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ABSTRACTS OF LECTURES AND POSTERS

8th Czech-Slovak Mycological Conference
Nitra, Slovakia, September 21–24, 2023

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8th biannual Czech-Slovak mycological conference took place on premises of Slovak Academy of Sciences in Nitra from 21. to 24. September 2023. The conference was co-organized by Slovak Mycological Society, Czech Scientific Society for Mycology, Institute of Forest Ecology and Institute of Botany (both Slovak Academy of Sciences), and Natural-history Museum (Slovak National Museum). 45 participants were registered for the conference and 26 oral and 9 poster lectures were presented. Field trip to surroundings of the castle Gýmeš (Tríbeč Mts., village of Jelenec) was focused on fungi of termophilic oak stands.

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PLANT SCIENCE & BIODIVERSITY CENTRE SAS

SLOVENSKÉ NÁRODNÉ MÚZEUM PRÍRODOVEDNÉ MÚZEUM

ORAL PRESENTATIONS:

EUROPEAN SPECIES OF THE *MELANOLEUCA GRAMINICOLA* GROUP

Vladimír Antonín[1], Ondrej Ďuriška[2], Soňa Jančovičová[3], Tomáš Kudláček[4], Roberto Para[5], Hana Ševčíková[1], Michal Tomšovský[4]

[1]Department of Botany, Moravian Museum, Zelný trh 6, CZ-659 37 Brno, Czech Republic; vantonin@mzm.cz; hsevcikova@mzm.cz
[2]Department of Pharmacognosy and Botany, Faculty of Pharmacy, Comenius University in Bratislava, Odbojárov 10, SK-832 32 Bratislava, Slovakia; duriska@fpharm.uniba.sk
[3]Department of Botany, Faculty of Natural Sciences, Comenius University in Bratislava, Révová 39, SK-81102 Bratislava, Slovakia; sona.jancovicova@uniba.sk
[4]Faculty of Forestry and Wood Technology, Mendel University in Brno, Zemědělská 3, CZ-613 00 Brno, Czech Republic; michal.tomsovsky@mendelu.cz; tomas.kudlacek@mendelu.cz
[5]Via Martiri di via Fani 22, I-61024 Mombaroccio, Italy; r.para@alice.it

Six European species of the *M. graminicola* group – *M. monticola*, *M. romanensis*, *M. graminicola*, *M. brachyspora*, *M. rufipes*, and *M. stridula*, belonging to subgen. *Urticocystis* (species with urticoid or absent cheilocystidia), are summarized in this study. *Melanoleuca monticola* and *M. romanensis* were described as new species in 2023. *Melanoleuca monticola* represents a European species earlier identified as *M. angelesiana*, but the latter is a North-American species probably absent in Europe. Results are based on morphological characters and a multigene phylogenetic analyses of the combined dataset (ITS, rpb2 and tef1) of both type material and recent specimens from various parts of Europe. All species are briefly characterized by macro- and micromorphological features, their ecology and distribution in Europe.

The studies of V. Antonín and H. Ševčíková were made possible by the support provided to the Moravian Museum by the Ministry of Culture of the Czech Republic as part of its long-term conceptual development programme for research institutions (DKRVO, ref. MK000094862). The research of T. Kudláček and M. Tomšovský was supported by the Czech Ministry of Education, Youth and Sports and the European Regional Development Fund, financing the Project *Phytophthora* Research Centre Reg. No. CZ.02.1.01/0.0/0.0/15_003/0000453. The research of O. Ďuriška was supported by VEGA Scientific Grant Agency, project VEGA 1/0749/21.

MACROMYCETES RESEARCH WITHIN THE PROJECT "IMPROVING THE STATUS OF HABITATS AND SPECIES OF EUROPEAN IMPORTANCE IN THE TERRITORY OF THE NÍZKE TATY NATIONAL PARK"

Katarína Bučinová[1], Maroš Peiger[2], Stanislav Glejdura[3]

[1] Nízke Tatry National Park Administration in Banská Bystrica, Research Station in Slovenská Ľupča Lichardova 129/52, SK-976 13 Slovenská Ľupča, Slovakia; katarina.bucinova@napant.sk
[2] Research Station and Museum of TANAP, Tatra National Park Administration, Tatranská Lomnica 14066, SK-059 60 Vysoké Tatry, Slovakia; maros.peiger@tanap.sk
[3] Kováčová 562, SK-962 37 Kováčová, Slovakia; glejdura@gmail.com

In 2023, macromycetes research was conducted in the Low Tatras National Park from April to August, at 22 locations. 362 species were recorded, among which the first finds for Slovakia were determined: *Bertia latispora, Chalazion helveticum, Peziza flavida,Perilachnea flavobrunnea, Pseudolanzia piceetorum, Stictis radiata*; as well as finds of legally protected species: *Amylocystis lapponica, Camarops tubulina,Climacodon septentrionalis, Rhodofomes roseus, Sparassis brevipes,* which, together with other rare species: *Cystostereum murrayi, Dacryobolus karstenii*, *Hymenochaete fuliginosa*, *Phellinus nigrolimitatus*, *Phlebia centrifuga, Skeletocutis odora,* can be considered as bioindicative in relation to forests and primeval forests that are naturally preserved, where the occurrance of these fungi was recorded. Rare fungi species: *Boudiera acanthospora, Elaiopezia polaripapulata*, *Gymnopus fuscopurpureus, Gymnopus hariolorum, Lactarius pterosporus Lasiobolidium coprophilum* and *Pachyella punctispora,* will be included in the new Red List of Slovakia's fungi under the higher threat categories. Of the lichenized fungi, *Lobaria pulmonaria* was recorded, which is a taxon protected by law, as well as other rare species: *Lichenomphalia umbellifera, Multiclavula mucida, Icmadophila ericetorum.* The findings of important species of fungi so far point to the great potential of the diversity of the mycoflora of the Nízke Tatry NP, across a wide range of habitats found in this area. Attention should be paid to bioindicative, rare and legally protected fungi occurring in the Low Tatras natural forests and primeval forests, the area of which has decreased in the recent past. Therefore, it is necessary to ensure their long-term monitoring and relevant protection.

NEW MEMBER OF THE GENUS *WOLFIPORIELLA* IN CENTRAL EUROPE

Daniel Dvořák[1], Michal Tomšovský[2]

[1]Department of Botany and Zoology, Faculty of Sciences, Masaryk University, Kotlářská 2, CZ-611 37 Brno, Czech Republic, dvorak@sci.muni.cz

[2]Department of Forest Protection and Wildlife Management, Faculty of Forestry and Wood Technology, Mendel University in Brno, Zemědělská 3, CZ-61300 Brno, Czech Republic, tomsovsk@mendelu.cz

A striking, yet unknown resupinate polypore was found in the years 2006 and 2009 in Fabián nature reserve in southern Bohemia. According to thickness and extent of fruitbodies, it is somewhat similar to *Yuchengia narymica*, micromorphologically and phylogenetically it is very distinct and close to the genus *Laetiporus*. The species is characterized by dimitic hyphal system with clampless hyphae and ellipsoidal spores. It inhabits both standing and fallen beech trunks, where it produces brown rot. It is apparently a very rare species in Central Europe – besides Fabián, it is known in merely from two older collections, originating from beech old growth forests (CR: Černý les; SVK: Mláčik) and labelled as a resupinate form of *Laetiporus sulphureus*. We found out that this undescribed taxon belongs to the genus *Wolfiporiella*, which was established only in 2022 and so far contains three species occurring in North America and Southeast Asia.

CORTINARIUS SUBGENUS *TELAMONIA* ON THE ALTITIDINAL GRADIENT OF THE SOUTH-BOHEMIAN RAISED BOGS

Štěpán Forejt

Department of Botany, Faculty of Science, University of South Bohemia, Branišovská 31, CZ-37005 České Budějovice, Czech Republic; stepan.forejt@seznam.cz

The subgenus *Telamonia* represents a taxonomically difficult group of the genus *Cortinarius* due to a high species diversity, a variability of morphological characters of fruit bodies and their mutual similarity. Species of the subgenus *Telamonia,* together with species of the subgenus *Dermocybe,* belong to the dominant groups of ectomycorrhizal fungi in raised bogs. Better knowledge of these species and their ecology can significantly contribute to the correct interpretation of mycobiota changes of these threatened biotopes. The aim of the study was to find out which species of the subgenus *Telamonia* growing in *Sphagnum* occur in selected raised bogs, which ectomycorrhizal trees do they prefer, and whether their occurrence is affected by altitude. In 2022, nine localities in the Šumava National Park and the Třeboňsko Protected Area (470–1175 m a.s.l.) were regularly visited. Microscopic and macroscopic features of each collection were studied. In case of problems with identification, the ITS region was sequenced and compared with sequences of type material and own sequences. Altogether 26 species were identified, the most common species were *C. flabellus, C. flexipes, C. fulvescentoideus* and *C. sphagnoravus*. Four of the species (*C. fragrantissimus, C. latiodistributus, C. lindstroemia and C. mammillaus*) were

recorded in the Czech Republic for the first time, four species are probably new to science. Abundant species occurred across the studied altitudinal gradient; the relationship of other species could not be evaluated due to the insufficient number of their records. 16 species were found in pure spruce stands, 5 in pure pine stands.

The administrations of Šumava National Park and Třeboňsko Protected Landscape Area are thanked for the permission to collect fruit bodies of *Cortinarius* species in protected areas.

INATURALIST AND NEW APPROACHES IN BIODIVERSITY MONITORING

Jonáš Gruska

LOM, Mlynarovičova 5, SK-85103 Bratislava, Slovakia; jonas@lom.audio

Current technologies offer us a wide range of possibilities to record and analyse the occurrence of fungi and lichens. Using the user-friendly iNaturalist platform, it is now possible to involve the wider public in the process of monitoring of rare or new species, and the resulting data are publicly available for study or science. What are the benefits and pitfalls of this technology? How can a 'citizen science' help scientific research?

A LIST OF ALIEN FUNGI OF THE CZECH REPUBLIC

Zuzana Haňáčková, Karel Černý, Markéta Hrabětová et al.

The Silva Tarouca Research Institute for Landscape and Ornamental Gardening
Květnové náměstí 391, CZ-252 43 Průhonice, Czech Republic; cerny@vukoz.cz

The introduction of alien species, their naturalization and spread represents one of the most important challenges in the protection of the environment of the Czech Republic. Fungi and fungal-like organisms are a very little explored but very important group of alien organisms, especially those potentially capable of parasitizing native animal and plant species. In the Czech Republic, there have been more than 500 species of fungi and fungal-like organisms that can be described as probably alien or cryptogenic. Approximately, 290 taxa can be included among the neomycetes (species introduced after 1492), where there is a greater consensus on the introduction. The most numerous are Oomycetes (19%) and Uredomycetes (16%), followed by relatively numerous representatives of Leotiomycetes, Dothideomycetes, Agaricomycetes, Sordariomycetes, Exobasidiomycetes, and other groups. In terms of life strategy, 80% of species are plant parasites, the remainder are saprobionts (16%) and other life strategies including mycorrhizal fungi (4%). Some taxonomic and ecological groups are characterized by certain time periods when they

were captured more often than others. The largest proportion of rust species or aerophytic oomycete species was recorded in the second half of the 19th and at the turn of the 19th and 20th centuries. On the contrary, most of species introduced in the last twenty years are polyphagous soil oomycetes – most of them can still be described as casually introduced, although there is no doubt about their future naturalization. About 42% of the neomycetes with known origin comes from North America and 26% from Asia.

We would like to thank many collaborators from a number of institutions for their valuable help, revision and information, including Markéta Šandová, Lucie Zíbarová, Ivana Šafránková, Michaela Sedlářová, Jana Palicová, Veronika Dumalasová, Alena Hemzalová, David Novotný and others. The work was supported by project TAČR No. SS02030018 DivLand.

A PAIR OF TWO FUNGI FROM BIAŁOWIEŻA FOREST – *DENTIPRATULUM* AND *CYPHELLOPORIA*

Jan Holec

National Museum, Mycological Department, Cirkusová 1740, CZ 193 00 Praha 9, Czech Republic; jan.holec@nm.cz

Two rare fungi were named after the Białowieża virgin forest – *Dentipratulum bialoviesense* and *Cyphelloporia bialoviesensis*. The author summarizes own published data on these species and reflects on their taxonomy, ecology and distribution.

Cryptic diversity and secondary metabolites of the genus *Exobasidium*

Tereza Ježková[1,2], Tereza Veselská[2], Denisa Višňovská, Eva Stodůlková[2], Andrej Jašica[2], Dominik Lovas[2], Jaroslav Semerád[2,3], Miroslav Kolařík[2], Adéla Čmoková[2]

[1]Department of Genetics and Microbiology, Faculty of Science, Charles University in Prague, Viničná 5, CZ-128 43 Prague 2, Czech Republic; jezkova.t@gmail.com
[2]Institute of Microbiology of the Czech Academy of Sciences, Vídeňská 1083, CZ-142 20 Prague 4, Czech Republic
[3]Institute for Environmental Studies, Faculty of Science, Charles University in Prague, Benátská 2, CZ-128 01 Prague 2, Czech Republic

Species of the genus *Exobasidium* (Ustilaginomycotina, Basidiomycota) are known as parasites or epiphytes on species of Ericales. They cause galls on leaves and flowers, lesions on leaves or deformations on fruits. This genus includes about 130 species. Screening of leaves mycobiome of different trees has shown that the diversity of the

genus *Exobasidium* is much higher. A total of 16 phylotypes of the genus *Exobasidium* were identified on the phylloplane of these trees by metabarcoding. One of them will soon be described as a new species because, unlike the others, it has been successfully cultivated. Since secondary metabolites have not been studied in the genus *Exobasidium* yet, they were studied just on this new species. It was found that it produces new gunacin derivatives with microbial and cytotoxic activity.

This project was funded by the Grant Agency of the Czech Republic (project GA22-29971S) and by a grant under the project "Mycobiomics" (European Union's Horizon 2020 research and innovation program (RISE) under the Marie Skłodowska-Curie grant agreement No. 101008129).

TAXONOMICAL REVISION OF TOMENTELLOID FUNGI FROM THE SPECIES COMPLEX *TOMENTELLA SUBLILACINA* AGG.

Aleš Jirsa

Department of Botany, Faculty of Science, University of South Bohemia, Na Zlaté stoce 1, CZ-370 05 České Budějovice; alesjirsa3@seznam.cz

Tomentella sublilacina is a taxon from the order Thelephorales (Basidiomycota) with resupinate fruiting bodies that is reported to be a very common ectomyccorhizal fungus in almost all types of forests. However, the great morphological and ecological variability of this taxon indicates a potential cryptic infraspecific diversity. The aim of this study was to reveal the cryptic species inside the species complex *Tomentella sublilacina* by sequencing ITS or LSU region and find any possible morphological or ecological differences between delimited entities. 50 specimens from the species complex *Tomentella sublilacina* collected in the Czech Republic during the period 2020–2021 were selected for Sanger sequencing. Microscopic characters of each collection were studied and the quantitative characters were analysed using PCA and CDA. As a result, ten entities were delimited by ITS sequences, six of them created a monophyletic core *Tomentella sublilacina* group whereas the others were more phylogenetically distant and more morphologically distinct. Those six entities were mostly distinguishable by ecology and their length of spines on basidiospores.

This study was supported by the Student Grant Agency of the Faculty of Science in the University of South Bohemia.

FUNGAL SECONDARY METABOLITES – A KEY TOOL FOR UNDERSTANDING THE ECOLOGY OF RAGWEED FUNGI

Miroslav Kolařík

Institute of Microbiology, Czech Academy of Sciences, Vídeňská 1083, CZ-128 01 Praha 4, Czech Republic,
Charles University, Faculty of Science, Department of Botany, Benátská 2, CZ-128 01 Praha 2, Czech Republic; mkolarik@biomed.cas.cz

Fungi interact with their environment through extrolytes such as enzymes and secondary metabolites. Both of these activities are of interest, particularly because of their biotechnological importance. However, very little is known about why the fungus produces the substances in question. These substances may be waste products of metabolism or may be involved in interactions with the environment. Our research focuses on understanding the ecology of several groups of fungi relevant to humans. This includes studying the biological activities of enzymes and secondary metabolites produced by these fungi. Possible types of metabolite interactions with the environment are illustrated using the examples of nutritional symbionts of ambrosia beetles (fungal genus *Geosmithia*), hookworms (fungal genus *Botryosphaeria*), ants (genus *Chaenocapnodium*), and phyllody (genus *Amylostereum*). In these cases, the fungus is actively cultivated and eaten by insects, forming monocultures in the environment. Therefore, it is assumed that these fungi produce biologically active substances (e.g. substances inhibiting the growth of micro-organisms, nematodes and mites) without harming their host. This makes them an ideal target for the search for new drugs.

DOES DEADWOOD ORIGIN MATTER? THE WAY A TREE DIES AFFECTS THE TRAJECTORIES OF WOOD-INHABITING FUNGAL COMMUNITY DEVELOPMENT IN *PICEA ABIES*, ESPECIALLY FOR VERY RARE SPECIALISTS

Monika Kolényová[1,2], Jan Běťák[2], Lucie Zíbarová[3], Linda Majdanová[4], Daniel Dvořák[1]

[1]Department of Botany and Zoology, Faculty of Science, Masaryk University, Brno, Czech Republic; 424056@mail.muni.cz
[2]Department of Forest Ecology, Silva Tarouca Research Institute, Brno; Czech Republic
[3]Resslova 26, Ústí nad Labem; Czech Republic
[4]Department of Forest Ecology, Faculty of Forestry and Wood Sciences, Czech University of Life Sciences, Praha; Czech Republic

Wood-inhabiting fungal communities were monitored on 60 spruce logs in different decay stages divided into two classes – (a) uprooted and (b) fallen snags, trees that had remained standing dead (several years to a few decades) before falling. Fieldwork was carried out in 2021 in the Boubín primeval forest (Šumava Mts., Czechia). On each studied log, we conducted both traditional fruitbody-based and eDNA-sequencing sampling. Our preliminary results (based on the former approach) show that the fungal assemblages differ between both classes of the studied trees. The species composition differs on fallen snags even after decades of decay. The fallen snags served as the preferred substrate for extremely rare species *Phellinidium ferrugineofuscum*, rediscovered in the Czech Republic after 25 years. Also the hemiboreal polypore *Skeletocutis delicata*, until now known only from North Europe and Russia, was for the first time collected in Central Europe on the same substrate. Long-standing deadwood is the rarest substrate (roughly less than 4% of trees stay standing dead compared to windthrows and breaks); nevertheless, it is commonly logged for safety reasons, even in protected areas. Our findings point to the need for a targeted selection of objects when managing deadwood in forest stands. Not only the total amount of deadwood, but also its diverse structure and origins represent key factors for the biodiversity of many dead-wood-dependent groups of organisms.

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NEW SPECIES OF EARTH TONGUES (*GEOGLOSSUM*) FROM SLOVAKIA

Viktor Kučera[1], Anna G. Fedosova[2], Filip Fuljer[3]

[1]Plant Science and Biodiversity Centre, Institute of Botany, Slovak Academy of Sciences, Dúbravská cesta 9, SK-845 23, Bratislava, Slovakia; viktor.kucera@savba.sk
[2]Laboratory of Systematics and Geography of Fungi, Komarov Botanical Institute, Russian Academy of Sciences, Prof. Popov Street 2, St. Petersburg, RU-197022, Russia; anna.fedosova@gmail.com
[3]Department of Botany, Faculty of Natural Sciences, Comenius University, Révová 39, SK-811 02 Bratislava, Slovakia; filipfuljer@gmail.com

During our field research interesting material of earth tongue fungi was collected. Data obtained from the public as part of "citizen science" activities also contributed to this research. New undescribed taxa were found near the villages of Telgárt, Plavecké Podhradie and Muránska Lehota. Their specific morphological features in combination with specific biotopes rank them among well-recognizable species in the group. *Geoglossum verkini* nom. prov. is characterized by a mace-shaped fruitbodies and spores with 15 septa, it grows at the waysides. *Geoglossum pascuum* nom. prov. has

black fruitbodies with a scaly stipe, hyaline spores with a maximum of 1 septum and it was collected on a mountain pasture. *Geoglossum calciphilum* nom. prov. has spores with 3-7 septa and grows on the side of the road in a small quarry. DNA analysis (ITS, LSU) was performed on all species and phylogenetically they represent separate species. Our study contributed to the knowledge of the biodiversity of the studied areas and to the systematic research of earth tongue fungi (Geoglossaceae).

The study was supported by project VEGA 2/0074/23 for VK and 122011900033-4 for AGF.

POGONOLOMA MACRORHIZUM – A DISTINCT FUNGUS OF *QUERCUS CERRIS* FORESTS IN CHANGING SLOVAK LANDSCAPE

Vladimír Kunca[1], Jan Holec[2], Branislav Olah[1], Petr Zehnálek[2,3], Tomáš Kučera[4]

[1]Technical University in Zvolen, Faculty of Ecology and Environmental Sciences, Department of Applied Ecology, T.G. Masaryka 24, SK-960 53 Zvolen, Slovakia, kunca@tuzvo.sk
[2]National Museum, Mycological Department, Cirkusová 1740, CZ-193 00 Praha 9, Czech Republic
[3]Charles University, Faculty of Science, Department of Botany, Benátská 2, CZ-128 01 Praha 2, Czech Republic
[4]University of South Bohemia, Faculty of Science, Department of Ecosystems Biology, Branišovská 1760, CZ-370 05 České Budějovice, Czech Republic

Ecology of a rare and iconic basidiomycete *Pogonoloma macrorhizum* (Basidiomycota, Agaricales) in Slovakia, a species on its northern limit of distribution in this part of Central Europe, was studied. Species identity was verified by sequencing ITS and 28S nrDNA. Analysis of trophic status by stable isotopes ratio of carbon and nitrogen showed that the species is probably ectomycorrhizal. Environmental data and information on landscape development plus management derived from historical maps and aerial orthophotographs were collected for seventeen microlocalities and analysed by multivariate statistical methods. *P. macrorhizum* occurs in thermophilous to mesophilous stands dominated by *Quercus cerris* with admixture of *Carpinus betulus, Quercus petraea* agg. and other tree species. Soil of those stands is more or less acidic with pH 4.1–6.2. The main vegetation gradients reflect lightness and openness of habitats, soil reaction and plant species composition of thermophilous forest communities. The main factors affecting habitat variability are a) time since deforestation correlated with former pasturing and occurrence of old *Q. cerris* individuals representing former solitary trees on pastures, b) soil reaction. In Slovakia, *P. macrorhizum* is a species of transitional habitats occurring at sites influenced by historical grazing. It represents transitions between thermophilic and mesophilic sites; oak forest communities, dry steppic grasslands and wood margins; and spontaneously overgrown pastures and

closed forest stands. *Quercus cerris* stands in Slovakia are threatened especially by current absence of grazing followed by successional changes towards closed stands with dominance of *Carpinus betulus*.

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TESTING OF ANTIFUNGAL EFFECTIVENESS OF SELECTED HYBRID COMPOUNDS IN VITRO

Renáta Lehotská, Elena Piecková, Ivan Malík

Slovak Medical University in Bratislava, Limbová 12, SK-833 03 Bratislava; elena.pieckova@szu.sk

Four newly synthesized derivatives, one from the group of hybrid compounds, hybrid compounds, 1-(3-phenylcarbamoyloxy-2-hydroxypropyl)-4-[acyl-/aryl-/(substituted) phenyl] piperazin-1-ium chlorides (6a10) and three from the group 1-[2-Hydroxypropyl-3-(4-chlorophenyl--carbamoyloxy)]-4-[aryl-(substituted) phenyl] piperazin-1-ium chlorides (6b7, 6b9, 6b10), were tested whether they also have potential as antifungal agents. Using the antifungal microdilution method for moulds (*Aspergillus niger*) and the antifungal microdilution method for yeast (*Candida albicans*), the minimum inhibitory concentration (MIC) of nine dilutions ranging 4-1024 μg/ml for each compound was determined. Compounds 6a10 and 6b7 did not show antifungal activity in the tested concentrations. Compound 6b9 was effective against *C. albicans* (MIC = 128-256 μg/ ml varying between used strains). Compound 6b10 inhibited the growth of both *A. niger* (MIC 1024 μg/ ml) and *C. albicans* (MIC = 128-256 μg/ml depending on the strain used). In vitro biological evaluation demonstrated that the compound 6b9 possess antifungal activity against filamentous fungi and the compound 6b10 possess antifungal activity against both filamentous fungi and yeasts.

This study was funded by the university internal grant 09/2021-svg1 and was accomplished in the laboratory of mycology, Department of Microbiology of the University.

ACTUAL OCCURRENCE OF SPECIES OF THE GENUS *NECTRIA* s. l. IN SLOVAKIA

Ivan Mihál[1], Stanislav Glejdura[2]

[1]Institute of Forest Ecology SAV v.v.i., Štúrova 2, SK-960 53 Zvolen, Slovakia; mihal@ife.sk,
[2]Kováčová 562, SK-962 37 Kováčová, Slovakia; glejdura@gmail.com

Altogether 31 species of the genus *Nectria* s.l. have been identified and recorded in Slovakia. Bionectriaceae family is represented by the genera *Hydropisphaeria, Nectriopsis, Paranectria, Pronectria, Sphaerostilbella* and *Stilbocrea*, Nectriaceae family by the genera *Cosmospora, Fusicolla, Monographella, Nectria, Neonectria, Pleonectria, Pseudonectria* and *Viridispora*. The rarest nectrioid fungi, including first reports for Slovakia, are *Cosmospora magnusiana, Fusicolla melogrammae, Nectria berolinensis, N. coryli, N. decora, Neonectria radicicola, Paranectria oropensis, Pronectria pertusariicola, Pseudonectria rousseliana* and *Viridispora alata*. Species *Nectria tubercullariformis, Nectriopsis indigens* and *Pronectria tincta* are extremely rare and may be extinct from our mycoflora (last collected in 1956 to 1966). Slovak members of the genus *Nectria* s.l. occupy living or dead substrate of various herbs and forest plants, some of them are mycoparasitic.

The contribution is part of VEGA grant no. 2/0045/22.

MICROSCOPIC FUNGI AFFECTING THE GROWTH AND DEVELOPMENT OF PLANTS WITH PHARMACOLOGICAL USE

Martin Pastirčák

National Agricultural and Food Centre, Research Institute of Plant Production, Bratislavská 122, SK-921 68 Piešťany, Slovakia; martin.pastircak@nppc.sk

Microscopic fungi integral component of all ecosystems, where they may attack plants growing in their natural habitat. The aim of this study was to examine the spectrum of microscopic fungi occurring on the above-ground parts of selected species of medicinal plants (*Achillea millefolium*, *Borago officinalis*, *Hypericum perforatum*, *Plantago lanceolata*) during the growing season. During the years 2007–2023, more than 110 samples from 33 different places in Slovakia were analysed. The samples were examined by using standard light microscopy techniques and the species identification was based on the morphology of their reproductive structures. Powdery mildew fungi (Erysiphales) and fungi belonging to the genera *Colletotrichum*, *Diploceras*,

Mycosphaerella, *Phaeosphaeria*, *Phomopsis*, *Septoria*, and *Stemphylium* were the most frequently recorded among the total spectrum of micromycetes colonising the above-ground parts of the studied plants. The mycoflora of the target plants was assessed by comparing the abundance of recorded species occurring on selected locations. Medicinal plants are commonly used in traditional medicine because of their biologically active compounds that are, of course, utilized in pharmacology. Transfer to and cultivation of plants in human-controlled production systems poses a potential risk of transmission of their natural pests must be controlled.

This study was supported by the R&D project „Molecular-biological approaches in the solution of plant adaptation to climate change and phytopathogen diagnostics for ecologically acceptable and sustainable agriculture“(contract 1092/2022/MPRVSR-930).

INTRASPECIFIC DIVERSITY OF *PHYTOPHTORA ALNI*

Štěpán Pecka[1,2], Ondřej Koukol[1], Gabriela Šrámková[1], Karel Černý[2]

[1]Charles University, Faculty of Science, Department of Botany, Benátská 2, CZ-128 01 Praha 2, Czech Republic; pecka@vukoz.cz
[2]The Silva Tarouca Research Institute for Landscape and Ornamental Gardening Květnové náměstí 391, CZ-252 43 Průhonice, Czech Republic

Phytophthora alni is an invasive pathogen that causes phytophthora rot in alders. It was first reported from Europe in the 1990s and from the Czech Republic in 2001. Within the *Phytophthora alni* species complex, three species have been identified. The most prevalent species in Europe is the triploid hybrid *Phytophthora ×alni*, which emerged from the hybridization of the other two taxa (*P. uniformis* and *P. ×multiformis*). Previous research revealed a substantial number of existing genotypes of this species with the prevailing P×a-1 genotype. However, these studies diverged on whether the incidence of the dominant genotype increased or decreased over time. As a result, our focus turned to comparing the original (around 2007) and the recent population of *Phytophthora ×alni* within the Vltava River basin. This period was characterized by a significant decline in the riparian population of its hosts, black and grey alders. A set of 10 microsatellites was used to identify genotypes. Out of the 94 *Phytophthora ×alni* isolates, 23 distinct genotypes were identified. However, only the dominant genotype (P×a-1) was consistently identified in both populations (old and recent). Its occurrence increased from 63% to 86% over time. Other genotypes mostly showed only minor variations from P×a-1, with the most common difference being the loss of heterozygosity. Likely the confirmed long-term dominance of P×a-1 may be due to its higher fitness or better dispersal abilities. These features can help it dominate even with a dramatic decline in the host population. However, it is also possible that

the time since the start of the invasion is too short to observe any significant changes in *P.* ×*alni* population.

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AEROMYCOBIOTA IN HISTORICAL OBJECTS – QUANTITATIVE ANALYSIS

Elena Piecková, Renáta Lehotská, Soňa Wimmerová

Slovak Medical University in Bratislava, Limbova 12, SK-833 03 Bratislava, Slovakia;
elena.pieckova@szu.sk

Occupants in heavily mouldy indoors, where air comprises as much as 10^9 fungal propagules in m^3, may suffer from mucosal irritations, acute/chronic damage of the respiratory tract, immunity suppression and general ill health status. Related hygienic limits, based on serious complex scientific data, are missing. The aim of the study was to perform an aeromycological analysis of relevant historical sites focused on possible breathable fungal load to the individuals present. There were 9 sampling localities with historical monuments with research running (excavations, anthropologic studies), or re-opened to public (museum, archive) in Slovakia and Hungary. In total, 67 complex air samples (indoor + outdoor) were taken by an impactor, and the culturable airborne fungi were enumerated per m^3, and the data mathematically and statistically processed. Proven presence of indoor fungal bioaerosol sources was detected in glass covered (underground) places without air circulation, or inside the mausoleum and a crypt. High outdoor fungal concentrations are pointing to the high concentrated bioaerosol in the air in general (pollen season). Inhalatory exposition to fungal bioaerosol in the localities was estimated by calculating total number of inhaled propagules over a period given, 1 or 8 hours, at a normal ventilation rate of 5 – 8 liters of the air per 1 min. The highest inhaled fungal load was estimated in the mausoleum, both for visitors and researchers. Between paired localities, there were no statistically relevant differences in quantities of air fungal isolates ($p > 0.05$), exc. the mausoleum and the archive. High concentrations of fungi may lead to mycoses as infectious dose of (opportunistic) pathogenic moulds is unknown yet. Special caution should be paid to remarkable amounts of fungal propagules inhaled by the staff working on site for 8 hrs as well as to possible ill health consequences in vulnerable visitors.

FUNGI AND OAKS – DOES A SPECIFIC OAK SPECIES AFFECT THE SPECIES DIVERSITY OF LIGNICOLOUS MACROFUNGI?

Andrej Rybár

Department of Applied Ecology, Technical University in Zvolen, T. G. Masaryka 24, SK-960 01 Zvolen, Slovakia; andrejrybar91@gmail.com

Several widely distributed species of oaks are occurring in Slovakia and Central Europe. However, in mycological research, a specific oak species is often not distinguished as a substrate for wood-inhabiting fungi. The study is providing preliminary results from the field research during the autumn of 2022 in well-preserved thermophilous oak forests nearby Zvolen with co-occurring sessile oak and Turkey oak. Frequency of fungal species on decaying logs of *Quercus cerris* and *Q. petraea* agg. was compared. Some common species like *Auricularia auricula-judae* s.l., *Hericium coralloides*, *Pleurotus pulmonarius* and *Schizophyllum commune* prefer *Q. cerris*, just as the rarer fungal species typical for well-preserved beech forests like *Gloeohypochnicium analogum, Hypsizygus tessulatus, Inonotus cuticularis, Mycoacia gilvescens, Ossicaulis lachnopus* do. Several species considered rare to very rare with a strong bond to *Q. cerris* were recorded: *Crepidotus ehrendorferi, Inonotus krawtzewii, Pluteus fenzlii, Pseudospongipellis litschaueri* and *Xylobolus subpiletaus.* Typical common oak species like *Daedalea quercina, Hymenochaete rubiginosa, Mycena galericulata, Mycena inclinata, Pachykytospora tuberculosa* and *Xylobolus frustulatus* show a strong preference for *Q. petraea* agg. Rarely recorded species with possible preference for *Q. petraea* agg. are *Buglossoporus quercinus, Donkia pulcherrima, Fistulina hepatica* and *Laetiporus sulphureus* agg. These results indicate significant differences in macrofungal communities on decaying logs of different oak species, mainly between *Q. cerris* and other *Quercus* species. Therefore, it is important in mycological research to identify the coarse woody debris of oaks, particularly Turkey oak.

The study was supported by the Internal Project Agency of Technical University in Zvolen under contract No. IPA 8/2022.

DIVERSITY OF FUNGI TRANSMITTED BY BARK BEETLES ON PINE TREES

Michaela Strmisková[1,2], Marek Barta[1], Miriam Kádasi Horáková[1], Katarína Pastirčáková[1]

[1]Institute of Forest Ecology SAS, Department of Plant Pathology and Mycology, Akademická 2, SK-949 01 Nitra, Slovakia; strmiskova@ife.sk

[2]Technical University in Zvolen, Faculty of Ecology and Environmental Sciences,
T. G. Masaryka 24, SK-960 01 Zvolen, Slovakia

Scots pine (*Pinus sylvestris*) is the second most important conifer in Slovakia, representing about 7% of the afforested area. Climate change contributes to the spread of harmful bark beetles (Coleoptera: Curculionidae, Scolytinae) and microscopic fungi that can be transmitted by the bark beetles under tree bark. As a result of these abiotic and biotic factors, pine trees are weakened, and their health deteriorates. Bark beetles can carry various species of fungi on the surface of their bodies. The aim of this study was to determine the species diversity of microscopic fungi carried by selected species of bark beetles in pine forests in the Záhorská nížina lowland. In 2022, we analysed the mycobiota of adults of 6 species of bark beetles (*Crypturgus cinereus*, *Ips acuminatus*, *Ips sexdentatus*, *Orthotomicus longicollis*, *Tomicus minor*, *Tomicus piniperda*) collected from bark beetles galleries of infested pine trees. In total, we isolated and molecularly identified 24 species of fungi from 9 families: Aspergillaceae (7 species of the genus *Penicillium*), Bionectriaceae (*Clonostachys rosea*), Cladosporiaceae (3 species of the genus *Cladosporium*), Cordycipitaceae (2 species of the genus *Beauveria*, 2 species of the genus *Lecanicillium*), Cunninghamellaceae (*Absidia glauca*), Myrotheciomycetaceae (*Trichothecium roseum*), Ophiostomataceae (*Graphilbum acuminatum*, 4 species of the genus *Ophiostoma*), Pleosporaceae (*Alternaria alternata*), and Saccotheciaceae (*Aureobasidium pullulans*). *Ophiostoma canum* and *O. minus* isolates dominated the mycobiota of the bark beetles analysed. Ophiostomatoid species of fungi are the causative agents of tracheomycosis disease; as a result, trees wither, reduce their growth, and eventually die.

This study was supported by the Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic and the Slovak Academy of Sciences, grant number VEGA 2/0122/22.

PLUTEUS PODOSPILEUS COMPLEX IN EUROPE

Hana Ševčíková[1], Giuliano Ferisin[2], Ekaterina F. Malysheva[3], Guillaume Eyssartier[4], Ida Broman Nielsen[5], Rudolf Cáfal[6], Jacob Heilmann-Clausen[7], Guillermo Muñoz González[8], Irja Saar[9], Alfredo Justo[10]

[1]Department of Botany, Moravian Museum, Zelný trh 6, CZ-659 37 Brno, Czech Republic
hsevcikova@mzm.cz
[2]Associazione Micologica Bassa Friulana, Via Vespucci 7, 33052 Cervignano del Friuli, Italy
[3]Shatelena Str. 20, RU-194021 St. Petersburg, Russia
[4]Institut de Systématique, Évolution, Biodiversité (UMR 7205–MNHN, CNRS,
Sorbonne Université, EPHE, Université des Antilles), 45 rue Buffon, FR-75005 Paris, France

[5]Center for Evolutionary Hologenomics, Globe Institute, University of Copenhagen, Øster Farimagsgade 5, DK-1014 Copenhagen, Denmark
[6]Pri Kaštieli 1473/21, SK-90851 Holíč, Slovakia
[7]Center for Macroecology, Evolution and Climate, Globe Institute, University of Copenhagen, Universitetsparken 15, DK-2100 Copenhagen, Denmark
[8] Calle Tudela, 20, SP-50650 Gallur, Zaragoza, Spain
[9]Institute of Ecology and Earth Sciences, University of Tartu, J. Liivi 2, EST-50409 Tartu, Estonia
[10]New Brunswick Museum, 277 Douglas Ave., Saint John, CAN-NB E2K 1E5, Canada

As part of the study Holarctic Species in the *Pluteus podospileus* Clade, Six New Species Described and Old Names Reassessed (Journal of Fungi), we (19 coauthors) focused on European, North American and Asian *Pluteus* species of the *P. podospileus* group. We studied the taxonomy of *Pluteus podospileus* and similar species using morphological and molecular (nrITS, *TEF1-α*) data, including a detailed study of the type collections of *P. inflatus* var. *alneus*, *Pluteus minutissimus* f. *major* and *P. granulatus* var. *tenellus.* In Europe, six species are phylogenetically confirmed – *Pluteus podospileus*, *P. inflatus*, *P. cutefractus*, *P. fuscodiscus*, *P. notabilis* including *P. notabilis* var. *insignis.* We describe new taxa *P. fuscodiscus*, *P. notabilis* and its variety *P. notabilis* var. *insignis.* Based on the holotype of *P. inflatus* var. *alneus*, collections of *P. inflatus* identified by Velenovský and several modern collections, we resurrect the name *P. inflatus.* Based on molecular analyses of syntypes of *Pluteus minutissimus* f. *major* and a holotype of *Pluteus granulatus* var. *tenellus* we synonymize them under *P. inflatus.* We also bring new data about the morphology and distribution of recently decribed species *P. cutefractus.*

DIFFERENCES BETWEEN *FOMES FOMENTARIUS* AND *F. INZENGAE* IN THE CZECH REPUBLIC

Michal Tomšovský[1], Sirapitcha Kaeochulsri[2], Tomáš Kudláček[1], László Benedek Dálya[1]

[1]Department of Forest Protection and Wildlife Management, Faculty of Forestry and Wood Technology, Mendel University in Brno, Zemědělská 3, CZ-61300, Brno, Czech Republic; tomsovsk@mendelu.cz
[2]Department of Forest Biology, Faculty of Forestry, Kasetsart University; Thailand

The phenomenon of cryptic species is widespread among various fungal lineages. *Fomes inzengae* has been recently recognized as a south European kin of well known wood-decay basidiomycete *F. fomentarius*. Due to problematic morphological identification of both species, their taxonomic status has been disputed. The aim of this research was to examine distribution, host preferences, morphological characters and phylogenetic relationships between *F. fomentarius* and *F. inzengae* in the South Moravian region in

Czech Republic, where both species occur sympatrically. The results revealed ecological preferences of *Fomes* spp. along altitudinal gradient, while *F. inzengae* is a lowland taxon, *F. fomentarius* dominates at higher altitudes in forests with abundant *Fagus sylvatica*. The contact zone of the two taxa is located in the upper-colline vegetation belt (elevation ca. 400-550 m a.s.l.). The morphological analysis revealed that basidiospore size, width of skeletal hyphae in basidiomes, and linear density of pores of both taxa are almost identical and can not be used for identification of the two species. Multigene sequence analyses of ITS, LSU, RPB1, RPB2, and TEF1 markers confirmed that *F. fomentarius* and *F. inzengae* are phylogenetically distinct species.

MECHANICAL PROPERTIES OF FUNGAL MYCELIUM AS PREREQUISITE FOR DEVELOPMENT OF MYCELIUM-BASED COMPOSITE MATERIALS

Michal Tomšovský[1], Miloš Trifković[1], Martin Brabec[2], Radim Rousek[2], Jan Baar[2], Valentino Cristini[2], Petr Čermák[2]

[1]Department of Forest Protection and Wildlife Management, Faculty of Forestry and Wood Technology, Mendel University in Brno, Zemědělská 3, CZ-61300, Brno, Czech Republic, tomsovsk@mendelu.cz

[2]Department of Wood Science and Wood Processing Technology, Faculty of Forestry and Wood Technology, Mendel University in Brno, Zemědělská 3, CZ-61300, Brno, Czech Republic

Fungal mycelium is currently increasingly applied as a binder for wood-based composite materials. The ability of fungi to grow through a woody substrate to form a compact material composed of a partially decomposed substrate and mycelium is successfully used for the production of environmentally friendly packaging and insulation materials. Methodological procedures involving different types of mushrooms are the subject of a number of progressive studies leading to patents. Aim of the study was to test mechanical properties of mycelia of *Ganoderma, Gloeophyllum, Hypsizygus, Fomes, Fomitopsis, Irpex, Laetiporus, Pleurotus, Phlebiopsis* and *Trametes* species. Strains were grown on Petri dishes with agar medium. Fully overgrown dishes were incubated for another 1-2 weeks, then the mycelium was removed and dried. Mycelium tensile strength and dynamic vapor sorption were measured for strains from the most compact mycelia and the results were evaluated.

Research was supported by the project Mycelium-Lignocellulose-Based Bio-Composites: From Growth Kinetics to Physico-Mechanical Properties (MyBiCo; Czech Science Foundation 23-04928S).

HOW TO FIND OUT WHAT RARE PEATLAND FUNGI NEED

Martina Vašutová

Department of Botany, Faculty of Science, University of South Bohemia, Branišovská 31, CZ-37005 České Budějovice, Czech Republic; mvasutova@prf.jcu.cz

Although fungi are very important organisms of peatlands, to consider their requirements in nature conservation and management of these habitats is complicated due to their ephemeral fruitbodies. The study focused on three indicator species of raised bogs (*Galerina hybrida, Arrhenia gerardiana, A. telmatiaea*) and one indicator species of bog forests (*Cortinarius chrysolitus*) to find out if it is possible to detect their mycelia by environmental sequencing, an if there are any higher plants, bryophytes or fungal operational taxonomic units (OTUs) that accompany them, and whose presence would indicate suitable conditions for their growth. Based on 144 collections of fruitbodies from 61 raised bogs and transitional mires from Šumava Mts. and surrounding area, it was found that there are two new species - *Arrhenia bigelowii* and *Cortinarius davemallochii*, and that environmental sequencing sometimes failed to detect sequences under fruitbodies of the respective species. In agreement with a field observation a relatively broad ecological niche of *G. hybrida* was confirmed. While *C. chrysolitus* occurred mainly in transitional mires, *C. davemallochii* was associated with raised bogs. *A. bigelowii* grew in similar sites as *A. gerardiana* and *A. telmatiaea*, but seems to be more hygrophilous. All studied species preferred microsites with an occurrence of peatland specialists (*Vaccinium oxycoccos, Eriophorum vaginatum*) but were not strictly associated with them. Environmental sequencing data showed similar pattern as vegetation data, but lack of reference sequences and other methodological limits make their use difficult. Most useful information on studied fungi was obtained by searching for their fruitbodies and studying vegetation in collaboration with botanists and bryologists.

The research was supported by the Grant Agency of the Czech Republic (No. 31-19-15031S).

PREPARING OF A NEW RED LIST OF MACROFUNGI OF THE CZECH REPUBLIC

Lucie Zíbarová [1], Monika Kolényová [2,3], Tereza Tejklová [4], Petr Zehnálek [5,6]

[1] Resslova 26, 400 01 Ústí nad Labem; Czech Republic; gekko13@centrum.cz
[2] Department of Botany and Zoology, Faculty Of Science, Masaryk University, Brno, Czech Republic; 424056@mail.muni.cz
[3] Department of Forest Ecology, Silva Tarouca Research Institute, Brno, Czech Republic

[4] Museum of Eastern Bohemia in Hradec Králové, Eliščino nábřeží 465, CZ-500 01 Hradec Králové, Czech Republic; tereza.tejklova@centrum.cz
[5] National Museum, Mycological Department, Cirkusová 1740, CZ-193 00 Praha 9, Czech Republic
[6] Charles University, Faculty of Science, Department of Botany, Benátská 2, CZ-128 01 Praha 2, Czech Republic

The first and the only edition of the Red List of macromycetes of the Czech Republic was published in 2006. Since then vast data on distribution and taxonomy of fungi have accumulated rendering the Red List less useful in conservation practice. Preparation of a new edition of Red List has started in 2022. It has much accelerated in with onset of 2023 following agreement with the Nature Conservation Agency of the Czech Republic. The new Red List is being assembled in accordance with the current IUCN Red List guidelines. Its scope encompasses ascomycete and basidiomycete species of macromycetes (excluding most of hypogeous fungi) native to the Czech Republic. In addition to 904 taxa included in the first edition of the Red List, 830 additional red-list candidate species were proposed by specialists, totalling 1733 species to be formally evaluated according to IUCN criteria. By mid-August over 67 000 observations of individual species were collected from various sources: major fungaria (BRA, BRNM, BRNU, HR, MJ, OLM, PRM, WU), Nature Protection Findings Database (NDOP), published and unpublished reports and personal records of members of mycological community. An easy-to-use web application based on R package was developed to facilitate and unify evaluation process. The formal evaluation process has started in August 2023 and the publication of results is scheduled for early 2024.

We thank everyone who decided to participate in the project and provide their personal or institutional data. The National Museum in Prague provided its data as part of institutional support (DKRVO 2019-2023/3.I.e, 00023272). The project is part of monitoring the condition of habitats and species organized by the Nature Conservation Agency of the Czech Republic (AOPK ČR).

POSTER PRESENTATIONS:

CONTRIBUTION TO THE KNOWLEDGE OF THE COMPLEX *HYGROCYBE MUCRONELLA*

Filip Fuljer[1], Milan Zajac[2], Ivona Kautmanová[3]

[1]Department of Botany, Faculty of Natural Sciences, Comenius University, Révová 39, SK-811 02 Bratislava, Slovakia; filipfuljer@gmail.com
[2]Administration of the Protected landscape area Kysuce, U Tomali č. 1511, SK-022 01 Čadca, Slovakia; milan.zajac@sopsr.sk
[3]Slovak National Museum – Natural History Museum, Vajanského nábrežie 2, P. O. Box 13, SK-810 06 Bratislava, Slovakia; ivona.kautmanova@snm.sk

Hygrocybe alpina and *H. amara* are two new European waxcap species that are closely related to *H. mucronella*. *Hygrocybe alpina* reported from Slovakia and Sweden is probably more widespread, especially in alpine regions of Central and Northern Europe. *Hygrocybe amara*, well delimited species based on molecular characters, is known only from Slovakia, but it is probably more widespred across Europe and misidentified as *H. mucronella* s. s. Because no type material of *H. mucronella* has been preserved a neotype was designated. These three bitter tasting species are compared.

CREPIDOTUS PINI – DOES THE EPITHET MATCH THE SPECIES ECOLOGY?

Soňa Jančovičová[1], Katarína Adamčíková[2], Miroslav Caboň[3], Slavomír Adamčík[3]

[1]Department of Botany, Faculty of Natural Sciences, Comenius University in Bratislava, Révová 39, SK-81102 Bratislava, Slovakia; sona.jancovicova@uniba.sk
[2] Institute of Forest Ecology SAS, Department of Plant Pathology and Mycology, Akademická 2, SK-949 01 Nitra, Slovakia
[3]Laboratory of Molecular Ecology and Mycology, Institute of Botany, Plant Science and Biodiversity Center, Slovak Academy of Sciences, Dúbravská cesta 9, SK-84523 Bratislava, Slovakia

Phylogenetic analysis of *Crepidotus applanatus* look-alikes revealed a new species *Crepidotus pini* in 2022. In addition to its unique molecular and morphological characters, this species shows a specific affinity for old stumps of *Pinus sylvestris*. Unpublished ecological data that may help to find new localities of *C. pini* and to clarify its trophic preferences are presented.

The participation of the first author at the 8th Czech-Slovak Mycological Conference and the presentation of the poster was financially supported by the Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic and Slovak Academy of Sciences – grant no. VEGA 1/0346/22.

VARIATION OF DNB SEVERITY OF *PINUS* SP. STANDS IN RELATION TO SELECTED CLIMATIC VARIABLES

Zuzana Jánošíková, Marek Kobza, Radovan Ostrovský, Katarína Adamčíková, Emília Ondrušková

Institute of Forest Ecology SAS, Department of Plant Pathology and Mycology, Akademická 2, SK-94901 Nitra, Slovakia; janosikova@ife.sk

Dothistroma needle blight (DNB) is a worldwide disseminated disease caused by two different fungal species, *Dothistoma septosporum* and *D. pini*. It causes significant defoliation of affected trees, intensive attacks lead to damages of the whole stand. Asexual conidia are produced abundantly during wet periods of the growing season and are responsible for the rapid development of epidemics. The relationship of trends in disease severity with climatic variables were studied in three pine plantations (Jahodná, Kálnica, Litava) during 2014–2018. In that period, the average temperatures in Jahodná, Kálnica and Litava were 10.62, 9.19 and 8.77 °C, respectively. Comparing the average monthly temperatures in 2014–2017, statistically significant differences were determined among the three sites. The greatest variability in disease severity showed the highest correlation with the variants of the most important climatic conditions (temperature and relative humidity) tested. For the spread of DNB, based on statistical assessment, a higher number of intervals of environmentally favourable climatic conditions is crucial. Mean disease severity significantly increased between the first (2014) and the last year (2018) of evaluation in each studied locality. Severity increased by 17.9% at Jahodná,17.8% at Litava and 32% at Kálnica. The severity progress was similar in Jahodná and Litava localities, and the highest increase in disease severity was recorded for Kálnica. Both *Dothistroma* species, which are causal agents of the disease, were identified in Jahodná, in Kálnica and Litava, only *D. septospor*um was present.

This presentation is based on COST Action < CA20132 - Urban Tree Guard - Safeguarding European urban trees and forests through improved biosecurity (UB3Guard) >. It was supported by COST (European Cooperation in Science and Technology), by the Scientific Grant Agency VEGA of the Slovak Academy of Sciences, No. 2/0132/22 and by MVTS COST 20132.

LOPHODERMIUM SPECIES RECORDED ON PINES NEW FOR SLOVAKIA

Emília Ondrušková, Zuzana Jánošíková, Marek Kobza, Katarína Adamčíková

Institute of Forest Ecology SAS, Department of Plant Pathology and Mycology, Akademická 2, SK-949 01 Nitra, Slovakia; ondruskova@ife.sk

Lophodermium species are endophytic fungi colonizing pine needles. Commensalistic Lophodermium pinastri was originally described from northern Europe and is very variable in morphology. L. seditiosum is a widespread and frequent pathogen of current year needles causing needle cast of pine trees manifested by sudden mass red-browning of needles in spring. Heavy infections can result in severe needle loss resulting in reduced growth or even tree death. In Europe, there is a special focus on the occurrence of L. seditiosum on Pinus sylvestris, because this native species is widely used in the forest and timber industry. L. seditiosum was previously only known from a single record from Slovakia. Our study, based on PCR detection, proved that both, L. seditiosum, and L. pinastri are widely distributed throughout the country and frequently co-occur and share a large part of their host spectrum. Additionally, L. seditiosum was present in the montane and subalpine areas of High Tatras. Sanger sequencing revealed other recently described Lophodermium corconticum presence in Slovakia. L. corconticum was described relatively recently on P. mugo needles at an altitude of about 1370 m in Karkonosze National Park in Poland. The Slovak record of L. corconticum originated from National Park Vysoké Tatry and was collected on P. mugo planted in the urban environment of Tatranská Lomnica. Slovakia is only the second country where L. corconticum has been recorded.

This presentaion is based on COST Action < CA20132 - Urban Tree Guard - Safeguarding European urban trees and forests through improved biosecurity (UB3Guard) >. It was supported by COST (European Cooperation in Science and Technology), by the Scientific Grant Agency VEGA of the Slovak Academy of Sciences, No. 2/0132/22 and by MVTS COST 20132.

THE SURVEY OF MICROMYCETES SPECIES DIVERSITY ON COMMON BARBERRY (*BERBERIS VULGARIS*) IN SLOVAKIA

Martin Pastirčák[1], Katarína Pastirčáková[2]

[1] National Agricultural and Food Centre, Research Institute of Plant Production, Bratislavská 122, SK-921 68 Piešťany, Slovakia; martin.pastircak@nppc.sk
[2] Institute of Forest Ecology SAS, Department of Plant Pathology and Mycology, Akademická 2, SK-949 01 Nitra, Slovakia; katarina.pastircakova@ife.sk

The common barberry (*Berberis vulgaris*), an economically important tree used not only in traditional medicine. It plays a crucial role in the reproductive cycle of rusts that parasitize cereals. This thorny shrub is gradually disappearing from the agricultural landscape, where it often occupies margins of fields and pastures. Total 25 samples were studied from 12 locations in Slovakia in 2018–2023. Plant material was analysed by light microscopy, identification of fungi was based on their morphology and biometrics of reproductive structures. Totally 22 genera of microscopic fungi were detected on branches of *B. vulgaris*. The most common parasitic species were members of the genera *Cucurbitaria*, *Diaporthe*, *Diplodia*, *Dothidea*, *Nectria*, *Phomopsis*, and *Tubercularia*. Obligate parasites *Erysiphe berberidis* and *Puccinia arrhenatheri* were frequently found on *B. vulgaris* leaves or young shoots, the presence of which is indicated by the production of a white-coloured powdery coating on affected tissue or the distortion of developing shoots. Knowledge of the causal agents of plant diseases, that affect plant growth and reproduction, is important for their sustainable, stable production.

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OPHIOSTOMATOID FUNGI COLONIZING BARK BEETLE GALLERIES ON SCOTS PINE

Katarína Pastirčáková[1], Andrea Lörinczová[2], Martin Pastirčák[3]

[1]Institute of Forest Ecology SAS, Department of Plant Pathology and Mycology, Akademická 2, SK-949 01 Nitra; katarina.pastircakova@ife.sk
[2]Constantine the Philosopher University in Nitra, Faculty of Natural Sciences and Informatics, Tr. Andreja Hlinku 1, SK-949 01 Nitra; andrea.lorinczova@student.ukf.sk
[3]National Agricultural and Food Centre, Research Institute of Plant Production, Bratislavská 122, SK-921 68 Piešťany; martin.pastircak@nppc.sk

The negative impacts of bark beetle (Coleoptera, Scolytinae) activity and microscopic fungi are visible on trees that are stressed and weakened due to abiotic factors (extreme temperature fluctuations, prolonged drought). Bark beetles and the microscopic fungi that are transported by adults on their bodies have developed a mutually advantageous relationship in which the bark beetles ensure the spread of microscopic fungi that are a source of food for them. The aim of this study was to examine the mycobiota in bark beetle galleries on Scots pine (*Pinus sylvestris*) in selected locations in Slovakia. Plant material (bark samples) from pine trees attacked by bark beetles (*Ips acuminatus*, *Pityogenes chalcographus*) and showing symptoms of fungal infection (blue staining of

the wood) was examined under the microscope. Ophiostomatoid fungi (1 species of the genus *Ceratocystiopsis* and 3 species of the genus *Ophiostoma*) that fructified in bark beetle galleries were identified by their morphological characters of the reproductive structures. Results expand the knowledge about occurrence and species spectrum of ophiostomatoid fungi transmitted by bark beetles on Scots pine, that reduce the quality of wood in Slovakia.

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MICROSCOPIC FILAMENTOUS FUNGI IN SOILS INFLUENCED BY MILITARY ACITIVITIES

Alexandra Šimonovičová[1,2], Sanja Nosalj[1], Francesca Maisto[3], Nikola Klištincová[3], Alessio Fontanot[3], Domenico Pangallo[3], Bruno Gábel[4]

[1]YMS, a.s., Hornopotočná 8208/1, SK-917 01 Trnava
[2]Department of Soil Science, Faculty of Natural Sciences, Comenius University, Ilkovičova 6, SK-842 15 Bratislava, Slovakia, e-mail:alexandra.simonovicova@uniba.sk
[3]Institute of Molecular Biology, Slovak Academy of Sciences, Dúbravská cesta 21, SK-841 04 Bratislava, Slovenská republika
[4]Vitigroup a. s., Dvořákovo nábrežie 10, SK-811 02 Bratislava, Slovakia

The analysed soil samples were taken from localities in central Slovakia. The first sample contains an increased amount of As and polychlorinated biphenils, the second sample contains an increased amount of Zn, polychlorinated biphenils and also non-polar hydrocarbons. Only the third of soil samples were without contamination. During the vegetation period there were applied remediation measures on the study sites. Altogether 114 microscopic filamentous fungi (MFF), 8 genera and 41 species were isolated from all analysed soil samples in 2022. PCR molecular analysis confirmed their similarity to 98-100. Mucoromycotina (Zygomycota) represent 7 genera and 10 species, some are ascomycete species. Species as *Mortierella alpina*, *Mucor hiemalis*, *Clonostachys rosea* and six species of genus *Trichoderma* dominated in soil samples in spring. Summer control soil samples differed in composition of isolated MFF, such as less species of genus *Trichoderma*. On the other hand, only in this soils samples were identified *Actinomucor elegans*, patogenic *Pilidium lythri* a three species of genus *Cladosporium* isolated. Additional samples were taken in October 2022 after remediation measures (into the soil was incorporated remedial substrate and remedial solution was also twice applicated). Soil analyse confirm significant reduction of all contaminants in study soils and less identified MFF. Revitalised soil samples were again dominated by species of genus *Trichoderma*.

This study was supported by the Ministry of Defense of the Slovak Republic „Remediation of the environment in zones contaminated by military acitivities" – APEIRON", No. SEMOD-EL 76/17-16/2021.

TESTING OF *ALNUS GLUTINOSA* RESISTANCE TO *PHYTOPHTHORA ×ALNI* AND *FRAXINUS EXCELSIOR* TO *HYMENOSCYPHUS FRAXINEUS* IN THE CZECH REPUBLIC

Petra Štochlová, Kateřina Novotná, Marek Štochl, Štěpán Pecka, Ludmila Havrdová, Karel Černý

Silva Tarouca Research Institute for Landscape and Ornamental Gardening, Publ. Res. Inst. (RILOG), Květnové náměstí 391, CZ-252 43 Průhonice, Czech Republic; stochlova@vukoz.cz

Autochthonous tree species of riparian stands and carr habitats are lately threatened by invasive pathogens that can cause rapid tree die back and consecutive ecosystem changes. Therefore, the *in vitro* susceptibility tests of *Alnus glutinosa* against *Phytophthora ×alni* (since 2009) and selection of resistant *Fraxinus excelsior* to *Hymenoscyphus fraxineus* in nature conditions (since 2014) has been performed in RILOG. Best of them were vegetatively propagated and preserved in stoolbeds. There were determined 13 genotypes of alder and 46 genotypes of ash (alder trees are adult now while most of ash trees are still juvenile). Alder trees have been used in controlled crossings to obtain progenies (open pollination of respective mothers have been used as a control) for the last 5 years. All obtained seedlings were inoculated several times per year with highly aggressive *P. ×alni* isolates. Within last 5 years nearly four thousand seedlings were obtained and subsequently inoculated. After the first inoculation usually less than one half survive. The oldest seedlings were inoculated already 7 times. In total, 6 % of all plants survived, so ca 230 seedling are available now. Best genotypes will be propagated and tested in replication. The obtained resistant trees (survived plants) represent ecologically friendly solution. Planting of such trees in *P. ×alni* infested areas can increase the diversity, stability and function of these ecosystems. Similar strategy will be used in ash when mature trees will be available.

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PARALLELS BETWEEN FUNGA COMPOSITION OF LOWLAND ALLUVIAL AND (SUB)MONTANE FORESTS.

Tereza Tejklová[1], Lucie Zíbarová[2]

[1]Museum of Eastern Bohemia in Hradec Králové, Eliščino nábřeží 465, CZ-500 01 Hradec Králové, Czech Republic; tereza.tejklova@centrum.cz
[2]Resslova 26, CZ-400 01 Ústí nad Labem, Czech Republic; gekko13@centrum.cz

During research in alluvial forests in Slovak and Czech Republic, there were recorded numerous lignicolous species considered to be typical funga of (sub)montane, often ravine forests. While such bimodal distribution had been long known for some species (most notably *Rhodotus palmatus*), more complete overview of the phenomenon is presented here. While there are differences between both forest types, e. g. in the mean annual temperature, the length of the vegetation season, dominant tree species and intensity of the human influence, there are also some similarities such as humid microclimate, presence of ample coarse dead wood and subdominant tree species (ash, elm, maple) forming arbuscular mycorrhizae. Regarding latter, some species show strong preference for wood of such trees such as *Rhodotus palmatus*, *Lopadostoma pouzarii* or *Hypoxylon vogesiacum*. The wood of poplars could serve as substrate also for species associated mainly with conifers, such *Antrodia* spp. and *Tubulicrinis* spp. Additional species present in both habitats are *Athelopsis subinconspicua*, *Chaetoporellus latitans*, *Chlorencoelia versiformis*, *Crepidotus malachioides*, *Crustomyces subabruptus*, *Dentipellis fragilis*, *Frantisekia mentschulensis*, *Gloeohypochnicium analogum*, *Litschauerella clematidis*, *Mycena romagnesiana*, *Odonticium septocystidia*, *Ossicaulis lachnopus*, *Phlebia centrifuga*, *P. nothofagi* or *Resupinatus striatulus.* Further research should focus on differences between population structure in both habitats and presence of habitat-specific cryptic species.

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AUTHORS INDEX

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