2025

Aleš Eichmeier, Jana Čechová,
Kristýna Kříčková, Pavla Přinosilová (Eds.)

Trends in Horticulture and Landscape Architecture 2025

Collection of Scientific Conference Abstracts

MENDELU
Faculty
of Horticulture

Mendel University in Brno

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November 25, 2025
Lednice

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Conference Organizer
Faculty of Horticulture, Mendel University in Brno

Place and Date of the Conference
Lednice, November 25, 2025

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FOREWORD

Dear Readers and Conference Participants,
Just like in previous years, the Faculty of Horticulture at Mendel University in Brno is hosting a doctoral scientific conference titled „Trends in Horticulture and Landscape Architecture 2025“ this year. The conference is scheduled for November 25, 2025, under the patronage of the Dean, Prof. Ing. Patrik Burg, Ph.D., and it will be focus around the subject of Horticultural Engineering and Landscape Architecture.

We firmly believe that this scientific conference will provide doctoral students with the opportunity to showcase their research accomplishments, discover uncharted avenues for scientific and creative endeavours, and influence trends in their fields of interest in science, research, and creative activities. Simultaneously, the conference demonstrates the Faculty of Horticulture's commitment to supporting student-driven scientific initiatives, serving as a solid foundation for the future scientific and research pursuits of each institute. Looking ahead, we would be delighted if the conference's content also caters to master's degree students as potential candidates for doctoral studies at our faculty.

The primary objective of the conference is to present the latest findings from doctoral program dissertations, which not only contribute new knowledge but also enhance the overall understanding of the research undertaken by the participating authors, who are students in doctoral programs. The conference also carries an educational dimension by fostering the presentation skills of individual speakers, strengthening their capacity to respond to questions, and engage in professional discussions effectively.

The conference benefits greatly from expert discussions and the exchange of opinions and valuable information, all of which are enriched by being hosted at the Faculty of Horticulture. These dialogues also play a pivotal role in shaping the development of doctoral students and emerging scientific and creative minds across various realms of horticultural research. We extend our heartfelt gratitude to all those who organize and support students' research and creative work, as well as to those who serve as mentors, dedicating their time to the scholarly and artistic education of their students. Special thanks go to all those involved in the organization of this conference.

Conference Scientific Committee

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CONTENT

THE IMPACT OF VINE PRUNING METHODS ON PHYSIOLOGICAL DEVELOPMENT AND HEALTH CONDITION OF *VITIS VINIFERA*

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Abstract

In order to maintain and stabilize grape-growing conditions in Czech Republic, working with the vine itself is more crucial than working with the grape. Vine training systems can offer a comprehensive understanding of the conditions for grape cultivation, as much as natural protection strategy against external effects. Vine vigor and vitality, combined with variety and rootstock selection, can become a key factor for growers, particularly in the context of sustainable viticulture to the climate changes. This study refers about observing the development of both traditional and progressive vine training systems from abroad, followed by a comparison of the potential of these systems under South Moravian climate conditions, avoiding formal growing mistakes and utilizing advanced of pruning prophylaxis. The goal was to take part in special certified pruning courses, to transfer the knowledge into Czech viticulture practices. Afterwards, obtained knowledge was applied within local young and old vineyards. The outcomes indicate that newly established cordon vines achieve slightly better analytical results. However, older transformed cane-trained vines are physiologically weaker and more unstable, with high mortality rates due to pre-existing open wounds. The study also applies established viticultural principles by Simonit & Sirch, which are crucial for the modernisation and sustainability of vineyard management, especially with older vines. These principles provide a deeper understanding of the challenges in converting cane-trained vines and establishing young cordon vineyards.

Keywords: grapevine, training systems, cordon, Guyot, Simonit & Sirch

OPTIMIZATION OF THE NUTRITIONAL AND PHYTOCHEMICAL COMPOSITION OF MICROGREENS THROUGH BIOFORTIFICATION

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Abstract

Over a quarter of the global population suffers from nutrient deficiencies, including essential vitamins and minerals. Agronomic biofortification represents a potential approach to increase the nutrient content of plants without compromising yield or quality. Microgreens are naturally rich in minerals, phytonutrients, and both primary and secondary metabolites, including chlorophyll, beta-carotene, vitamins, and phenolic compounds, often showing higher concentrations compared to the same species at their mature growth stage. They may also serve as suitable candidates for agronomic biofortification. The dissertation focuses on the possibilities of agronomic biofortification of microgreens, with current research primarily oriented toward magnesium biofortification. The effects of different Mg concentrations across a broader spectrum of species are being evaluated in terms of both mineral and phytochemical composition and morphological parameters, with further experiments planned for iron, zinc, and ascorbic acid. The research also aims to identify new and promising species that could be suitable for cultivation as microgreens. To date, the composition of industrial hemp (Cannabis sativa L.) has been analyzed, including the determination of major phytocannabinoids. The evaluation included three cultivars of industrial hemp, along with purslane (Portulaca oleracea L.), evening primrose (Oenothera biennis L.), red clover (Trifolium pratense L.), and ribwort plantain (Plantago lanceolata L.). In the coming years, the research will focus on assessing the impact of light intensity and other environmental factors on the efficiency of agronomic biofortification.

Keywords: microgreens, agronomic biofortification, mineral and phytochemical composition, magnesium

YEASTS AS A BIOTECHNOLOGICAL TOOL FOR WINE ACIDITY MANAGEMENT

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Abstract

Climate change significantly affects grape quality and must composition. Rising temperatures accelerate ripening, increase sugar levels, and reduce organic acids, especially malic acid, resulting in wines with higher alcohol and lower acidity. This study evaluates the effect of three yeast strains (*Saccharomyces cerevisiae* – IONYS WF, MAURIVIN B, and ZYMAFLORE XORIGIN) on wine acidity in relation to the initial pH of the must. The results aim to verify the potential of selected yeasts as a biotechnological tool for controlling wine acidity and to support adaptation strategies of viticulture to ongoing climate change.

Keywords: wine yeast, acidity, fermentation, organic acids, climate change

EFFECT OF MICROCLIMATIC CONDITIONS OF THE HABITAT ON *VITIS VINIFERA*

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Abstract

The aim of this dissertation is to develop a vineyard microclimate model that enables a detailed characterization of spatial variability in temperature and humidity within different vineyard zones. The model will serve as a tool for optimizing the allocation of grapevine varieties and selecting suitable viticultural practices to mitigate the impacts of climate change on vine growth and grape quality. The experiment involves continuous monitoring of microclimatic parameters in selected vineyard sections and analysis of their relationship with grapevine phenological stages and bioclimatic indices. Riesling was chosen as a model variety due to its pronounced ability to reflect the specific characteristics of terroir. The resulting spatial model of vineyard microclimate will identify thermally and humidity-contrasting areas, providing a foundation for targeted vineyard management and supporting sustainable grape production under changing climatic conditions.

Keywords: vineyard, microclimate, temperature, humidity, variability

INFLUENCE OF ARBUSCULAR MYCORRHIZAL FUNGI ON GRAPEVINE VITALITY

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Abstract

Grapevine (*Vitis vinifera* L.) is an economically important crop whose health status significantly affects the quality and yield of the harvest. Due to increasing pressure to reduce chemical inputs in viticulture, biological solutions, including the use of arbuscular mycorrhizal fungi (AMF), are gaining importance. These symbiotic soil fungi enhance nutrient uptake, particularly phosphorus, promote plant growth, and may positively influence tolerance to abiotic and biotic stresses. The aim of this dissertation is to assess the effect of AMF on the growth, physiological status, and vitality of grapevine under controlled experimental conditions as well as in long-term field trials. Particular emphasis is placed on verifying the influence of AMF on the virulence of pathogens belonging to the GTD (Grapevine trunk diseases) complex, which represents one of the most serious biotic problems in viticulture. Within the study will be monitored physiological parameters of grapevines, the degree of AMF root colonization, the microbial composition of the rhizosphere, and the virulence of GTD pathogens such as *Diplodia seriata*, *Eutypa lata* and *Phaeoacremonium minimum.*

Keywords: AMF, biochar, grapevine, GTD, *Diplodia seriata, Eutypa lata*, *Phaeoacremonium minimum*

STUDY OF GRAPEVINE CULTIVAR RESISTENCE TO THE PATHOGEN *CADOPHORA LUTEO-OLIVACEA*

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Abstract

Grapevine trunk diseases (GTD complex) cause extensive damage to grapevines. The causal agents of GTD are found in the Basidiomycetes division, as well as among species of the *Botryosphaericeae, Diatrypaceae* families of fungi and also among species of the *Cadophora, Campylocarpon, Cylindrocarpon, Cylindrocladiella, Dactylonectria, Ilyonectria, Phaeoacremonium and Phaemoniella* genera*. Cadophora luteo-olivacea* (CLO) is classified as a causal agent of Petri disease and chiefly affects young vine plantings. There is currently no direct effective protection against fungal pathogens of the GTD complex, so it is important to seek effective measures to increase the resistance of grapevines through breeding methods. There is a large number of CLO isolates which have different virulence. In the spring of 2024, the selected isolate I1 obtained from tissu, was inoculated onto 18 grapevine varietes under the field conditions. In the fall of 2024, a symptomatic evaluation of the experiment was performed, RNA was extracted, and the presence of the CLO pathogen was detected in selected samples. The presence of the CLO pathogen was not confirmed.

Keywords: *Cadophora luteo-olivacea*, GTD complex, inoculation, pathogen detection, RNA extraction, symptomatology

THE INFLUENCE OF TECHNOLOGICAL OPERATIONS ON SELECTED PARAMETERS OF FRUIT WINE QUALITY

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Abstract

The aim of this thesis is to increase the quality and antioxidative capacity of fruit wine by different methods of aging. The methods consist of contact with yeast lees and wooden fragments separately of each other. Based on the results obtained, a recommendation will be devised for fruit wine finalization and aging technology. The expected results are a raise of antioxidative capacity and quality for both the contact with yeast lees and also wooden fragments.

Keywords: fruit wine, aging methods, yeast lees, wooden fragments, antioxidative capacity, wine quality

HORTICULTURAL CROPS AS A TOOL FOR SUSTAINABLE DEVELOPMENT IN DEVELOPING COUNTRIES

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Abstract

Mango underpins Guimaras Island's economy, yet intensifying climate change raises labour-intensive induction costs and compresses margins. The potential of integrating pitahaya as a climate-adaptation pathway aligned with sustainable development was assessed. 35 semi-structured interviews (2023–2025) with farmers and local authorities were triangulated with obtained statistics and thematically analysed. Mango remains prioritised, but climate risks and rising costs encourage diversification through alternative crops (mainly pitahaya). Climate stresses also expose constraints for pitahaya: moisture management for a cactus in humid tropics, ant and fungal outbreaks that drive chemical dependence and gaps in residue-compliance systems. Tree/post counts between years 2013-2023 (120,000 to 140,000 mango trees and pitahaya posts 0 to 7,000) indicate diversification rather than substitution.

Keywords: climate adaptation, crop diversification, smallholder horticulture, Philippines (Guimaras), mango–pitahaya systems

INFLUENCE OF THE MODIFIED SOIL ENVIRONMENT ON ESTABLISHMENT AND VITALITY OF TREES AFTER PLANTING

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Abstract

Newly planted urban trees encounter multiple stressors, including elevated summer temperatures, soil compaction, and limited water availability, which can reduce growth and survival. This study evaluates whether soil amendments and aeration treatments can improve the condition and resilience of young urban trees. Field experiments were conducted with model trees of *Prunus serrulata* in Brno and Znojmo, using two soil amendments: Hydrogel® and Endomyk Prof + Tri. Trees responses to the treatments are monitored through physiological parameters during the vegetation period. Soil moisture and temperature are continuously recorded to evaluate environmental effects on tree health and development. The research aims to assess how soil improvements influence growth, stress resilience, and adaptability of young urban trees. Findings are expected to support practical recommendations for sustainable urban forestry and effective management of green spaces.

Keywords: soil amendments, young urban trees, soil injection

CONDENSATION OF FERMENTATION GASES

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Abstract

Alcoholic fermentation of grape must is a complex biochemical process associated with the intensive production of fermentation gases, primarily carbon dioxide, which is currently regarded mostly as an undesired by-product. These gases entrain volatile metabolites formed during alcoholic fermentation in the medium—predominantly esters, higher alcohols, terpenes and other volatile compounds, especially ethanol. Condensation of these gases results in a liquid fraction – the condensate of fermentation gases – which authentically reflects the fermentative character of the medium and represents a still little-explored commodity as well as a valuable source of information on the dynamics of volatile compounds during fermentation.

The aim of this dissertation is to describe and quantify the composition of fermentation gas condensate over time and to evaluate the influence of selected alcoholic fermentation conditions. The research also focuses on the optimization of the condensation process itself, assessing its efficiency and economic feasibility. An integral part of the work is the proposal of possible applications of the obtained condensates, both in winemaking technology (e.g. re-incorporation of aromatic compounds) and in the broader food industry.

The expected contribution of the thesis is to provide a comprehensive understanding of the composition, evolution and dynamics of fermentation gas condensate in relation to specific fermentation conditions. The results may enhance the understanding of the mechanisms of formation and release of volatile aromatic compounds, support the optimization of fermentation and condensation technologies, and open pathways for practical utilization of this emerging resource.

Keywords: condensation, alcoholic fermentation, aromatic compounds

DEVELOPMENT AND TESTING OF SELECTIVE SORBENTS FOR SULFUR COMPOUNDS IN THE FLOW OF FERMENTATION GAS MIXTURE

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Abstract

The dissertation thesis deals with the development and testing of a sorbent for the chemisorption of sulphan, which is contained in a mixture of fermentation gases captured during the fermentation of a grape must.

The mixture of fermentation gases is a by-product of alcoholic fermentation of grape must. Yeast converts carbohydrates in the must into ethanol and carbon dioxide. In parallel with alcoholic fermentation, many volatile substances are also produced. The most concentrated volatile substances include mainly esters providing fruity aroma, higher alcohols supporting this fruity aroma, but also undesirable sulfur-based substances, the most important of which is sulphan. This causes the aroma of rotten eggs in wine.

A sorbent with the ability to partially or completely chemisorb sulfur compounds could solve this problem so that mixtures of fermentation gases are suitable for further use without the risk of deterioration.

The experiment is focused on testing individual variants of the sorbent. The most suitable variant is then applied to the fermentation gas capture technology in practice and fermentation gas samples are collected to evaluate the efficiency of the sorbent.

Keywords: fermentation gas, carbon dioxide, sorbents, sulfur compounds

STUDY OF THE MICROBIOME AND POLYPHENOLIC PROFIL OF GRAPE MUST AND WINE

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Abstract

The dissertation focused on the influence of vinification technologies and fermentation strategies on the microbiome, polyphenolic profile, and formation of biogenic amines in Sauvignon wines. The experiment comprised seven variants combining spontaneous and controlled alcoholic and malolactic fermentation under different methods of must and mash processing. Microbial populations were monitored using sequencing techniques, while wine composition was evaluated by LC-MS/MS, HPLC, and spectrophotometry. The analyses provided initial insights into the influence of fermentation strategy and technological processing on the chemical and microbiological composition of wines. The obtained data contribute to a deeper understanding of the interactions between microbial diversity and the chemical profile of wines.

Keywords: biogenic amines, LC-MS, fermentation strategy, winemaking technology

PERI-URBAN LANDSCAPE IN THE PLANNING SYSTEM

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Abstract

The project focuses on the analysis of the legislative, institutional, and economic framework shaping the transformation and management of peri-urban landscapes in the Czech Republic. It aims to identify planning tools such as spatial plans, landscape studies, and green infrastructure methodologies - relevant to transition zones between urban and rural areas, and to assess their impact on sustainable spatial development. The research includes the creation of a professional map depicting landscape structures around a medium-sized town, evaluating various land-use types and their interrelations. The outcomes will support the development of methodological guidelines for integrated planning and governance of peri-urban areas, enhancing ecological stability and sustainable urban-rural relations.

Keywords: peri-urban landscape, spatial planning, sustainable development, green infrastructure, landscape governance

IDENTIFICATION, INTERPRETATION AND POSSIBILITIES OF REGENERATION OF DESIGNED LANDSCAPE VRANOV, BÍTOV, CHLUMEC NAD CIDLINOU

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Abstract

The dissertation focuses on research into composed landscapes. The model areas are the Vranovsko-Bítovsko landscape heritage zone and the landscape of Chlumec nad Cidlinou. These are two different landscapes, with Chlumec nad Cidlinou being a geometrically composed landscape, Vranovsko a combined composition, and Bítovsko a purely idealized natural landscape. A separate composition was also identified near Nové Syrovice, which loosely connects to the Vranovsko-Bítovsko landscape heritage zone. Field surveys were completed as part of the research. Based on archival research, elements were identified in late 18th-century vedute depicting the composition of the Vranov landscape, and maps with expert content were produced. In cooperation with the National Heritage Institute, a workshop was organized for fifth-year landscape architecture students and a manuscript for a Jsc article was prepared.

Keywords: designed landscape, Vranov nad Dyjí, Bítov, Chlumec nad Cidlinou, heritage protection, interpretation, identification

INFLUENCE OF *BRETTANOMYCES* YEAST METABOLITES CONTENT ON THE SENSORY PERCEPTION OF WINE

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Abstract

This dissertation thesis focuses on *Brettanomyces* yeasts, particularly on their metabolites that influence the aromatic profile of wine. The literature review provides a detailed overview of *Brettanomyces* yeasts and the formation of their compounds. The experimental part will include both sensory and analytical examination of wines potentially infected by *Brettanomyces* yeasts. The aim is to determine the relationship between the actual concentration of these compounds and their sensory perception threshold in red wines (*Pinot Noir*, *Cabernet Sauvignon*, and *Blaufränkisch*). Analyses will be carried out using gas chromatography and FTIR spectroscopy. Under laboratory conditions, metabolites such as 4-ethylphenol, 4-ethylguaiacol, 4-ethylcatechol, and isovaleric acid will be added to wines in various concentrations. Sensory testing will determine at which concentration these compounds become perceptible and how they affect the aroma and overall acceptability of the wine.

Keywords: *Brettanomyces*, wine, aromatic profile, volatile phenols, yeast metabolites

POSSIBILITIES OF INFLUENCING THE PRODUCTION OF BIOGENIC AMINES IN RED WINES

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Abstract

Although the general mechanisms of biogenic amine formation in wine are well known, the specific influence of individual technological factors in practice remains insufficiently investigated. This dissertation focuses on studying four essential variables affecting the formation of biogenic amines in red wines: pH, the amount of yeast lees, the method of conducting malolactic fermentation, and storage temperature. The aim is to determine the influence of these parameters on the content of selected amines (monitored using LC–MS), such as histamine, tyramine, putrescine, and cadaverine, thereby contributing to the optimization of production processes with an emphasis on the quality and safety of the final product. The results may serve as a practical guide for winemakers as well as a foundation for further research in enology and food safety.

Keywords: wine, biogenic amines, malolactic fermentation

OPTIMIZATION OF ECOLOGICAL CULTIVATION OF FORCED CHICORY (*CICHORIUM INTYBUS* VAR. *FOLIUM*)

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Abstract

The dissertation focuses on verifying the effectiveness of biological and alternative methods of protecting chicory (*Cichorium intybus* var. *foliosum*) against key pathogens (e.g., *Phytophthora, Sclerotinia, Pseudomonas*) in laboratory and rapid testing conditions. Biopolymers and biocontrol microorganisms, either alone or in combination, will be selected for testing. Their effect on the health and yield of forced buds will be evaluated.

Keywords: chicory, *Cichorium intybus* var. *foliosum*, plant protection, biopolymers, biocontrol microorganisms

THE ROLE OF LANDSCAPE ARCHITECTURE IN PLANNING AND DESIGNING PEDESTRIAN CONNECTIONS IN CITIES – SAFETY AND PUBLIC HEALTH

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Abstract

This dissertation tests whether the quality pedestrian connections in cities can be evaluated more accurately by adding landscape-architecture criteria to existing methods. The research uses the Healthy Streets Approach, which evaluates streets through indicators of user experience and mobility performance but does not measure the spatial and environmental qualities that shape these perceptions. Landscape architecture directly influences these qualities through vegetation structure, microclimate regulation, storm-water-sensitive design and spatial clarity. The hypothesis is that including landscape-architecture criteria results in a more complete assessment of walkability, safety and health benefits. Ten pedestrian connections in Brno are selected to represent different street typologies, such as school routes, residential streets, high-traffic corridors and riverfront paths. First, each route is evaluated using Healthy Streets to create a baseline. A Landscape Architecture Index is then developed to capture missing spatial and environmental qualities, and the routes are re-evaluated using the combined HS + LA Index. The results are visualised in GIS, revealing where landscape interventions could improve pedestrian comfort, safety and health. The project produces two outputs: the HS + LA Index and a GIS evaluation layer for integration into Brno's Generel pěší dopravy.

Keywords: walkability, landscape architecture, healthy streets, pedestrian connections, urban public health

STUDY OF THE INFLUENCE OF SELECTED ROOTSTOCKS ON INFECTION BY ‚CANDIDATUS PHYTOPLASMA PRUNORUM' IN THE TISSUES OF APRICOT TREES

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Abstract

The dissertation examines the influence of apricot rootstocks on the presence and concentration of *'Candidatus Phytoplasma prunorum'* in plant tissues. One of the aims is to monitor seasonal changes in phytoplasma concentration to better understand infection dynamics, with the experiment conducted within the internal grant agency project. The experiment includes the species *P. armeniaca*, *P. salicina*, *P. domestica* and *P. persica*. Samples were collected monthly from annual shoots, one year old shoots, and roots to assess phytoplasma distribution in different plant parts. DNA was extracted from phloem tissue, and the concentration of *'Ca. P. prunorum'* was determined by absolute quantification using real-time PCR. The results will contribute to the identification of species taht can be used as rootstock that may limit phytoplasma spread.

Keywords: *Candidatus Phytoplasma prunorum*, apricot, rootstock, real-time PCR

PARAMETRIC MODELLING IN LANDSCAPE PLANNING: A DATA-DRIVEN APPROACH TO THE OPTIMIZATION OF ADAPTATION MEASURES IN THE LANDSCAPE

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Abstract

The dissertation addresses the potential of parametric and data-driven modelling to support environmental performance assessment in the early stages of landscape and urban design. It investigates how selected environmental parameters — such as water retention, climatic exposure or vegetation-related effects — can be computationally evaluated and integrated into design workflows. The research builds on existing digital modelling platforms and examines their applicability beyond building design towards landscape architecture and open space planning. The aim is to analyse current modelling approaches, propose a framework for parametric evaluation of a selected environmental metric, and test its relevance on a case study.

Keywords: parametric modelling, landscape planning, environmental performance, Grasshopper, data-driven design

EVALUATION OF AQUACULTURE-DERIVED ORGANIC FERTILIZERS FOR INDOOR BASIL PRODUCTION

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Abstract

Global greenhouse production of vegetables and herbs largely relies on mineral fertilizers. However, these nutrients are finite — for example, phosphorus depends on the mining of non-renewable mineral resources. Therefore, it is essential to find strategies to efficiently reuse and recycle phosphorus already present in ecosystems for sustainable food production. Over the past year, two studies have been conducted focusing on nutrient recirculation and recycling from aquaculture in indoor basil cultivation. The first study examined the dynamics of macronutrients (N, P, K) in subsystems of coupled aquaponic systems to better understand the balance between the fish-rearing and plant-growing components. Two model coupled aquaponic systems were compared. The second study evaluated basil growth under indoor conditions using mineralized fish waste (variant FEM). Plants grown with FEM showed lower (-19.5 %) above-ground fresh biomass compared to the standard hydroponic solution (HYDRO). However, the 50:50 mixture of FEM and HYDRO (MIX) achieved comparable results to HYDRO. Additionally, basil grown with mineralizate showed significantly higher root biomass when compared to HYDRO (+ 13.8 %), suggesting the presence of growth-promoting substances or microorganisms. Fluorescence in situ hybridization staining confirmed higher abundance of *Azospirillum* and *Bacillus* species, known as plant growth-promoting bacteria (PGPB).

Keywords: fish sludge, nutrient recovery, organic biostimulant

STUDY AND CRITICAL EVALUATION OF ARCHIVAL SOURCES ON THE HISTORICAL DEVELOPMENT OF THE LEDNICE CHATEAU PARK

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Abstract

The subject of the dissertation is the evaluation of already acquired materials mapping the historical development of the Lednice Chateau Park, as well as their further supplementation through as-yet unexplored written sources. According to the working hypothesis, it can be expected that this will make it possible to supplement the missing information concerning the motivation and decisions of the ruling Princes of Liechtenstein regarding the garden modifications around the chateau. In the first phase, a large amount of already collected maps and visual materials is systematically sorted. In the next step, archival research will be carried out. The period of interest is 1700–1850, when two stylistically very different garden compositions were created here: the older formal Classicist garden and the later Romantic landscape composition, representing the English-style natural park in the Czech lands.

Keywords: landscape architecture, historical object of landscape architecture, Lednice chateau park, development of Lednice chateau park

NANOPARTICLES ENHANCE IN VITRO MICROPROPAGATION OF OLIVE (*OLEA EUROPAEA* L.): PRELIMINARY OBSERVATIONS ON CULTIVARS, GALEGA VULGAR‘ AND ‚FRANTOIO‘

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Abstract

In vitro micropropagation of olive (*Olea europaea* L.) is limited by genotype-dependent responses, slow proliferation, and high cytokinin costs. This study tested the effect of silicon dioxide (SiO_2NPs) and copper oxide nanoparticles (CuONPs) on shoot multiplication under reduced zeatin in cultivars ‚Galega vulgar‘ and ‚Frantoio‘. Single-node explants were cultured on Rugini medium with zeatin (1.5–0.5 mg L^{-1} for ‚Galega vulgar‘; 3.0–1.0 mg L^{-1} for ‚Frantoio‘) and nanoparticles (SiO_2NPs 0–50; CuONPs 0–20 mg L^{-1}) through three cycles. In ‚Galega vulgar‘, 50 mg L^{-1} SiO_2NPs at 1.0–1.5 mg L^{-1} zeatin yielded the highest average number of nodal segments per explant. In ‚Frantoio‘, 20 mg L^{-1} CuONPs or 25 mg L^{-1} SiO_2NPs at 3.0 mg L^{-1} zeatin produced values comparable to the control. Reducing zeatin by one-third did not significantly affect multiplication, indicating about 33 % lower cytokinin costs.

Keywords: olive, zeatin, shoot multiplication, nanoparticles

INDOOR PLANTS AND THEIR USE IN VERTICAL GARDENS

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Abstract

The dissertation focuses on the issue of interior „vertical gardens," which represent a modern and attractive way of complementing interiors with live plants that have a positive impact on the quality of the environment and human health. The aim of the thesis is to collect relevant literary sources, analyze key concepts related to indoor plant cultivation, and describe historical and contemporary forms of interior plant use, with an emphasis on their integration into vertical gardens. It also focuses on the typology of vertical gardens in relation to the technologies used. The thesis maps the current state of vertical gardens in the Czech Republic and abroad and provides a critical analysis, particularly from the perspective of their maintenance and long-term life expectancy. The experimental part uses selected existing vertical gardens for an empirical evaluation of the issue under investigation. The results will be summarized in a methodology focused on the effective use of interior plants in vertical gardens in public and private interiors.

Keywords: interior design, indoor plants, vertical gardens

THE STUDY OF POMOLOGICAL TRAITS AND GENETIC VARIABILITY OF THE SERVICE TREE (*SORBUS DOMESTICA)*

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Abstract

The service tree (*Sorbus domestica L.*) is a rare and underutilized fruit species valued for its high nutritional quality, ecological resilience, and better adaptability to dry, warm climates. This research evaluates the pomological and biochemical traits of various *S. domestica* genotypes. Morphological traits of leaves and fruits were assessed using official descriptor, while biochemical analyses of fruits focused on, for example, total phenols and antioxidant capacity. The next phase will focus on genetic diversity analysis using SSR markers, with potential marker transferability explored from related *Rosaceae* species such as apple (*Malus domestica*).

Keywords: *Sorbus domestica*, pomological traits, biochemical composition, SSR markers

MANAGEMENT OF NUTRITION DURING SECONDARY FERMENTATION

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Abstract

The dissertation thesis examines the influence of nutrition, to be more precise individual amino acid during the secondary alcohol fermentation of sparkling wine made using the traditional method. The literature search consists of a detailed review of the anorganic nutrition in the form of ammonia and organic nutrition, particulary amino acid and their impact on metabolism during fermentation and production of side products. In the experimental part was comparted use of individual ten amino acids - phenylalanine, valine, alanine, serine, glutamic acid, arginine, aspartic acid, leucine, isoleucine, threonine and check in form ammonia and complex of all amino acids in commercial organic nutrition. Their influence was comparted of production ethanol, higher alcohol, esters and kinetics of AF related to pressure in bottles. The result showed differences in kinetics of AF, speed of metabolism of sugar, and different total pressure in each variant.

Keywords: secondary fermentation, wine nutrition, amino acid, sparkling wine

SUSTAINABILITY OF THE HERBACEOUS LAYER IN PUBLIC SPACES

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Abstract

The dissertation evaluates the applicability and sustainability of the herbaceous layer in public spaces within selected municipalities of the Hustopeče and Mikulov bioregions, located in the Pannonian region, which represents one of the warmest areas of the Czech Republic. The study analyses the distribution, establishment methods, maintenance practices, and costs of herbaceous vegetation elements funded from public sources in the model municipalities of Kostice, Lednice, and Podivín. The research is based on direct field observation of individual planting beds. The main objective is to use the monitored parameters to assess the persistence of perennial species and their suitability for ornamental mixed flower beds situated in public areas of municipalities. Expected results include the identification of drought-tolerant taxa, optimization of planting and maintenance techniques, and the development of recommendations for sustainable landscape design in urban environments.

Keywords: xerophytic herbace, sustainability, perennial beds, public space

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