka 1982 – as *Ch. tenthrediniformis*); V 10. 7. 1993, T 10. 7. 1992 (Kj) – xerothermophilous to mesophilous 2 – European.

Chamaesphecia tenthrediniformis (Denis et Schiffermüller, 1775) – C (2) misidentification, correct *Ch. empiformis*.

Limacodidae

Apoda limacodes (Hufnagel, 1766) – MV 1. 7. 2001 (IR); BL (9) – mesophilous 3 – West-Palaearctic.

Zygaenidae

Rhagades pruni (Denis et Schiffermüller, 1775) – T (5); V 18. 6. 1994, T 12. 6. 2000 (Kj, IR) – xerothermophilous 2 and hygrophilous 1 – Eurosiberian.

Jordanita budensis (Ad. et Au. Speyer, 1858) – T 15. 6. 1995 (IR) (Streda nad Bodrogom in Tokár et al. 2002) – xerothermophilous 1 – Palaearctic.

Jordanita globulariae (Hübner, 1793) – M. Kamenec (3a); V 18. 6. 1994 (Kj); MV 1. 7. 2001 (IR); Kucany (6) – xerothermophilous to mesophilous 1 and 2 – West-Palaearctic.

Adscita statices (Linnaeus, 1758) – M. Kamenec (3a) – xerothermophilous to hygrophilous 1 – Palaearctic.

Zygaena punctum Ochsenheimer, 1808 – T 26. 6. 2003 (IR); Svätuše 1. 7. 2013, Veľký vrch 27. 6. 2017 (MH) – xerothermophilous 1 – Ponto-Mediterranean.

Zygaena cynarae (Esper, 1789) – T 6. 6. 2003 (IR); T, K 25. 5. 2009 (Pj, MH); Veľký kopec 25. 6. 2015 (Pj) – xerothermophilous to mesophilous 2 – Eurosiberian (Fig. 17).

Zygaena purpuralis (Brünnich, 1763) – Veľký kopec 2. 8. 2015 (Pj) – xerothermophilous to mesophilous 1 – Eurosiberian.

Zygaena carniolica (Scopoli, 1763) – V (5); K 10. 7. 1993 (ZT); MV 1. 7. 2002 (IR); Svätuše 1. 7. 2013, Veľký vrch 27. 6. 2017 (MH) – xerothermophilous 1 and 2 – Eurosiberian.

Zygaena loti (Denis et Schiffermüller, 1775) – MT (3a); K (5) – xerothermophilous 1 and 2 – Palaearctic.

Zygaena osterodensis Reiss, 1921 – T 17. 6. 1998 (IR) – mesophilous 2 and 3 – Eurosiberian.

Zygaena ephialtes (Linnaeus, 1767) – C (2); K (5) 29. 6. 1996 (ZT); Svinice abundant (6); Vľký kopec 2. 8. 2015 (Pj) – xerothermophilous 1 and 2 – West-Palaearctic.

Zygaena angelicae Ochsenheimer, 1808 – Svinice (6) abundant – xerothermophilous 2 – Ponto-Mediterranean.

Zygaena filipendulae (Linnaeus, 1758) – MT (3a); K, V, T (5); Sírnik 1. 8. 2002 (IR); Svinice, Kucany abundant (6); Čičarovský les 6. 8. 2015 (Pj) – ubiquitous – West-Palaearctic.

Zygaena lonicerae (Scheven, 1777) – C (2); MT (3a) – xerothermophilous to mesophilous 1 and 2 – Palaearctic.

Papilionidae

Zerynthia polyxena (Denis et Schiffermüller, 1775) – SNM, Borša (1); Z (2); Tajba, SO, T (3c); Chlmecké kopce-Poniklecová lúčka (Ponec 1989); KM, Svinice, Dlhé Tice abundant (6); Veľký kopec (8); BL (9) – mesophilous 2 and xerothermophilous 2 – Ponto-Mediterranean. Common throughout the monitored area of the PLA. Protected species of Natura 2000.

Parnassius mnemosyne (Linnaeus, 1758) – KCH (1); C, Z, Ladmovce (2); Svätuše 1. 6. 2004, Beša-Moľva 23. 5. 2008 (MH); V, Svätá Mária 25. 5. 2009, Čičarovský les 23. 5. 2015 (Pj) – mesophilous 2 – West-Palaearctic. Common species in wooded areas. Protected species of Natura 2000.

Iphiclides podalirius (Linnaeus, 1758) – C, Z (2); Borša, V, M. Horeš, K (4); KM abundant, Kucany, Svinice, Latorica-bridge (6); MT, Veľká Tŕňa (7); Veľký kopec (8) – xerothermophilous 2 – West-Palaearctic.

Papilio machaon (Linnaeus, 1758) – C, V. Kamenec, KCH (2); V, K (4); KM abundant, Sírnik-Avaš (6); Veľká Tŕňa (7); Veľký kopec (8) – ubiqitous – Holarctic.

Hesperiidae

Erynnis tages (Linnaeus, 1758) – C, Z, KCH (2); Borša, V, Latorica-bridge, K (4); KM, Kucany, Latorica-bridge, Svinice abundant (6); MT, Veľká Tŕňa (7); Veľký kopec (8) – mesophilous to xerothermophilous 1 – Eurosiberian. Common species.

Carcharodus alcae (Esper, 1780) – C (2); Borša, V (4); V 10. 7. 1993 (Kj); K 10. 7. 1999 (ZT); KM abundant (6); MT (7); Veľký kopec (8) – xerothermophilous 1 – West-Palaearctic.

Carcharodus orientalis (Reverdin, 1913) – Beša-Moľva 31. 5. 2018 (observ. and photo: M. Balla) – xerothermophilous 1 – Mediterranean.

Spialia sertorius Hoffmansseg, 1804 – V 14. 5. 1994 (Kj); T (6); K 13. 5. 2010 (MH); Veľký kopec (8) – xerothermophilous 1 – Atlanto-Mediterranean.

Pyrgus carthami (Hübner, 1813) – V. Kamenec, KCH (2); K (4) 29. 6. 1996 (ZT); V 10. 7. 1993, T 12. 6. 2000 (Kj); Veľký kopec (8) – xerothermophilous 1 – West-Palaearctic.

Pyrgus malvae (Linnaeus, 1758) – C, Z (2); K (4); KM abundant, Kucany, Dlhé Tice, Latorica–bridge (6); MT (7); Veľký kopec (8) – xerothermophilous to mesophilous 1 – Palaearctic.

Pyrgus armoricanus (Oberthür, 1910) – Z (2); K 16. 5. 1997 (ZT) – xerothermophilous to mesophilous 1 – West-Palaearctic.

Carterocephalus palaemon (Pallas, 1771) – MT (7) – mesophilous to hygrophilous 1 – Holarctic.

Thymelicus lineola (Ochsenheimer, 1808) – SO (2); Latorica-bridge, K (4); Kucany, Latorica–bridge, Solnička, Svinice abundant (6); MT (7); Čičarovský les 6. 8. 2015 (Pj); Veľký kopec (8) – mesophilous 1– Palaearctic (Holarctic – accidental to North America).

Thymelicus sylvestris (Poda, 1761) – C, Leles, KCH (2); Borša, K (4); Kucany abundant (6); MT (7) – mesophilous 2 – West-Palaearctic.

Hesperia comma (Linnaeus, 1758) – Veľká Tŕňa (7); Čičarovský les 6. 8. 2015 (Pj); Veľký kopec (8); Svätuše 4. 8. 2011 (MH) – xerothermophilous to mesophilous 1 – Holarctic.

Ochlodes sylvanus (Esper, 1777) – SNM (1); SO (2); Borša, Tajba, V (4); Kucany (6); MT (7); Čičarovský les 7. 6. 2015; Chlmecké kopce 25. 6. 2015 (Pj); Veľký kopec (8) – ubiquitous – Palaearctic.

Pieridae

Leptidea sinapis (Linnaeus, 1758) – SNM (1); C, Z, Leles, KCH (2);V, K (4); KM abundant, Kucany, Dlhé Tice, Svinice abundant (6); MT; Veľká Tŕňa (7); Veľký kopec (8); BL (9) – xerothermophilous 2 and mesophilous 2 – West-Palaearctic. Among the species is possible occurrence of *L. juvernica*, which was not monitored at that time.

Leptidea juvernica (Williams, 1946) – K 15. 7. 1995 (ZT); Borša 15. 6. 2019 (Pj) – hygrophilous to mesophilous 2 – West-Plaearctic.

Leptidea morsei (Fenton, 1882) – C (2) – xerothermophilous to mesophilous 2 – Eurosiberian. Protected species of Natura 2000. Currently a missing species.

Anthocharis cardamines (Linnaeus, 1758) – C, Z (2); SO (3c); MV 7. 6. 2003 (ZT); KM abundant (6); Veľká Tŕňa (7); Čičarovský les 25. 4. 2015 (Pj); Veľký kopec (8); BL (9) – mesophilous 1 – Palaearctic.

Aporia crataegi (Linnaeus, 1758) – VK (1); V, C, KCH (2); MT (7); Svätuše 1. 6. 2004 (MH); T (Pj); Sírnik 13. 6. 2006, Leles 24. 5. 2012 (SM); Čičarovce 13. 6. 2006, 6. 6. 2019 (SM and photo M. Balla); Veľký kopec (8); Poľany 21. 5. 2014, Beša-Moľva 6. 6. 2019 (SM) – mesophilous and xerothermophilous 2 – Palaearctic.

Pieris brassicae (Linnaeus, 1758) – C, Z (2); Borša, Tajba, V, K (4); Svinice (6); MT, Veľká Tŕňa (7); Čičarovský les 7. 6. 2015 (Pj); Veľký kopec (8) – ubiquitous – West-Palaearctic.

Pieris mannii (Mayer, 1851) – SNM (1, 2) – xerothermophilous 1 – Mediterranean. Currently a missing species in the monitored area.

Pieris rapae (Linnaeus, 1758) – SNM (1); C, Z, KCH (2); Tajba, V, T, K (4); KM, Kucany, Latorica–bridge, Dlhé Tice, Svinice; Avaš (6) very abundant; Veľká Tŕňa (7); Veľký kopec (8); BL (9) – ubiquitous – Cosmopolitan. Common species.

Pieris napi (Linnaeus, 1758) – C, Z, V. Kamenec, Leles, KCH (2); Tajba, T, K (4); KM, Svinice, Latorica–bridge (6); Veľká Tŕňa (7); Čičarovský les 25. 4. 2015 (Pj); Veľký kopec (8); BL (9) – ubiqitous – Palaearctic. Common species.

Pontia edusa (Fabricius, 1777) – Borša, C, Z, SO, KCH (2); MT (3c); Borša, V, K (4); Kucany, Solnička, KM abundant, Avaš abundant (6); Veľká Tŕňa (7); Veľký kopec (8) – xerothermophilous 1 and 2 – Palaearctic?

Colias erate (Esper, 1805) – KM (6); Chlmecké kopce 6. 8. 2015 (Pj) – xerothermophilous 1 – Continental.

Colias crocea (Frcyer, 1785) – Z (1); MT (3c), Kucany (6); Veľký kopec (8) – xerothermophilous 1 – Mediterranean.

Colias myrmidone (Esper, 1781) – SNM (1); Z (2); M. Kamenec (3c) – xerothermophilous 2 – European. A rare species throughout Slovakia, currently missing in Medzibodrožie. Protected species of Natura 2000.

Colias hyale (Linnaeus, 1758) – SNM (1); C (2); V, T, K (4); Svinice, KM abundant, Avaš abundant (6); MT (7); Veľký kopec (8) – mesophilous 1 – Eurosiberian.

Colias alfacariensis Ribbe, 1905 – MT (3c); V (4); Kucany (6); Chlmecké kopce 14. 8. 2015 (Pj) – xerotermophilous 1 – West-Palaeacrtic.

Gonepteryx rhamni (Linnaeus, 1758) – C, KCH (2); K (4); KM abundant, Kucany (6); MT (7); Čičarovský les 25. 4. 2015 (Pj); Veľký kopec (8); BL (9) – mesophilous 2 – West-Palaearctic.

Riodinidae

Hamearis lucina (Linnaeus, 1758) – C (2); MT (3c); Tajba (4); Kucany (6); Čičarovský les 25. 4. 2015 (Pj) – mesophilous 2 – European.

Lycaenidae

Lycaena phlaeas (Linnaeus, 1761) – C, Leles, KCH, Z (2); MT (3c); V, T (4); KM, Kucany, Latorica–bridge, Svinice; V. Kamenec 20. 8. 2009 (B. Endel); Avaš (6) abundant; MT (7); Veľký kopec (8) – ubiquitous – Holarctic.

Lycaena dispar (Haworth, 1803) – C (2); MT (3c); Kucany, Latorica–bridge (6); MT; Veľká Tŕňa (7); Leles 23. 5. 2006, Svätuše 15. 6. 2006; Somotor-Véč 9. 8. 2007, V. Trakany-shore of Tisa 24. 7. 2013 (SM); Strážne 13. 5. 2010 (Pj); Borša 25. 5. 2011 (Pj); K 31. 7. 2015 (Pj) – hygrophilous to mesophilous 1 and 2 – Eurosiberian. Common throughout the monitored area of the PLA. Protected species of Natura 2000.

Lycaena virgaureae (Linnaeus, 1758) – Svinice (6); Veľký kopec (8) – mesophilous 2 – palaearctic.

Lycaena tityrus (Poda, 1761) – C (2); MT (3c); V (4); Kucany, Svinice, KM; Avaš (6); MT, Veľká Tŕňa (7); Strážne 13. 5. 2010 (Pj); Veľký kopec (8), K 13. 7. 1996 (ZT) – mesophilous to xerothermophilous 1 – West-Palaearctic. Very abundant.

Lycaena alciphron (Rottemburg, 1775) – MT (3c); T 10. 7. 1992 (Kj); Veľká Tŕňa (7); Veľký kopec (8) – mesophilous 1 to hygrophilous – West-Palaearctic. Abundant in all area.

Lycaena hippothoe (Linnaeus, 1761) – T 16. 8. 2006, Tajba, Svätuše 29. 5. 2007, M. Horeš 16. 6. 2009 (SM) – mesophilous to hygrophilous 1 – Eurosiberian.

Lycaena thersamon (Esper, 1784) – C, Z (2); Beša-Moľva, KM; V 7. 5. 2014, V-embankment of Bodrog 27. 6. 2017 (MH); Sírnik-Avaš (6); Strážne, Svätuše, Solnička, K, T (SM) – xerothermophilous 1 to hygrophilous – Ponto-Mediterranean. On suitable arid habitats almost everywhere.

Thecla betulae (Linnaeus, 1758) – SNM (1); V (4); KM (6); MT, Veľká Tŕňa (7); Svätuše 24. 9. 2014, Čičarovce 27. 7. 2017 (SM) – mesophilous 2, xerothermophilous 2 – Palaearctic.

Favonius quercus (Linnaeus, 1758) – C (2); V (4); T 10. 7. 1992 (Kj); Veľký kopec (8) – mesophilous 3 – West-Palaearctic.

Callophrys rubi (Linnaeus, 1758) – C (2); MT (3c, 7); Avaš 26. 5. 2009 (Pj); K 23. 4. 2015, T 3. 5. 2018 (SM); Veľký kopec (8) – mesophilous – Palaearctic.

Satyrium w-album (Knoch, 1782) – Svinice, T (6); Chlmecké kopce 11. 7. 2015 (Pj); K 4. 7. 2017 (SM) – mesophilous 3 – Palaearctic.

Satyriunm pruni (Linnaeus, 1758) – V (2); MT (3c); Svätá Mária (6); Svinice 25. 5. 2009 (Pj); Svätuše 20. 5. 2009, MV 23. 5. 2014, Strážne 10. 5. 2018 (SM) – xerothermophilous 2 and mesophilous 2 – Palaearctic.

Satyrium spini (Denis et Schiffermüller, 1775) – KCH (2); MT (3c), Leles 24. 5. 2012, Kapušianske Kľačany 3. 6. 2016, Malá Bara 16. 6. 2016 (SM) – xerothermophilous 2 – West-Palaearctic.

Satyrium acaciae (Fabricius, 1787) – Leles, KCH, C (2); MT (3a); V 18.6.1994 (Kj); Svinice (6); Veľký kopec (8) – xerothermophilous 2 – Ponto-Mediterranean.

Satyrium ilicis (Esper, 1779) – C (2); Svätuše 15. 6. 2006, K 4. 7. 2017 (SM) – mesophilous to xerothermophilous 2 – West-Palaearctic.

Cupido minimus (Fuessly, 1775) – Borša (4); K 16. 5. 1997 (ZT); Svinice (6);Veľký kopec (8) – xerothermophilous 1 – Eurosiberian.

Cupido argiades (Pallas, 1771) – SO, C (2); MT (3c); V, Latorica-bridge, K (4); KM, Kucany, Latorica–bridge (6); MT (7); Veľký kopec (8) – xerothermophilous 1 – Palaearctic.

Cupido alcetas (Hoffmannsegg, 1804) – KCH (1); Leles (2); V (4) – xerothermophilous 2 and hygrophilous – Ponto-Mediterranean.

Celastrina argiolus (Linnaeus, 1758) – C, KCH (2); MT (3c); Borša, Tajba (4); T 10. 7. 1992 (Kj); K 29. 6. 1996 (ZT); Svinice (6); Veľká Tŕňa (7); Čičarovský les 7. 6. 2015 (Pj); Veľký kopec (8) – mesophilous 3 – Holarctic.

Pseudophilotes vicrama (Moore, 1865) – KCH (2); V, K (4, 6) 13. 5. 1993 (ZT); Avaš 26. 5. 2009 (Pj); Veľký kopec (8) – xerothermophilous 1 – Ponto-Mediterranean.

Scolitantides orion (Linnaeus, 1758) – K, T 14. 5. 2008 (Pj); Svätuše 1. 6. 2004, Malá Bara 23. 5. 2014 (SM); Veľký vrch 27. 6. 2017 (MH); Veľký kopec (8) – xerothermophilous 1 – Palaearctic.

Glaucopsyche alexis (Poda, 1761) – C (2); MT (3c); V 14. 5. 1994 (Kj), 17. 6. 2016 (SM); Svätuše 1. 6. 2004 (MH); MT (7); K 14. 5. 2008 (Pj); SO 13. 6. 2018 (SM) – xerothermophilous 2 – Palaearctic.

Phengaris arion (Linnaeus, 1758) – C (2); V (4); Kucany (6); Veľký kopec (8) – xerothermophilous 1 – Palaearctic. Protected species of Natura 2000.

Phengaris teleius (Bergsträser, 1779) – Kucany (6); Raškovský luh 19. 7. 2007; Beša 18. 7. 2914, Čičarovce 14. 7. 2006 až 24. 7. 2019 (SM) – hygrophilous – Palaearctic. A common species in wet meadows with *Sanguisorba officinalis*. Protected species of Natura 2000.

Plebeius argus (Linnaeus, 1758) – V, SO, C (2); MT (3c); Borša, V, T, K (4); LL 8. 9. 1991 (ZT); Dlhé Tice, Kucany, Latorica–bridge, Solnička, Svinice (6); Veľký kopec (8) – xerothermophilous 1 – Palaearctic. Common species.

Plebeius idas (Linnaeus, 1758) – C, V, V. Kamenec, KCH (2) – V, K (4); Veľký kopec (8) – xerothermophilous 1 – Holarctic.

Plebeius argyrognomon (Bergsträsser, 1779) – SNM (1); T 14. 5. 2008 (Pj) – xerothermophilous 1 – European.

Aricia agestis (Den. et Schiffermüller, 1775) – T (Pj); MT, Veľká Tŕňa (7); Chlmecké kopce 11. 7. 2015 (Pj); Veľká kopec (8) – xerothermophilous 1 – Palaearctic.

Polyommatus semiargus (Rottemburg, 1775) – MT (3c, 7) – mesophilous 1 – Palaearctic.

Polyommatus dorylas (Denis et Schiffermüller, 1775) – T 25. 6. 2013, K 31. 7. 2015 (Pj); Veľký kopec (8) – xerothermophilous 1 – European.

Polyommatus icarus (Rottemburg, 1775) – SNM (1); SO, C, Z, V. Kamenec (2); Borša, V, T, M. Horeš, K (4); T 10. 7. 1992 (Kj); KM, Kucany, Latorica–bridge, Svinice (6); MT (7) K 27. 5. 1995 ex larvae, 15. 7. 1995 (ZT) – ubiquitous – Palaearctic. Common species.

Polyommatus daphnis (Denis et Schiffermüller, 1775) – MT (3c); V, T (4); Strážne 7. 7. 2006 (MH); Kucany, Avaš (6); Veľký kopec (8) – xerothermophilous 1 – Ponto-Mediterranean.

Polyommatus bellargus (Rottemburg, 1775) – KCH (2); Strážne 7. 7. 2006 (SM), T 4. 6. 2008, Svätuše, K 16. 8. 2008 (MH); MT (7) – xerothermophilous 1 – Ponto-Mediterranean.

Polyommatus coridon (Poda, 1761) – MT (3c); V, K (4);V 19.7.1993 (Kj); Kucany (6);V. Tŕňa (7); V. kopec (8) – xerothermophilous 1 – European.

Nymphalidae

Libythea celtis (Laicharting in Fuessly, 1782) – Strážne 1. 5. 2015, 7. 5. 2016, Ladmovce 27. 3. 2020 (M. Balla) – xerothermophilous 2 – Palaearctic.

Argynnis paphia (Linnaeus, 1758) – C (2); Tajba, K (4); Latorica–bridge (6); MT, Veľká Tŕňa (7); Veľký kopec (8) – mesophilous 3 – Eurosiberian.

Argynnis pandora (Denis et Schiffermüller, 1775) – V. Kamenec (2); Klin nad Bodrogom 11. 9. 2018 (SM) – xerotermophilous 2 – Mediterranean (Fig. 18).

Argynnis aglaja (Linnaeus, 1758) – C (2); K (4); Dlhé Tice, Svinice (6); MT, Veľká Tŕňa (7); SO 4. 7. 2013 (SM) – mesophilous 2 – Palaearctic.

Argynnis adippe (Denis et Schiffermüller, 1775) – KCH (1); MT (3c); K (4); Kucany abundant, KM (6); Veľká Tŕňa (7) – mesophilous 2 – Palaearctic.

Argynnis laodice (Pallas, 1771) – Veľká Tŕňa (7) – mesophilous 2 and 3 – Eurosiberian.

Issoria lathonia (Linnaeus, 1758) – KCH (1); C (2); K (4); KM, Kucany, Solnička, Avaš abundant (6); MT (7); Veľký kopec (8) – ubiquitous – West-Palaearctic.

Brenthis ino (Rottemburg, 1775) – MT, Veľká Tŕňa (7); Svätá Mária 13. 7. 10, Boľ 23. 6. 2006 (SM) – hygrophilous, mesophilous 2 – Eurosiberian.

Brenthis daphne (Denis et Schiffermüller, 1775) – Ladmovce, Svätá Mária, T (6); Avaš 26. 5. 2009 (Pj); Veľký kopec (8) – xerothermophilous 2, mesophilous 2 – Palaearctic.

Brenthis hecate (Denis et Schiffermüller, 1775) – Veľký kopec (6, 8, too SM); Kapušianske Kľačany 12. 6. 2014, Beša-Moľva 14. 6. 2016 (SM); Veľký kopec (8, Panigaj & Kalivoda 2019) – xerothermophilous 2 – Ponto-Mediterranean.

Boloria euphrosyne (Linnaeus, 1758) – C, Z (2), Kucany; T (6); Čičarovský les 23. 5. 2015 (Pj) – mesophilous 2 – Eurosiberian.

Boloria selene (Denis et Schiffermüller, 1775) – C, Leles, Z (2); Kucany (6); MT, Veľká Tŕňa (7); Čičarovský les 7. 6. 2015 (Pj); Chlmecké kopce 25. 6. 2015 (Pj); Veľký kopec (8) – mesophilous 2 (tyrphophilous) – Holarctic.

Boloria dia (Linnaeus, 1767) – C, Leles, KCH (2); MT, T (3c); K (4); MT (7); Čičarovský les 6. 8. 2015 (Pj); Veľký kopec (8) – mesophilous 1, xerothermophilous 2 – Eurosiberian.

Vanessa atalanta (Linnaeus, 1758) – Leles (2); Tajba (4); Latorica–bridge abundant, Svinice, KM (6); MT, Veľká Tŕňa (7); Veľký kopec (8) – ubiqutous – Holarctic.

Vanessa cardui (Linnaeus, 1758) – Leles (2); V, K (4); KM abundant, Kucany mass occurrence (6); Veľký kopec (8) – ubiquitous – Cosmopolitan. In some years, a mass migrant.

Araschnia levana (Linnaeus, 1758) – C, V. Kamenec, Leles, KCH (2); V (4); KM very abundant, Dlhé Tice, Svinice abundant (6); MT, Veľká Tŕňa (7); Veľký kopec (8) – mesophilous 3 – Palaearctic.

Aglais io (Linnaeus, 1758) – Tajba (4); KM, Kucany abundant, Latorica–bridge mass occurrence, Dlhé Tice, Svinice abundant (6); MT, Veľká Tŕňa (7); Veľký kopec (8) – ubiquitous – Palaearctic.

Aglais urticae (Linnaeus, 1758) – Borša, Tajba, V, K (4); Kucany abundant (6); MT, Veľká Tŕňa (7); Veľký kopec (8) – ubiquitous – Palaearctic.

Nymphalis polychloros (Linnaeus, 1758) – C, Leles (2); MT (3c); KM (6); Kapušianske Kľačany 6. 3. 2015, Strážne 29. 5. 2018, K 17. 4. 2019 (SM); Veľký kopec (8) – mesophilous 3 – West-Palaearctic.

Nymphalis antiopa (Linnaeus, 1758) – Tajba (4); KM (6); MT (7); Čičarovský les 25. 4. 2015 (Pj) – mesophilous 3 – Holarctic.

Nymphalis xanthomelas (Denis et Schiffermüller, 1775) – Kapušianske Kľačany 6. 3. 2014, 13. 3. 2018, MT 5. 4. 2016, Strážne 29. 5. 2018, K 21. 3. 2019, V. Kamenec 20. 3. 2015, Beša 26. 3. 2017, Rad, Zatín 6. 6. 2019 (SM), Rad – dead stream branch of Latorica 7. 4. 2020 (K. Gulyás) – mesophilous 3 – Eurosiberian.

Nymphalis c-album (Linnaeus, 1758) – Leles (2); Borša (4); KM, Kucany abundant, Dlhé Tice, Svinice (6); MT, Veľká Tŕňa (7); Chlmecké kopce 25. 6. 2015 (Pj) – mesophilous 3 – Palaearctic.

Apatura iris (Linnaeus, 1758) – Kucany (6); Chlmecké kopce 11. 7. 2015 (Pj) – mesophilous 3 – Eurosiberian.

Apatura ilia (Denis et Schiffermüller, 1775) – C, KCH (2); M. Trakany-shore of Tisa 3. 9. 2004 (MH); Chlmecké kopce 11. 7. 2015 (Pj) – mesophilous 3 – Eurosiberian.

Limenitis camilla (Linnaeus, 1764) – Ladmovce-Tardiky 30. 6. 2009 (observ. et photo M. Balla) – mesophilous 3 – Palarearctic.

Neptis sappho (Pallas, 1771) – C (2); Čičarovce 14. 6. 2019 (SM) – mesophilous 2 – Palaearctic (Oriental?) (Fig. 19).

Melitaea cinxia (Linnaeus, 1758) – C (2); MT (3c); V 14. 5. 1994 (Kj); Svätuše 1. 6. 2004 (MH); T 14. 5. 2008 (Pj); Avaš 26. 5. 2009 (Pj); Veľký kopec 3. 5. 2007, MV 23. 5. 2014, Beša-Moľva 22. 5. 2018, Klin nad Bodrogom 11. 9. 2018 (SM) – mesophilous 1 – Palaearctic.

Melitaea phoebe (Denis et Schiffermüller, 1775) – C, SO, Z (2); K 14. 5. 1994 (ZT); Svinice (6); MT (7); Chlmecké kopce 6. 8. 2015 (Pj); Veľký kopec (8); Čičarovské lúky 6. 6. 2019 (SM) – xerothermophilous 2 – Palaearctic. Abundant in all area.

Melitaea trivia (Denis et Schiffermüller, 1775) – V (4); T, K, Avaš 23. – 25. 6. 2009 (Pj); MV 23. 5. 2014, Ladmovce 7. 5. 2014 (SM); Veľký kopec (8) – xerothermophilous 1 – Ponto-Mediterranean.

Melitaea didyma (Esper, 1779) – C (2); K (4); Kucany (6); Veľký kopec (8) – xerothermophilous 1 – West-Palaearctic.

Melitaea britomartis (Assmann, 1847) – M. Kamenec-Tarbucka 26. 6. 2006 (MH) – xerothermophilous 2 – Eurosiberian.

Melitaea athalia (Rottemburg, 1775) – C, Z (2); Borša (4); Latorica-bridge abundant, Svinice (4, 6); MT, Veľká Tŕňa (7) – mesophilous 2 – Palaearctic.

Euphydryas maturna (Linnaeus, 1758) – mapping square of the Slovak Fauna Databank – 7696 2. 5. 2019 1 ex. observ. et photo M. Balla (Fig. 20). The author does not publish the exact location due to the protection of a possible population. Only the second record on Eastern Slovakia. Protected species of Natura 2000 – mesophilous 3 – Eurosiberian.

Pararge aegeria (Linnaeus, 1758) – C (2); Tajba (4); MT (7); Čičarovský les 7. 6. 2015 (Pj); Veľký kopec (8); BL (9) – mesophilous 3 – West-Palaearctic.

Lasiommata megera (Linnaeus, 1767) – C (2); MT (3c); V, T, K (4); Avaš (6); Veľká Tŕňa (7); Veľký kopec (8) – ubiquitous – West-Palaearctic.

Lasiommata maera (Linnaeus, 1758) – C (2); V, T, K (4); Dlhé Tice, Kucany (6); Veľká Tŕňa (7); Čičarovský les 7. 6. 2015 (Pj); Veľký kopec (8) – mesophilous 3, xerothermophilous 2 – West-Palaearctic.

Coenonympha arcania (Linnaeus, 1761) – C (2); MT (3c); Solnička abundant (6); MT, Veľká Tŕňa (7); Chlmecké kopce 5. 6. 2015 (Pj); Veľký kopec (8) – mesophilous 2 to xerothermophilous 2 – European.

Coenonympha glycerion (Borkhausen, 1788) – V, K (4); Kucany very abundant (6); Veľká Tŕňa (7); Veľký kopec (8) – xerothermophilous 2, hygrophilous – Eurosiberian.

Coenonympha pamphilus (Linnaeus, 1758) – C, Z, KCH (2); Borša, K (4); KM, Kucany, Latorica–bridge, Solnička, Dlhé Tice, Svinice (6); MT, Veľká Tŕňa (7); Veľký kopec (8); BL (9) – ubiquitous – Palaearctic. Common species.

Aphantopus hyperanthus (Linnaeus, 1758) – C (2); Tajba, V, K (4); Kucany, Dlhé Tice, Svinice, Latorica–bridge (6); MT, Veľká Tŕňa (7); Veľký kopec (8) – mesophilous 1 – Palaearctic.

Maniola jurtina (Linnaeus, 1758) – C, Leles (2); Borša, Tajba, V, T, K (4); V 18. 6. 1994 (Kj); Kucany, Latorica–bridge, Solnička, Svinice (6); MT, Veľká Tŕňa (7); Veľký kopec (8) – ubiquitous – West-Palaearctic. Common species.

Hyponephele lycaon (Rottemburg, 1775) – C (2); MT (3c); V, K (4); Svinice (6); V. kopec (8) – xerothermophilous 1 – West-Palaearctic.

Melanargia galathea (Linnaeus, 1758) – Borša (1); C, V. Kamenec (2); Borša, V, T, K (4); Kucany abundant (6); MT, Veľká Tŕňa (7); Veľký kopec (8) – mesophilous 1 – West-Palaearctic.

Minois dryas (Scopoli, 1763) – SNM (1); C (2); V, K (4); Kucany very abundant (6); MT, Veľká Tŕňa (7); Veľký kopec (8); BL (9) – xerothermophilous 1 to hygrophilous – Eurosiberian.

Hipparchia fagi (Scopoli, 1763) – Borša (1); C (2); MT (3c); V, K (4); MT (7) – xerothermophilous 2 – Ponto-Mediterranean.

Hipparchia semele (Linnaeus, 1758) – C (2); Veľký kopec (8) – xerothermophilous 2 – European.

Arethusana arethusa (Denis et Schiffermüller, 1775) – V, K (4); Avaš (6); V. Kamenec 20. 8. 2009 (B. Endel); Veľký kopec (8) – xerothermophilous 2 – West-Palaearctic.

Brintesia circe (Fabricius, 1775) – V. Kamenec, C (2); MT (3c); V, K (4); Avaš (6); Veľká Tŕňa (7); Veľký kopec (8) – xerothermophilous 2 – West-Palaearctic.

Pyralidae

Aphomia sociella (Linnaeus, 1758) – MV 1. 7. 2002 (IR); BL (9) – mesophilous 2 and 3 – ?.

Aphomia zelleri (Joannis, 1932) – MT (3b); Borša (5); V 10. 7. 1993 (Kj); MV 1. 7. 2002 (IR) – xerothermophilous to mesophilous 1 and 2 – ?.

Lamoria anella (Denis et Schiffermüller, 1775) – V 24. 6. 1992 (Kj); K 15. 7. 1995, 29. 6. 1996, 10. 7. 2003 (ZT); T 28. 6. 2001 (IR).

Galleria mellonella (Linnaeus, 1758) – MT (3b) – mesophilous 2 and 3 (synanthropic) – Cosmopolitan.

Synaphe moldavica (Esper, 1794) – VK 11. 6. 1993 (IR); Latorica-bridge (6) – xerothermophilous 1 – South-European.

Synaphe punctalis (Fabricius, 1773) – SNM (1); MT (3b); MV 1. 7. 2002 (IR); T (6).

Pyralis regalis (Denis et Schiffermüller, 1775) – Borša (5); V 10. 7. 1993 (Kj); K 2. 7. 1993, 16. 6. 1995 (ZT, IR); Beša-Moľva (6) – mesophilous 2 and 3 – European.

Pyralis farinalis (Linnaeus, 1758) – Borša (5); K 27. 5. 2000 (IR); KM (6); BL (9) – synathropic – Cosmopolitan.

**Pyralis perversalis* (Herrich-Schäffer, 1849) – SO 4. 8. 2001 (IR) (Tokár et al. 2002 – as the first record from Slovakia).

Stemmatophora brunnealis (Treitschke, 1829) – V 29. 7. 1992 (Kj); K 5. 8. 1999 (IR).

Hypsopygia costalis (Fabricius, 1775) – Poľany, Beša-Moľva (6); BL (9) – synanthropic – Cosmopolitan?
Hypsopygia glaucinalis (Linnaeus, 1758) – K 17.9.1999 (ZT).
Hypsopygia rubidalis (Denis et Schiffermüller, 1775) – SNM (1).
Endotricha flammealis (Denis et Schiffermüller, 1775) – Borša (5); T 3. 8. 2001 (IR) – mesophilous 2 and 3 – ?.
Elegia similella (Zincken, 1818) – MV 7. 5. 2003 (IR).
Rhodophaea formosa (Haworth, 1811) – K 5. 8. 1999 (IR).
Pempelia ornatella (Denis et Schiffermüller, 1775) – T 17. 6. 1998 (IR).
Delplanqueia inscriptella (Duponchel, 1836) – K 29. 7. 1992, 29. 6., 10. 8. 1996 (ZT).
Delplanqueia dilutella (Denis et Schiffermüller, 1775) – K 5. 8. 1999 (IR).
Catastia marginea (Denis et Schiffermüller, 1775) – LL 27. 7. 1991 (ZT).
Khorassania compositella (Treitschke, 1835) – K 19. 7. 2003 (ZT).
Sciota fumella (Eversmann, 1844) – Klin nad Bodrogom 18. 6. 1998 (IR); K 7. 5. 2000 (ZT) – hygrophilous 1 – European.
Sciota rhenella (Zincken, 1818) – K 16. 6. 1995 (IR); BL (9).
Sciota adelphella (Fischer von Rosslerstamm, 1836) – Klin nad Bodrogom 18. 6. 1998 (IR); Latorica-bridge, Dlhé Tice (6).
Selagia argyrella (Denis et Schiffermüller, 1775) – K 5. 8. 1999 (IR).
Selagia spadicella (Hübner, 1796) – Borša (5); K 5. 8. 1999 (ZT); T 3. 8. 2001 (IR).
Etiella zinckenella (Treitschke, 1832) – T 27. 7. 2000 (IR).
Oncocera semirubella (Scopoli, 1763) – SNM (1); SO 22. 9. 2007 (IR); Dlhé Tice, Beša-Moľva, abundant (6); Chlmecké kopce 11. 6. 2015 (Pj); BL (9) – xerothermophilous 1 to mesophilous 1 and 2 – ?.
Phycita roborella (Denis et Schiffermüller, 1775) – MV 1. 7. 2002 (IR); LL 7. 6. 2003 (ZT).
Hypochalcia decorella (Hübner, 1810) – MV 5. 6. 2003 (IR).
Hypochalcia ahenella (Denis et Schiffermüller, 1775) – T 15. 6. 1995 (IR); Dlhé Tice (6).
Nephopterix angustella (Hübner, 1796) – MV 1. 7. 2002 (IR).
Hypochalcia dignella (Hübner, 1796) – Borša (Slamka 1997).
Acrobasis tumidana (Denis et Schiffermüller, 1775) – LL 16. 6. 1989, 4. 8. 1992, K 15. 7. 1995 (ZT); MV 2. 5. 2002 (IR).
Acrobasis repandana (Fabricius, 1798) – MT (3b); VK 19. 6. 1988 (IR); LL 16. 6. 1989, 7. 6. 2003 (ZT); BL (9).
Acrobasis suavella (Zincken, 1818) – MV 3. 8. 2003 (IR).
Acrobasis advenella (Zincken, 1818) – K 29.7.1992, 15. 7. 1995, 13. 7. 1996, 19. 7. 2003 (ZT).
Acrobasis legatea (Haworth, 1811) – K 15. 7. 1995 (IR), 13. 7. 1996 (ZT); T 27. 7. 2000 (IR).
Acrobasis dulcella (Zeller, 1848) – K 2. 7. 1993 (ZT) (Slamka 1997), 13. 7. 1996 (ZT); MV 1. 7. 2002 (IR).
Acrobasis marmorea (Haworth, 1811) – K 29. 6. 1996, 27. 5. 2000 (ZT, IR).
Acrobasis glaucella Staudinger, 1859 – V 1. 8. 2005 (IR).
Acrobasis obtusella (Hübner, 1796) – K 10. 7. 1993 (ZT); Klin nad Bodrogom 6. 7. 1996 (IR).
Acrobasis bistriatella (Hulst, 1887) – MV 1. 7. 2002 (IR).

Glyptoteles leucacrinella Zeller, 1848 – VK 19. 6. 1988 (IR).
Myelois circumvoluta (Freyer, 1785) – Boľské rašelinisko peat bog, Poľany, Beša-Moľva (6).
Eccopisa effractella Zeller, 1848 – K 5. 8. 1999 (IR).
Euzophera bigella (Zeller, 1848) – Klin nad Bodrogom 18. 6. 1998 (IR).
Euzophera cinerosella (Zeller, 1839) – K 27. 5. 2000 (IR).
Euzophera bigella (Zeller, 1848) – LL 7. 6. 2003 (ZT).
Nyctegretis lineana (Scopoli, 1786) – Dlhé Tice (6).
Episcythrastis tetricella (Denis et Schiffermüller, 1775) – K 30. 4. 1993, 16. 5. 1997, 26. 4. 2020 abundant (ZT).
Eurhodope rosella (Scopoli, 1763) – K 29. 7. 1992, 5. 8. 1999 (ZT).
Euzophera cinerosella (Zeller, 1839) – K 15. 7. 1995 (ZT).
Euzophera fuliginosella (Heinemann, 1865) – LL 7. 6. 2003 (ZT).
Homoeosoma sinuella (Fabricius, 1794) – K 18. 6. 1994, 27. 5. 2000 (ZT, IR); BL (9).
Homoeosoma inustella Ragonot, 1884 – K 15. 7. 1995, 16. 8. 1997 (ZT), 5. 8. 1999 (IR).
Homoeosoma nebulella (Denis et Schiffermüller, 1775) – SNM (1); K 5. 8. 1999 (IR).
Homoeosoma nimbella (Duponchel, 1837) – K 13. 7. 1996, 17. 9. 1999 (ZT); T 17. 9. 1999 (IR).
Ectohomoeosoma kasyellum (Roesler, 1965) – K 17. 9. 1999 (Tokár et al. 2002).
Phycitodes maritima (Tengström, 1848) – MV 1. 7. 2002 (IR).
Phycitodes binaevella (Hübner, 1813) – K 5. 8., 17. 9. 1999 (ZT, IR); Beša-Moľva (6); BL (9).
Phycitodes inquinatella (Ragonot, 1887) – T 3. 8. 2001 (IR); MV 29. 7. 2002 (ZT) – xerothermophilous to mesopilous 1 – Southern and Central European.
Phycitodes albatella (Ragonot, 1887) – K 15. 7. 1995, 5. 8. 1999 (ZT, IR).
Ephestia kuehniella Zeller, 1879 – K 16. 6. 1995 (IR) – synanthropic - Cosmopolitan.
Cadra furcatella (Herrich-Schäffer, 1849) – K 14. 5. 1994, 7. 5. 2000, 24. 8. 2002 (ZT); MV 21. 8. 2003 (IR).
Anerastia lotella (Hübner, 1813) – T 27. 7. 2000 (IR).
Ematheudes punctella (Treitschke, 1833) – T 27. 7. 2000 (IR).

Crambidae
Cholius luteolaris (Scopoli, 1772) – K 27. 5. 2000 (IR).
Scoparia subfusca Haworth, 1811 – SO 2. 8. 2002 (IR).
Scoparia pyralella (Denis et Schiffermüller, 1775) – Klin nad Bodrogom 18. 6. 1998 (IR).
Eudonia lacustrata (Panzer, 1804) – K 18. 6. 1994 (ZT); Klin nad Bodrogom 6. 7. 1996 (IR).
Eudonia mercurella (Linnaeus, 1758) – Poľany (6).
Heliothella wulfeniana (Scopoli, 1763) – Kopč. slanisko 3. 6. 2019 (MH).
Euchromius ocellea (Haworth, 1811) – K 17.9.1999 (ZT) – mesophilous 1 and 2 – South-Eastern European.
Chilo phragmitellus (Hübner, 1810) – Borša (5); V 15. 7. 1995 (Kj); T 28. 6. 2001 (IR); Beša-Moľva (6); Strážne 23. 7. 2009 (MH) – hygrophilous 1 – ?.
Calamotropha paludella (Hübner, 1824) – Borša (3b); V 29. 7. 1992 (Kj); T 28. 6. 2001 (IR; Latorica-bridge, Poľany abundant, Dlhé Tice (6); BL (9) – hygrophilous 1 – ?.
Chrysoteuchia culmella (Linnaeus, 1758) – SNM (1); T 17. 6. 1998 (IR).

Crambus pascuella (Linnaeus, 1758) – SNM (1); T 28. 6. 2001 (IR).
Crambus lathoniella (Zincken, 1817) – T 17. 6. 1998 (IR).
Crambus perlella (Scopoli, 1763) – K (5); LL 22. 6. 1989 (ZT); VK 2. 6. 2000 (IR); Dlhé Tice, Latorica-bridge abundant (6).
Agriphila tristella (Denis et Schiffermüller, 1775) – SO 22. 9, 2007 (IR); Beša-Moľva, KM, Sírnik-Avaš – mass occurrence (6); BL (9).
Agriphila inquinatella (Denis et Schiffermüller, 1775) – MV 21. 8. 2003 (IR).
Agriphila selasella (Hübner, 1813) – SNM (1).
Agriphila geniculea (Haworth, 1811) – BL (9).
Agriphila straminella (Denis et Schiffermüller, 1775) – T 17. 6. 1998 (IR).
Catoptria falsella (Denis et Schiffermüller, 1775) – Borša 1. 8. 1985 (5, IR).
Catoptria pinella (Linnaeus, 1758) – K 15. 7. 1995, 19. 7. 2003 (ZT).
Catoptria verellus (Zincken,1817) – K 18. 6. 1994 (ZT); V 10. 7. 1994 (Kj); MV 1. 7. 2002 (IR).
Xanthocrambus saxonellus (Zincken, 1821) – K 10. 7. 1993 (ZT); V 19. 7. 1993 (Kj); T 15. 6. 1995 (IR); Veľký vrch 15. 7. 1995 (ZT).
Chrysocrambus craterella (Scopoli, 1763) – SNM, V (1); MT (3b); K, V 18. 6. 1994 (ZT, Kj); T 17. 6. 1998 (IR).
Thisanotia chrysonuchella (Scopoli, 1763) – SNM (1); C (2a); MT (3b); K 13. 5. 1995, 26. 4. 2020 abundant (ZT); V 15. 5. 1993 (Kj); T 15. 6. 1995 (IR) – abundant.
Pediasia luteella (Denis et Schiffermüller, 1775) – SNM (1); SO 29. 6. 2001 (IR); Kopč. slanisko 3. 6. a 19. 6. 2019 (MH).
Pediasia contaminella (Hübner, 1796) – K 15. 7. 1995 (ZT); SO 4. 8. 2001 (IR).
Pediasia aridella (Thunberg, 1788) – K 27. 5. 2000 (IR); LL 7. 6. 2003 (ZT).
Platytes cerussella (Denis et Schiffermüller, 1775) – Borša 22.5.1992, T 12. 6. 2000 (Kj); Sírnik 5. 6. 2003 (IR); LL 7. 6. 2003 (ZT); Kopč. slanisko 13. 6. 2019 (MH).
Pediasia alpinella (Hübner, 1813) – Borša (5); T 27. 7. 2000 (IR); Beša-Moľva, very abundant (6).
Schoenobius gigantella (Denis et Schiffermüller, 1775) – Borša 1. 8. 1985 (IR) – hygrophilous 1 – ?.
Donacaula forficella (Thunberg, 1794) – Borša (5); V 24. 6. 1992 (Kj), K 5. 8. 1999 (IR); Poľany abundant, Beša-Moľva (6); BL (9) – hygrophilous 1 – ?.
Donacaula mucronella (Denis et Schiffermüller, 1775) – Borša (3b) – hygrophilous 1 – ?.
Elophila nymphaeata (Linnaeus, 1758) – Borša (5); LL 22. 6. 1989, 7. 6. 2003 (ZT); V 24. 6. 1992, T 12. 6. 2000 (Kj); K 17. 9. 1999 (IR); Poľany abundant, Dlhé Tice abundant, Beša-Moľva (6); BL (9) – hygrophilous 1 – ?.
Acentria ephemerella (Denis et Schiffermüller, 1775) – VK 7. 6. 2003 (IR) – hygrothermophilous – ?.
Cataclysta lemnata (Linnaeus, 1758) – Borša (5); V 24.6.1992, T 12. 6. 2000 (Kj); Klin nad Bodrogom 18. 6. 1998 (IR); Beša-Moľva (6); BL (9) – hygrophilous 1 – ?.
Parapoynx stratiotata (Linnaeus, 1758) – Borša (3b); V 10.7.1993, T 12. 6. 2000 (Kj); Klin nad Bodrogom 6. 7. 1996 (IR); Beša-Moľva (6); BL (9) – hygrophilous 1 – ?.
Parapoynx stagnalis (Zeller, 1852) – LL 7. 6. 2003 (ZT) – hygrophilous 1 – ?.
Nymphula nitidulata (Hufnagel, 1767) – Borša (3b); VK 7. 6. 2003 (IR).

Eurrhypis pollinalis (Denis et Schiffermüller, 1775) – K 18. 6. 1994 (ZT).
Aporodes floralis (Hübner, 1809) – T 12. 6. 2000 (Kj); MV 21. 8. 2003 (IR); Beša-Moľva, Dlhé Tice (6).
Cynaeda dentalis (Denis et Schiffermüller, 1775) – V 18. 6. 1994 (Kj).
Epascestria pustulalis (Hübner, 1823) – K 16. 6. 1995 (IR).
Atralata albofascialis (Treitschke, 1829) – MV 7. 5. 2003 (IR).
Titanio normalis (Hübner, 1796) – T 12. 6. 1993 (IR); V. Kamenec, K 15. 4. 20 (MH).
Evergestis frumentalis Linnaeus, 1758 – V 14. 5. 1994 (Kj); V. Kamenec 21. 5. 2011 (B. Endel); T 15. 5. 2018 (MH).
Evergestis extimalis (Scopoli, 1763) – Borša 1. 8. 1985 (IR); V 29. 7. 1992 (Kj); BL (9).
Evergestis limbata (Linnaeus, 1767) – V 10. 7. 1993 (Kj); K 16. 8. 1997 (ZT); T 29. 5. 1999 (IR).
Evergestis pallidata (Hufnagel, 1767) – Klin nad Bodrogom 18. 6. 1998 (IR); Beša-Moľva, Dlhé Tice (6).
Evergestis aenealis (Denis et Schiffermüller, 1775) – K 10. 8. 1996, 7. 5. 2000 (ZT); SO 4. 8. 2001 (IR).
Paracorsia repandalis (Denis et Schiffermüller, 1775) – V 13. 5. 1995 (Kj); K 13. 7. 1996 (ZT); SO 2002 1ex. (IR).
Loxostege turbidalis (Treitschke, 1829) – T 29. 5. 1999 (IR).
Loxostege sticticalis (Linnaeus, 1761) – K 5. 8. 1999 (IR); Beša-Moľva (6); Chlmecké kopce 11. 6. 2015 (Pj).
Uresiphita gilvata (Fabricius, 1794) – Zemplínske vrchy Mts. 3. 5. 2002 (ZT).
Ecpyrrhorrhoe rubiginalis (Hübner, 1796) – V 13. 7. 1994 (Kj); T 30. 4. 2000 (IR); Zemplínske vrchy Mts. 3. 5. 2002 (ZT).
Pyrausta cingulata (Linnaeus,1758) – V 14. 5. 1994 (Kj); K 13. 5. 1995, 5. 8. 1999, 16. 8. 2007 (ZT, IR, MH).
Pyrausta rectefascialis Toll, 1936 – K 5. 8. 1999 (IR).
Pyrausta virginalis (Duponchel, 1832) – T. 28. 5. 1999 (IR).
Pyrausta sanguinalis ((Linnaeus, 1767) – V 10. 7. 1993 (Kj); K 11. 6. 2000 (Pj), T (6); M. Kamenec (MH).
Pyrausta despicata (Scopoli, 1763) – C (2); SNM (1); K (5); V 19.7.1993 (Kj); T 15. 6. 1995 (IR); KM, Dlhé Tice (6); BL (9).
Pyrausta aurata (Scopoli, 1763) – Borša, K (5); T 27. 7. 2000 (IR); KM, Latorica-bridge (6); Chlmecké kopce 11. 6. 2015 (Pj).
Pyrausta purpuralis (Linnaeus, 1758) – C (2); MT (3b); K (5); K 5. 8. 1999 (IR).
Pyrausta ostrinalis (Hübner, 1796) – SNM (1); V 18. 6. 1994 (Kj); K 2. 7., 17. 8. 1992, 13. 7. 1996, 5. 8. 1999 (ZT, IR).
Pyrausta nigrata (Scopoli, 1763) – T. 27. 7. 2000 (IR); K 19. 4. 2010 (MH).
Nascia cilialis (Hübner, 1796) – Klin nad Bodrogom 6. 7. 1996 (IR); MV 7. 5. 2003 (ZT); Poľany (6).
Sitochroa palealis (Denis et Schiffermüller, 1775) – Borša (3b); T 27. 7. 2000 (IR); Kopč. slanisko 25. 7. 2019 (MH); BL (9).
Sitochroa verticalis (Linnaeus, 1758) – MT (3b); V 15. 5. 1993 (Kj); SO 29. 6. 2001 (IR).
Anania coronata (Hufnagel, 1767) – Borša (5); T 29. 5. 1999 (IR).

Anania hortulata (Linnaeus, 1758) – Borša (5); Poľany (6); BL (9).
Anania perlucidalis (Hübner, 1809) – Klin nad Bodrogom 27. 5. 2005 (IR).
Anania verbascalis (Denis et Schiffermüller, 1775) – V 18. 6. 1994 (Kj); K 7. 5. 2000 (ZT); T 27. 7. 2000 (IR).
Psammotis pulveralis (Hübner, 1796) – K 27. 9. 1992 (ZT); V 13. 7. 1994 (Kj); SO 2. 8. 2002 (IR); Beša-Moľva (6); Zemplín 29. 7. 1992 (ZT).
Ostrinia palustralis (Hübner, 1796) – Borša 1. 8. 1985 (IR); BL (9).
Ostrinia nubilalis (Hübner, 1796) – SNM (1); MT (3b); Borša (5); V 24. 6. 1992 (Kj); T 15. 6. 1995 (IR); Poľany abundant, Dlhé Tice, Beša-Moľva (6); BL (9).
Paratalanta pandalis (Hübner, 1825) – SNM (1); Borša (5); K 29. 4. 2000 (IR).
Paratalanta hyalinalis (Hübner, 1796) – BL (9).
Udea ferrugalis (Hübner, 1796) – VK 4. 10. 2001 (IR).
Udea institalis (Hübner, 1819) – K 14. 5. 1994, 16. 5. 1997 (ZT).
Udea lutealis (Hübner, 1809) – K 5. 8. 1999 (IR).
Patania ruralis (Scopoli, 1763) – C (2); Borša (5); Dlhé Tice, Beša-Moľva (6); Chlmecké kopce 11. 6. 2015 (Pj); BL (9).
Mecyna flavalis (Denis et Schiffermüller, 1775) – LL 19. 6. 1988 (IR); K 2. 7. 1993, Kopč. slanisko 21. 4. 1994, 7. 6. 2015, 24. 8. 1999 (ZT); V 18. 6. 1994 (Kj); T 28. 6. 2001 (IR).
Diasemia reticularis (Linnaeus, 1761) – Borša (5), 22. 5. 1992 (Kj); K 5. 8. 1999 (IR); Dlhé Tice, Poľany, Beša-Moľva (6).
Cydalima perspectalis (Walker, 1859) – Borša 2019 (Pj) – mesophilous 2 and 3 – originally widespread in Eastern Asia, now introduced to Europe. Pest of *Buxus* spp.
Dolicharthria punctalis (Denis et Schiffermüller, 1775) – Klin nad Bodrogom 18. 6. 1998 (IR).
Metasia ophialis (Treitschke, 1829) – V 29. 7. 1992 (Kj); K 29. 7., 17. 8. 1992 (ZT) (Slamka 1997), 10. 7. 1993, 15. 7. 1995, 29. 6., 13. 7., 10. 8. 1996, 19. 7. 2003, Veľký vrch 15. 7. 1995 (ZT).
Nomophila noctuella (Denis et Schiffermüller, 1775) – Borša (5); VK 4. 10. 2001 (IR); KM, Dlhé Tice (6); BL (9).

Drepanidae

Falcaria lacertinaria (Linnaeus, 1758) – Borša (5) – mesophilous 3 – Palaearctic.
Watsonalla binaria (Hufnagel, 1767) – MT (3c); V 14. 5. 1994 (Kj, ZT); MV 3. 5. 2002 (ZT); BL (9) – mesophilous 3 to xerothermophilous 2 – West-Palaearctic.
Drepana falcataria (Linnaeus, 1758) – Klin nad Bodrogom 27. 5. 2005(IR); Dlhé Tice (6) – mesophilous 2 to 3 – Palaearctic.
Sabra harpagula (Esper, 1786) – MT (3c); Borša (5) – mesophilous 2 and 3 – Palaearctic.
Cilix glaucata (Scopoli, 1763) – MT, M. Kamenec (3c); V 14. 5. 1994, T 12. 6. 2000 (Kj); Latorica-bridge 14. 5. 2010 (Pj) – xerothermophilous 2 – West-Palaearctic.
Thyatira batis (Linnaeus, 1758) – MT (3c); Borša (5); Dlhé Tice, Beša-Moľva (6); BL (9) – mesophilous 1 and 2 – Palaearctic.
Habrosyne pyritoides (Hufnagel, 1766) – MT (3c); Borša (5); Dlhé Tice, KM (6); BL (9) – mesophilous 2 – Palaearctic – common species.

Tethea ocularis (Linnaeus, 1767) – MT, M. Kamenec (3c); V 14. 5. 1994 (Kj); Klin nad Bodrogom 6. 7. 1996 (IR); Dlhé Tice (6); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous 2 – Palaearctic.

Tethea or (Denis et Schiffermüller, 1775) – MT, M. Kamenec, T (3c); Borša (5); Klin nad Bodrogom 27. 5. 2005 (IR); K, M, Dlhé Tice (6); BL (9) – mesophilous 2 and 3 – Palaearctic.

Tetheella fluctuosa (Hübner, 1803) – M. Kamenec (3c) – mesophilous 3 to hygrophilous 2 – Palaearctic.

Lasiocampidae

Malacosoma neustria (Linnaeus, 1758) – MT (3c); V 10. 7. 1993 (Kj); Klin nad Bodrogom 6. 7. 1996 (IR); BL (9) – mesophilous 2 to xerothermophilous 2 – Palaearctic.

Malacosoma castrense (Linnaeus, 1758) – V 15. 5. 1993 (Kj); K 19. 6. 2012 (MH) – xerothermophilous 1 – Palaearctic.

Eriogaster lanestris (Linnaeus, 1758) – K 15. 5. 1993 (ZT); V 10. 7. 1993 caterpillars (Kj); MV 2003 1 ex. (IR) – mesophilous 2 – Palaearctic.

Eriogaster catax (Linnaeus, 1758) – K 24. 4. 2014 (SM) – xerothermophilous 2 – West-Palaearctic. Protected species of Natura 2000.

Lasiocampa quercus (Linnaeus, 1758) – Borša (5); T 27. 7. 2000 (IR); K 3. 8. 2000 (ZT); Dlhé Tice (6); BL (9) – mesophilous 2 to xerothermophilous 2 – Palaearctic.

Lasiocampa trifolii (Denis et Schiffermüller, 1775) – MT (3c); V 14. 5. 1994 (Kj); K 24. 8. 2002 (ZT); Beša-Moľva (6); V. Kamenec 18. 8. 2009 (B. Endel) – xerothermophilous 1 to 2 – West-Palaearctic.

Macrothylacia rubi (Linnaeus, 1758) – K 16. 5. 1997 (ZT); Dlhé Tice, KM (6); Dlhé Tice 25. 5. 2009 (Pj); T 12. 9. 215 (Pj) – mesophilous 2 – Palaearctic.

Trichiura crataegi (Linnaeus, 1758) – MT (3c); Dlhé Tice (6); Raškovský luh 7. 9. 2013 (Pj) – mesophilous to mild hygrophilous – West-Palaearctic.

Euthrix potatoria (Linnaeus, 1758) – Dlhé Tice, Beša-Moľva (6) – hygrophilous 2 – Palaearctic.

Gastropacha quercifolia (Linnaeus, 1758) – Borša (5); T 27. 7. 2000 (IR); Dlhé Tice (6); K 13. 7. 2011 (Pj); Avaš 28. 7. 2013 (Pj); K 10. 7. 1999 (ZT) – mesophilous 2 to xerothermophilous 2 – Palaearctic.

Odonestis pruni (Linnaeus, 1758) – MT (3c); Borša (5); V 19.7.1993 (Kj); Borša (6) – mesophilous 2 – Palaearctic.

Saturniidae

Aglia tau (Linnaeus, 1758) – Malá Bara 10. 5. 2005 (Pj) – mesophilous 3 – Palaearctic.

Saturnia pyri (Denis et Schiffermüller, 1775) – Borša (5); Chlmecké kopce-Poniklecová lúčka (Ponec 1989); C (M. Dudáš) – mesophilous 2 to xerothermophilous 2 – Mediterranean.

Saturnia pavoniella (Scopoli, 1763) – KM (6) – mesophilous 2 – Palaearctic. It was originally identified as *Saturnia pavonia* (Linnaeus, 1758).

Sphingidae

Mimas tiliae (Linnaeus, 1758) – MT (3c); KM, Beša-Moľva (6) – mesophilous 2 and 3 – Palaearctic.

Smerinthus ocellatus (Linnaeus, 1758) – Dlhé Tice (6); Čičar. les 2. 7. 2015 (Pj); BL (9) – mesophilous to hygrophilous 2 – West-Palaearctic.
Laothoe populi (Linnaeus, 1758) – Borša (5); Dlhé Tice (6); Čičarovský les 2. 7. 2015, Chlmecké kopce 11. 6. 2015 (Pj); BL (9) – mesophilous to hygrophilous 2 – Palaearctic.
Agrius convolvuli (Linnaeus (1758) – M. Kamenec (3c); K 30. 4. 2000, 3. 8. 2003 (ZT) – xerothermophilous – Cosmopolitan.
Sphinx ligustri (Linnaeus, 1758) – M. Kamenec (3c); V 19. 7.1 993 (Kj); K 15. 7. 1995 (ZT), 13. 7. 2011 (Pj; Chlmecké kopce 11. 6. 2015 (Pj); Avaš 28. 7. 2013 (Pj) – mesophilous 2 and 3 – Palaearctic.
Sphinx pinastri (Linnaeus, 1758) – MT (3c); Borša (5); K 13. 7. 2011 (Pj) – mesophilous 3 – Holarctic.
Acherontia atropos (Linnaeus, 1758) – Borša 12. 8. 2018 (Pj) – mesophilous? – Palaeotropic?
Hemaris fuciformis (Linnaeus, 1758) – Ladmovce (3c) – mesophilous 2 and 3 – Palaearctic.
Macroglossum stellatarum (Linnaeus, 1758) – K (5); Svinice (6) – ubiquitous – Holarctic.
Proserpinus proserpina (Pallas, 1772) – MV 2. 5. 2003 (ZT) observed, 2. 5. 2013 (IR) – mesophilous to hygrophilous 2 – Palaearctic. Protected species of Natura 2000.
Hyles euphorbiae (Linnaeus, 1758) – M. Kamenec 28. 7. 1986 (Z. Laštůvka); V 14. 5. 1994 (Kj), K 7. 5. 2000 (ZT); Kucany (6); T 2012 (caterpillars), Avaš 28. 7. 2013 (Pj); Malý Horeš 12. 9. 2013 (SM) – xerothermophilous 1 – Palaearctic.
Hyles gallii (Rottemburg, 1775) – Čičarovce 25. 7. 2006, Vojka 24. 7. 2013, Kucany 7. 8. 2013 (SM) – mesophilous 2 and 3 – Holarctic.
Deilephila porcellus (Linnaeus, 1758) – MT (3c); Borša (5); KM, Poľany, Dlhé Tice (6); Čičarovský les 2. 7. 2015 (Pj); Avaš 28. 7. 2013 (Pj) – mesophilous 2 – West-Palaearctic.
Deilephila elpenor (Linnaeus, 1758) – MT (3c); Borša (5); Poľany, Dlhé Tice (6); K 13. 7. 2011 (Pj); Chlmecké kopce 11. 6. 2015 (Pj) – mesophilous 2 – Palaearctic.

Geometridae

Alsophila aceraria (Denis et Schiffermüller, 1775) – KM (6) – mesophilous 2 and 3 – Eurocaucasic.
Archiearis parthenias (Linnaeus, 1761) – Malá Bara 20. 3. 2010 (MH) – mesophilous 2 and 3 – Eurosiberian.
Boudinotiana notha (Hübner, 1803) – VK-Latorica river canal 17. 3. 2012 (MH) – mesophilous 2 and 3? – Eurosiberian.
Boudinotiana puella (Esper, 1787) – VK-Latorica river canal 20. 3. 10, 17. 3. 2012 (MH) – mesophilous 2 and 3 (hygrotermophilous) – European.
Abraxas grossulariata (Linnaeus, 1758) – Borša (5); T 28. 6. 2001 (IR); Dlhé Tice (6) – mesophilous to mind hygrophilous 2 and 3 – Palaearctic.
Ligdia adustata (Denis et Schiffermüller, 1775) – C (2); T 29. 5. 1999 (IR); Čičarovský les 2. 7. 2015 (Pj); Avaš 28. 7. 2013 (Pj); BL (9) – mesophilous 2 and 3 – West-Palaearctic.
Angerona prunaria (Linnaeus, 1758) – MT (3c); Borša (5); V 29.7.1992 (Kj); Dlhé Tice, Beša-Moľva (6); BL (9) – mesophilous 2 – Palaearctic.
Aspitates gilvaria (Denis et Schiffermüller, 1775) – MT (3c); Dlhé Tice (6); T (Pj) – xerothermophilous 1 and 2 – Eurosiberian.

Lomographa bimaculata (Fabricius, 1775) – C (2); T 30. 4. 2000 (IR) – mesophilous to hygrophilous 2 – Eurosiberian.
Lycia hirtaria (Clerck, 1759) – Leles IV. 1962 (leg. et det. J. Patočka, SMBB); MT (3c); KM (6); T 19. 4. 2013 (Pj); BL (9) – mesophilous 2 and 3 – Palaearctic.
Lycia pomonaria (Hübner, 1790) – Leles IV. 1962, Pavlovce n/Uhom 1963 (J. Patočka, SMBB) – mesophilous 2 and 3 – Eurosiberian.
Lycia zonaria (Denis et Schiffermüller, 1775) – VK (1); Beša-Moľva 6. 4. 2018 (R. Gabzdil) – xerothermophilous – European.
Biston strataria (Hufnagel, 1767) – MT (3c) – mesophilous 2 and 3 – Palaearctic.
Biston betularia (Linnaeus, 1758) – M. Kamenec, MT (3c); K 16. 9. 1997 (ZT); Borša (5); Dlhé Tice (6); BL (9) – mesophilous 2 and 3 – Holarctic.
Erannis defoliaria (Clerck, 1759) – BL (9) – mesophilous 2 and 3 – West-Palaearctic.
Agriopis bajaria (Denis et Schiffermüller, 1775) – KM (6) – mesophilous to xerothermophilous 2 and 3 – West-Palaearctic.
Synopsia sociaria (Hübner, 1799) – M. Kamenec (3c); V 19. 7. 1993 (Kj); K 5. 8. 1999 (IR) – mesophilous to xerothermophilous 2 – Mediterranean.
Peribatodes rhomboidaria (Denis et Schiffermüller, 1775) – V. Kamenec 18. 8. 2009 (B. Endel) – mesophilous 2 and 3 – West-Palaearctic.
Selidosema plumaria (Denis et Schiffermüller, 1775) – SO (1) – xerothermophilous 1 and 2 – Mediterranean.
Cleora cinctaria (Denis et Schiffermüller, 1775) – MT (3c); KM (6) – mesophilous to xerothermophilous 2 – Palaearctic.
Deileptenia ribeata (Clerck, 1759) – KM (6) – mesophilous 3 – Eurosiberian.
Alcis repandata (Linnaeus, 1759) – Dlhé Tice (6) – mesophilous 3 – West-Palaearctic.
Hypomecis roboraria (Denis et Schiffermüller, 1775) – MT (3c); MV 5. 6. 2003 (IR); BL (9) – mesophilous 2 and 3 – Eurosiberian.
Ascotis selenaria (Denis et Schiffermüller, 1775) – MT, M. Kamenec (3c); Borša (5); T 2006, some exemplars on *Artemisia* sp. (IR); Dlhé Tice, Poľany, Beša-Moľva (6); BL (9) – xerothermophilous 1 and 2 – Palaearctic.
Ectropis crepuscularia (Denis et Schiffermûller 1775) – MT (3c); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous 1 to 3 – Palaearctic.
Aethalura punctulata (Denis et Schiffermüller, 1775) – C (2) – mesophilous to hygrophilous 2 and 3 – West-Palaearctic.
Ematurga atomaria (Linnaeus, 1758) – C, Leles (2); MT (3c); Borša, K (5); KM, Latorica-bridge, Dlhé Tice (6); BL (9) – xerothermophilous to hygrophilous 1 and 2 – Palaearctic.
Cabera exanthemata (Scopoli, 1763) – C (2); Borša (5); Klin nad Bodrogom 27. 5. 2005 (IR); KM (6); BL (9) – mesophilous 2 and 3 – Holarctic.
Cabera pusaria (Linnaeus, 1758) – Borša (3c) – mesophilous – Eurosiberian.
Campaea margaritata (Linnaeus, 1767) – MT (3c); Dlhé Tice (6); BL (9) – mesophilous 3 – West-Palaearctic.
Lomographa bimaculata (Fabricius, 1775) – Borša (9) – mesophilous to hygrophilous 2 – Eurosiberian.
Lomaspilis marginata (Linnaeus, 1758) – C (2); Z (3c); Borša (5); K 27. 5. 2000 (IR); Dlhé Tice, Poľany (6); BL (9) – mesophilous to hygrophilous 2 and 3 – Palaearctic.

Stegania cararia (Hübner, 1790) – C (Laštůvka et al. 1982); Latorica-bridge (6); BL (9) – mesophilous to hygrophilous 2 – Eurosiberian.
Stegania dilectaria (Hübner, 1790) – MV 7. 5. 2003 (IR); BL (9) – mesophilous to hygrophilous 2 – Ponto-Mediterranean.
Colotois pennaria (Linnaeus, 1761) – MT (3c); K 25. 8. 2011 (Pj); BL (9) – mesophilous 2 and 3 – Palaearctic.
Apeira syringaria (Linnaeus, 1758) – C (2); MT (3c); VK 19. 6, 1988 (IR) – mesophilous 3 – Eurosiberian.
Ennomos autumnaria (Wernberg, 1813) – MT (3c);VK 4. 10. 2001 (IR); Dlhé Tice (6); BL (9) – mesophilous 2 and 3 – Eurosiberian.
Ennomos quercinaria (Hufnagel, 1767) – C (2); M. Kamenec, MT (3c); BL (9 – mesophilous 3 – West-Palaearctic.
Ennomos erosaria (Denis et Schiffermüller, 1775) – SNM (1); M. Kamenec (3c); VK 4. 10. 2001 (IR); Beša-Moľva (6); BL (9) – mesophilous to hygrophilous 2 – West-Palaearctic.
Ennomos quercaria (Hübner, 1813) – BL (9) – xerothermophilous 2 and 3 – Mediterranean.
Selenia dentaria (Fabricius, 1775) – Poľany (6); Avaš 28. 7. 2013 (Pj); BL (9) – mesophilous 2 and 3 – Palaearctic.
Selenia lunularia (Hübner, 1788) – C (2); M. Kamenec, MT (3c); BL (9) – mesophilous – West-Palaearctic.
Selenia tetralunaria (Hufnagel, 1767) – MT (3c); BL (9) – mesophilous 2 and 3 – Palaearctic.
Artiora evonymaria (Denis et Schiffermüller, 1775) – Streda nad Bodrogom (1); MT (3c); Raškovský luh 7. 9. 2013 (Pj); BL (9) – mesophilous 2 and 3 – Ponto-Mediterranean.
Opisthograptis luteolata (Linnaeus, 1758) – C (2); MT (3c); Borša (5); K 30. 4. 2000 (ZT); KM, Dlhé Tice (6) – mesophilous 2 and 3 – West-Palaearctic.
Epione repandaria (Hufnagel, 1767) – VK 7. 6. 2003 (IR); BL (9) – mesophilous to hygrophilous 2 – Eurosiberian.
Epione vespertaria (Linnaeus, 1767) – C (2) – mesophilous to hygrophilous 2 and 3 – Eurosiberian.
Therapis flavicaria.(Denis et Schiffermüller, 1775) – Borša 1. 8. 1985 (IR); K 16. 8. 1997 (ZT) – mesophilous 2 – Ponto-Mediterranean.
Pseudopanthera macularia (Linnaeus, 1758) – V (1); Borša (5); BL (9) – mesophilous 2 – Eurosiberian.
Eilicrinia cordiaria (Hübner, 1790) – Borša (5); V 15. 7. 1995 (Kj); Klin nad Bodrogom 6. 7. 1996 (IR); KM, Dlhé Tice (6); BL (9) – hygrophilous 2 – Ponto-Mediterranean.
Hypoxystis pluviaria (Fabricius, 1787) – V 13. 7. 1994 (Kj), MV 1. 7. 2002 (IR); KM, Kucany, Poľany (6) – mesophilous to hygrophilous 2 – Eurosiberian.
Charissa obscurata (Denis et Schiffermüller, 1775) – M. Kamenec (3c); K 16. 8. 1997 (ZT) – xerothermophilous to mesophilous 1 and 2 – West-Palaearctic.
Siona lineata (Scopoli, 1763) – Sírnik 28. 5. 2005 (IR); Dlhé Tice (6) – mesophilous 1 and 2 – Eurosiberian.
Odontopera bidentata (Clerck, 1759) – Bodrog basin (1) – mesophilous 3 – Eurosiberian.
Crocallis elinguaria (Linnaeus, 1758) – M. Kamenec, MT (3c); BL (9) – mesophilous 3 – Palaearctic.

Plagodis dolabraria (Linnaeus, 1767) – MT (3c); Borša, K (5); V 14.5.1994 (Kj), KM (6); BL (9) – mesophilous 3 – Palaearctic.

Heliomata glarearia (Denis et Schiffermüller, 1775) – C (2); V 29. 7. 1992 (Kj); T 15. 6. 1995 (IR); V. Kamenec 20. 8. 2009 (B. Endel) – xerothermophilous 1 and 2 – West-Palaearctic.

Macaria notata (Linnaeus, 1758) – C (2) – mesophilous to hygrophilous 2 and 3 – Eurosiberian.

Macaria alternata (Denis et Schiffermüller, 1775) – C (2); Borša (5); LL 6. 6. 1991 (ZT); Beša-Moľva (6) – mesophilous 1 and 2 – Palaearctic.

Macaria liturata (Clerck, 1759) – Sírnik 1. 8. 2002 (IR) – mesophilous to xerothermophilous 1 and 2 – Eurosiberian.

Chiasmia clathrata (Linnaeus, 1758) – C, V, KCH (2); Borša (5); BL (9) – mesophilous to xerothermophilous 1 and 2 – Palaearctic.

Isturgia roraria (Fabricius, 1776) – MT (3c) – xerothermophilous 2 – Ponto-Mediterranean.

Isturga murinaria (Denis et Schiffermüller, 1775) – M. Kamenec (3c); V 14. 5. 1994 (Kj); K 29. 4. 2000 (IR) – xerothermophilous 1 – Mediterranean.

Isturga arenacearia (Denis et Schiffermüller, 1775) – MT, M. Kamenec (3c); Borša (5); K 10. 7. 1993 (ZT); V 19. 7. 1993 (Kj); Klin nad Bodrogom 6. 7. 1996 (IR) – xerothermophilous 1 and 2 – Ponto-Mediterranean.

Narraga fasciolaria (Hufnagel, 1767) – M. Kamenec (Laštūvka et al. 1982); T 12. 6. 2000 (Kj); SO 4. 8. 2001 (IR) – xerothermophilous 1 and 2 – Palaearctic.

Ourapteryx sambucaria (Linnaeus, 1758) – K 16. 6. 1997 (ZT); Dlhé Tice (6); BL (9) – mesophilous 2 and 3 – Palaearctic.

Comibaena bajularia (Denis et Schiffermüller, 1775) – Dlhé Tice (6) – mesophilous to xerothermophilous 2 and 3 – West-Palaearctic.

Thetidia smaragdaria (Fabricius, 1787) – MT (3c); V 14. 5. 1994 (Kj); T 29. 5. 1999 (IR); Dlhé Tice (6); Čičarovský les 2. 7. 2015 (Pj); Avaš 28. 7. 2013 (Pj); BL (9) – xerothermophilous 1 – Palaearctic.

Hemistola chrysoprasaria (Esper, 1795) – V 18. 6. 1994 (Kj) – xerothermophilous 2 – Palaearctic.

Hemithea aestivaria (Hübner, 1799) – Leles (3); VK 19. 6. 1988 (IR); Čičarovský les 2. 7. 2015 (Pj); Avaš 28. 7. 2013 (Pj) – mesophilous 2 and 3 – Palaearctic.

Chlorissa cloraria (Hübner, 1813) – MT (3c); Borša, K (5) – mesophilous to xerothermophilous 2 – Ponto-Mediterranean.

Chlorissa viridata (Linnaeus, 1758) – MT, M. Kamenec (3c); Borša 22. 5. 1992 (Kj), T 2006, ex *Artemisia* sp. (IR); KM (6); Čičarovský les 2. 7. 2015 (Pj); Avaš 28. 7. 2013 (Pj); BL (9) – mesophilous to hygrophilous 2 and 3 – Palaearctic.

Phaiogramma etruscaria (Zeller, 1849) – T 3. 8. 2001 (IR) – xerothermophilous 1 and 2 – Mediterranean.

Jodis lactearia (Linnaeus, 1758) – K 29. 4. 2000 (IR) – mesophilous 2 – Palaearctic.

Thalera fimbrialis (Scopoli, 1763) – Borša (5); Poľany (6); BL (9) – xerothermophilous to mesophilous 1 – Palaearctic.

Euchoeca nebulata (Scopoli, 1763) – Beša-Moľva (6) – mesophilous to hygrophilous 2 and 3 – Eurosiberian.

Asthena anseraria (Herrich-Schäffer, 1855) – Klin nad Bodrogom 18. 6. 1998 (IR) – mesophilous 2 and 3 – Eurosiberian.
Asthena albulata (Hufnagel, 1767) – C (2) – mesophilous 3 – West-Palaearctic.
Minoa murinata (Scopoli, 1763) – C (2); MT (3c); Borša, V, K, T (5); BL (9) – mesophilous to xerothermophilous 1 and 2 – Palaearctic.
Cataclysme riguata (Hübner, 1913) – V 29. 7. 1992 (Kj) – xerothermophilous 1 and 2 – Mediterranean.
Phibalapteryx virgata (Hufnagel, 1767) – K (5); V 29. 7. 1992 (Kj); T 28. 6. 2001 (IR); BL (9) – mesophilous to xerothermophilous 1 – Palaearctic.
Aplocera efformata (Guenée, 1857) – MT (3c); MV 4. 10. 2002 (IR) – xerothermophilous 1 and 2 – Mediterranean.
Aplocera plagiata (Linnaeus, 1758) – MT (3c) – xerothermophilous to mesophilous 1 and 2 – West-Palaearctic.
Lithostege farinata (Hufnagel, 1767) – C, V (2) – xerothermophilous 1 – West-Palaearctic.
Lithostege griseata (Denis et Schiffermüller, 1775) – C (2) – xerothermophilous 1 – West-Palaearctic.
Cosmorhoe ocellata (Linnaeus, 1758) – VK 19. 6. 1988 (IR); Beša-Moľva (6); Chlmecké kopce 11. 6. 2015 (Pj); Čičarovský les 2. 7. 2015 (Pj); Avaš 28. 7. 2013 (Pj) – hygrophilous 1 and 2 – Palaearctic.
Gandaritis pyraliata (Denis et Schiffermûller 1775) – BL (9) – mesophilous – Palaearctic.
Cidaria fulvata (Forster, 1771) – VK 19. 6. 1988 (IR); K 18. 6. 1994 (ZT) – mesophilous to xerothermophilous 2 – Palaearctic.
Plemyria rubiginata (Denis et Schiffermüller, 1775) – Klin nad Bodrogom 18. 6. 1998 (IR); BL (9) – mesophilous to hygrophilous 2 and 3 – Eurosiberian.
Colostygia pectinataria (Knoch, 1781) – VK 19. 6. 1988 (IR); Beša-Moľva (6); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous to hygrophilous 2 and 3 – Palaearctic.
Euphyia biangulata (Haworth, 1809) – K 5. 8. 1999 (IR) – mesophilous to mind hygrophilous 3 – West-Palaearctic.
Eupithecia simpliciata (Haworth, 1809) – BL (9) – xerothermophilous to mesophilous 1 – Eurosiberian.
Eupithecia linariata (Denis et Schiffermüller, 1775) – C (2); M. Kamenec (3c); T 27. 7. 2000 (IR) – mesophilous to xerothermophilous 1 – Palaearctic.
Eupithecia plumbeolata (Haworth, 1809) – SNM (3c); Borša (5); LL 2. 6. 1990 (ZT); Latorica-bridge (6) – mesophilous 2 and 3 – Eurosiberian.
Eupithecia abbreviata Stephens, 1831 – MV 2. 5. 2002 (IR) – mesophilous to xerothermophilous 3 – West-Palaearctic.
Eupithecia pusillata (Denis et Schiffermüller, 1775) – T 2006, ex *Artemisia* sp. (IR) – mesophilous 2 and 3 – Palaearctic.
Eupithecia virgaureata Doubleday, 1861 – K 5. 8. 1999 (ZT); T 30. 4. 2000 (IR); BL (9) – mesophilous to xerothermophilous 2 and 3 – Eurosiberian.
Eupithecia selinata Herrich-Schäffer, 1861 – Sírnik 1. 8. 2002 (IR) – mesophilous 2 and 3 –Eurosiberian.
Eupithecia pimpinellata (Hübner, 1813) – T 27. 7. 2000 (IR) – xerothermophilous to mesophilous 1 and 2 – Eurosiberian.

Eupithecia extraversaria Herrich-Schäffer, 1852 – K 27. 5. 2000 (IR) – xerothermophilous 1 and 2 – West-Palaearctic.
Eupithecia centaureata (Denis et Schiffermüller, 1775) – Borša (5); Dlhé Tice, Poľany (6); K 25. 8. 2011 (Pj) – mesophilous to xerothermophilous 2 – Palaearctic.
Eupithecia trisignaria Herrich–Schäffer, 1848 – M. Kamenec (3c) – mesophilous 2 and 3 – Eurosiberian.
Eupithecia absinthiata (Clerck, 1759) – M. Kamenec (3c); T 27. 7. 2000 (IR) – mesophilous 2 – Palaearctic.
Eupithecia expallidata Doubleday, 1856 – SO 2. 8. 2002 (IR) – mesophilous to hygrophilous 2 and 3 – European.
Eupithecia vulgata (Haworth, 1809) – T 17. 9. 1999 (IR) – mesophilous 2 and 3 – Palaearctic.
Eupithecia denotata (Hübner, 1813) – K 27. 5. 2000 (IR) – mesophilous to mind hygrophilous 2 and 3 – Eurosiberian.
Eupithecia millefoliata (Rössler, 1866) – T 27. 7. 1999 (IR) – xerotermophilous 1 – Palaearctic.
Eupithecia tantillaria (Boisduval, 1840) – K 15. 5. 1993 (ZT) – mesophilous 3 – Eurosiberian.
Eupithecia ochridata (Schütze et Pinker, 1968) – K 18. 5. 1997 (ZT) – xerothermophilous 2 – Continental.
Eupithecia icterata (Villers, 1789) – M. Kamenec (3c); Borša (5); T 27. 7. 1999 (IR) – mesophilous to xerothermophilous 1 and 2 – West-Palaearctic.
Eupithecia succenturiata (Linnaeus, 1758) – Borša (5) – mesophilous to xerothermophilous 1 and 2 – Eurosiberian.
Eupithecia orphnata Petersen, 1909 – T 28. 6. 2001 (IR) – xerothermophilous 1 and 2 – West-Palaearctic.
Eupithecia subfuscata (Haworth, 1809) – T 29. 5. 1999(IR) – mesophilous to mind hygrophilous 2 – Holarctic.
Gymnoscelis rufifasciata (Haworth, 1809) – T 27. 7. 1999 (IR) – mesophilous to xerothermophilous 2 and 3 – Palaearctic.
Pasiphila chloerata (Mabille, 1870) – BL (9) – mesophilous to xerothermophilous 2 – Eurosiberian.
Pasiphila rectangulata (Linnaeus, 1758) – VK 19. 6. 1988 (IR) – mesophilous to xerothermophilous 2 – Palaearctic.
Mesoleuca albicillata (Linnaeus, 1758) – Borša (5); Klin nad Bodrogom 18. 6. 1998 (IR) – mesophilous 2 and 3 – Eurosiberian.
Earophila badiata (Denis et Schiffermûller 1775) – MT (3c); BL (9) – mesophilous 2 – West-Palaearctic.
Pelurga comitata (Linnaeus, 1758) – MT, M. Kamenec (3c); T 3. 8. 2001 (IR); BL (9) – mesophilous to xerothermophilous 1 and 2 – Eurosiberian.
Lythria purpuraria (Linnaeus, 1758) – T 27. 7. 2000 (IR); Kucany, Latorica-bridge, Solnička, Dlhé Tice – in all cases mass occurrence (6) – xerothermophilous 1 – Eurosiberian.
Lythria cruentaria (Hufnagel, 1767) – Borša 22. 5. 1992, T 28. 5. 1999 (Kj, IR) – mesophilous to xerothermophilous 1 and 2 – Eurosiberian.
Anticollix sparsata (Treitschke, 1828) – SO 2. 8. 2002 (IR) – hygrophilous 2 and 3 – Eurosiberian.
Epirrita dilutata (Denis et Schiffermûller 1775) – BL (9) – mesophilous – West-Palaearctic.

Operophtera brumata (Linnaeus, 1758) – KM (6); BL (9) – mesophilous 2 and 3 – Palaearctic.
Perizoma lugdunaria (Herrich–Schäffer, 1855) – M. Kamenec (Laštůvka et al. 1982); Dlhé Tice (6) – mesophilous to hygrophilous 2 – European.
Perizoma alchemillata (Linnaeus, 1758) – Borša (5) – mesophilous – Holarctic.
Perizoma blandiata (Denis et Schiffermüller, 1775) – Poľany (6) – mesophilous to hygrophilous 1 and 2 – Palaearctic.
Perizoma flavofasciata (Thunberg, 1792) – M. Kamenec (3c); K 5. 8. 1999 (IR); Dlhé Tice (6); Čičarovský les 2. 7. 2015 (Pj) – mesophilous – Palaearctic.
Philereme transversata (Hufnagel, 1767) – T 6. 6. 2003 (IR); Poľany (6) – mesophilous to xerothermophilous 2 – Palaearctic.
Triphosa dubitata (Linnaeus, 1758) – KM (6) – mesophilous – Palaearctic.
Lobophora halterata (Hufnagel, 1767) – C (2); T 30. 4. 2005 (IR); KM (6) – mesophilous 2 and 3 – Eurosiberian.
Pterapherapteryx sexalata (Retzius, 1783) – M. Kamenec (3c); Borša (5); Klin nad Bodrogom 18. 6. 1998 (IR) – mesophilous to hygrophilous 2 – Eurosiberian.
Scotopteryx bipunctaria (Denis et Schiffermüller, 1775) – K, V, Borša (5) – xerothermophilous 1 and 2 – Mediterranean.
Scotopteryx chenopodiata (Linnaeus, 1758) – Borša (5); Dlhé Tice (6) – mesophilous 2 – Palaearctic.
Xanthorhoe ferrugata (Clerck, 1759) – MT (3c); Borša (5) – mesophilous – Palaearctic.
Xanthorhoe fluctuata (Linnaeus, 1758) – C (2) – mesophilous 2 and 3 – Holarctic.
Catarhoe cucullata (Hufnnagel, 1767) – M. Kamenec (3c); Beša-Moľva (6); Chlmecké kopce 11. 6. 2015; Čičarovský les 2. 7. 2015 (Pj); Avaš 28. 7. 2013 (Pj) – mesophilous to hygrophilous 3 – Palaearctic.
Catarhoe rubidata (Denis et Schiffermüller, 1775) – C (2); M. Kamenec (3c); Čičarovský les 2. 7. 2015 (Pj) – mesophilous 3 – Mediterranean.
Epirrhoe alternata (Müller, 1764) – Klin nad Bodrogom 18. 6. 1998 (IR); Čičarovský les 2. 7. 2015 (Pj) – mesophilous to mind hygrophilous 1 and 2 – Palaearctic.
Epirrhoe tristata (Linnaeus, 1758) – C (2); Borša (5) – mesophilous – Eurosiberian.
Epirrhoe rivata (Hübner, 1813) – C (2); SNM (3c); KM (6) – mesophilous to hygrophilous 2 – West-Palaearctic.
Epirrhoe galiata (Denis et Schiffermüller, 1775) – Klin nad Bodrogom 18. 6. 1998 (IR) – mesophilous to xerothermophilous 1 and 2 – Palaearctic.
Costaconvexa polygrammata (Borkhausen, 1794) – M. Kamenec (3c); V 13.5.1995 (Kj); K 5. 8. 1999 (IR, ZT); Latorica–bridge, Avaš (6) – hygrophilous 1 and 2 – West-Palaearctic.
Camptogramma bilineata (Linnaeus, 1758) – C (2); Kucany, Beša-Moľva (6); Chlmecké kopce 11. 6. 2015 (Pj) – mesophilous 2 – Palaearctic.
Cyclophora pendularia (Clerck, 1759) – KM (6) – hygrophilous 2 and 3 – West-Palaearctic.
Cyclophora albiocellaria (Hübner, 1789) – MV 2. 5. 2003 (IR) – xerothermophilous 2 and 3 – Mediterranean.
Cyclophora quercimontaria (Bastelberger, 1897) – C (2) – xerothermophilous 2 and 3 – West-Palaearctic.
Cyclophora porata (Linnaeus, 1767) – C (2); BL (9) – xerothermophilous 2 and 3 – Mediterranean.

Cyclophora annularia (Fabricius, 1775) – VK 2003, ex *Acer* sp. (IR); BL (9) – mesophilous 3 – West-Palaearctic.

Cyclophora punctaria (Linnaeus, 1758) – MT, M. Kamenec (3c); Borša 22. 5. 1992 (Kj); MV 1. 7. 2002 (IR); KM (Pj); BL (9) – mesophilous 2 and 3 – West-Palaearctic.

Cyclophora linearia (Hübner, 1799) – Beša-Moľva abundant (6); Čičarovský les 7. 6. 2015 (Pj) – mesophilous 3 – West-Palaearctic.

Idaea serpentata (Hufnagel, 1767) – Borša (5); V 29. 7. 1992 (Kj); T 15. 6. 1995 (IR) – xerothermophilous to mesophilous 1 – West-Palaearctic.

Idaea muricata (Hufnagel, 1767) – MT, M. Kamenec (3c); Borša (5); Beša-Moľva (6); BL (9) – xerothermophilous to mild hygrophilous 1 and 2 – Eurosiberian.

Idaea rufaria (Hübner, 1799) – Borša (5); Klin nad Bodrogom 6. 7. 1996 (IR) – xerothermophilous 1 – West-Palaearctic.

Idaea ochrata (Scopoli, 1763) – T 5. 7. 1996 (IR) – xerothermophilous 1 and 2 – Mediterranean.

Idaea rusticata (Denis et Schiffermüller, 1775) – V 10. 7. 1993 (Kj); Klin nad Bodrogom 6. 7. 1996 (IR); Čičarovský les 2. 7. 2015 (Pj) – xerothermophilous 1 and 2 – Mediterranean.

Idaea moniliata (Denis et Schiffermüller, 1775) – M. Kamenec (3c); V 10. 7. 1993 (Kj) – xerotherophilous 1 and 2 – Mediterranean.

Idaea politaria (Hübner, 1799) – K 15. 7. 1995 (ZT); Poľany (6) – xerothermophilous 1 and 2 – Mediterranean.

**Idaea elongaria* (Rambur, 1833) – M. Kamenec (Krampl 1984) – xerothermophilous 1 – Mediterranean. Found as a new species for Slovakia.

Idaea subsericeata (Haworth, 1809) – BL (9) – xerothermophilous – Mediterranean.

Idaea pallidata (Denis et Schiffermüller, 1775) – K 15. 5. 1993 (ZT) – mesophilous? – Eurosiberian.

Idaea dimidiata (Hufnagel, 1767) – T 17. 9. 1999 (IR); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous to hygrophilous 2 and 3 – Holarctic.

Idaea biselata (Hufnagel, 1767) – Latorica-bridge (6) – xerothermophilous to mild hygrophilous 2 and 3 – Palaearctic.

Idaea aversata (Linnaeus, 1758) – MT (3c); Borša (5); Klin nad Bodrogom 6. 7. 1996 (IR); Dlhé Tice (6); BL (9) – mesophilous 2 and 3 – Palaearctic. Abundant.

Idaea emarginata (Linnaeus, 1758) – Klin nad Bodrogom 6. 7. 1996 (IR) – mesophilous to hydrophilous 2 and 3 – Eurosiberian.

Idaea rubraria (Staudinger, 1901) =*bilinearia* (Fuchs, 1878) – K 5. 8. 1999 (IR) – xerothermophilous 1 and 2 – Mediterranean.

Idaea degeneraria (Hübner, 1799) – M. Kamenec (3c); T 27. 7. 2000 (IR) – mesophilous 2 – Mediterranean.

Idaea deversaria (Herrich-Schäffer, 1847) – V 29. 7. 1992 (Kj) – xerothermophilous 2 – Palaearctic.

Scopula immorata (Linnaeus, 1758) – MT (3c); Borša (5) – mesophilous to xerothermophilous 1 and 2 – Palaearctic.

Scopula corrivalaria (Kretschmar, 1862) – Leles 7. 6. 2003 (IR) – hygrophilous 1 – Palaearctic.

Scopula virgulata (Denis et Schiffermüller, 1775) – V 18. 6. 1994 (Kj); K, 5. 8. 1999 (IR); Chlmecké kopce 11. 6. 2015 (Pj); BL (9) – xerothermophilous 1 – Palaearctic.

Scopula ornata (Scopoli, 1763) – Avaš 28. 7. 2013, Chlmecké kopce 11. 6. 2015 (Pj) – xerothermophilous to mesophilous 1 and 2 – Palaearctic.
Scopula decorata (Denis et Schiffermüller, 1775) – M. Kamenec (3c); V 29. 7. 1992 (Kj, ZT); K 5. 8. 1999 (IR) – xerothermophilous 1 – Palaearctic.
Scopula rubiginata (Hufnagel, 1767) – C (2); Borša (5); T 10. 7. 1992, V 10. 7. 1993 (Kj); K 5. 8. 1999 (IR); Čičarovský les 2. 7. 2015 (Pj) – xerothermophilous 1 – Palaearctic.
Scopula marginepunctata (Goeze, 1781) – M. Kamenec (3c); V 10. 7. 1993 (Kj); K 13. 5. 1995 (ZT); T 29. 5. 1999 (IR) – xerothermophilous 1 and 2 – Mediterranean.
Scopula floslactata (Haworth, 1809) – LL 6. 6. 1991 (ZT) – hygrophilous 1 and 2 – Eurosiberian.
Scopula nigropunctata (Hufnagel, 1767) – Chlmecké kopce 11. 6. 2015 (Pj) – mesophilous – Eurosiberian.
Scopula immutata (Linnaeus, 1758) – V 24. 6. 1992 (Kj); BL (9) – hygrophilous – Palaearctic.
Scopula flaccidaria (Zeller, 1852) – V 24. 6. 1992 (Kj) – xerothermophilous 1 – Ponto-Mediterranean.
Rhodostrophia vibicaria (Clerck, 1759) – MT (3c); Veľký Kopec 25. 6. 2015 (Pj); BL (9) – mesophilous to xerothermophilous 1 and 2 – Palaearctic.
Timandra comae Schmidt, 1931 – MT (3c); Borša (5); Svinice, Dlhé Tice, Beša-Moľva (6); BL (9) – hygrophilous 2 and 3 – West-Palaearctic.

Notodontidae

Thaumetopoea processionea (Linnaeus, 1758) – KCH (1); Borša (5); Dlhé Tice (6) – mesophilous 3 – West-Palaearctic.
Clostera curtula (Linnaeus, 1758) – T (3c); Borša 1. 8. 1985 (5, IR); KM, Dlhé Tice (6); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous 2 to mild hygrophilous 2 – Palaearctic.
Clostera pigra (Hufnagel, 1766) – Borša (5); MV 7. 5. 2003 (IR); Dlhé Tice (6); BL (9) – mesophilous 2 – Palaearctic.
Clostera anachoreta (Denis et Schiffermüller, 1775) – KM, Beša-Moľva (6) – mesophilous to mild hygrophilous 2 – Palaearctic.
Clostera anastomosis (Linnaeus, 1758) – Borša (5); Klin nad Bodrogom 6. 7. 1996 (IR); V. Kamenec 19. 8. 2009 (B. Endel); Dlhé Tice (6) – mesophilous 2 – Palaearctic.
Notodonta tritophus (Denis et Schiffermüller, 1775) – MT, M. Kamenec (3c); Borša 1. 8. 1985 (5, IR); KM, Beša-Moľva (6); Čičarovský les 2. 7. 2015 (Pj) – mesophilous to mild hygrophilous 2 – West-Palaearctic.
Notodonta ziczac (Linnaeus, 1758) – KM, Dlhé Tice, Beša-Moľva (6); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous to mild hygrophilous 2 – West-Palaearctic.
Drymonia dodonaea (Denis et Schiffermüller, 1775) – MT (3c) – mesophilous 3 – West-Palaearctic.
Drymonia ruficornis (Hufnagel, 1766) – MT (3c); KM (6) – mesophilous 3 to xerothermophilous 3 – West-Palaearctic.
Drymonia querna (Denis et Schiffermüller, 1775) – Klin nad Bodrogom 6. 7. 1996 (IR); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous 2 to xerothermophilous 2 – Mediterranean.

Pheosia tremula (Clerck, 1759) – MT (3c); Borša 1. 8. 1985 (5, IR); KM, Dlhé Tice (6); BL (9) – mesophilous 2 – West-Palaearctic.
Pterostoma palpina (Clerck, 1759) – MT (3c); Borša (5); KM, Dlhé Tice (6); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous 2 – West-Palaearctic.
Ptilodon capucina (Linnaeus, 1958) – MT (3c); Borša (5) – mesophilous 2 and 3 –Palaearctic.
Ptilodon cucullina (Denis et Schiffermüller, 1775) – Borša (5); Dlhé Tice (6); BL (9) – mesophilous 2 and 3 – Palaearctic.
Gluphisia crenata (Esper, 1785) – Klin nad Bodrogom 18. 6. 1996 (IR); KM, Dlhé Tice, Poľany (6); BL (9) – mesophilous to hygrophilous 2 – Palaearctic.
Cerura erminea (Esper, 1783) – Chlmecké kopce 11. 6. 2015 (Pj); BL (9) – mesophilous 2 – Palaearctic.
Cerura vinula (Linnaeus, 1758) – Streda nad Bodrogom (3c) – mesophilous 2 – Palaearctic.
Furcula furcula (Clerck, 1759) – Streda nad Bodrogom (3c); Borša (5); Klin nad Bodrogom 27. 5. 2005 (IR); KM, Dlhé Tice (6) – mesophilous 3 – West-Palaearctic.
Furcula bicuspis (Borkhausen, 1790) – Beša-Moľva (6) – mesophilous 2 and 3 – West-Palaearctic.
Furcula bifida (Brahm, 1787) – M. Kamenec (3c); Borša (5); Klin nad Bodrogom 6. 7. 1996 (IR); KM (6); BL (9) – mesophilous 2 and 3 – West-Palaearctic.
Dicranura ulmi Reichenbach, 1817 – river basin of Bodrog (1) – mesophilous 2 and 3 – Mediterranean.
Phalera bucephala (Linnaeus, 1758) – Dlhé Tice (6); BL (9) – mesophilous 2 to 3 – Palaearctic.
Peridea anceps (Goeze, 1781) – MT, Streda nad Bodrogom (3c) – mesophilous 3 – West-Palaearctic.
Stauropus fagi (Linnaeus, 1758) – river basin of Bodrog (1); MT (3c) – mesophilous 3 – Palaearctic.
Harpyia milhauseri (Fabricius, 1775) – MT, Streda nad Bodrogom (3c); MV 2. 5. 2003 (ZT) – mesophilous 2 – West-Palaearctic.
Spatalia argentina (Denis et Schiffermüller, 1775) – V 19. 7. 1993 (Kj); Poľany, Beša-Moľva (6); BL (9) – mesophilous 2 and 3 – West-Palaearctic.

Erebidae

Lymantria dispar (Linnaeus, 1758) – SNM (3c); Borša, V (5); Borša abundant (6); Avaš 28. 7. 2013 (Pj); BL (9) – mesophilous 2 and 3 – Palaearctic, introduced to North America.
Laelia coenosa (Hübner, 1808) – Strážne 23. 7. 2009 (MH) – hygrophilous – Palaearctic.
Calliteara pudibunda (Linnaeus, 1758) – MT (3c); BL (9) – mesophilous 2 and 3 – West-Palaearctic.
Ocneria rubea (Denis et Schiffermüller, 1775) – T 10. 7. 1992, Borša 24. 6. 1992, V 19. 7. 1993 (Kj) – xerothermophilous 2 – Mediterranean.
Orgyia antiqua (Linnaeus, 1758) – T 3. 8. 2001 (IR); Dlhé Tice (6); Čičarovský les 2. 7. 2015 (Pj) – mesophilous 2 – Holarctic.
Penthophera morio (Linnaeus, 1767) – MT (3c); K 18. 6. 1994, MV 7. 5. 2003 (ZT); KM abundant (6) – mesophilous 1 – Ponto-Mediterranean
Arctornis l-nigrum (Müller, 1764) – BL (9) – mesophilous 3 – Palaearctic.

Leucoma salicis (Linnaeus, 1758) – Borša (5); Dlhé Tice, KM (6); BL (9) – mesophilous 2 – Palaearctic.

Euproctis chrysorrhoea (Linnaeus, 1758) – KCH (1); T 28. 6. 2001 (IR) – mesophilous 2 and 3 – West-Palaearctic.

Euproctis similis (Fuessly, 1775) – MT (3c); Borša (5); Beša-Moľva, KM (6); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous 2 and 3 – West-Palaearctic.

Cybosia mesomella (Linnaeus, 1758) – K 27. 5. 2000 (IR); BL (9) – mesophilous 2 – Palaearctic.

Pelosia muscerda (Hufnagel, 1766) – K 27. 5. 2000 (IR); Beša-Moľva, KM, Sv. Mária (6); Čičarovský les 2. 7. 2015 (Pj); BL (9) – hygrophilous 2 – Palaearctic.

Pelosia obtusa (Herrich-Schäffer, 1852) – Strážne 23. 7. 2009 (MH) – hygrophilous 1 – Palaearctic.

Lithosia quadra (Linnaeus, 1758) – MT (3c); VK 4. 10. 2001 (IR); Beša-Moľva (6) – mesophilous 2 and 3 – Palaearctic.

Eilema lutarella (Linnaeus, 1758) – K 10. 8. 1996 (ZT); Čičarovský les 2. 7. 2015 (Pj); Avaš 28. 7. 2013 (Pj) – mesophilous 1 to xerothermophilous 1 – Palaearctic.

Eilema lurideola (Zincken, 1817) – Dlhé Tice (6) – mesophilous 2 to xerothermophilous 2 – Palaearctic.

Eilema palliatella (Scopoli, 1763) – Borša (5); K 19. 8. 1992 (ZT) – xerothermophilous 1 – Palaearctic.

Eilema complana (Linnaeus, 1758) – SNM (1); M. Kamenec (3c); Borša (5); K 15. 7. 1995 (ZT); Dlhé Tice (6); Čičarovský les 2. 7. 2015 (Pj); Avaš 28. 7. 2013 (Pj) – mesophilous 2 to xerothermophilous 2 – Palaearctic.

Eilema pygmaeola (Doubleday, 1848) – M. Kamenec (3c) – xerothermophilous – Palaearctic.

Eilema sororcula (Hufnagel, 1766) – Streda nad Bodrogom (3c) 28. 5. 1999 (ZT); KM (6) – mesophilous 3 – Palaearctic.

Thumatha senex (Hübner, 1808) – SO 4. 8. 2001 (IR); LL 7. 6. 2003 (ZT); Latorica-bridge, Beša-Moľva (6); Čičarovský les 2. 7. 2015 (Pj); BL (9) – hygrophilous – West-Palaearctic.

Miltochrista miniata (Forster, 1771) – C (2); M. Kamenec (3c); BL (9) – mesophilous 3 – Palaearctic.

Amata phegea (Linnaeus, 1758) – MT (3c); Dlhé Tice, Svinice abundant (6) – mesophilous 2 to xerothermophilous 2 – West-Palaearctic.

Dysauxes ancilla (Linnaesu, 1767) – C (2); T 10. 7. 1992, K, V 10. 7. 1993 (ZT, Kj); Čičarovský les 2. 7. 2015 – xerothermophilous 2 – West-Palaearctic.

Chelis maculosa (Denis et Schiffermüller, 1775) – M. Kamenec (3c); K, V 15. 5. 1993 (ZT, Kj) – xerothermophilous 1 – West-Palaearctic.

Phragmatobia fuliginosa (Linnaeus, 1758) – MT (3c); Borša (5); KM, Poľany, Dlhé Tice, Beša-Moľva (6); Avaš 28. 7. 2013 (Pj); BL (9) – mesophilous 1 and 2 – Palaearctic.

Epatolmis luctifera (Denis et Schiffermüller, 1775) – MT, Streda nad Bodrogom (3c) – mesophilous 1 – Palaearctic.

Spilosoma lubricipeda (Linnaeus, 1758) – Borša (5); Dlhé Tice (6); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous 2 – Palaearctic.

Spilosoma urticae (Esper, 1789) – VK (3c); K 15. 5. 1997, 5. 8. 1999 (ZT, IR); KM (6) – mesophilous 2 – Palaearctic.

Spilarctia lutea (Hufnagel, 1766) – Borša (5); Horešské lúky 11. 6. 2015 (Pj); BL (9) – mesophilous 2 – Palaearctic.

Hyphantria cunea (Drury, 1773) – KCH (1); M. Kamenec, Čierna nad Tisou (3c); V 19. 7. 1993 (Kj); K 29. 4. 2000 (IR); T (6) – mesophilous 2 – originally Nearctic, currently on all continents. Pests of fruit trees.

Diaphora mendica (Clerck, 1759) – C (1); Streda nad Bodrogom (3c) – mesophilous 2 – Palaearctic.

Diacrisia sannio (Linnaeus, 1758) – Borša, V, K (5) – mesophilous 2 – Palaearctic.

Hyphoraia aulica (Linnaeus, 1758) – Zatín (photo M. Balla); K 15. 5. 2010 (MH) – mesophilous to xerothermophilous 2 – Continental.

Arctia caja (Linnaeus, 1758) – Borša (5); Dlhé Tice (6); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous 2 – Holarctic.

Arctia festiva (Hufnagel, 1766) – K (Ponec 1989) – xerothermophilous 1 – Palaearctic.

Callimorpha dominula (Linnaeus, 1758) – Borša (5) – mesophilous 2 – West-Palaearctic.

Euplagia quadripunctaria (Poda, 1761) – C (1); MT (3c); Borša (5); K 31. 7. 2015, Čičarovský les 6. 8. 2015 (Pj); Avaš 28. 7. 2013 (Pj) – mesophilous 2 – West-Palaearctic. Protected species of NATURA 2000.

Tyria jacobaeae (Linnaeus, 1758) – C (1) – mesophilous 1 – Holarctic.

Simplicia rectalis (Eversmann, 1842) – M. Kamenec (3c) – mesophilous 2 – Palaearctic.

Paracolax tristalis (Fabricius, 1794) – C, KCH (2); MT (3c); T 15. 6. 1995 (IR); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous 3 – European.

Herminia tarsipennalis Treitschke, 1835 – KCH (1); MT (3c); Klin nad Bodrogom 18. 6. 1998 (IR); BL (9) – mesophilous 2 – Palaearctic.

Herminia grisealis (Denis et Schiffermüller, 1775) – VK, 19. 6. 1988 (IR); Beša-Moľva (6); BL (9) – mesophilous 2 and 3 – Palaearctic.

Polypogon tentacularia (Linnaeus, 1758) – C (2); VK 7. 6. 2003 (IR); BL (9) – mesophilous to mild hygrophilous 2 – Palaearctic.

Pechipogo strigilata (Linnaeus, 1758) – C (2) MT (3c); Klin nad Bodrogom 18. 6. 1998 (IR) – mesophilous 2 and 3 – Palaearctic.

Zanclognatha lunalis (Scopoli, 1763) – KCH (1); MV 1. 7. 2002 (IR) – mesophilous to xerothermophilous 2 and 3 – Palaearctic.

Hypena proboscidalis (Linnaeus, 1758) – MT (3c); Borša (5); Chlmecké kopce 11. 6. 2015 (Pj); BL (9) – mesophilous 2 and 3 – Palaearctic.

Hypena rostralis (Linnaeus, 1758) – MT (3c); MV 1. 7. 2002 (IR); KM abundant, Latorica-bridge (6); BL (9) – mesophilous 2 and 3 – Palaearctic.

Rivula sericealis (Scopoli, 1763) – V (1); Borša (5); Dlhé Tice abundant (6); BL (9) – mesophilous to hygrophilous 1 – Palaearctic.

Scoliopteryx libatrix (Linnaeus, 1758) – Borša 1. 8. 1985 (IR); BL (9) – mesophilous to hygrophilous 2 – Holarctic.

Laspeyria flexula (Denis et Schiffermüller, 1775) – Dlhé Tice, Beša-Moľva (6); K 25. 8. 2011 (Pj); Čičarovský les 2. 7. 2015 (Pj); Avaš 28. 7. 2013 (Pj) – mesophilous 3 – Palaearctic.

Odice arcuinna (Hübner, 1790) – Borša (5); V 29. 7. 1992 (Kj); K 10. 8. 1996 (ZT) – xerothermophilous 1 – Palaearctic.

Calymma communimacula (Denis et Schiffermüller, 1775) – SNM (1); M. Kamenec (Laštůvka et al. 1982); V 10. 7. 1993 (Kj); K 13. 7. 1996 (ZT, IR) – xerothermophilous 2 – Mediterranean.

Eublemma purpurina (Denis et Schiffermüller, 1775) – M. Kamenec (3c); V 19. 7. 1993 (Kj); K 14. 5. 1994 (ZT); K 22. 5. 1996 (Pj) (Panigaj & Reiprich 1998); Sírnik 1. 8. 2002 (IR); KM, Dlhé Tice (6) – xerothermophilous 1 and 2 – Palaearctic.

Phytometra viridaria (Clerck, 1759) – MT (3c); Borša (5); SO 2. 8. 2001 (IR); Beša-Moľva (6) – mesophilous to hygrophilous 1 and 2 – Palaearctic.

Trisateles emortualis (Denis et Schiffermüller, 1775) – VK 19. 6. 1988 (IR); Beša-Moľva (6) – mesophilous 2 and 3 – Palaearctic.

Lygephila lusoria (Linnaeus, 1758) – BL (9) – xerothermophilous 1 – Ponto-Mediterranean.

Lygephila pastinum (Treitschke, 1826) – T 17. 9. 1999 (IR); Beša-Moľva (6); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous to xerothermophilous 1 – Palaearctic.

Lygephila craccae (Denis et Schiffermüller, 1775) – M. Kamenec (3c); V 18. 6. 1994 (Kj); T 28. 6. 2001 (IR) – mesophilous to xerothermophilous 2 – Palaearctic.

Euclidia glyphica (Linnaeus, 1758) – MT (3c); Borša (5); Dlhé Tice, Latorica-bridge (6) – mesophilous to xerothermophilous 1 and 2 – Palaearctic.

Euclidia mi (Clerck, 1759) – MT (3c); MV 2. 5. 2002 (IR); Dlhé Tice (6) – mesophilous to xerothermophilous 1 and 2 – Palaearctic.

Minucia. lunaris (Denis et Schiffermüller, 1775) – C (2); MT (3c); V 14. 5. 1994 (Kj) – mesophilous to xerothermophilous 2 and 3 – Mediterranean.

Dysgonia algira (Linnaeus, 1767) – Strážne 18. 7. 2017 (M. Balla); BL (9) – xerothermophilous 2 – Palaeotropic (Fig. 21).

Catocala fulminea (Scopoli, 1763) – MT (3c); Borša (5); V 13.7.1994 (Kj), Dlhé Tice (6); BL (9) – xerothermophilous 2 – Palaearctic.

Catocala hymenaea (Denis et Schiffermüller, 1775) – M. Kamenec (3c); V 19. 7. 1993 (Kj); T 3. 8. 2001 (IR); BL (9) – xerothermophilous 2 – Ponto-Mediterranean.

Catocala nupta (Linnaeus, 1767) – T 18. 9. 1999 (IR); Dlhé Tice (6) – mesophilous to hygrophilous 1 and 2 – Palaearctic.

Catocala electa (Vieweg, 1790) – BL (9) – hygrophilous 2 – Palaearctic.

Catocala elocata (Esper, 1787) – MT (3c) – mesophilous 2 – Palaearctic.

Catocala promissa (Denis et Schiffermüller, 1775) – C (2); V 19. 7. 1993 (Kj); MV 1. 7. 2002 (IR) – mesophilous 2 and 3 – West-Palaearctic.

Nolidae

Meganola strigula (Denis et Schiffermüller, 1775) – K 27. 5. 2000 (IR); KM abundant, Beša-Moľva (6) – mesophilous 3 – West-Palaearctic.

M. albula (Denis et Schiffermüller, 1775) – M. Kamenec (3c); K 11.6.2000 (Kj); MV 1. 7. 2002 (IR); Poľany abundant, Beša-Moľva (6); BL (9) – hygrophilous 1 – Palaearctic.

Nola cucullatella (Linnaeus, 1758) – M. Kamenec (3c); K 19. 6. 1994, 27. 5. 2000 (ZT, IR) – mesophilous 3 – West-Palaearctic.

Nola aerugula (Hübner, 1793) – MV 1. 7. 2002 (IR) – hygrophilous 2 – Palaearctic.

Nola cristatula (Hübner, 1793) – MV 1. 7. 2002 (IR) – hygrophilous 1 – Palaearctic.

Nola chlamitulalis (Hübner, 1813) – K 15. 7. 1995 (ZT) – xerothermophilous 1 – Palaearctic.

Bena bicolorana (Fuessly, 1775) – Borša (5); VK 19. 6. 1988 (IR) – mesophilous 3 – West-Palaearctic.
Pseudoips prasinana (Linnaeus, 1758) – MT (3c); K 15. 7. 1995 (ZT) – mesophilous 3 – Palaearctic.
Nycteola revayana (Scopoli, 1772) – MV 1. 7. 2002 (IR); Latorica-bridge (6) – mesophilous 3 – Palaearctic.
Nycteola asiatica (Krulikovsky, 1904) – Klin nad Bodrogom 18. 6. 1998 (IR); Strážne 28. 8. 2009 (MH); BL (9) – hygrophilous 2 – Palaearctic.
Earias clorana (Linnaeus, 1761) – Klin nad Bodrogom 6. 7. 1996 (IR); Latorica-bridge, Poľany, Beša–Moľva (6) – mesophilous to hygrophilous 2 – Palaearctic.
Earias vernana (Fabricius, 1787) – V 10. 7. 1993 (Kj); K 5. 8. 1999 (IR); Poľany, Dlhé Tice (6) – mesophilous to hygrophilous 2 – West-Palaearctic.

Noctuidae
Abrostola tripartita (Hufnagel, 1766) – MT (3c); MV 2. 5. 2003 (IR) – mesophilous 2 and 3 – Palaearctic.
Abrostola asclepiadis (Denis et Schiffermüller, 1775) – MT (3c); Borša (5); K 10. 7. 1999 (ZT) – xerothermophilous 2 and 3 – Palaearctic.
Abrostola triplasia (Linnaeus, 1758) – MT (3c); Beša-Moľva (6); BL (9) – mesophilous 2 – Palaearctic.
Macdunnoughia confusa (Stephens, 1850) – KCH, Leles (1); MT (3c); Borša (5); KM, Dlhé Tice (6); Čičarovský les les 2. 7. 2015 (Pj); BL (9) – ubiquitous – Eurosiberian.
Diachrysia chrysitis (Linnaeus, 1758) – Borša (5); T 29. 5. 1999 (IR); Dlhé Tice, Poľany (6); BL (9) – mesophilous 1 and 2 – Palaearctic.
Autographa gamma (Linnaeus, 1758) – SO (1); Borša, V, T (5); KM abundant, Dlhé Tice abundant (6); BL (9) – ubiquitous – Palaearctic. Common species.
Autographa pulchrina (Haworth, 1809) – KM (6) – hygrophilous 1 and 2 – Palaearctic.
Plusia festucae (Linnaeus, 1758) – M. Kamenec (3c); Borša (5) – mesophilous 2 – Palaearctic.
Deltote pygarga (Hufnagel,1766) – M. Kamenec (3c); Dlhé Tice (6); BL (9) – mesophilous to hygrophilous 2 – Palaearctic.
Deltote deceptoria (Scopoli, 1763) – T25. 6. 2013 (Pj) – mesophilous – Eurosiberian.
Deltote uncula (Clerck, 1759) – M. Kamenec (3c) – hygrophilous 1 – Palaearctic.
Deltote bankiana (Fabricius, 1775) – M. Kamenec (3c); V 10. 7. 1993, T 28. 5. 1999 (Kj, IR); Latorica-bridge, Dlhé Tice (6); V. Kamenec 21. 5. 2011 (B. Endel); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous to hygrophilous 1 – Palaearctic.
Acontia lucida (Hufnagel, 1766) – V 10. 7. 1993 (Kj); Dlhé Tice (6) – xerothermophilous 1 – Palaearctic (Afrotropic).
Acontia trabealis (Scopoli, 1763) – C (2); MT (3c); Borša (5); Borša 22. 5. 1992, V 19. 7. 1993 (Kj), Dlhé Tice, Latorica-bridge, Poľany, Svinice, Beša-Moľva – very abundant (6); Sírnik-Avaš 28. 7. 2013 (Pj); BL (9) – xerothermophilous 1 – Palaearctic. Common speciesn.
Aedia funesta (Esper, 1786) – MT, M. Kamenec (3c); V 19. 7. 1993 (Kj), V. Kamenec 21. 5. 2011 (B. Endel) – mesophilous 2 – Mediterranean.

Calocasia coryli (Linnaeus, 1758) – MT, Streda nad Bodrogom (3c); Borša (5); MV 2. 5. 2003 (IR); KM (6) – mesophilous 2 and 3 – Eurosiberian.
Diloba caerulocephala (Linnaeus, 1758) – MT (3c); Dlhé Tice (6) – mesophilous 2 – West-Palaearctic.
Moma alpium (Osbeck, 1778) – MT (3c); MV 2. 5. 2003 (ZT) – mesophilous 3 – Palaearctic.
Acronicta tridens (Denis et Schiffermüller, 1775) – Klin nad Bodrogom 6. 7. 1996(IR) – mesophilous 2 – Palaearctic.
Acronicta psi (Linnaeus, 1758) – M. Kamenec (3c); K, T 30. 4. 2000 (ZT, IR) – mesophilous 2 and 3 – Palaearctic.
Acronicta aceris (Linnaeus, 1758) – Borša (5) – mesophilous 2 and 3 – Palaearctic.
Acronicta strigosa (Denis et Schiffermüller, 1775) – Sírnik 8. 5. 2003 (IR); Dlhé Tice (6); Strážne 28. 8. 2009 (MH) – mesophilous 2 – Palaearctic.
Acronicta auricoma (Denis et Schiffermüller, 1775) – M. Kamenec (3c); T 10. 8. 1998 (IR); K 30. 4. 2000 (ZT) – mesophilous 2 – Holarctic.
Acronicta euphorbiae (Denis et Schiffermüller, 1775) – M. Kamenec (3c); T 27. 7. 2000 (IR) – mesophilous 1 – Palaearctic.
Acronicta rumicis (Linnaeus, 1758) – MT, M. Kamenec (3c); Borša 1. 8. 1985 (5, IR) – mesophilous to mind hygrophilous 1 and 2 – Palaearctic.
Subacronicta megacephala (Denis et Schiffermüller, 1775) – MT, M. Kamenec (3c); V 13. 5. 1995 (Kj); Klin nad Bodrogom 18. 6. 1998 (IR); K 17. 9. 1999 (ZT); Dlhé Tice (6); BL (9) – mesophilous 3 – Palaearctic.
Craniophora ligustri (Denis et Schiffermüller, 1775) – Borša (5); BL (9) – mesophilous 2 – Palaearctic.
Simyra albovenosa (Denis et Schiffermüller, 1775) – M. Kamenec (3c); Borša (5); Klin nad Bodrogom 6. 7. 1996 (IR); KM (6) – hygrophilous 1 – Palaearctic.
Panemeria tenebrata (Scopoli, 1763) – C (2); MT (3c); Dlhé Tice abundant (6) – mesophilous 1 and 2 – West-Palaearctic.
Aegle kaekeritziana (Hübner, 1799) – M. Kamenec (3c) – xerothermophilous 1 – Ponto-Mediterranean.
Tyta luctuosa (Denis et Schiffermüller, 1775) – C (2); MT (3c); Borša (5); Borša 22. 5. 1992, 10. 7. 1993 (Kj); KM (6); BL (9) – xerothermophilous 1 – Mediterranean.
Cucullia fraudatrix Eversmann, 1837 – M. Kamenec (Laštůvka et al. 1982); Borša (5); Sírnik 1. 8. 2002 (IR) – xerothermophilous 1 – Eurosiberian.
Cucullia absinthii (Linnaeus, 1761) – M. Kamenec (3c); Hatfa 30. 7. 2005 (IR) – xerothermophilous 2 – Eurosiberian.
Cucullia artemisiae (Hufnagel, 1766) – M. Kamenec, MT (3c); V 19. 7. 1993 (Kj); T 23. 5. 2000 (IR) – xerothermophilous to mesophilous 1 – Palaearctic.
Cucullia xeranthemi (Boisduval, 1840) – M. Kamenec (Laštůvka et al. 1982); V 13. 7. 1994 (Kj) – xerothermophilous 1 – Continental.
Cucullia lucifuga (Denis et Schiffermüller, 1775) – V 13. 7. 1994 (Kj); MV 7. 5. 2003 (ZT) – mesophilous 1 and 2 – Palaearctic.
Cucullia lactucae (Denis et Schiffermüller, 1775) – MV 7. 5. 2003 (IR) – xerothermophilous 2 – Palaearctic.

Cucullia umbratica (Linnaeus, 1758) – M. Kamenec, MT (3c); V 19. 7. 1993 (Kj); K 5. 8. 1999 (IR) – xerothermophilous to mesophilous 1 – Palaearctic.

Cucullia chamomillae (Denis et Schiffermüller, 1775) – MT (3c) – xerothermophilous to mesophilous 1 and 2 – West-Palearctic.

Cucullia dracunculi (Hübner, 1813) – M. Kamenec (Laštůvka et al. 1982) – xerothermophilous 1 – Mediterranean.

Shargacucullia gozmanyi Ronkay et Ronkay, 1994 – MV 7. 5. 2003 (IR) 2. 7. 2003 (ZT) – xerothermophilous 1 – European.

Shargacucullia scrophulariae (Denis et Schiffermûller, 1775) – BL (9) – mesophilous 2 – West-Palaearctic.

Shargacucullia verbasci (Linnaeus, 1758) – K 29. 4. 2000 (IR) – xerothermophilous 2 – Palaearctic.

Amphipyra pyramidea (Linnaeus, 1758) – Leles (3c); K 5. 8. 1999 (IR); Beša-Moľva (6); BL (9) – mesophilous 3 – Palaearctic.

Amphipyra livida (Denis et Schiffermüller, 1775) – SO 4. 8. 2001 (IR) – mesophilous 1 and 2 – Palaearctic.

Amphipyra tragopoginis (Clerck, 1759) – C (2) – mesophilous 2 – Holarctic.

Allophyes oxyacanthe (Linnaeus, 1758) – MT (3c); BL (9) – mesophilous 2 – West-Palaearctic.

Asteroscopus sphinx (Hufnagel, 1766) – Leles (3) – mesophilous 1 – West-Palaearctic.

Valeria oleagina (Denis et Schiffermüller, 1775) – MT (3c); T19. 4. 2013 (Pj); Veľký vrch 1. 4. 2016 (MH) – xerothermophilous 2 – Mediterranean.

Calophasia lunula (Hufnagel, 1766) – M. Kamenec, MT (3c); K 14. 5. 1994 (ZT); Sírnik 8. 5. 2003 (IR); Poľany (6); Chlmecké kopce 11. 6. 2015 (Pj) – xerothermophilous 1 and 2 – Holarctic.

Lamprosticta culta (Denis et Schiffermüller, 1775) – M. Kamenec (3c); K, V 19. 7. 1993 (ZT, Kj); T 28. 6. 2001 (IR) – xerothermophilous 2 – Mediterranean.

Eucarta amethystina (Hübner, 1803) – M. Kamenec (Laštůvka et al. 1982); Borša (5); T 6. 6. 2003 (IR); Poľany, Dlhé Tice (6); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous to hygrophilous 2 – Palaearctic.

Eucarta virgo (Treitschke, 1835) – Borša (5); Borša 24. 6. 1992; V 10. 7. 1993 (Kj); K, 5. 8.1999 (IR); Latorica-bridge (6); BL (9) – xerothermophilous – Palaearctic.

Schinia cognata (Freyer, 1833) – Svätuše 4. 8. 2011 (MH) – xerothermophilous 1 – Ponto-Mediterranean.

Protoschinia scutosa (Denis et Schiffermüller, 1775) – K 15. 7. 1995 (ZT); MV 1. 7. 2002 (IR) – xerothermophilous 1 – Palaearctic.

Heliothis viriplaca (Hufnagel, 1766) – M. Kamenec (3c); Borša (5); K 3. 7. 1992 (ZT); T 5. 7. 1996 (IR); Kucany, Svinice (6); Čičarovský les 2. 7. 2015 – xerothermophilous 1 – Palaearctic.

Heliothis adaucta Butler, 1878 – M. Kamenec, MT (3c) – xerothermophilous 1 – Palaearctic.

Heliothis peltigera (Denis et Schiffermüller, 1775) – Strážne 23. 7. 2009 (MH) – xerothermophilous – Palaeotropic. Migrant.

Helicoverpa armigera (Hübner, 1808) – MV 4. 10. 2002 (IR); Kucany, Poľany, Svinice, Beša-Moľva (6); Chlmecké kopce 11. 6. 2015 (Pj) – Palaeotropic. Agricultural pest.

Pyrrhia umbra (Hufnagel, 1766) – M. Kamenec, MT (3c); MV 1. 7. 2002 (IR); Dlhé Tice, Beša-Moľva (6); BL (9) – mesophilous to xerothermophilous 1 – Palaearctic.

Periphanes delphinii (Linnaeus, 1758) – M. Kamenec (3c) – xerothermophilous 1 – Mediterranean.

Cryphia fraudatricula (Hübner, 1803) – Sírnik 4. 6. 2003 (IR) – mesophilous to xerothermophilous 2 and 3 – Palaearctic.

Cryphia algae (Fabricius, 1775) – M. Kamenec (3c); Borša (5); V 15. 5. 1995 (Kj); T 27. 7. 2000 (IR); Dlhé Tice (6) – mesophilous to mild hygrophilous 2 – West-Palaearctic.

Bryophila ereptricula (Treitschke, 1825) – K 13. 7. 1995 (ZT) – xerothermophilous 1 and 2 – West-Palaearctic

Bryophila raptricula (Denis et Schiffermüller, 1775) – M. Kamenec (3c); SO 4. 8. 2001 (IR) – mesophilous 1 – Palaearctic.

Bryophila domestica (Hufnagel, 1766) – K 13. 7. 1995 (ZT) – xerothermophilous 1 and 2 – West-Palaearctic.

Pseudeustrotia candidula (Denis et Schiffermüller, 1775) – M. Kamenec, MT (3c); Borša (5); Klin nad Bodrogom 6. 7. 1996 (IR); Dlhé Tice abundant, Poľany, Beša-Moľva (6); BL (9) – mesophilous to xerothermophilous 2 – Eurosiberian.

Elaphria venustula (Hübner, 1790) – Borša (5); V 18. 6. 1994, T 28. 5. 1999 (IR); Beša-Moľva (6) – xerothermophilous 1 and 2 – Palaearctic.

Caradrina morpheus (Hufnagel, 1766) – M. Kamenec (3c); T 27. 7. 2000 (IR); BL (9) – hygrophilous 1 and 2 – Palaearctic.

Platyperigea kadenii (Freyer, 1838) – BL (9) – xerothermophilous 1 and 2 – Mediterranean.

Hoplodrina octogenaria (Goeze, 1781) – M. Kamenec, MT (3c) – mesophilous 1 and 2 – Palaearctic.

Hoplodrina blanda (Denis et Schiffermüller, 1775) – K 10. 8. 1996 (ZT); Poľany (6); BL (9) – xerothermophilous 1 and 2 – Palaearctic.

Hoplodrina ambigua (Denis et Schiffermüller, 1775) – SO (1); MT (3c); T 5. 7. 1996 (IR); BL (9) – xerothermophilous to mesophilous 1 and 2 – Palaearctic.

Charanyca trigrammica (Hufnagel, 1766) – MT (3c); BL (9) – mesophilous 1 and 2 – Mediterranean.

Athetis gluteosa (Treitschke, 1835) – M. Kamenec (3c) – xerothermophilous 1 – Palaearctic.

Athetis furvula (Hübner, 1808) – M. Kamenec (Laštůvka et al. 1982); T 27. 7. 2000 (IR) – xerothermophilous 1 – Continental.

Athetis lepigone (Möschler, 1860) – M. Kamenec, V (Laštůvka et al. 1982); Sírnik 8. 5. 2003 (IR) – xerothermophilous 1 – Continental.

Dypterygia scabriuscula (Linnaeus, 1758) – MT, M. Kamenec (3c); Borša (5); T 3. 8. 2001 (IR); Čičarovský les 2. 7. 2015 (Pj); Avaš 28. 7. 2013 (Pj); BL (9) – mesophilous to hygrophilous 1 and 2 – Palaearctic.

Trachea atriplicis (Linnaeus, 1758) – MT (3c); Dlhé Tice (6); BL (9) – mesophilous 2 – Palaearctic.

Actinotia polyodon (Clerck, 1759) – Streda nad Bodrogom, MT, M. Kamenec (3c); Borša (5); K 29. 4. 2000 (IR, ZT) – xerothermophilous 2 – Palaearctic.

Cloantha hyperici (Denis et Schiffermüller, 1775) – M. Kamenec (3c); V 19. 7. 1993 (Kj); K 13. 5. 1995 (ZT); MV 2003 ex l. (IR) – xerothermophilous 1 and 2 – Palaearctic.

Auchmis detersa (Esper, 1787) – K 3. 8. 2000 (ZT) – xerothermophilous 2 – Mediterranean.
Euplexia lucipara (Linnaeus, 1758) – SO 4. 8. 2001 (IR) – mesophilous 2 and 3 – Palaearctic.
Calamia tridens (Hufnagel, 1766) – MT (3c); V 29. 7. 1999 (Kj); T 27. 7. 2000 (IR); Beša-Moľva 16. 7. 2009 (MH) – xerothermophilous 1 – Palaearctic.
Helotropha leucostigma (Hübner, 1808) – Borša (5); T 5. 7. 1996 (IR); Beša-Moľva 16. 7. 2009 (MH) – hygrophilous 1 and 2 – Palaearctic.
Thalpophila matura (Hufnagel, 1766) – MT (3c); K 24. 8. 2002 (ZT); BL (9) – mesophilous 1 and 2 – West-Palaearctic.
Phlogophora meticulosa (Linnaeus, 1758) – MT (3c); BL (9) – mesophilous – Mediterranean.
Gortyna flavago (Denis et Schiffermüller, 1775) – MT (3c) – mesophilous to hygrophilous 1 and 2 – West-Palaearctic.
Hydraecia petasitis (Doubleday, 1847) – V 13. 7. 1994 (Kj); BL (9) – hygrophilous 2 – Eurosiberian.
Hydraecia micacea (Esper, 1789) – MT (3c); Dlhé Tice (6); BL (9) – hygrophilous 1 – Holarctic.
Amphipoea fucosa (Freyer, 1830) – MT (3c); Borša (5) – hygrophilous 1 and 2 – Palaearctic.
Amphipoea oculea (Linnaeus, 1761) – M. Kamenec (3c); K 13. 7. 1996 (ZT); Dlhé Tice (6) – mesophilous to hygrophilous 1 and 2 – Palaearctic.
Lenisa (= Archanara) geminipuncta (Haworth, 1809) – M. Kamenec (Laštůvka et al. 1982); Strážne 23. 7. 2009 (MH) – hygrophilous 1 – European.
Archanara dissoluta (Treitscke, 1825) – Strážne 23. 7. 2009 (MH) – hygrophilous 1 and 2 – West-Palaearctic.
Photedes fluxa (Hübner, 1809) – M. Kamenec (3c) – mesophilous 2 – Eurosiberian.
Photedes extrema (Hübner, 1809) – MV 1. 7. 2002 (IR) – hygrophilous 1 and 2 – Eurosiberian.
Globia sparganii (Esper, 1790) – M. Kamenec (3c); Dlhé Tice very abundant (6); Strážne 23. 7. 2009 (MH); BL (9) – hygrophilous 1 and 2 – Palaearctic.
Apamea monoglypha (Hufnagel, 1766) – KCH (1); Borša (5); Čičarovský les 2. 7. 2015 (Pj) – mesophilous – Palaearctic.
Apamea lithoxylaea (Denis et Schiffermüller, 1775) – MT (3c); MV 1. 7. 2002 (IR) – mesophilous to xerothermophilous 1 and 2 – Palaearctic.
Apamea remissa (Hübner, 1809) – K 8. 7. 1996 (ZT) – mesophilous? – Palaearctic.
Apamea sordens (Hufnagel, 1766) – K 14. 5. 1994 (ZT) – mesophilous – Holarctic.
Apamea oblonga (Haworth, 1809) – K 18. 6. 1994 (ZT) – mesophilous 1 – Palaearctic.
Apamea sublustris (Esper, 1788) – K 16. 6. 1995 (IR) – mesophilous 2 – Palaearctic.
Mesapamea secalis (Linnaeus, 1758) – M. Kamenec (3c); T 28. 6. 2001 (IR) – mesophilous 2 – West-Palaearctic.
Mesapamea secalella Remm, 1983 – MV 1. 7. 2001 (IR) – mesophilous 2 – West-Palaearctic.
Luperina testacea (Denis et Schiffermûller, 1775) – MT (3c); BL (9) – xerothermophilous to mesophilous 1 – West-Palaearctic.
Litoligia literosa (Haworth, 1809) – T 27. 7. 2000 (IR) – xerothermophilous 1 and 2 to hygrophilous – Palaearctic.
Mesoligia furuncula (Denis et Schiffermüller, 1775) – M. Kamenec (3c) – xerothermophilous to mesophilous 1 and 2 – Palaearctic.

Oligia versicolor (Borkhausen, 1792) – MT (3c) – mesophilous to hygrophilous 2 – West-Palaearctic.
Oligia latruncula (Denis et Schiffermüller, 1775) – MT (3c) – mesophilous 1 to ubiquitous – Palaearctic.
Brachylomia viminalis (Linnaeus, 1776) – MT (3c) – mesophilous to hygrophilous 2 – Palaearctic.
Parastichtis suspecta (Hübner, 1807) – Beša-Moľva 16. 6. 2012 (MH); BL (9) – mesophilous? – Palaearctic.
Parastichtis ypsillon (Denis et Schiffermüller, 1775) – BL (9) – mesophilous to hygrophilous – Palaearctic.
Tiliacea citrago (Linnaeus, 1758) – MT (3c); MV 4. 10. 2002 (IR) – xerothermophilous 1 and 2 – West-Palaearctic.
Tiliacea aurago (Denis et Schiffermüller, 1775) – SNM (1); VK 4. 10. 2001 (IR) – mesophilous 3 – West-Palaearctic.
Tiliacea sulphurago (Denis et Schiffermüller, 1775) – MT (3c); Raškovský luh 7. 9. 2013 (Pj); BL (9) – mesophilous 2 and 3 – Ponto-Mediterranean.
Xanthia icteritia (Hufnagel, 1766) – MT (3c); Beša-Moľva, KM (6); BL (9) – mesophilous to hygrophilous 1 and 2 – Palaearctic.
Agrochola lychnidis (Denis et Schiffermüller, 1775) – MT (3c) – mesophilous 2 and 3 – Palaearctic.
Agrochola A. humilis (Denis et Schiffermüller, 1775) – MT (3c) – xerothermophilous 2 – Ponto-Mediterranean.
Agrochola litura (Linnaeus, 1761) – MT (3c) – mesophilous 1 and 2 – West-Palaearctic.
Agrochola helvola (Linnaeus, 1758) – BL (9) – mesophilous 1 and 2 – Holarctic.
Agrochola lota (Clerck, 1759) – KM (6) – hygrophilous to mesophilous 1 and 2 – Palaearctic.
Agrochola laevis (Hübner, 1803) – MT (3c); BL (9) – xerothermophilous 2 and 3 – Ponto-Mediterranean.
Agrochola circellaris (Hufnagel, 1766) – MT (3c); BL (9) – mesophilous 2 and 3 – Palaearctic.
Lithophane socia (Hufnagel, 1766) – KM (6) – mesophilous 1 and 2 – Palaearctic.
Lithophane ornitopus (Hufnagel, 1766) – SNM (1) – mesophilous 2 and 3 – West-Palaearctic.
Xylena vetusta (Hübner, 1813) – KM (6) – mesophilous to hygrophilous 1 and 2 – Palaearctic.
Conistra vaccinii (Linnaeus, 1761) – BL (9) – mesophilous 1 and 2 – Palaearctic.
Conistra rubiginosa (Scopoli, 1763) – BL (9) – mesophilous 1 and 2 – West-Palaearctic.
Conistra rubiginea (Denis et Schiffermûller, 1775) – BL (9) – mesophilous 2 and 3 – West-Palaearctic.
Conistra erythrocephala (Denis et Schiffermüller, 1775) – MT (3c) – mesophilous 1 – West-Palaearctic.
Eupsilia transversa (Hufnagel, 1766) – Dlhé Tice (6); BL (9) – mesophilous 2 and 3 – Palaearctic.
Enargia paleacea (Esper, 1788) – Dlhé Tice (6); BL (9) – mesophilous 2 and 3 – Palaearctic.
Ipimorpha retusa (Linnaeus, 1761) – Klin nad Bodrogom 6. 7. 1996 (IR); BL (9) – mesophilous to hygrophilous 2 – Palaearctic.
Iphimorpha subtusa (Denis et Schiffermüller, 1775) – Borša (5); Dlhé Tice (6) – mesophilous to hygrophilous 2 – Palaearctic.

Cosmia diffinis (Linnaeus, 1767) – MV 1. 7. 2002 (IR); BL (9) – mesophilous to hygrophilous 2 – Mediterranean.
Cosmia affinis (Linnaeus, 1767) – K 5. 6. 1999 (ZT) – mesophilous – Palaearctic.
Cosmia trapezina (Linnaeus, 1758) – Borša (5); Dlhé Tice (6); Čičarovský les 2. 7. 2015 (Pj); BL (9) – mesophilous 2 and 3 – Palaearctic.
Cosmia pyralina (Denis et Schiffermüller, 1775) – Leles (1); MT (3c); VK 7. 6. 2003 (IR); BL (9) – mesophilous 2 and 3 – Palaearctic.
Atethmia centrago (Haworth, 1809) – MT (3c); KM (6) – mesophilous 2 – West-Palaearctic.
Dichonia convergens (Denis et Schiffermüller, 1775) – SNM (1); MV 4. 10. 2002 (IR) – mesophilous to xerothermophilous 1 and 2 – Ponto-Mediterranean.
Ammoconia caecimacula (Denis et Schiffermüller, 1775) – MT (3c) – mesophilous to xerothermophilous 2 – Palaearctic.
Aporophyla lutulenta (Denis et Schiffermüller, 1775) – VK 4. 10. 2001 (IR) – mesophilous to xerothermophilous 1 and 2 – Ponto-Mediterranean.
Polymixis polymita (Linnaeus, 1761) – BL (9) – mesophilous to xerothermophilous 2 and 3 – West-Palaearctic.
Mniotype satura (Denis et Schiffermûller, 1775) – MT (3c); BL (9) – mesophilous 2 and 3 – Palaearctic.
Orthosia incerta (Hufnagel, 1766) – MT (3c); KM, T (6); BL (9) – mesophilous 2 and 3 – Palaearctic.
Orthosia miniosa (Denis et Schiffermüller, 1775) – MV 2. 5. 2003 (IR); T (6); BL (9) – mesophilous 2 and 3 – West-Palaearctic.
Orthosia cruda (Denis et Schiffermüller, 1775) – MT (3c); MV 2. 5. 2003 (IR); BL (9) – mesophilous 3 – West-Palaearctic.
Orthosia populeti (Fabricius, 1781) – MT (3c) – mesophilous 2 and 3 – West-Palaearctic.
Orthosia cerasi (Fabricius, 1775) – KM (6); BL (9) – mesophilous 3 – West-Palaearctic.
Orthosia gracilis (Denis et Schiffermüller, 1775) – KM (6); T 19. 4. 2013 (Pj) – mesophilous 2 – Palaearctic.
Orthosia opima (Hübner, 1809) – MT (3c) – mesophilous 1 to 3 – Palaearctic.
Orthosia gothica (Linnaeus, 1758) – MT (3c); T 19. 4. 2013 (Pj); BL (9) – mesophilous 2 – Palaearctic.
Egira conspicillaris (Linnaeus, 1758) – MT (3c); V 18. 6. 1994 (Kj), KM (6); T 19. 4. 2013 (Pj) – mesophilous 2 and 3 – West-Palaearctic.
Mesogona acetosellae (Denis et Schiffermüller, 1775) – K 17. 9. 1999 (ZT) – mesophilous? – Palaearctic.
Tholera decimalis (Poda, 1761) – KM abundant (6); Raškovský luh 7. 9. 2013 (Pj); BL (9) – mesophilous 2 and 3 – Palaearctic.
Tholera cespitis (Denis et Schiffermüller, 1775) – MT (3c); K 7. 9. 2000 (ZT); KM (6); BL (9) – mesophilous 1 – West-Palaearctic.
Cerapteryx graminis (Linnaeus, 1758) – Dlhé Tice abundant (6) – mesophilous 2 and 3 – Holarctic.
Hadula (= Anarta) odontites (Boisduval, 1829) – K 15. 7. 1995 (ZT) – xerothermophilous 1 – Palaearctic.

Hadula (= Calocestra) trifolii (Hufnagel, 1766) – Borša (5); K 14. 5. 1994, 16. 8. 1997 (ZT); T 27. 7. 2000 (IR); Dlhé Tice (6); Chlmecké kopce 11. 6. 2015 (Pj); Avaš 28. 7. 2013 (Pj) – xerothermophilous 1 – Holarctic.

Hadula (= Calocestra) dianthi (Tauscher, 1809) – M. Kamenec (Laštůvka et al. 1982) – xerothermophilous 1 – Continental.

Polia hepatica (Clerck, 1759) – V 18. 6. 1994 (Kj) – mesophilous to hygrophilous 2 – Palaearctic.

Polia nebulosa (Hufnagel, 1766) – MT (3c); Čičarovský les 2. 7. 2015 (Pj) – mesophilous 2 and 3 – Plaearctic.

Pachetra sagittigera (Hufnagel, 1766) – Borša 22. 5. 1992 (Kj) – xerothermophilous 2 and 3 – Plaearctic.

Mamestra brassicae (Linnaeus, 1758) – K 5. 8. 1999 (ZT) – mesophilous 2 – Palaearctic.

Lacanobia thalassina (Hufnagel, 1766) – Borša (5); BL (9) – mesophilous 2 and 3 – Palaearctic.

Lacanobia contigua (Denis et Schiffermüller, 1775) – Borša (5); T 30. 4. 2000 (IR); BL (9) – mesophilous 2 and 3 – Palaearctic.

Lacanobia suasa (Denis et Schiffermüller, 1775) – Borša (5); T 30. 4. 2000 (IR) – mesophilous 2 and 3 – Palaearctic.

Lacanobia w-latinum (Hufnagel, 1766) – MT (3c); BL (9) – mesophilous to xerothermophilous 1 and 2 – Palaearctic.

Lacanobia oleracea (Linnaeus, 1758) – MT (3c); T 27. 7. 2000 (IR); BL (9) – mesophilous 1 and 2 – Palaearctic.

Lacanobia amurensis (Staudinger, 1901) – T 15. 6. 1995 (IR) – xerothermophilous 1 and 2 – Palaearctic.

Hada plebeja (Linnaeus, 1761) – Sírnik 8. 5. 2003 (IR); Dlhé Tice (6); BL (9) – mesophilous 2 and 3 – Palaearctic.

Hyssia cavernosa (Eversmann, 1842) – MT, M. Kamenec (3c) – xerothermophilous 1 and 2 – Continental.

Sideridis lampra (Schawerda, 1913) – C (2); M. Kamenec (3c); V 19. 7. 1993 (Kj); K 27. 5. 2000 (IR) – xerothermophilous 1 – Ponto-Mediterranean.

Sideridis rivularis (Fabricius, 1775) – MT (3c); Borša (5); MV 7. 5. 2003 (IR); BL (9) – xerothermophilous 1 and 2 – Palaearctic.

Sideridis reticulata (Goeze, 1781) – M. Kamenec, MT (3c); K 13. 7. 1996 (ZT); T 28. 6. 2001 (IR) – mesophilous to xerothermophilous 1 and 2 – West-Palaearctic.

Conisania luteago (Denis et Schiffermüller, 1775) – V 18. 6. 1994 (Kj); K, 16. 6. 1995 (IR); Chlmecké kopce 11. 6. 2015 (Pj) – xerothermophilous 1 – Palaearctic.

Hecatera bicolorata (Hufnagel, 1766) – M. Kamenec (3c); V 19. 7. 1993 (Kj); K 13. 7. 1996 (ZT); T 29. 5. 1999 (IR); V. Kamenec 20. 8. 2009 (B. Endel); BL (9) – xerothermophilous 1 and 2 – Palaearctic.

Hecatera dysodea (Denis et Schiffermüller, 1775) – MT (3c) – xerothermophilous 1 – Mediterranean.

Hadena compta (Denis et Schiffermüller, 1775) – M. Kamenec (3c); T 27. 7. 2000 (IR); BL (9) – xerothermophilous 1 – Palaearctic.

Hadena confusa (Hufnagel, 1766) – MT (3c) – mesophilous 1 and 2 – Palaearctic.

Hadena irregularis (Hufnagel, 1766) – M. Kamenec (3c); T 11. 6. 2000 (Kj); Streda nad Bodrogom 15. 6. 1995 (IR) – xerothermophilous 1 – South-Palaeacrctic.
Hadena perplexa (Denis et Schiffermüller, 1775) – MV 7. 5. 2003 (ZT) – xerothermophilous 1 – Palaearctic.
Mythimna turca (Linnaeus, 1761) – MT (3c); T 28. 6. 2001 (IR, ZT); Dlhé Tice, Beša-Moľva abundant (6); BL (9) – mesophilous to hygrophilous 2 – Eurosiberian.
Mythimna pudorina (Denis et Schiffermüller, 1775) – LL 7. 6. 2003 (ZT); BL (9) – hygrophilous 1 and 2 – Palaearctic.
Mythimna conigera (Denis et Schiffermüller, 1775) – Poľany (6); BL (9) – mesophilous 1 and 2 – Palaearctic.
Mythimna pallens (Linnaeus, 1758) – Dlhé Tice (6); Chlmecké kopce 11. 6. 2015 (Pj); Avaš 28. 7. 2013 (Pj); BL (9) – mesophilous 1 and 2 – Palaearctic.
Mythimna impura (Hübner, 1808) – M. Kamenec (Laštůvka et al. 1982); BL (9) – hygrophilous 1 and 2 – Palaearctic.
Mythimna albipuncta (Denis et Schiffermüller, 1775) – MT (3c); Dlhé Tice, Beša-Moľva (6); BL (9) – mesophilous to hygropilous 1 – Palaearctic.
Mythimna ferrago (Fabricius, 1787) – MT (3c); K 16. 8. 1997 (ZT); BL (9) – mesophilous 1 and 2 – Palaearctic.
Mythimna l-album (Linnaeus, 1767) – MT (3c); BL (9) – hygrophilous 1 and 2 – Palaearctic.
Leucania obsoleta (Hübner, 1803) – V 14. 5. 1994 (Kj, ZT); T 27. 7. 2000 (IR); Strážne 28. 8. 2009 (MH) – hygrophilous 1 – Palaearctic.
Senta flammea (Curtis, 1828) – Strážne 28. 8. 2009 (MH) – hygrophilous 1 – Eurosiberian.
Dichagyris nigrescens (Höfner, 1888) – V 19. 7. 1993 (Kj) – xerothermophilous 1 – Mediterranean.
Dichagyris forcipula (Denis et Schiffermüller, 1775) – M. Kamenec (3c) – xerothermophilous 1 – Mediterranean.
Euxoa eruta (Hübner, 1817) – M. Kamenec 30. 7. 1977 (Z. Laštůvka) (Tokár et al. 1996) – xerothermophilous 1 – South-European.
Euxoa obelisca (Denis et Schiffermüller, 1775) – MT (3c) – xerothermophilous 1 – Palaearctic.
Euxoa tritici (Linnaeus, 1761) – M. Kamenec (3c) – xerothermophilous 1 – West-Palaearctic.
Euxoa aquilina (Denis et Schiffermüller, 1775) – MT (3c); K 2. 7. 1993 (ZT) – xerothermophilous 1 – Palaearctic.
Agrotis bigramma (Esper, 1790) – K 10. 8. 1996 (ZT) – xerothermophilous 1 – Mediterranean.
Agrotis cinerea (Denis et Schiffermüller, 1775) – V 15. 5. 1993 (Kj, ZT); MV 2. 5. 2003 (IR) – xerothermophilous 1 – Palaearctic.
Agrotis exclamationis (Linnaeus, 1758) – K 27. 5. 2000 (IR); Dlhé Tice (6); Avaš 28. 7. 2013 (Pj); BL (9) – xerothermophilous 1 – Palaearctic.
Agrotis segetum (Denis et Schiffermüller, 1775) – C, VK (2); MT (3c); K 18. 6. 1994 (ZT); T 27. 7. 2000 (IR); BL (9) – xerothermophilous 1 – Palaearctic.
Agrotis clavis (Hufnagel, 1766) – T 27. 7. 2000 (IR); BL (9) – xerothermophilous 1 – Palaearctic.
Agrotis ipsilon (Hufnagel, 1766) – V (2); MT (3c); Borša (5); Chlmecké kopce 11. 6. 2015 (Pj); BL (9) – mesophilous to xerothermophilous 1 – Palaearctic.

Axylia putris (Linnaeus, 1761) – Borša (5); Dlhé Tice (6); Avaš 28. 7. 2013 (Pj); BL (9) – mesophilous 1 – Palaearctic.
Ochropleura plecta (Linnaeus, 1761) – Borša (5); MV 7. 5. 2003 (IR); KM, Dlhé Tice (6); BL (9) – mesophilous 2 – Holarctic.
Diarsia brunnea (Denis et Schiffermüller, 1775) – T 27. 7. 2000 (IR) – mesophilous 2 – Eurosiberian.
Diarsia rubi (Vieweg, 1790) – MT (3c) – mesophilous to hygrophilous 2 – Eurosiberian.
Cerastis rubricosa (Denis et Schiffermüller, 1775) – MT (3c); K 30. 4. 2000 (IR) – mesophilous to hygrophilous 1 – Palaearctic.
Chersotis multangula (Hübner, 1803) – K 2. 7. 1993 (ZT); V 19. 7. 1993 (Kj) – xerothermophilous 1 – Palaearctic.
Chersotis fimbriola (Esper, 1803) – T 27. 7. 2000 (IR) – xerothermophilous 1 – European.
Noctua pronuba (Linnaeus, 1758) – MT (3c); Borša (5); V 14. 7. 1994 (Kj), Dlhé Tice, KM (6); BL (9) – mesophilous 1 and 2 – Holarctic.
Noctua fimbriata (Schreber, 1759) – MT, M. Kamenec (3c); Borša (5); K 3. 7. 1993 (ZT); V 19. 7. 1993 (Kj); Chlmecké kopce 11. 6. 2015 (Pj) – mesophilous 2 and 3 – Palaearctic.
Noctua orbona (Hufnagel, 1766) – V 14. 7. 1994 (Kj); K 16. 6. 1995 (IR) – mesophilous 2 and 3 – Palaearctic.
Noctua interposita (Hübner, 1790) – MT (3c); T 15. 6. 1995 (IR) – xerothermophilous 1 and 2 – Mediterranean.
Noctua janthina (Denis et Schiffermüller, 1775) – MT (3c); K 15. 7. 1995 (ZT); T 5. 7. 1996 (IR); BL (9) – mesophilous 1 and 2 – West-Palaearctic.
Spaelotis ravida (Denis et Schiffermüller, 1775) – M. Kamenec (Laštůvka et al. 1982); MT (3c) – xerothermophilous 1 – Palaearctic.
Epilecta linogrisea (Denis et Schiffermüller, 1775) – M. Kamenec (Laštůvka et al. 1982); T 3. 8. 2001(IR) – xerothermophilous 1 and 2 – West-Palaearctic.
Xestia stigmatica (Hübner, 1813) – MT (3c) – mesophilous 2 and 3 – West-Palaearctic.
Xestia xanthographa (Denis et Schiffermüller, 1775) – MT (3c); KM (6) – mesophilous to hygrophilous 1 and 2 – Continental.
Xestia c-nigrum (Linnaeus, 1758) – Borša (5); K 14. 5. 1994 (ZT); Dlhé Tice, Beša-Moľva, KM abundant (6); Chlmecké kopce 11. 6. 2015 (Pj); BL (9) – mesophilous 2 – Holarctic.
Xestia triangulum (Hufnagel, 1766) – T 28. 6. 2001 (IR) – mesophilous 2 and 3 – Palaearctic.
Eugnorisma depuncta (Linnaeus, 1761) – BL (9) – mesophilous 2 and 3 – Palaearctic.

Conclusions

In total, we recorded 1,593 species of Lepidoptera (70 families) from the Latorica PLA and some adjacent areas, which is almost 44.2% of the total lepidopteran fauna of Slovakia (Pastorális et al. 2013). The most numerous family is Noctuidae with 224 species, followed by Totricidae with 189 species, Geometridae with 182 species, and Gelechiidae having 118 species. Considering the habitat preference, mainly xerothermophilous species, with a connection to a limestone or sandy base, are present. There is also a significant percentage of species associated with wetland habitats – hygrophilous or hygrothermophilous. This is of course related to the composition of habitats in the studied area. Many species inhabit various

associations of forest covers that run alongside water streams, especially when it is hard or soft floodplain forests. It must be acknowledged that the lepidopterofauna of the researched area has been examined unevenly. Most of the data come from well-known and attractive localities in the western and southern part of the territory – Kašvár, Tarbucka, Medový vrch, Somotor, Malá Tŕňa etc. There are still a lot of sites that deserve more detailed research, e.g. Boľské peat bog, banks of the Tisa/Tisza River, etc., which is a challenge for further research projects.

The faunal significance of the researched area has increased, for example, by the discovery of new species for science. In the case of the investigated area, *Vespina slovaciella* (Zaguljajev et Tokár 1990), described from the foothills of Vihorlat, but known from several other localities in the Latorica PLA, represents such species. In addition, species found on the territory of the Latorica PLA, or in its vicinity, for the first or second time give this area a mark of exceptionality. We have recorded several such species. The first finds reported from the Latorica PLA include *Monochroa inflexella, Dichomeris barbella, Coleophoria sergiella, Tecmerium perplexum, Cochylimorpha woliniana*, *Pyralis perversalis* and *Idaea elongaria*. To other rare lepidopterofauna of Slovakia we can assign mainly several species from the group of so-called Microlepidoptera – *Glaucolepis magna*, *Nemapogon gliriella*, *Cephimallota crassiflavella*, *Parornix tenella*, *Oegoconia novimundi*, *Apatema whalley*, *Kasyniana diminutella*, *Aristotelia subdecurtella*, *Chrysoesthia verrucosa*, *Monochroa palustrella*, *Scrobipalpa arenbergeri*, *S. erichi*, *Coleophora adjectella*, *C. adjunctella*, *C. tamesis*, *C. preisseckeri, Perritia herrichiella*, *Cydia pyrivora*. From the so-called Macrolepidoptera we can mention as rare *Zygaena cynarae, Archiearis parthenias, Boudinothiana notha, B. puella, Proserpinus proserpina, Phaiogramma etruscaria, Eupithecia ochridata, E. orphnata, Scopula corrivalaria, Laelia coenosa, Epatolmis luctifera, Aegle kaekeritziana, Cucullia dracunculi, Periphanes dephinii, Hadula odontites, H. dianthi, Agrotis bigramma, and Xestia stigmatica.*

Day active Lepidoptera (butterflies) are a separate chapter. They are more noticeable, and the public has more information about them. So far, 115 species of butterflies have been observed in the monitored area. A larger number of data from this area has begun to accumulate only after the Second World War, mainly thanks to the work of Moucha & Novák (1960). However, studies were insufficient, as shown in the research by Kulfan J. & Kulfan M. (1990), who did not take into account the participation of the Eastern Slovak Plain when evaluating the fauna of butterflies of xerothermic areas of Slovakia. Otherwise, after reevaluation of the older data, we can pronounce that some species – *Leptidea morsei*, *Colias myrmidone* no longer live in this area. *Pieris mannii* briefly appeared in the 1950s, but soon disappeared from the territory (Moucha 1956). Rare species that occur in only a few localities include *Carcharodus orientalis*, *Libythea celtis*, *Argynnis pandora*, *Nymphalis xanthomelas*, *Neptis sappho* and especially *Euphydryas maturna*. This "Natura" species was recorded in eastern Slovakia only in the second locality.

From the zoogeographical point of view, most species of observed Lepidoptera have a Palaearctic distribution of – 416 species, followed by species with a West-Palaearctic distribution of 409 species, European – 190, and Eurosiberian – 163 species. Other possible distributions do not represent a significant numerous, e. g. Holarctic 90 species, Mediterranean 48 species, and Ponto-Mediterranean 39 species. It is perhaps worth noting of the Afrotropical

species (*Acontia lucida*) or Palaeotropic (*Acherontia atropos*, *Dysgonia algira, Heliothis peltigera, Helicoverpa armigera*), which regularly fly into our territory from the southern regions. In addition to them, the most common migrants include the *Vanessa cardui*, which, for example, occurred en masse in the first half of 2019; at individual numbers, the migratory *Herse convolvuli* was observed.

The occurrence of protected lepidopteran species usually signals for a given area the presence of suitable living conditions that allow their occurrence and survival. According to the Nature Protection Act no. 543/2002 Coll. and Decree no. 24/2003 Coll. we distinguish between species of national and of European significance. From the first group in the studied area we found *Zygaena cynarae, Lycaena thersamon, Brenthis hecate, Hipparchia semele, Euplagia quadripunctaria* and from the second group *Zerynthia polyxena, Parnassius mnemosyne, Lycaena dispar, Phengaris arion, Ph. teleius, Euphydryas maturna, Eriogaster catax,* and *Proserpinus proserpina*. This group represents species within the Natura 2000 project as the so-called "Natura" species, which are receiving increased attention within Europe.

The issue of Lepidoptera protection also includes the determination of endangered species. In Slovakia, we have elaborated a list of endangered species of Lepidoptera (Kulfan M. & Kulfan J. 2001). Among the species living in the Latorica PLA, *Euphydryas maturna, Euplagia quadripunctaria, Neptis sappho,* and *Zygaena cynarae* belong to the critically endangered. Endangered are represented by *Brentis hecate, Hipparchia semele, Lycaena thersamon, Phengaris* (= *Maculinea*) *teleius*, and *Proserpinus proserpina*. *Aporia crataegi, Brenthis ino, Hyles euphorbiae, H. gallii, Laelia coenosa, Lycaena alciphron, L. dispar, Phengaris* (= *Maculinea*) *arion, Melitaea phoebe, M. trivia*, *Parnassius mnemosyne*, *Polyommatus bellargus, Pseudophilotes vicrama, Saturnia pyri, Zerynthia polyxena*, and *Zygaena punctum* are vulnerable. Within the last two categories of data deficient and less endangered (lower risk) include eight other species. From a regional point of view, we can consider the species *Colias myrmidone*, *C. chrysotheme*, *Leptidea morsei*, *Pieris mannii* as extinct.

The monitored area of the Eastern Slovak Plain is a prevalent lowland in nature, just a few hills reach a little over 200 m, or part of the Zemplínske vrchy Mts. has a higher altitude. Therefore, in the lepidopterofauna we have not found any species typical for middle or higher positions, or even mountain species. The vast majority of the species is characteristic for lowlands, especially thermophilic or xerothermic. There are excellent preconditions for the development of such lepidopterofauna. The occurrence of many thermophilous species is concentrated in this area, with species that live within the territory of Slovakia only here or in Soutwestern Slovakia. At the same time, the species gradually moving from southern Europe to the north, due to increasing average annual temperatures, reaches Slovakia through this territory. In addition to species with preference to limestone geological base (Kašvár NNR), e.g. species of the genus *Coleophora*, *Scythris hungariciella*, *Chamaesphecia dumonti*, *Scolitantides orion*, *Glaucopsyche alexis*, *Libythea celtis*, *Brenthis hecate*, *Melitaea trivia*, *Hyponephele lycaon*, *Hyles euphorbiae*, *Phaiogramma etruscaria*, *Ocneria rubea*, *Chelis maculosa*, *Odice arcuinna*, *Catocala hymenaea*, *Cucullia fraudatrix*, *Schinia cognata*, *Periphanes delphinii*, etc.

There are many localities on the windy sands dunes, which are present only in this part of Eastern Slovakia (Tarbucka NR, Svätuše, Somotor, Strážne, the surroundings of

M. Horeš), and then in Záhorie or the Poddunajská rovina plain. Psammophilic flora and subsequently entomofauna are bound to habitats with a sandy base, from Lepidoptera e.g. *Scythris bifissella*. Natural conditions in the Eastern Slovak Plain are also ideal for the emergence of various types of wetland habitats from mesophilic meadows, wetlands, swamps, periodic water areas, many blind branches, bogs and lowland peat bogs to large water areas with hygrophilous or vegetation in the main watercourse basin – Latorica and Bodrog. Many species of Lepidoptera are tied to such places. We can mention e.g. *Limnaecia phragmitella*, *Atremaea lonchopera*, *Clepsis spectrana*, *Lycaena hippothoe*, *Phengaris teleius*, *Chilo phragmitellus*, *Calamatropha paludella*, *Schoenobius gigantellus*, *Donacaula forficella*, *Acentria ephemerella*, *Parapoynx stratiotata*, *P. stagnalis*, *Nymphula nitidulata*, *N. nymphaeta*, *Scopula corrivalaria*, and *Nycteola asiatica*. Their habitat preference falls most likely into the definition of hygrothermophilous, i.e. they prefer moist habitats, but in a warm climatic range.

In the territory of the Latorica PLA, in addition to autochthonous species, there are also some invasive species that we register as pests in agriculture or otherwise cultivated plants. After the World War II, the *Hyphantria cunea* spread to fruit trees and has survived successfully until now, Lepidoptera from North America also arrived here in the larval stage using agate (*Robinia pseudoaccacia*) – *Parectopis robiniella*, *Macrosaccus robiniella*, *Blastobasis glandulella*. In recent years also *Cameraria ohridella* with connection to chestnut has appeared, or *Cydalima perspectalis* preferring ornamental shrubs of the genus *Buxus* spp.

Like any landscape area, the territory of the Latorica PLA has changed over the years under the influence of real and necessarily advancing succession or under the influence of intensive anthropogenic interventions. Extensive land reclamation works to prevent floods that recured every year were a major intervention in the natural course of natural conditions. Currently, floods occur minimally, rather the second extreme prevails – the drying up of the country. Originally marshy and wet lowland with many blind arms dries out and hygrophilous species of plants and animals disappear. Blind arms are grounded or are overgrown with other types of vegetation. Even the cultivated, original meadows or steppe habitats are intensely overgrown with raids of bushes and trees, there is no grazing that would hinder this succession. There is a real threat of a rapid change of habitats, e.g. in Kašvár NNR or Tarbucka NR that would mean the disappearance of rare heat – and drought-loving species of Lepidoptera. Some signs of improvement, e.g. elimination of raids in Tarbucka NR should be followed in other localities. A specific feature in the Latorica PLA is the presence of sands and sand dunes with characteristic vegetation. Unfortunately, these are also overgrown in addition to being mined and subsequently the excavated sites are often used as illegal landfills, e.g. in the village of Svätuše.

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Súhrn

Motýle (Lepidoptera) Chránenej krajinnej oblasti Latorica

Príspevok sa venuje výsledkom výskumu rozšírenia a výskytu zástupcov radu motýle (Lepidoptera) na území Chránenej krajinnej oblasti Latorica a ďalších susediacich plôch Východoslovenskej roviny a v malej miere aj Zemplínskych vrchov. Najprv sú zhrnuté publikované údaje, ktorých je do obdobia tesne po druhej svetovej vojne málo a sú to len jednotlivé nálezy. Až neskôr začal seriózny prieskum, s najvyššou intenzitou v rokoch 1990 až 2005. Výsledkom bolo viacero príspevkov s priebežnými výsledkami o výskyte vzácnych druhov motýľov, prípadne druhov s dennou aktivitou.

Lokalizácia sledovaného územia na juhu východného Slovenska a prírodné pomery – stepné i mokraďné lokality, piesočné duny, slaniská, mäkké a tvrdé lužné lesy, dávajú predpoklad rozvoja

pestrých a bohatých spoločenstiev motýľov. To sa prejavilo aj v počte zistených druhov, ktorých je 1 593 zo 70-ich čeľadí, čo predstavuje 44, 2% z fauny motýľov Slovenska. Zo vzácnych nálezov – prvé, resp. druhé nálezy v rámci Slovenska, treba spomenúť – *Vespina slovaciella*, *Monochroa inflexella, Dichomeris barbella, Coleophoria sergiella, Tecmerium perplexum, Cochylomorpha wolniana, Pyralis perversalis* alebo *Idaea elongaria*. Dôležité je vyzdvihnúť aj ďalšie vzácne druhy pre Slovensko, zo skupiny tzv. drobných motýľov (tzv. Microlepidoptera) - *Glaucolepis magna*, *Nemapogon gliriella*, *Cephimallota crassiflavella*, *Parornix tenella*, *Oegoconia novimundi*, *Apatema whalley*, *Kasyniana diminutella*, *Aristotelia subdecurtella*, *Chrysoesthia verrucosa*, *Monochroa palustrella*, *Scrobipalpa arenbergeri*, *Scrobipalpa erichi*, *Coleophora adjectella*, *C. adjunctella*, *C. tamesis*, *C. preisseckeri, Perritia herrichiella*, *Cydia pyrivora* a zo skupiny veľkých motýľov (tzv. Macrolepidoptera) - *Zygaena cynarae, Boudinothiana parthenias, B. notha, B. puella, Proserpinus proserpina, Phaiogramma etruscaria, Eupithecia ochridata, E. orphnata, Scopula caurivalaria, Laelia coenosa, Epatolmis luctifera, Aegle koetzkeriana, Cucullia dracunculi, Periphanes delphinii, Hadula odonites, H. dianthi, Agrotis bigramma,* a *Xestia stigmatica.* Entomofaunu CHKO Latorica charakterizujú teplo- a suchomilné druhy - so xerotermnou habitatovou preferenciou, a z motýľov k nim zaraďujeme napr. druhy rodu *Coleophora*, *Scythris hungariciella*, *Chamaesphecia dumonti*, *Scolitantides orion*, *Glaucopsyche alexis*, *Libythea celtis*, *Brenthis hecate*, *Melitaea trivia*, *Hyponephele lycaon*, *Hyles euphorbiae*, *Phatogramma etruscaria*, *Scopula irregulata, Ocneria rubea*, *Chelis maculosa*, *Odice arcuinna*, *Catocala hymenaea*, *Cucullia fraudatrix*, *Schinia cognata*, *Periphanes delphinii*, A taktiež významný podiel majú mnohé mokraďné lokality, vlhké lúky, mŕtve ramená riek so svojráznou lepidopterofaunou, kde nachádzame hygrofilné druhy, ako napr. *Limnaecia phragmitella*, *Atremaea lonchopera*, *Clepsis spectrana*, *Lycaena hippothoe*, *Phengaris teleius*, *Chilo phragmitellus*, *Calamatropha paludella*, *Schoenobius gigantellus*, *Donacaula forficulla*, *Acentria ephemerella*, *Parapoynx stratiotata*, *P. stagnalis*, *Nymphula niditula*, *N. nymphaeta*, *Scopula corrivalaria* a *Nycteola asiatica*. Dobre preskúmaná je aj ekologická skupina motýľov s dennou aktivitou. Bolo ich zistených až 115 druhov, hoci minimálne tri druhy už môžeme považovať na území CHKO Latorica za vyhynuté – *Leptidea morsei*, *Pieris mannii* a *Colias myrmidone*. Výskytom vzácne reprezentujú *Carcharodus orientalis*, *Libythea celtis*, *Argynnis pandora*, *Nymphalis xanthomelas*, *Neptis sappho* a hlavne *Euphydryas maturna*. Práve z tejto skupiny druhov boli viaceré zaradené medzi prioritné druhy v rámci programu Natura 2000 a zároveň aj medzi zákonom chránené druhy národného alebo európskeho významu, ktoré na sledovanom území nachádzame. Okrem už vyššie spomenutých druhov sú to *Zerynthia polyxena*, *Parnassius mnemosyne*, druhy rodu *Phengaris* (*Ph. arion* a *Ph. teleius*), *Lycaena dispar*, tiež *Eriogaster catax*, *Proserpinus proserpina* a *Euplagia quadripunctaria*. Zo zoogeografického hľadiska najviac zistených druhov motýľov je rozšírených v palearktickej oblasti (416), nasledujú druhy so západopaleartkickým rozšírením (409), európske (190) a eurosibírske (163). Významný je aj podiel druhov mediteránnych (48) a pontomediterránnych druhov (39), ktoré sú viazané na xerotermné habitaty. Zoznam zistených druhov je rozsiahly, zaujímavé je, že väčšina nálezov pochádza z niekoľkých atraktívnych a intenzívne navštevovaných lokalít, ako sú NPR Kašvár, PR Tarbucka, Medový vrch pri Černochove, Malá Tŕňa, teda z juhozápadnej časti územia. Bolo by vhodné, aby bol ďalší výskum orientovaný do juhovýchodnej časti, prípadne na lokality, ktoré zatiaľ neboli podrobnejšie skúmané, napr. PR Boľské rašelinisko, brehové partie Tisy a pod.

Invertebrates of the Latorica Protected Landscape Area