



ČESKÁ ZEMĚDĚLSKÁ UNIVERZITA V PRAZE

Fakulta lesnická a dřevařská

Sborník abstraktů

Book of Abstracts

STUDENTSKÁ KONFERENCE
MASTER 2014

STUDENTS' CONFERENCE
MASTER 2014

Praha

12. května 2014



Fakulta lesnická
a dřevařská

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Vliv technologie termicky modifikovaného dřeva na únosnost vrutových spojů

The impact of technology thermally modified wood carrying capacity of connections between carriage

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Abstract

This diploma thesis deals with the impact of technology on thermal modification of wood on load capacity of wood screws. First I detailed description of the issue, both in terms of the manufacturing process, characteristics and changes in thermally modified wood, as well as a description of the use of wood screws as fasteners utilized in wood. The next part deals with the methodology of experimental tests, their detailed description both with regard to production of thermo-modified wood, and the exam of pulling wood screws, as well as all auxiliary measurements. The last part describes the evaluation system of all measurement and reached results. The conclusion summarizes the results, interprets them and places them in relation to the theoretical part of diploma thesis.

Klíčová slova: Termicky- modifikované dřevo, thermowood, vrut, únosnost, pevnost, tangenciální dřevo.

Keywords: Thermo-modified wood, thermowood, wood screw, load capacity, strength, tangential wood grain.

Vliv technicko-technologických a materiálových faktorů rovinného frézování termicky modifikovaného březového dřeva na energetickou náročnost obrábění

Influence of technical-technological and material factors of planar milling of thermal modified birch wood on energy performance during shaping

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Abstract

This thesis with the issue of the effects of technical-technological and material factors on the energy performance machining face milling of thermally modified wood of birch. In the theoretical part of the thesis are described the basic concepts related to the topic of this issue. Theoretical analysis is devoted to the description of thermally modified wood, milling and cutting energy intensity. The next part of thesis is the methodology of work and includes information on the preparation of experimental samples and also contains a description of the experimental device. The experimental part of the work is focused on the assessment of the materials effects (grown birch wood, birch wood thermal treatment of 160°C, 180°C, 210°C, 240°C) and technical-technological factors (cutting speed, feed rate, cutting of length) on energy intensity of the cutting process (the amount of energy thus cutting power P (W) required for machining materials). These following chapters present the results and evaluation of the recorded values and associated with the conclusions drawn and the main parts of this work. The main goal of this thesis is the experimental evaluation of the impact of material and technical and technological parameters (cutting speed, feed rate, cutting of length) cutting the size of the input and the changes in face

milling process and thermally modified solid birch wood. Contribution for the science and practice and action are in the last part of this thesis.

Klíčová slova: termicky modifikované dřevo, frézování, technicko-technologické faktory, řezný příkon, energetická náročnost při frézování.

Keywords: thermowood, milling, technical-technological factors, cutting power, energy intensity of milling.

Vliv technologicko-technických a materiálových faktorů rovinného frézování termicky modifikovaného březového dřeva na otupení řezného klínu nástroje

Impact of technological-technical factors of planar milling thermally modified birch wood on blunting of the cutting edge of the tool

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Abstract

The diploma thesis is focused on an issue of flat milling of the thermally modified birch wood, and its relation with blunting of the cutting edge of the tool while working. In the analysis of the present situation, there is an overview of theoretical knowledge about the thermal treatment of the wood, milling of the wood, blunting of the cutting edge of the tool, measuring of the blunting, and the analysis of the blunting. In the experimental part of the dissertation, there has been done milling of natural and thermally treated wood samples, and while milling the development of the blunting was observed. A result of individual measurements has been evaluated, if there is significant difference between blunting of the tool while milling natural and thermally treated birch wood. For more information about the wood samples, selected physical and mechanical properties has been measured.

Klíčová slova: frézování, termo-wood, otupení, nástroj, technicko-technologické parametry.

Keywords: milling, thermo-wood, blunting, tool, technological-technical parameters.

Nízkonákladové stavby na bývanie

Low-cost housing construction

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Abstract

The low-cost housing is not popular in construction industry yet. Little interest in the topic of low-cost housing, despite its high timeliness when most of young people under thirty still lives with parents, is strange. Anyhow there was no serious study or research to reduce cost of housing constructions. Inspiration to find solutions to low-cost housing in Slovakia is folk architecture. Study clarifies the issue of low-cost housing and the main concepts. The main point of this study is its own set of proposed solutions to specific building structures for small residential buildings, called plebs (Progressive low-cost eco building system). The PLEBS is a unique set of such existing design solutions and materials set as much as possible to the requirements of low-cost houses in Slovakia, that a small proportion of industrial processing, local availability of materials, low price of the final construction, and low or zero cost of running the house, its demolition and recycling. PLEBS is based on wooden truss girders and insulated by straw bales, fully diffusion open. System satisfies the requirement to passive houses and also has a very favorable carbon footprint. Most importantly, the price that is more than half lower than a comparable building built by a conventional materials.

Klíčová slova: nízkonákladové domy, trvalá udržateľnosť, dostupné bývanie, ľudové staviteľstvo, prírodná architektúra.

Keywords: low cost houses, sustainability, affordable housing, folk architecture, natural architecture.

Analýza mediálního obrazu státního podniku LČR

Analysis of the state enterprise Forests of the Czech Republic media image

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Abstract

The diploma thesis deals with a relationship of media and society, with the focus is primarily on media that express about a national enterprise Lesy ČR, s. p. . The thesis provides a comprehensive and detailed overview on historical evolution of a single media – printed as well as electronic from the past to the present. Emphasis is placed on the development of the forestry press, Česká televize (Czech Television), Český Rozhlas (Czech radio) and the internet portal Silvarium. The methodical part is focused on the content analysis of all kinds of media, specifically on the quantitative analysis within three years. Therefore the aim of the thesis is to give a complete overview of the image in the media of the national enterprise Lesy ČR, s. p. over the period of years 2011-2013. Also achieved results must correspond with a conclusion of the National Forestry Program for the period of the year 2013 and with objectives of the national forestry politics.

Klíčová slova: média, hromadné sdělovací prostředky, mediální obraz, obsahová analýza, lesní hospodářství a Lesy ČR, s.p.

Keywords: media, mass media, media image, content analysis, forestry management and Lesy ČR, s.p.

Tvorba multifunkčního lesa v přírodních podmínkách autonomní oblasti Vojvodina, Srbsko

Creation of multifunctional forest in autonomous region Vojvodina, Serbia

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Abstract

The potential of plain areas of Vojvodina, by standpoints of forestry, wood production and general functions, is underused. Forest cover of 6,37 % is insufficient to maintain the stability and development of the ecosystem and biodiversity of Vojvodina. The forest coverage is especially low in the automorphic ecological zone in the area of crop production. In this zone, the dominant habitat are steppes or forest steppes, whose dominant edaphic representative is chernozem, (43,6 %) of the total area of Vojvodina. A large share are also hydromorphic soils (44 %) of the total area, particularly in the class of gley soils. The overall goal of raising multifunctional forests under natural conditions is to create a productive, high-quality, healthy, vital and stable forest stands, which can satisfy different requirements and functions of forests, such as: wood and wooden biomass production, the production of oxygen and carbon sequestration from the air, microclimate control and mitigate the macro - climate changes, and also to protect the soil from erosion, to protect the water regime and the infrastructure from adverse influences - the protective belts. These goals, forest functions and needs of forest owners, are the best fulfilled by forest plantations, forests and their biological diversity, with the aim of gradual recovery of native vegetation. Such stands are both biological and economical the most stable. In order to move forward, which is the success of ecological, social and economical point of view, it is necessary to improve managerial jobs and opportunities, to

improve the technical level of all forest activities on the territory of Vojvodina.

Klíčová slova: Vojvodina, multifunkční les, nížinné lesy, přírodní podmínky, ochranné lesní pásy.

Keywords: Vojvodina, multifunctional forest, lowland forest, natural conditions, protective forest belts.

Analýza zahraničního obchodu se dřevem z vybraných biomů Země

The analysis of foreign trade with wood from selected biomes of the Earth

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Abstract

The object of this diploma thesis is evaluation trends of chosen countries between the years 1990–2010 in division of production, import and export. The next part is description of the year 2010, determination of the main producers, importers, exporters and most significant flows of the industrial roundwood between countries, regions and continents. The following point is taken into consider other factors like a forest area and population of individual country. These factors strongly influence production, import and export of each country. There were also mentioned the significant benefits and problems of Czech Republic, because of production, import, export and geographical position. Each of the result was presented by graphs and thematic maps. The diploma thesis is based on the statistical information from databases of Food and Agriculture Organization of the United Nations (FAO). These information were evaluated by FAO and estimated like official data about selected countries.

Klíčová slova: průmyslová kulatina, zahraniční obchod, produkce, import, export.

Keywords: industrial roundwood, foreign trade, production, import, export.

Bezpeční interaktivní hlasovací systémy

Secure interactive voting systems

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Abstract

We propose a secure protocol for anonymous voting system. We have focused on continuous evaluation of votes and application of the voting scheme on mobile platform. Created protocol has achieved security and interactive requirements as eligibility, privacy, verifiability. Voter can join to the voting in the middle of the presentation. The protocol has been implemented in Java and tested in multiplatform environments. We have been using test driven development and appropriate design patterns. Application is ready to use in the classroom and in public presentations.

Klíčová slova: kryptografia, hlasovanie, bezpečné komunikačné protokoly, interaktivnosť, Android.

Keywords: cryptography, voting, secure communication protocols, interactivity, Android.

Vývoj krajinné struktury hornické oblasti východního Krušnohoří

The development of the landscape structure of the eastern Krušnohoří/Erzgebirge mining region

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Abstract

This thesis deals with the development of the landscape structure in the eastern Krušnohoří/Erzgebirge region. This territory is situated in the northern part of the Teplice district and includes these cadasters: Cínovec, Fojtovice, Habartice, Horní Krupka and Mohelnice. The main goal of this thesis is to describe the change of the landscape structure in the region through its history, which was significantly altered by the mining activities, the German speaking population and the events following the end of The Second World War. For that purpose, historical sources and maps were analysed, including the five sets of maps (1847, 1936–1938, 1953, 1976, 1990), which were vectorized in ArcGIS together with an extra set created according to the field survey in 2013. The results have shown, as expected, a significant impact of the historical events on the landscape structure, magnified by the displacement of the German population and demolition of the majority of buildings after 1945.

Klíčová slova: vývoj krajiny, východní Krušnohoří, historické mapy, česko-německé pohraničí.

Keywords: development of landscape, eastern Krušnohoří/Erzgebirge region, historical maps, Czech-German border area.

Hospodářská úprava vybraných porostů jádrové zóny přírodního parku Záhlinické rybníky

Forest management in selected stands of core zone in natural park Záhlinické ponds

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Abstract

Floodplain forests are rare ecosystem having colorful species composition and also higher biodiversity. Production of biomass is significantly higher in these areas than in other areas in the Czech Republic. However, their origin is associated with human activities. Yet the first demands of human society for wood and forest usage have led to many changes. Usage of streams and their adaptation to human needs, when rivers had been regulated, caused more frequent floods. However, forests have adapted to this regime and also thanks to the fertile alluvium they were able to prosper and increase their production. In contrast, nowadays they are negatively affected by water regulated buildings on watercourses as well as by straightening, pollution, parching and last but not least by floods. Because of conservation purposes of these areas it is necessary to find the right ways of management in order to maintain the ecosystem of floodplain forest with its natural biodiversity. It is also important to choose the right species composition because it is inextricably bound with the occurrence of specific animals and plants. The subject of the study is a floodplain forest in the natural park Záhlinické ponds, which serves to protect the landscape architecture. The aim of this study is to propose the solution of the management, which will be multifunctional and will fulfill timber-producing as well as non-production function. The stock volume and stand characteristics were found out using the method of circular sample plots and data were evaluated in order to

achieve appropriate results. Furthermore, there was assessing the quality of trees and species composition.

Klíčová slova: lužní les, biodiverzita, hospodářská úprava, přírodní park.

Keywords: floodplain forest, biodiversity, forestry management, natural park.

Vývoj zmlazení dřevin a vegetace bylinného patra horských smrčín 12 let po přirozeném a antropogenním narušení

Development of tree regeneration and herb-layer vegetation of mountain spruce forest 12 years after natural and anthropogenic disturbance

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Abstract

Disturbances are an important factor influencing the dynamics and structure of mountain spruce forests. Storm events resulting in windthrows, bark beetle (*Ips typographus* (L.)) outbreaks, and subsequent forestry operations are the main disturbance agents in European mountain spruce (*Picea abies* (L.) Karst.) forest. In the 1990's, bark beetle outbreak resulted in the large-scale dieback of semi-natural mountain spruce forests in the central part of the Šumava National Park (Bohemian Forest) on the southwest border of the Czech Republic. Two applied management measures enabled a long-term monitoring of effect of natural and anthropogenic disturbance on forest recovery: 1) core zones were left without intervention, and 2) surrounding zones were clear-cut, infested trees removed, and cleared areas replanted. Research plots were established in acidophilous mountain spruce forests with both types of management and in edaphically conditioned waterlogged spruce forests without intervention. Amount and vertical structure of tree regeneration and herb-layer vegetation changes have been studied on 18 permanent plots (0.04 ha each) since the beginning of the disturbance in

1997. The main question of the study was if tree regeneration and herb-layer vegetation differed between spontaneously developing disturbed stands and clearcuts 12 years after the disturbance. Multivariate analyses of vegetation composition and tree regeneration, supplemented by analyses of variance of numbers of spruce and rowan, confirmed differences between the applied management methods. In the spontaneously developing stands, advance regeneration grew very successfully under the protection of dead canopy and was sufficient to replace the previous canopy. The direct regeneration of previous tree species composition followed the bark beetle outbreak. In the case of clearcuts with artificial regeneration, there was a more unified height structure of spruce regeneration. Due to a less harsh change in site conditions and no damage from logging, typical herb species flourished in the non-intervention zones in comparison to the clear-cuts. The impact of post-disturbance interventions on the herb-layer vegetation was significant even 12 years after the event. In conclusion, natural disturbances in mountain spruce forests promote spontaneous recovery and maintain its structural and biological diversity.

Klíčová slova: horská smrčina, gradace lýkožrouta smrkového, asanační těžba, přirozená obnova, vegetace bylinného patra.

Keywords: mountain spruce forest, bark beetle outbreak, salvage logging, natural regeneration, herb-layer vegetation.

Výpočet radiace v lesních porostech na základě dat leteckého laserového skenování

Estimation of solar radiation in forest stands from airborne laser scanning data

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Abstract

Leaf area index (LAI) is the most important variable influencing the penetration of solar radiation beams through the forest stand. Currently, the airborne laser scanning, as new indirect method, suggests itself for estimation of LAI and solar radiation. LAI was measured terrestrially using the hemispherical photographs analysis and compared with LiDAR Penetration Index - LPI. Field measurements of LAI using hemispherical photographs took place before the calculation of regression models. These hemispherical photographs were processed with the software Gap Light Analyzer and WinScanopy. Field of view limited to 30° gives the highest correlation with airborne laser scanning data. Using of commercial software Winscanopy is the best, because it can reduce the field of view by entering a specific angle. Field of view can be limited also in Gap Light Analyzer by specifying image area, but then there is a strong underestimation of LAI. However, this software is suitable for most other applications. LiDAR Penetration Index (LPI), which studies the penetration of the laser beam through the forest stand, was chosen to determine the forest light conditions, canopy structures, LAI etc. from airborne laser scanning data. The best correlation with LAI at an angle of 30° has been reached on the LPI raster with pixel size of 15 meters. Regression models of LAI dependence on LPI were calculated in software QC Expert. The first model with two independent variables (LPI and tree species)

has a coefficient of determination of 0,75. The second model with a coefficient of determination of 0.71 and one independent variable does not consider tree species composition of the forest stand, has the lowest potential errors caused by the incorrect classification of tree species composition and is probably best suited for a given application, because in this research area there is uneven tree species composition. Sub models for coniferous and broad leaved forests were developed with regression rebate 81 % and 75 %. LAI map was based on the second model, and values from it were used to calculate the solar radiation on forest stands, using Beer-Lambert extinction law. Thus generated maps of solar radiation are for illustrative purposes only, because the verification by radiation sensors was not conducted in forest stand edges. It was proved that the LPI can be used to estimate stocking of broad-leaved forest stands. It was not possible to differentiate stocking level 9 from 10.

Klíčová slova: LPI, index listové plochy, LiDAR, hemisférická fotografie, LAI.

Keywords: LPI, Leaf Area Index, LiDAR, hemispherical photography, LAI.

Fotosyntéza in vitro kultivovaných dřevin *Boswellia amaero* ovlivněná vysokými hodnotami záření: Komplexní fluorometrická studie

Photosynthesis of in vitro-cultivated *Boswellia amaero* trees as affected by high light doses: A complex fluorometric study

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Abstract

The studies focused on in vitro cultivation of *Boswellia* sp. are far from being numerous. Only few has been published that focused optimization of growth medium and formation of biologically active compounds, boswellic acid in particular, during in vitro cultivation. Majority of these studies were done on *B. serrata*. Contrastingly, only little is known about optimum growth medium and light for the early seedlings of *B. amaero*, a species endemic to Socotra Island. Therefore, we focused on *B. amaero* cultivated in vitro on different media and under different growth and experimental radiation. In our study, we addressed the questions: (1) What is the best medium composition for optimal cultivation of *B. amaero*? (2) Is in vitro-cultivated *B. amaero* sensitive to photoinhibition?, and (3) May chlorophyll fluorescence parameters be used for evaluation of optimum irradiation during in-vitro growth? *B. amaero* was grown from seeds, naked embryos with cotyledons placed on ½ Murashige Skoog medium, respectively. After germination, the plants were grown at 50 micromols m⁻² s⁻¹ of PAR and then subjected to photoinhibitory treatments (low =LL=300, medium=ML=600, and high=HL900 micromols m⁻²

s-1 of PAR for 1 h) and consequent recovery. The treatments induced regulatory changes in chloroplastic photosynthetic apparatus that involved photoprotective mechanisms such as non-photochemical quenching (qN) of absorbed light energy and its components (photoinhibitory-, state transition-, and energy-dependent quenching: qI, qT, qE). For evaluation of high light effects in photosystem II, several chlorophyll (Chl) fluorescence methods were used : (a) fast kinetics: OJIPs, (b) Slow Kautsky kinetics with quenching analysis, (c) imaging of Chl fluorescence heterogeneity over a leaf, and (d) on-line monitoring Chl fluorescence. Analysis of OJIP curves showed that ML to HL photoinhibitory treatments led to changes in energy transfer through LHCs and PSII. The changes were reversible, however, time of recovery increased with the intensity of light treatment. Chl fluorescence parameters related exclusively to PSII showed negative changes in PSII at HL with slow recovery. Chl fluorescence imaging showed that long-term exposition of *B. amaero* to ML led to activation of photoprotective mechanism, capacity of which was sufficient to cope with light stress. It was, therefore, concluded, that in vitro cultivated *B. amaero* could resist PAR intensities up to 300-600 micromols m⁻² s⁻¹ of PAR.

Klíčová slova: Kadidlovník, fluorescence chlorofylu, mikropropagace, fotoinhibice, stres.

Keywords: Frankincense tree, chlorophyll fluorescence, micropropagation, photoinhibition, stress.

Studium diverzity hub a příčiny způsobující její nadhodnocování

Study of fungal diversity and causes of its overestimating

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Abstract

The term forest usually denotes a complex community determined mostly by woody plants occurrence. However, another interesting issue is situated underneath the surface, where the plant's roots are in a mutualistic relationship with fungal hyphae. This relationship is generally called mycorrhiza. An individual tree may have 15 or more different fungal mycorrhizal partners at the same time. The importance of fungi for human society is much broader, though. Total amount of fungal species on the world is estimated up to 1,5–5 million. Therefore a great emphasis is placed on diversity studies. Recently these studies have been primarily employing methods of molecular biology, especially sequencing of DNA regions using the next generation sequencing methods. The mostly used fungal marker for distinguishing individual species is the nuclear ribosomal DNA (rDNA), particularly the region called ITS. Due to its multi-copy nature it's very easy to amplify environmental DNA. However, there are some negatives like a presence of intragenomic variability resulting in problems with species quantification and proper diversity estimation. Possible alternatives are single-copy protein coding genes, such as the gene called RPB2. To compare usability of these markers the in vitro-assembled mock community of 130 fungal species was created. Both markers showed overestimation (1,35–2,72 times, depending on the clustering algorithm used) of real species numbers.

From the species taken to the study, just 68 were presented in both datasets, whereas 29 (RPB2) and 33 (ITS) were found only in one of the datasets. It was showed that the RPB2 is applicable as a marker for fungal community studies. Our study points out that the diversity data commonly obtained from environmental samples might be highly overestimated. On the other hand there is a warning against the use of the conventional ITS itself because a quarter of real present species could remain covered. The general recommendation is to use some supplement markers to ITS and therefore prevent the problems mentioned above.

Klíčová slova: Studium environmentálních vzorků, houby, nadhodnocování diverzity, sekvenování nové generace, ITS a alternativní markery.

Keywords: Study of environmental samples, fungi, overestimating of diversity, next generation sequencing, ITS and alternatives markers.

Volně žijící herbivoři v opuštěné krajině – jaký mají význam pro šíření rostlin?

Free-ranging herbivores in abandoned landscape – what is their potential for seed dispersal?

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Abstract

Free-ranging herbivores are an essential part of landscape in Central Europe. Their impact on vegetation is a highly complex system from which certain parts are yet to be clarified. One example for all is assisted seed dispersal which has been investigated in abandoned landscape of Military Area Hradiště in the Doupov Mountains. Three species of herbivorous ungulates are sufficiently abundant in the area: red deer (*Cervus elaphus*), sika deer (*Cervus nippon*) and wild boar (*Sus scrofa*). Dispersal potential was examined from dung pellets. Faeces samples collected throughout the season 2012/2013 were examined and viable seeds were determined using seedling emergence method. Preliminary results were obtained by manual extraction of seeds. We have discovered significant differences between the two methods used for determination of seeds probably due to small number of samples that were manually extracted. Nevertheless, studied herbivores proved themselves to be highly effective seed dispersal vectors in numbers of seeds as well as in numbers of transported species as well. High numbers of several species have been found, for example nettle *Urtica dioica*, strawberry *Fragaria* sp., speedwell *Veronica chamaedrys* and bedstraw *Galium mollugo*. We have discovered strong seasonality in both species composition and the numbers of diaspores which were both influenced by the producing animal as well. The latter indicates that species of herbivorous ungulates are not equal in their role as seed dispersers as is often accounted for.

Klíčová slova: Endozoochorie, herbivoři, šíření rostlin, Doupovské hory.

Keywords: Endozoochory, herbivores, seed dispersal, Doupov Mountains.

Kamarádi vs konkurenti u jelena evropského: vztahy v mládenecké skupině – předběžné výsledky

Friends vs Rivals in Red Deer: Relationships within bachelor groups – preliminary results

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Abstract

Except the rutting season, red deer males aggregate in unstable bachelor groups. Rank of the deer within the group can affect antler growth and timing. This has a hormonal basis. Previous studies were focused mainly on testosterone, a key hormone in development of secondary sex characteristics. Based on previous study, we predicted that individuals can associate with their “Friends” (those who are together and do not fight) or “Rivals” (those with whom they compete for dominance position). A group of 17 stags equipped with GPS collars was observed from June to August 10 times per month. We always recorded agonistic behaviour one day at competition for supplemental food in late afternoon (two hours before dusk) and following day for another two hours after dawn with no supplemental food. Blood samples were taken during regular monthly handlings and also GPS data were downloaded for interindividual distances determination. Using the cluster analysis we confirmed the group of companions who moved within a 22 m range from each other. According to frequency of agonistic interactions we could distinguish the associates in two groups; “Friends” who achieved 8 or less interactions, and “Rivals” with more than 8 interactions. Using GLMM, we found that number of interactions were

dependent on average distance from the associate nested within the Friend/Rival class ($F_{2,68.3}=86.23$, $P<0.0001$). While Rivals with increasing distance increased number of interactions with associates ($t=7.66$, $P<0.0001$), there was no such relation for Friends ($t=-0.26$, $P=0.80$). In another GLMM it was shown that average distance between associates tended to increase with age only ($F_{1,7.29}=8.45$, $P<0.02$). On the other hand, it was neither dependent on whether the associate was Friend or Rival ($F_{1,33.6}=0.01$, $P=0.92$) nor the total number of agonistic interactions ($F_{1,35.3}=0.25$, $P=0.62$). Our results thus suggest that there are both, friends and rivals within a bachelor group. Friends and rivals keep the same inter-individual distance within the group. Rivals tend to be on distance from opponents, but once they get closer, they attack each other frequently. In the next step we are planning to verify these two categories by measuring cortisol and testosterone concentrations.

Klíčová slova: jelen evropský; agonistické chování; interindividuální vzdálenosti; vztah; kamarádi vs konkurenti.

Keywords: Red Deer, agonistic behavior, interindividual distances, relationship, Friends vs Rivals.

Vliv vodního deficitu smrku ztepilého na společenství brouků (Coleoptera)

Influence of water deficit of Norway spruce (*Picea abies* /L./) on association of beetles (Coleoptera)

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Abstract

Beetles population dynamics is mainly affected by weather conditions, e.g. prolonged and frequent drought periods, etc. Research was done at the Norway spruce (*Picea abies* /L./) stand area in Central Bohemia (Czech Republic). It is an 80-year old spruce monoculture, at which were established four experimental plots. Two areas inside each plot of the size of 625 m² were covered with roof construction to prevent input of precipitation into the soil profile with the aim of manipulating with the water regime of the stand. Other two areas were marked as the control and they were of the same size. On the 16 trees were hung 32 window traps (passive flight interception traps) without bait, which means two window traps per tree. Traps were hung at the altitudes of 4 and 12 meters above the ground. Traps were exposed throughout the whole vegetative period and regularly collected each 7-21 days. The assumption was that all stressed trees will have a slightly higher attractiveness for the beetle associations compared with the control plot and that there will be difference in certain beetle families in their flight levels preference. Bark beetles (Coleoptera: Curculionidae: Scolytinae) are considered as one of the most important disturbance factors in forest ecosystems which were not much observed in this experiment. Families such as Curculionidae, Elateridae and Carabidae

were among the most abundant ones in the research area. There was observed that non-stressed plot was more preferred by beetle families.

Klíčová slova: Coleoptera, xylofágové, saproxylové, volatilní látky, vodní deficit, *Picea abies*, atrakce, letová aktivita.

Keywords: Coleoptera, xylophagous, saproxylic, volatile compounds, water deficit, *Picea abies*, attraction, flight activity.

Vliv magnetického pole na explorační chování hlodavců

Magnetic field effects on exploration behaviour of rodents

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Abstract

Magnetoreception, the ability to detect magnetic fields, has been demonstrated in a number of animal species. However, the physiological mechanisms underlying this ability remain largely unknown and the effects of magnetic fields on animal physiology and behavior are still equivocal. The aim of the present study was to analyze the effects of magnetic fields on exploration behavior of C57BL/6J mice in the open-field test. Animals were divided into 5 experimental groups. Each group was exposed to a different magnetic field for the duration of 75 minutes (local geomagnetic field; „zero“ field; experimental field with periodically manipulated intensity; two complexly changing magnetic fields). Data for analysis was collected from a video recording of the open-field test using an automatic tracking system (ABA System) and by recording discrete behaviors in JWatcher software. The following aspects of behavior were included in the analysis: velocity (angular, radial and overall velocity), spontaneous directional preference, thigmotaxis, wall-sniffing, wall-touching, rearing, wall-leaning, grooming, and jumping. The majority of results fail to show any significant effect of magnetic fields on exploratory behavior of C57BL/6J mice. Therefore, we can assume that the differences in activation of the trigeminal system of mice from particular experimental groups, discovered by Bláhová et al., are directly due to changes in the ambient magnetic field, and not just an epiphenomenon of behavioral changes. Nevertheless, subsequent in-depth analysis uncovered some positive results. Animals exposed to different magnetic fields differed significantly in angular velocity, temporal pattern of grooming and intensity

of exploration near the wall of the arena. These results, while not showing any pronounced behavioral effect of magnetic fields, provide some evidence that changes in magnetic fields can influence exploration behavior of rodents.

Klíčová slova: magnetorecepce, magnetická orientace, open field test, explorace hlodavců, myš C57BL/6.

Keywords: magnetoreception, magnetic navigation, open field test, rodent exploration, mouse C57BL/6.

Fylogeneze parazitických vosiček tribu Microdontomerini (Chalcidoidea:Torymidae:Toriminae)

Phylogeny of parasitic wasps of the tribe Microdontomerini (Chalcidoidea:Torymidae:Toriminae)

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Abstract

Chalcidoidea (chalcid wasps) represent the most species-rich group of Hymenoptera, which is also one of the most diverse orders of insects, perhaps the most diversified of all animal orders. Considerable part of Chalcidoidea representatives belongs to the family Torymidae, whose monophyly is nowadays intensively discussed. On the other hand, no comprehensive study dealing with family relationships has yet been made, and therefore resolving the relationships within this megadiverse family is of special importance. This particular study aims at the tribe Microdontomerini, established by Eric Grissell in his brilliant memoir about subfamily Toriminae in 1995. Grissell defined the tribe Microdontomerini based on several shared morphological characters and absence of others, but he did not find any exclusive autapomorphy. Species of this tribe are usually minute inconspicuous wasps (body length ranges 2 to 4 mm), only few species are brightly coloured. All members of Microdontomerini tribe are parasitic or even hyperparasitic. However, hosts are known for only about half of the actual diversity. Most of hosts recruit from the gall-forming insects (e.g. Chalcididae), other hosts comprise eggs of various insects (e.g. Mantodea). Microdontomerini (genus *Idiomacromerus*) are the only group known to attack Strepsiptera larvae. Recent progress in phylogenetics of chalcid wasps allowed us to formulate robust hypothesis of Microdontomerini evolution, as a component of broader study of Chalcidoidea phylogeny and classification.

Our approach combines molecular and morphological evidence to formulate the most plausible evolutionary scenario. We have selected representative set of over 25 species for morphological analysis, including all existing Microdontomerini genera and 13 outgroups in order to compare a broad list of morphological characters documented using Hitachi S-3700N-VP scanning electron microscope. In 124 taxa, we sequenced 4 nuclear genes (18S,28S,EF1alfa,Wingless) and 2 mitochondrial genes (COI,CytB) making together 414kbp. Molecular trees are built using maximum likelihood and Mr.Bayes algorithms. Evolution of morphological characters is going to be mapped on the most congruent tree in order to establish the most parsimonious hypothesis of the group evolution. Ongoing results shows us nullity of original Grissell hypotesis. We didn't exclude any of the original Microdontomerini taxa, but we add some. Complete results will be published in taxonomical WoS journal.

Klíčová slova: Fylogeneze, Torymidae, Microdontomerini, incertae sedis.

Keywords: Phylogeny, Torymidae, Microdontomerini, incertae sedis.

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