ČESKÁ ZEMĚDĚLSKÁ UNIVERZITA V PRAZE

Fakulta lesnická a dřevařská

Sborník abstraktů

Conference abstracts

STUDENTSKÁ KONFERENCE

MASTER 2015

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Obsah

TECHNICKO-EKONOMICKÁ SEKCE

Konstrukční návrh dřevostavby s téměř nulovou potřebou energie

Engineering design of nearly zero energy wooden house

MILOŠ PAVELEK

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Abstract
My thesis deals with project of zero energy house (wooden house with nearly zero energy) based wood from the point of view of engineering design. The work is devided into two parts. The theoretical part includes the history and development of buildings with low energy, the basic principles and requirements for individual constructions and placement of concrete project. On the basis of this theoretical knowledge is created the second part of work. That is graphic design project of own wooden house with nearly zero energy by ČSN 73 0540-2. It is one-floor tourist cabin with construction of wood I-beams. On the north side is designed reinforced concrete retaining wall that is completely in contact with the earth – house is partially covered by earth. All home insulation are made mostly from natural materials. The building is located on a reinforced concrete slab and the whole house is covered with extensive green roof.

Klíčová slova: energeticky nulový dům; dřevostavba; grafický návrh; obnovitelné zdroje energie; přírodní materiály.

Keywords: zero energy house; wooden house; graphic design; renewable energy; natural materials.

Modifikace překližky pro opláštění přepravních kontejnerů

Plywood modification for sheathing of shipping containers

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Abstract
The work deals with the issue of shipping containers sheathing made of corrugated plywood instead of traditional corrugated metal sheets. It was found that the corrugated plywood is a suitable material for the sheathing due to its great flexural strength perpendicular to the course of the wave, sufficient impact resistance, surface compressive strength and low weight. Three sample sets of different thicknesses 5, 8 and 10 mm were tested in the experiments. The tests have shown that the 5 cm corrugated plywood is the most suitable thickness for sheathing because it exceeds plain plywood with its flexural strength by 280%. Experiments showed that the increase of bending strength at this value, it was necessary to increase the weight of the timber only by 1.6%. Flat crash test showed that 5 mm corrugated plywood is sufficient material for sheathing from a mechanical point of view. Angle of corrugation was found as a very important factor which greatly affects the mechanical properties. The impact strength test has shown that plywood is relatively tough material in direction of corrugation. It was calculated that the use of corrugated plywood sheathing for the containers can reduce the weight of the walls up to 75%.

Klíčová slova: vlnitá překližka, přepravní ISO kontejner, vrubová houževnatost, plošná pevnost v tlaku, pevnost v ohybu.

Keywords: corrugated plywood, ISO shipping container, impact strength in flexure, flat crash test, bending strength.

Vliv ochranného prostředku na kvalitu lepeného spoje

Effect of protection equipment on the quality of the adhesive joint

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Abstract
The aim of this thesis was to investigate the influence of impregnation agents on the strength of glued joints. Two water based impregnations (Teknol aqua 1410-01 and Cetol WV 885 BPD+) and one impregnation based on organic solvents (Gori 605) were used. To glue the joints, we used PVAC ADHESIVE 3384 (single component PVAC adhesive), EPI system 1920/1993 (two component adhesive) and PUR 1968. The specimens were made of beech timber according to the ČSN EN 205 norm. The tests were carried out according to the ČSN EN 204 norm for PVAC adhesives and according to the ČSN EN 12765 norm for PUR adhesives. The influence of the impregnation on the strength of the glued joints was shown, but varied among the used adhesive types. For all the tests, there was a positive influence on the strength of PUR glued joints. For the PVAC adhesive, the influence of the impregnation for each single test was different.

Klíčová slova: PVAC; polyvinylacetát; polyuretan; PUR; impregnace; lepidla; pevnost spoje.

Keywords: PVAC; polyvinylacetáte; polyurethane; PUR; impregnation; glues; bond strength.

Možnosti využití moderních technologií zjišťování dendrometrických parametrů lesních porostů v provozních podmínkách ČR

Modern tools for forestry mensuration utilization possibilities in operational conditions in the Czech Republic

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Abstract
This diploma thesis presents the literature review of basic dendrometric variables and methods for their inventory and brief review of dendrometric tools too. The methodological part of this work describes Digitech Professional and Digitech Professional II calipers made by Haglöf and glance at their ergonomy. Since the work touches the wide spectrum of modern dendrometric technologies, the possibility of self made software solutions for computer terminals and smartphones are presented. Next part of this work is focused on history of electronic calipers in Czech republic and current use of electronic calipers in Forest of Czech Republic, state enterprise with evaluation of data collection effectivity.

Klíčová slova: zjišťování porostních zásob; elektronické registrační průměrky; měření dříví; stanovení porostních charakteristik.

Keywords: stand volume inventories; electronic calipers; timber measuring; determination of stand characteristics.

Dopad úpravy Seleckého potoka (okres Trenčín) na geobiocenózu

The impact of technical adjustments Selecký creek (district Trenčín) on geobiocenoses

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Abstract
This thesis was focused on the evaluation of natural conditions of Selec watershed and basic characteristics of its tributary Kondrút. The thesis dealt with the causes of adjusments of this watercourse and its impact on the surrounding environment. Previous technical adjustment made the stream impassable for its inhabitans, which caused the gradual loss of biodiversity and rapid removal of water from the watershed. I compared the adjusted and unadjusted part of the spring stemming from a beech forest in Považský Inovec, which was inhabited by animal species of European importance. The aim of my thesis referred to the problem of flow adjustments in the past, and suggested possible improvements to the current situation.

Klíčová slova: Salmo trutta m. fario, Selecký potok, revitalizácia.

Keywords: Salmo trutta m. fario, Selecký creek, revitalization.

Optimalizace výrobního procesu tvarovaných překližek

Optimization of manufacturing process of molded plywood

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Abstract
General aim of thesis is to focus on manufacturing process of composite materials, specifically heat transfer through the layers of molded plywood during hot compression. Hot compression is considered as the most important operation during manufacture of composite materials. These materials get their final properties by it or they are considerably influenced. Pressure altogether with temperature in pressing machine impact layered mat. Ultimate function of those physical quantities is to provide enough of contact between elements and subsequently solidification of adhesive. Pressing time is the third important factor, which we have an effort to explain in by this research. Fundamental understanding of pressing process is therefore basic for optimization of manufacturing speed, costs, energy consumption and also for manipulation with board properties and new products and technologies development. Goal of this thesis is to explain heat transfer as a key action during curing of adhesive. By change of flatness of veneers is some prediction of influence of these bends on heat and mass transfer through the layers. Temperature in various spots in glued layer was measured with probes – thermocouples. The most important chapter of this thesis is summary of data acquired and comparison among glued layers and places in one layer. For another comparison are used data from compressions with different temperatures where we are looking to achieve minimal curing values in all measured spots in plywood and its maintaining

for necessary time. By results acquired in this experiment we can optimize manufacturing process of molded plywood. Final products were tested on physical and mechanical properties with goal of proper values and technology verification.

Klíčová slova: tvarované překližky, přechod tepla a hmoty, lisovací čas.

Keywords: molded plywood, heat and mass transfer, pressing time.

Optimalizace výrobního procesu v mlékárenství

Optimization of Production Processes in Milk Industry

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Abstract
Milk has been considered as nutrient food and beverage to the human body since the beginning of human civilization. In this project work, optimization the production processes in milk industry is mainly focused with 7 chapters. The first chapter describes the development of livestock industry with agriculture and the importance of milk as a nutrient food and beverage to the human body. Statistical data related to the milk processing industry in current world is mainly discussed in the second chapter. Afterwards the technological equipments and technologies used in traditional and modern farms including animal housing, feeding, milking methods, further processing of milk and usages of milk to other applications are discussed. Technical parameters for selection of milking parlor, milk cooling and milk storage are calculated in the Chapter 05. The conclusions of the observations and improvements to increase the efficiency are discussed in the last chapter. The recommendations for dairy farms in Sri Lanka are also discussed with new implementations in suitable areas.

Keywords: dairy farms, milking machines, milk cooling, milk processing.

Návrh klasifikácie producentov energeticky efektívnych drevostavieb na Slovensku s metodikou investičnej návratnosti ich realizácie

Proposal for classification of producers of energy-efficient wooden houses in Slovakia with the methodology of the investment return on their realization

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Abstract
Ensuring your own home is an elementary need and want of every responsible man. Recently our countryside is coming back to life by construction activities, so we have recorded an increased interest in family houses building. Nowadays, buildings are producing one third of world CO2 production, and they spend 40% of global energy, where heating makes even 60% part. Therefore, low energy demands buildings construction which doesn't burden an environment has become the preferred solution. This work focuses on a potential advantage of low energy wooden house construction. This type of construction is an alternative housing solution that is comfortable and healthy, less energy-intensive and bringing funds saving during its operation. The total sum of knowledge regarding the specifics of the technological processes for the production of energy efficient wood building, identifying their advantages and disadvantages in terms of technical parameters, time of realization, investment and operating costs can be concluded that the wooden houses of the overall energy intensity show that

energy-efficient solution. Wooden houses achieve excellent thermo-technical properties that reduce heat consumption for heating and indoor temperature can be better controlled. Opposite resulted in increased investment costs and difficult market orientation on the choice of contractor wooden houses taking into account quality, price and selection of suitable materials. We have put together a ranking list of wooden buildings producers in Slovakia with an approximated specification of their distribution ranked by: construction systems use and external walls composition, obtained certifications / quality labels, additional quality verification tools, quotations calculated per square meter of usable space and the available instruments for their implementation financial support. Major producers of low-energy wooden houses in Slovakia have been divided into three quality groups in according to following criteria. In the increased investment costs issue, we will try to assess long term efficiency housing in the low energy house investment. Also, we will try to compare increased implementation costs to heating energy savings compared to traditional brick construction, which could be potentially bring by this kind of building in the future. The effect of the project should the competitiveness and the market potential growth for wooden houses producers in Slovakia. This form of housing support increases wood appreciation as a renewable raw material and ecological approach minimizes the operational thermal energy consumption.

Klíčová slova: nízkoenergetický drevodom; klasifikácia producentov; investičná návratnosť; úspora energie.

Keywords: energy-efficient wooden house; a ranking list of producers; return on investment; energy savings.

Controllingový informačný systém pre nábytkárske malé a stredné podniky na báze Excelu

Controlling information system for small and medium furniture enterprises on the basis of Excel

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Abstract
In the current turbulent entrepreneurial environment, the aim of each enterprise is to decide better and faster, this means to perform more effectively, to be more competitive and to further develop as an enterprise. Management information systems have become an essential help even for small and medium enterprises (SMEs) in order to support their management decisions. These systems offer a high analytical comfort and easy access to data, which has been transparently collected. The aim of the submitted thesis is a proposal of model for controlling information system (CIS) in the Microsoft Office Excel environment, which the mangers will be able to use in order to manage liquidity, finances, cost and investments, and as well to create and control the effectiveness of plans. The designed CIS is able to satisfy the basic and as well advanced manager needs of any furniture SME. The requirement in order to use this system is in first place elementary economic, financial and business literacy of an user and his/her basic working knowledge of MO Excel 2007. In this thesis we have dealt as well with description of basic CIS functions, where we have analyzed respective types of enterprise controlling such as strategic, operative, cost controlling, investment and financial controlling. The most extensive part takes currently financial controlling, especially due to manager´s need to know the health of his/her enterprise and as well the need to manage cash flow. During the

elaboration of the thesis we have used various traditional and modern indicators. Amongst the modern indicators, which we have chosen based on our needs, was the indicator economic value added (EVA), which represents an effective instrument for measuring company performance and is basic indicator for identification, if the enterprise is creating or is losing the added value. For effective management through this indicator we have elaborated EVA through the methodic of pyramidal decomposition, which is used to identify factors, which influence the enterprise performance. System is built on semaphore evaluation, which shows the manager in visual way, which factors positively influence the performance growth and the enterprise value, and on the contrary which factors influence it negatively. The outcome of this thesis is a functional and into practice of furniture SMEs prepared CIS created on basis of Excel. This system enables furniture SMEs to react flexible to market changes, offers alternative possibilities for management decisions and is able to simulate impacts of each change in the plan on business economy. The proposed CIS is also suitable for educational purposes in the area of controlling, finances, investments, cost and planning of SME.

Klíčová slova: controlling, informačný systém, Excel, malé a stredné podniky.

Keywords: controlling, information system, Excel, small and medium enterprise.

Přátelé vs konkurenti u jelena evropského: vztahy v mládenecké skupině

Friends vs Rivals in Red Deer: Relationships within bachelor groups

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Abstract
Red deer males aggregate during major part of a year to bachelor groups. Social position – Rank – is unstable in these groups. Previous experiments revealed that rank modulated by agonistic behaviour influences antler growth and antler cycle timing. Antlers are secondary sexual characteristics of the deer family and one of the fastest growing tissue in vertebrate taxa. Their development is modulated by androgenic hormone, testosterone. In our experiment, we observed agonistic behaviour of 19 males. They were equipped with GPS collars and regularly handled for blood samples and downloading of telemetrical data. Based on statistical analysis, we found that in our bachelor group 13 stags kept similar interindividual distances which did not exceed 22 metres ("Closest associates"), whereas the rest of the group moved tens of metres away ("Wanderers"). In regard to the number of agonistic interaction and interindividual relationship, which arised from that, we divided the bachelor group on "Friends" (≤ 8 interactions) and "Rivals" (> 8). We found that the number of interactions depended on average distance among males in groups divided by dyadic relationship ("Friends" and "Rivals"). "Rivals" with increasing distance increased the number of

interactions, while “Friends” did not show this trend. Average distance between stags was positively correlated with age. Our results suggest that bachelor group of stags is composed of subgroups which differ in average distance kept by stags among themselves. There also seems to be a clear division based on interindividual relationship on “Friends” and “Rivals”. In the relation of “Closest associates” both categories kept similar interindividual distance, nevertheless, “Rivals” tended to avoid each other. However, when “Rivals” got closer they usually attacked each other. Based on these findings, we wanted to know how the division of bachelor group can be reflected in hormonal levels of studied animals. Both categories of grouping (“Wanderers” and “Closest associates”) mutually differed in testosterone concentrations (T) but also in concentrations of cortisol (C). With increasing proportion of “Friends” the concentrations of C declined in both categories of grouping. However, it was not so clearly apparent for T. Concentrations of C were positively correlated with increasing number of interactions, similarly to the values of T which were dependent on stag´s weight.

Klíčová slova: agonistické chování; interindividuální vzdálenosti; dělení mládenecké skupiny; testosteron, kortizol.

Keywords: agonistic behavior, division of the bachelor group, interindividual distances, testosterone, cortisol.

Stav lesních porostů na zalesněné lesnické půdě v Orlických horách

Forest stands status on the afforested agricultural land in the Orlické hory Mts

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Abstract
This diploma thesis focuses on the state of woodlands on forested agricultural land in Orlické hory. Studied area is located in the range of the village Neratov in protected territory Orlické hory in natural forest area n. 25 – Orlické hory. Literary recherche deals with afforestation of farmland in the Czech Republic with focus on history, aims of forestation, legislature and economic. It also covers description of individual tree species suitable for afforestation of cropland, means of planting and consequent protection of forested areas. The literary recherche likewise includes detailed description of studied locality from geological and climate condition views. Further follows characteristics of seven permanent trial areas that had been forested during the 5. decade of the last century, mostly with Norway spruce. Processed results and comparing inventory of lumber mass among the individual trial areas generally confirms excessive production of lumber mass. Permanent trial area with spruce monoculture reached 851 m3 mass per hectare in 61 years. Soil sampling results also correspond with existing findings. The end of dissertation evaluates forestation of agricultural land with Norway spruce. In the case of restoration of such vast areas it will be necessary to gradually segment the land and decrease rotation period. Newly

established forest cover will be much more stable and may serve some other functions beside production.

Klíčová slova: zalesňování zemědělských půd, struktura porostů, stav porostů, Orlické hory.

Keywords: forestation of agricultural land, forest cover structure, forest cover condition, Orlické hory.

Use of brassinosteroids to overcome unfavorable climatic effects on seed germination of chosen tree species

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Abstract
Many seeds have an ability to overcome some adverse climatic conditions, however many forest seeds from temperate regions come across with some germination and survival problems when they are exposed to adverse climatic conditions of the environment during their germination period. Brassinosteroids (BRs) regulate several kinds of plant activities and they can help to overcome these problems. The effects of exogenous application of BRs on germination capacity and germination energy of European black pine (Pinus nigra) seeds were tested in this study. For this study a synthetically prepared analogue of 24-epibrassinolid (brassinosteroid-2α,3α,17β-trihydroxy-5α-androstan-6-one) was used. Four different concentrations of BRs and control were used under two regimes: optimal conditions and stress conditions which means that seeds were exposed to high temperatures up to 42°C. Seeds were soaked for 24 hours. After that seeds were planted in containers and placed into growth chambers. Fully germinated seeds were counted and radicular length of each seed was measured. Under the optimal conditions results of germination capacity showed significant difference between control and high concentrations of BRs treated seeds. In the case of stress conditions there was observed significant difference between control and medium BRs concentration. In the case of germination energy there was also a significant difference between control and medium concentrations of BRs treatments. In this study it was found out that the BRs improve the

germination capacity and germination energy of Pinus nigra seeds under the high temperatures.

Klíčová slova: brassinosteroidy, Pinus nigra, schopnost klíčení, energie klíčení.

Keywords: brassinosteroids, Pinus nigra, germination capacity, germination energy.

Morfologická variabilita mezi diploidními a tetraploidními zástupci rodu bříza (Betula spp.) na Šumavě a genetická analýza vybraných druhů z území ČR

Morphological variability between diploid and tetraploid taxa of Betula spp. in Bohemian Forest and genetic analysis of some species within Czech Rep.

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Abstract

Taxonomy of the genus Betula remains to be a complicated and complex issue. Even though there are naturally only few species of Betula spp. present in the Czech Republic, taxonomic relations in the genus are, according to many authors, uncertain. High variability of birches is probably the consequence of hybridization and introgression (back-crossing with original individuals). In the past, this fact resulted into the misclassification of some species or incorrect recordings of taxon presence. Birches, their tetraploid taxons in particular, are very important in applied forestry, especially in afforestation of highly disturbed areas in mountains, where air pollution calamities took place and where wind and insect disturbances cannot be excluded. According to several studies, e.g. from the Ore Mountains (Czech Republic), it is necessary to distinguish between diploid and tetraploid groups of taxa. For that reason, the ability to determine ploidy of each individual based on macroscopic parameters that can be measured using non‑ expensive and simple techniques is desirable. The aim of the study is

to define a decision criterion (classification function) based on macroscopic measurements to distinguish between diploids and tetraploids and to analyse genetic relations between examined taxa. This study is divided into two parts – (1) classical morphometrics, where classification function is computed and (2) genetic analysis, where genetic relationships between taxa are described. For classical morphometrics, samples from 57 individuals from 8 locations in the Šumava Mountains were collected. On each leaf sample, 16 parameters were measured for statistical analysis. Classification function was obtained by linear discriminant analysis (LDA). With the use of the suggested formula, it was possible to correctly determine the ploidy of an individual in 96% cases. The individuals for genetic analysis (microsatellites, SSRs) were collected on 10 locations in the Czech Republic. Performed analysis showed that some species often described by some authors across diploid and tetraploid taxa could not be distinguished by used markers.

Klíčová slova: bříza, ploidie, mikrosatelity, morfometrika.

Keywords: Betula, ploidy, microsatellites, morphometrics.

Rastové a morfologické charakteristiky pôvodov brezy previsnutej svalcovitej (Betula pendula Roth.var. carelica Merkl.) v Arboréte Borová hora

Growth and morphological characteristics of the origins of the karelian birch (Betula pendula Roth. var. carelica Merkl.) in the Borova hora arboretum

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Abstract
The study was focused on the study of growth and morphological characteristics of Karelian birch (Betula pendula Roth. var. carelica Merkl.) planted in the Borová hora arboretum in Zvolen. The birches were transferred to the arboretum from several localities in Slovakia, Finland and Russia. We studied the height, diameter in breast height and near the ground, diameter of the crown, number of branches, diameter of the branches, the shape of the verricous thickenings and the type of the trees. Based on the results of our study, we concluded that the most frequent were bush types with white bark and shallow thickenings. In the arboretum we recorded very valuable dark-barked forms. Based on our analyses, we came into conclusion that the variability of the locations of the parent trees influenced 22% of the variability of the shape of the thickenings of the individual trees planted in arboretum. We conducted similar analyses for the height of the trees planted within the arboretum and diameter near the ground. The variability of the locations of the parent trees influenced 18% of the variability of heights and 9% of the variability of diameter near ground.

Klíčová slova: breza svalcovitá, svalce, rastové charakteristiky, morfologické charakteristiky.

Keywords: Karelian birch, verricous thickenings, growth characteristics, morphological characteristics.

Analýzy mízy z břízy

Analyzes of birch sap

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Abstract
Diploma thesis focuses on the sap flow in woody tissues of genus Betula in the spring before the leaves sprout. The practical part of the final work characterise substances contained in the sap of selected birch trees species. Selected individual´s woody tissues were injured and consequent root preasure lifted samples of the sap into prepared container. Samples were analyzed by using mass spektrometry. The contents of sugars (glucose, fructose and sucrose) were recorded in mg/l into the table. The results show considerable variability in terms of sample´s substances content, especially sugars. This can be used in commercial sector for beverages and liquers production.

Klíčová slova: míza, bříza, Betula, Arboretum FLD v Kostelci nad Černými lesy.

Keywords: sap, birch, Betula, Arboretum FLD in Kostelec nad Cernymi lesy.

Analýza růstu bukových porostů ve vztahu ke způsobu jejich výchovy na území B.F.P. Lesů a statků Tomáše Bati, spol. s r.o.

Analysis of growth of beech stands in relation to the methods of their tending at the B.F.P. Forests and farms of Tomáš Baťa.

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Abstract
The thesis deals with tending of beech stands. Summarizes information from available literature and monitors the growth responses of trees in different thinning regimes. To compare, there are 3 series of plots in thinning age and 1 younger stand. The study area is situated in the property of B.F.P. Forests and farms of Tomáš Baťa. The task was to propose optimal solutions for growing of beech stands on the site. The proposal is based on an analysis of habitat, natural conditions and analysis of field samples. Furthermore the effect of various tending interventions and subsequent development of vegetation was compared in order to achieve the highest production or better assortments. The results show that even in the first year after the intervention the diameter increment is greater than in areas without intervention. This work also confirmed the hypothesis that beech reaches higher increment in lower canopy. This is related to intraspecific competition and influence of the position of each tree in the stand. For selected individuals from the tending intervention a dendrochronological analysis was carried out to create an average tree ring curve representing the site.

Selected individuals were also categorized according to their position in the stand, and the results clearly show an intense increment of trees growing in the upper level, or even above the main tree layer.

Klíčová slova: výchova porostů, buk lesní, přírůst, produkce dřeva.

Keywords: silviculture, beech, increment, timber production.

Struktura původního horského smrkového lesa na vybraných lokalitách na Slovensku

Structure of the natural spruce mountain forests in the selected localities in Slovakia

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Abstract
Natural mountain old-growth Norway spruce (Picea abies (L.) Karst.) forests have recently become an important subject in various ecological, biological and social studies. Studies on structure and dynamics of natural forest are of high importance since they provide an important guidance for forest managers and decision makers. Aim of this thesis is to collect data and on their basis describe structural variability and dynamics in the natural mountain spruce forest. Study was conducted in the Tatra National Park and cover two valleys with 16 plots each (total 1790 trees). Statistical analysis was applied to prove or reject the hyphotheses regarding dependence between structural parameters (e.g. living and dead standing trees, coarse woody debris, regeneration) and their relation to physiographic parameters (e.g. altitude). The deacreasing numbers of large trees in more dense stands, importance of dead wood volume for spruce regeneration and preference among available substrates among spruce regeneration (particularly in favor of dead wood) were proven significant. However, no significance was proven for change of stand density along altitudinal gradient. Most trends were well fitting in generally observed patterns but some, for example density of regeneration with respect to elevation are not reflecting published informations. The importace of scale for serious part of the results is

apparent too. Via comparison with other studies, which often involved different analyses, disturbance regimes leading to particular observed structures were considered. The observed structures seem to be following the patterns described as results of intermediate disturbance regimes. On larger scales the diameter distribution curve is resembling the shape of this curve as described for selection forest.

Klíčová slova: smrk ztepilý, Picea abies, struktura porostu, disturbance.

Keywords: Norway spruce, Picea abies, stand structure, disturbances.

Využitie rastového simulátora a nástrojov optimalizácie pri hospodársko-úpravníckom plánovaní

Use of growth simulator and optimization tools for forest management planning

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Abstract
The main focus of this work is the use of growth simulator Sibyla and optimization tools to design an appropriate forest management plan including economic, ecological and evnironmental point of view, based on the selected indicators. For the purpose of the research we selected the spatial distribution of forest units (JPRL), that is representative in Slovakia stand in terms of tree species composition and frequency. We deal with a stand 391 which represents a mixture of tree species composition. In selected stand we made detailed forest stand analysis and review of option for creating various forest management plans. We conducted simulation of state forest in Sibyla program for all possible forest management plans. The optimal variant of forest management plan of stand was chosen by using optimization program and compared with the original forest management plan.

Klíčová slova: obhospodarovanie lesov, multikriteriálna optimalizácia, rastové simulátory, Sibyla, VisAn, expertné systémy.

Keywords: forest management, multicriterial optimization, growth simulators, Sibyla, VisAn, expert system.

Změny mykorhizních poměrů na dubové ploše Dřevíč

Changes in the mycorrhizal status of oak site Dřevíč

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Abstract
To determine changes in mycorrhizal relationships during the year were sampled on oak surface 'Dřevíč' each month during the year 2011. Sampling was performed approximately at the same location at a chosen distance from the trunk. A total of 60 samples were collected from five trees. From the soil probe the roots were manually dissected and classified according to the average in each class. Subsequently, they were washed in water to remove most impurities that complicate further work with them. Roots of up to 1 mm were placed in fixative glutaraldehyde for subsequent examination, which took place at the roots 5 cm long, and, as stated,of up to 1 mm, including all lateral roots. There were evaluated 20 segments in each probe. Binocular loupe served for evaluation and determination of the number of individual mycorrhizal tips. The level of mycorrhizal relationships was evaluated using two parameters: the density of mycorrhizas and their percentage. The density of active and inactive mycorrhizas was calculated as the average value of the number of detected mycorrhizas per 1 cm long root. Mycorrhizas percentage was calculated as the ratio of active and inactive mycorrhizas of the total number of all found mycorrhizas. For all variables have been shown assumption instability and inconstancy. This occurred mainly in spring (March, April, May) and autumn (September, October) months, which could be caused by increasing aggregate monthly precipitation during this period. It was also found that neither the number of active and inactive mycorrhizal tips may not exactly correlate. This

relationship is influenced by a number of external factors (extremity during weather, lack of rainfall, biotic factors etc.). Number of active mycorrhizal peaks was rising with increasing rainfall, or it happened in the immediate dependence. For inactive mycorrhizal peaks showed no significant decline or growth during 2011.

Klíčová slova: mykorhiza, kořen, dub letní, dynamika mykorhiz.

Keywords: mycorrhiza, root, oak, dynamics of mycorrhiza.

Fototrofní a heterotrofní růst mikrořas: fotobiochemické a změny v průběhu kultivace a trofických konverzí

Phototrophic and heterotrophic growth of microalgae: trophic conversions and photobiochemical changes during cultivation

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Abstract

The photobiochemical and physiological changes in the cells of microalgae, which was placed from darkness to constant light, are described in this work. Two strains of Chlorella sorokiniana were used; heterotrophic strain 1100, which is usually kept aseptically in the organic medium with glucose, and autotrophic strain R117 cultivated in mineral media with CO2. Both strains are from the internal collection of Laboratory of biotechnology, Institute of Microbiology in Třeboň. I monitored the rate of adaptation heterotrophic biomass to phototrophic cultivation by fluorescence measurement (light response curves, OJIP curves and variables of fluorescence). The growth was measured by optical density and content of dry biomass in the suspension. The fluorescent variables showed the first fluorescence activity after 6 hours, the photosynthesis is comparable with autotrophic culture after 24 hours. The different concentrations of microalgae suspension at the start of experiment didn´t affect the process of adaptation. The pigment content compared to control phototrophic culture was low, under 0.9 % in the biomass.

Klíčová slova: Chlorella sorokiniana, mikrořasy, heterotrofie, fototrofie, výživa, konverze.

Keywords: Chlorella sorokiniana, microalgae, heterotrophy, autotrophy, nutrition, conversion.

Oxidační poškození buněčných komponent po indukci oxidačního stresu specifickými herbicidy

Oxidative damage to cellular components by oxidative stress induced by specific herbicides

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Abstract
Oxidative stress is a complex chemical and physiological phenomenon causing cellular damage in all organisms from bacteria to plants and animals. In case of plants it is primarily related to biotic and abiotic stress conditions. Nowadays there are many abiotic stressors negatively influencing crop production and agricultural management in general. The most important being drought, salted soils, floods and anoxic conditions which annually damage the yields of important crops. But that is not all, natural ecosystems such as meadows, forests, etc., also suffer from the above mentioned unfavourable conditions. Plants are sessile organisms which means they are attached to the substrate where they grow and thus they live by a completely different strategy than animals. They cannot freely move during unconvenient environmental conditions around them or during a pathogen/herbivore attack. Nonetheless it doesn´t mean they cannot defend themselves at all. Most of these stress factors usually leads to a state of oxidative stress mediated by reactive oxygen species (ROS). This group of molecules, when overproduced, causes specific damage on a cellular level which can be detected. Plants have various ways of dealing with such a situation. In my work I applied herbicides paraquat and 3-aminotriazole with

specific mode of action in order to create a state of oxidative stress at tobacco cells. I compared various markers of oxidative stress in plant cells through monitoring specific oxidative modifications of DNA, membrane lipids and proteins. I also observed the activity of antioxidant enzymes catalase and ascorbate peroxidase. My results showed that nuclei were the most susceptible component and their oxidative damage was easily detectable by a commet assay. On the other hand I observed only moderately oxidatively modified proteins and lipids. The role of antioxidant enzymes was confirmed in my study. The commet assay proved to be a quick and easy method for detection of DNA damage and could be used for ecological end environmental studies.

Klíčová slova: oxidační stres, herbicidy, kometový test, reaktivní formy kyslíku, antioxidační enzymy.

Keywords: oxidative stress, herbicides, commet assay, reactive ogygen species, antioxidant enzymes.

Baking quality of composite flour

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Abstract
This study evaluated the quality of baking products from composite flours - wheat flours mixed with hemp, quinoa, and soybean flours. Composite flours percentage proportion was 5:95 and 10:90 (5-10% was replaced flour, 90 – 95 % wheat flour). Nutritional, rheological or physical characteristics of the composite flour and baking quality were investigated using farinograph, extensograph, at the same time ash test, falling number, gluten test, moisture test and protein test were conducted. The results show that moisture was rather similar in all the composite flours, contents of ash and protein was higher in each composite flour compared to wheat flour; percent of gluten in each composite flour was very similar to wheat and the volume of baked product was higher in composite flours made out of wheat with quinoa compared to pure wheat product. There was significantly distinction between breads from wheat flour and composite flours baking in the crust colour, crumb holes, shape regularity and appearance. The shape and characteristic crust colour of composite hemp flour was different, had specific smell and taste.

Keywords: composite flours, rheological method, baking test, nutritional value.

Vyhodnotenie fenotypových charakteristík škvrnitosti karpatského poddruhu rysa ostrovida (Lynx lynx carpathicus) na Slovensku

Evaluation of the phenotypic characteristics in coat patterning of the Carpathian subspecies of the Eurasian Lynx (Lynx lynx carpathicus) in Slovakia

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Abstract
Large distinct spots are characteristic for the Carpathian population of lynx. However, there are some indications that imply the decrease in number of the spotted individuals in Slovakia. Similarly, it can be presumed that their number varies from region to region populated by lynx in Slovakia. This study aims to evaluate the patterns of damage caused by I. typographus to spruce forests with compromised ecological stability. The aim of this study was to evaluate the phenotypic characteristics of the Carpathian subspecies of Eurasian Lynx (Lynx lynx carpathicus) in Slovakia. For the purposes of this thesis, 278 records of captured and living lynx from the entire area of Slovakia have been collected and catalogued. Altogether 468 records have been used and divided into three categories of coat patterning – spotted, rosette and uniform pattern. Then the ratio of the most dominant spotted and rosette pattern was evaluated in time span of 60 years in the chosen six areas with the expansion of lynx. The results have confirmed the hypothesis of the balancing and increase of the individuals with the rosette coat patterning in the population over past six decades. Also, considerable

differences in the probability of rosette patterning in the lynx population depending on a specific area have been confirmed. The probability in question has increased in past six decades by 23%. The highest values have been observed in two peripheral regions and moderately higher value has been found in the middle region of Slovakia. These results indicate the possibility of modifications and processes in the population of lynx in Slovakia. For this reason, the methodology used in this study is, together with another methods, relevant approach for the evaluation of the future lynx population development.

Klíčová slova: rys ostrovid; fenotyp; Slovensko; populácia; vývoj.

Keywords: Eurasian lynx; phenotype; Slovakia; population; developement.

Genový tok v rámci plemene český fousek

Gene-flow within Cesky Fousek breed

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Abstract
The goal of this study was to compare genetic parameters among the breeds of Cesky Fousek (CF) and another three breeds of pointing dogs (Deutsch Drahthaar (DD, GWP), Wirehaired pointing griffon (WPG) and Deutsch Kurzhaar (DK)) using 19 microsatellite markers. It was assumed that the CF breed show lowest heterozygosity and that this breed is more geneticaly related to the DD breed. Strong gene-flow was observed between CF and WPG breeds. The aim of this study was to investigate the rate of genetic divergence between breeds, analyse genetic variability and description of basic genetic parameters. Another goal was to find outif different concepts of breeding in abroad are visible in the genetic architecture of the CF breed. In total, 414 buccal swab samples were taken(213 CF, 118 DD, 42 DK and 39 WPG). Bayesian clustering analysis indicate that CF breed is isolated from other breeds. All breeds divided into separated clusters, however a higher rate of genetic variability was detected in WPG breed. This could be caused by different sets of samples in this breed - part of them was taken from AKC registered dogs, the other part was taken from WPGCA registered dogs. WPGCA uses CF individuals in their breeding system for almost 30 years, that is probably the reason, why are these dogs so geneticaly different from AKC

registered WPG. In some cases a strong gene-flow was detected from the CF breed to WPG. There were found no differences between the CF individuals bred in Czech Republic and abroad. A weak differenciation was detected between individuals of DD and GWP breeds. Phylogenetic analysis indicated, that the CF breed is older than other breeds analysed in this study. Although this could be misrepresented due to absence of another pointing dog breeds in the study. Althoug line breeding is still used in the CF breed, inbreeding coefficient did not indicatedany expressive influence of inbreeding. Average value of heterozygosity ranged from 0,66 (DK) to 0,69 (DD). Pairwise FST values for all breeds matched with the values for medium differenciation. Molecular variance analysis revealed that 8 % of the total variance occured among populations.

Klíčová slova: genetická variabilita, liniový chov, mikrosatelity, německý drátosrstý ohař, český fousek.

Keywords: Cesky Fousek, Deutsch Drahthaar, genetic variability, line breeding, microsatellites.

Podílí se magnetorecepce na vytváření kognitivní mapy psů?

Is magnetoreception involved in creating the cognitive map in dogs?

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Abstract
This thesis focuses on cognitive maps in dogs and their possible connection with magnetoreception. Many scientific studies have shown the ability of animals to percieve the Earth´s magnetic field. However the way how the animals feel and process the information that the magnetic field provides has not been reliably proven yet. The main aim of the practical part of the thesis is an evaluation of the possible effects of geomagnetism on dachshund orientation. The data were collected in the natural environment of forest and field hunting districts near Prague and Pilsen using GPS technology. Collected data were analysed in the statistical software Oriana using the circular diagrams. The results indicate that dachshunds utilize several different navigation strategies for spatial orientation which help them to find their way back. One of them is the orientation using the magnetic field of the Earth. It was confirmed that the direction of the return initiation is not completely random and dogs statistically significantly prefer the first section of the return in the north – south axis.

Klíčová slova: kognitivní mapa, magnetorecepce, magnetické pole, pes, savci.

Keywords: cognitive map, magnetoreception, magnetic field, dog, mammals.

Vliv resveratrolu na mikrobiom zažívacího traktu člověka

Effect of resveratrol on the human gastrointestinal tract

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Abstract

The gastrointestinal tract of human is a special microbial ecosystem which ontogenetically and physiologically equivalent to external environment and changes in the course of a person's life. It contains microorganisms from all three domains: Bacteria, Archaea and Eukarya which play a large role in processes related to human homeostasis and pathogenic conditions. The aim of this work was experimental study the effect of resveratrol and red wine on bacterial profile intestinal contents of people. Four volunteers consumed 80 mg of resveratrol in the form of tablets (A1 Resveratrol 800 tbl.30 RX) 3 times a day for 10 days and unspecified amount of resveratrol contained in red wine (variety Primitivo di Puglia IGT Piantaferro, Stelvin) 1x daily for 10days 2dcl. Genomic DNA from 145 stool samples of each experimental period was isolated using special commercial kits, and bacterial profile in samples was studied using DGGE. Bacterial patterns of the control and experimental periods were compared and selected DGGE bands were defined based on sequence analysis of the 16S rDNA by algorithm the BLAST [1] The experiments show that polyphenolic substance resveratrol has proven effects on the composition of the bacterial population of the gastrointestinal tract of humans. However,it is not possible clearly assess whether it is a positive influence. Indirectly, however, so can be inferred from the fact that with the use of resveratrol and red wine consumption was intensely represented species Faecalibacterium prausnitzii, whose positive effects on the gastrointestinal tract are already established and species Anaerostipes

hadrus, whose production of butyrate is important for a healthy intestinal mucosa.

Klíčová slova: resveratrol, gastrointestinální trakt, polymerázová řetězová reakce (PCR), denaturační gradientová gelová elektroforéza (DGGE), sekvenační analýza.

Keywords: resveratrol, gastrointestinal tract, polymerase chain reaction (PCR), denaturing gradient gel electrophoresis (DGGE), DNA sequencing.

Simulace transportu Pb a Zn půdním profilem po aplikaci syntetického oxidu manganu (AMO)

Simulation of Pb and Zn transport through the soil profile after amorphous manganese oxide treating (AMO)

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Abstract
Contaminated soils by various sources of potentially toxic metals/metalloids are actually introducing thorny and problematic issues nowadays. Conventional methods of remediation of such soils are very expensive and time-consuming. Potentially very effective and alternative remediation methods using sorbent, which can stabilize mobile forms of pollutants thus preventing their usage in plants or leaching to groundwater table, was therefore investigated. Amorphous manganese oxide (AMO) was tested as relatively easy made sorbent. The AMO was applied to experimental prepared soil, heavily polluted by following concentration of metals (2500 mg/kg for Lead and 4500 mg/kg for Zinc). Batch experiments were performed. Sorption efficiency in soils treated by AMO was achieved approximately 98% for Lead and 67% for Zinc, respectively. Nevertheless, continuous desorption of Zinc was detected in soils without treatment. Column experiments and statistical tests were also performed. Here significant stabilization of observed pollutants during extraction experiments by leaching agents was demonstrated. The average extraction of Zn in AMO treated soil was decreased by 36% (by 56 % in case of Pb) in comparison with untreated soil. On the other side, extraction of dissolved organic carbon in

AMO treated soil was increased only by 12%.Statistically significant increment of sorption capacity was demonstrated during column saturation by experimental solutions. Only 27% of maximum sorption capacity in AMO treated soil was reached after 82 hours of saturation (versus 6% exceeding of maximal sorption capacity in untreated soil) in average. The transport model (HYDRUS 1D) was calibrated and validated by prediction of following laboratory tests. In AMO treated soil, the maximal sorption capacity during modelled constant surface solute flux (751.4 ml/day, 10.6 mM Pb and 5 mM Zn solution) was reached by 8 days later in average compared to untreated soil. Significant stabilization of followed metals was detected in long experiment (27 days x 7 days in untreated soil) in AMO treated soil during simulation of continual constant water flux (754,1 ml/day). Speciation modelling (PHREEQC 3) was used for specification of followed elements and their forms and significant differences (AMO x control) were described. Performed experiments, statistical evaluations and mathematical modeling confirmed hypothesis that AMO significantly enhanced sorption capacity in soil and soil pollutants are stabilized and delayed in their extraction. Amorphous manganese oxide seems to be potentially very efficient sorbent, which should be further tested in field experiments under real natural conditions in order of future utilization of this matter in extensive remediation in highly metals/metalloids contaminated soils.

Klíčová slova: AMO, vsádkové a kolonové experimenty, speciační model, Pb, Zn.

Keywords: AMO, batch&column experiments, speciation model, Lead, Zinc.

Ontogeneze vojenského chování u termita Prorhinotermes simplex (Rhinotermitidae) a jeho polyethismus

Onthogeny of the soldier behaviour in termite Prorhinotermes simplex (Rhinotermitidae) and its polyethism

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Abstract
The existence of the soldier caste represents an important synapomorphy of all modern termites. Polyethism is in termites known to occur especially in the worker caste, since the only function of the soldiers is the defence; even the scarce reports on polyethism in soldiers are always linked with the polymorphism. The data gathered during my Master thesis show the fact that there actually occurs certain polyethism in a termite species with monomorphic soldiers – Prorhinotermes simplex (Isoptera: Rhinotermitidae). The experiments consisted in exposing the soldiers of the known age to an opponent in a form of heterospecific worker (Reticulitermes flavipes; also Rhinotermitidae) and shooting the repeated records of their defensive reactions. The soldiers were studied the day after moulting from the presoldier, then on the third, sixth and on the twelfth day of their age. The control samples comprised the same number of fully mature soldiers extracted from the same parental colony. The reactions to the opponent were classified into four types – retreat (U-turn from the opponent), ignoring

(no interest in the opponent), interest (antennal inspection of the opponent) and full-force attack, where the latter of the two are aggressive and the first two being rather passive. My results show that young soldiers are significantly less aggressive compared to mature soldiers, and they are becoming more aggressive as their age increases. More interestingly, two groups of soldiers can be defined based on behavioural reactions, namely the number of attacks and their impact on the opponents. While "cowards" attack less frequently and were not observed to kill the opponent, "braves" attack more often and inflict serious injuries resulting often in the death of Reticulitermes worker. My plan is to publish these results at the beginning of my Ph.D. studies in a leading behavioural journal, such as Animal Behaviour (IF=3.068).

Klíčová slova: termiti, vojáci, vojenské chování, agrese, polyethismus.

Keywords: termites, soldiers, soldier behaviour, aggression, polyethism.

Amazonina platystylata, opylující šváb

Amazonina platystylata, pollinating cockroach

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Abstract
Cockroaches are widespread insects, usually known as a pest, but they are definitely not considered to be typical pollinators. However, cockroaches could be found on the flowers quite often, there exist only a few cases when they play a role as a pollinators. First study which proves that cockroach is an important pollinator of plant is known from Borneo since 1997. Nowadays exists less than ten studies on cockroach-plant pollinating relationship. Vlasáková et al. (2008) described pollination relationship of dioecious shrub Clusia blattophila and cockroach Amazonina platystylata from Inselberg mountain in French Guyana. C. blattophila flowers are opened only during the night. However, flowers are often visited by crickets, flies and ants, it seems to be pollinated by A. platystylata only. Although cockroach A. platystylata is abundant in South America, pollinated plant clusia is strictly endemic for Inselberg rock savanna. Shrub C. blattophila is the only plant known to be pollinated by A. platystylata. In our research we aim at biology of A. platystylata and at the pollinator-plant relationship. As there are differences between male and female flower reward and smell production, there is also difference between insect species visiting male and female flowers. But obviously, flowers of both sexes must be visited by the same specimen, in order to successfully pollinate clusia shrub. We tested if cockroaches are able to make difference between male flowers with reward and female flowers without it through various scent. We tested their ability to find food marked by the flower scent and control food and their ability to

find food marked only by acetoin- the main smell compound- in compare to control.

Klíčová slova: šváb, Amazonina platystylata, opylování, klusie Clusia blattophila.

Keywords: cockroach, Amazonina platystylata, pollination, Clusia blattophila.

Denní a sezónní letová aktivita a výskyt druhu Eucnemis capucina Ahrens, 1812 (Coleoptera: Eucnemidae) v NPR Vrapač

Diurnal and seasonal flight activity and occurence of Eucnemis capucina Ahrens, 1812 (Coleoptera: Eucnemidae) in NNR Vrapač

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Abstract
The research was conducted as part of diploma and previously bachelor theses of the author. The aim of the thesis was to prove importance of Ash (Fraxinus excelsior) trees with cavities for abundance of saproxylic beetles with focus on Eucnemis capucina and diurnal and seasonal flight activity, sex ratio and size of individuals of this species. The research was conducted in NNR Vrapač on Ash trees with open stem cavities. The individuals were collected using passive trunk window traps placed in front of the opening of the stem cavity. Twelve trees were tested during years 2011, 2012 and 2013. The assortments of samples were done weekly from March to the end of October. In 2013 in order to observe diurnal flight activity the assortments of samples were done every hour since half of April until end of May. In total, 4071 specimen from 49 families have been collected. Substantial share of recorded families are saproxylic ones. Most individuals were collected on trees with stem perimeter over 300 cm. Four species from family Eucnemidae were present in the samples, including Eucnemis capucina which was represented by 254 individuals. This amount includes 113 males and 141

females. The sex ratio was statistically balanced (n=254, X2=3.09, p=0.08), lower amounts of males were collected on trees with lower stem perimeter probably as a result of lower temperatures or inappropriateness of respective trees for their development. The diurnal flight activity was from 7 am to 8 pm (max. 1 pm to 5 pm) which proves daytime activity of the species. Seasonal flight activity was from the end of April to the end of July with peak at the end of May and beginning of June. The size of collected individuals was from 3.64 to 6.40 mm, mean 5.20 mm (n= 57, σ= 0.65). No statistically significant difference in size between males and females was found (t-value=-0.01, p=0.99). Also the correlation between size of individuals and number of individuals captured on a given tree was proven to be statistically insignificant (min. p=0.28). The abundant occurrence of Eucnemis capucina was proven for Ash trees with cavities and high stem perimeter. Even low numbers of such trees can preserve high abundance and species diversity of not only saproxylic beetles including species filed in red lists. Based on the amount of collected individuals of Eucnemis capucina the NNR Vrapač is for this species the most important locality in Czech Republic and probably in the whole area of its occurrence.

Klíčová slova: Eucnemis capucina, letová aktivita, kmenová dutina, poměr pohlaví, nárazová past.

Keywords: Eucnemis capucina, flight activity, stem cavity, sex ratio, passive trunk window trap.

Stanovení citlivosti patogenů Leptosphaeria maculans a L. biglobosa k vybraným fungicidům

Determination of sensitivity of pathogens Leptosphaeria maculans and L. biglobosa to selected fungicides

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Abstract
In recent years, oilseed rape has become one of the most important crops in the world. Its largest producer is the European Union, followed by China. An important limiting factor for high yield of winter oilseed rape is fungal diseases. One of the most common fungal diseases is blackleg (phoma stem canker), whose causal agents are Leptosphaeria maculans and L. biglobosa. Due to the efforts of growers to achieve the best possible economic results, targeted protection of oilseed rape against this disease is an integral part of the growing technology. The most important protection method is chemical protection using fungicide agents. The aim of this thesis was to determine the sensitivity of the pathogens L. maculans and L. biglobosa to selected fungicides based on in vitro testing and MIC (minimum inhibitory concentration) determination of the fungicides. The first phase involved preparation of V8 agar culture medium for preservation and growth of the pathogens and the subsequent fungicide sensitivity/resistance testing. Five fungicides were tested (Horizon, Efilor, Pictor, Propulse and Prosaro). The determined MIC value of Horizon was 0.0125 % and it was used as the default value for further testing. The MIC value of Efilor, Propulse and Prosaro was determined to be between 0.0125 % and 0.025 %. Pictor showed MIC at the lowest concentrations of about 0.0015625%. The tests

have found that the pathogen had the highest sensitivity to fungicide Pictor. In contrast, the pathogen had the lowest sensitivity to Horizon. Other agents showed similarly very good efficiency. There was no statistically significant difference in sensitivity between the isolates of L. maculans and L. biglobosa and the inhibitory potencies of the fungicides were similar for both pathogens. No resistance to the tested fungicides was detected. Nevertheless, it can be pointed out, based on the obtained results, that there is a possibility of its development with commonly used antifungal substance tebuconazole (Horizon). In order to reduce the risk of resistance development, it is necessary to follow the correct principles of plant growing and anti-resistance strategies (alternating commonly and less commonly used pesticides etc.) in oilseed rape protection.

Klíčová slova: Leptosphaeria spp., fungicidní ochrana, minimální inhibiční koncentrace, in vitro testy účinnosti.

Keywords: Leptosphaeria spp., fungicidal protection, minimum inhibitory concentration, in vitro efficacy assays.

Publikace neprošla jazykovou úpravou. Za obsah příspěvků odpovídají jejich autoři.

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