



Mendel University in Brno

Collection of scientific conference abstracts

Trends in Horticulture and Landscape Architecture 2023

Aleš Eichmeier, Jana Čechová, Kristýna Kříčková

November 21, 2023

Lednice

Conference organizer:

Faculty of Horticulture, Mendel University in Brno

Place and date of the conference: Lednice, November 21, 2023

Scientific Committee:

prof. Ing. Patrik Burg, Ph.D. - chair
doc. Mgr. Miroslav Baránek, Ph.D.
Ing. Barbora Dohnalová, Ph.D.
doc. Dr. Ing. Alena Salašová
Ing. Aleš Eichmeier, Ph.D.
doc. Ing. Petr Kučera, Ph.D.
prof. Ing. Robert Pokluda, Ph.D.
doc. Ing. Barbara Ševčíková, Ph.D.
doc. Dr. Ing. Petr Salaš
Ing. Jozef Sedláček, Ph.D.
prof. Ing. Pavel Šimek, Ph.D.
prof. Ing. Mojmír Baroň, Ph.D.
prof. Ing. Roman Gálik, Ph.D. - TF SPU Nitra
Ing. Barbora Badalíková – Research Institute for Fodder Crops, spol. s r.o. Troubsko
prof. dr hab. inž. Edward Kunicki – Faculty of biotechnology and horticulture, UR Krakov
dr hab. inž. Monika Bieniasz, prof. – Faculty of biotechnology and horticulture, UR Krakov

Organizing Committee:

Ing. Jana Čechová, Ph.D.
Ing. Aleš Eichmeier, Ph.D.
Ing. Kristýna Kříčková
Ing. Kateřina Štůsková
Ing. Lucie Frejlichová
Tahseen Chikte
Sana Saleem, MSc.
Ing. Marie Zahrádková
Bc. Josef Knézlík
Ing. Pavel Čech

Address of the Organizing Committee:

Faculty of Horticulture MENDELU in Lednice, Dean's Office, Scientific Department, Valtická 337, 691 44 Lednice, Czech Republic

Contact:

Ing. Kristýna Kříčková
e-mail: kristyna.krickova@mendelu.cz
tel.: +420 519 367 222

Editor of the collection: Aleš Eichmeier, Jana Čechová, Kristýna Kříčková

Publisher: Mendel University in Brno

Notice:

Contributions have not been reviewed, the authors are responsible for their content and formal correctness.

Acknowledgments:

This collection was published with the support of the IGA project with the designation IGA – ZF/2023 – KONF002 entitled "Trends in horticulture and landscape architecture 2023".

ISBN 978-80-7509-948-8

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 2023" this year. The conference is scheduled for November 21, 2023, under the patronage of the Dean, Prof. Ing. Patrik Burg, Ph.D., and it will center 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 endeavors, 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

● MENDELU
● Faculty
● of Horticulture
●



CONTENT

Botek, P. THE EFFECT OF LIGHT SPECTRAL COMPOSITION ON COMPOUND IN VEGETABLE SPECIES	5
Dočekalová, H. SUBSTANCE COMPONENTS AND ORGANOLEPTIC PROPERTIES OF ABSINTHE	7
Ferby, V. USABILITY OF ALTERNATIVE SUBSTRATES IN THE HYDROPONIC SYSTEM OF VEGETABLE PRODUCTION	8
Fiala, J. COMPARISON OF A SELECTED ASSORTMENT OF ASIAN PEAR VARIETIES AND PEAR HYBRIDS	9
Franková, Š. USE OF BIOSTIMULATION ALGAE TO SUPPORT PLANT GROWTH IN THE HYDROPONIC SYSTEM	10
Hádlík, M. INCREASING THE EFFICIENCY OF GRAPEVINE BREEDING BY USING DNA MARKERS LINKED TO GENES FOR RESISTANCE TO FUNGAL DISEASES	11
Humaj, J. STUDY OF FERMENTATION GASES DURING THE FERMENTATION OF GRAPE MUST	12
Kohoutková, K.	

THE IMPACT OF TOURISM ON LANDSCAPE CHARACTER AND SUSTAINABLE DEVELOPMENT	13
Kulhánková, M. STUDY OF THE INFLUENCE OF TECHNOLOGICAL OPERATIONS ON OXYGEN CONSUMPTION DURING WINE PRODUCTION	14
Mikuš, J. CHANGING IN WINE THE COMPOSITION DURING THE AGING ON YEAST LEES	15
Řihák, Z. HYPEROXYGENATION OF GRAPE MUST IN WINEMAKING PROCESS	16
Saleem, S. EXPLOITATION OF BENEFICIAL MICROORGANISMS IN VEGETABLE CROPS	17
Seriš, D. TRAINING OPERATIONS IN THE PRODUCTION OF ALCOHOLIC BEVERAGES OF THE CIDER TYPE	18
Štůsková, K. THE INHIBITORY EFFECT OF <i>SACCHAROTHRIX</i> ISOLATES AGAINST GRAPEVINE TRUNK DISEASE PATHOGENS	19
Šulík, M. EVALUATION OF TERROIR CONDITIONS AND VINEYARD MANAGEMENT DURING THE CULTIVATION OF WELSCHRIESLING	20
Chikte, T. AN OVERVIEW OF THE PRODUCTION OF VEGETABLES WITH LOW OR NO PESTICIDE RESIDUES	21
Trempetic, G. STUDY OF THE PRIMARY AND SECONDARY METABOLITES OF STONE FRUIT TREES INFECTED WITH ' <i>CANDIDATUS PHYTOPLASMA PRUNORUM</i> '	22
Urban, V. OPTIMIZATION OF THE LANDSCAPE STRUCTURE OF THE CZECH REPUBLIC IN THE CONTEXT OF CLIMATE CHANGE	23
Vavřiník, A. COMPOSITION OF THE MICROBIOME IN VINEYARDS AND ITS CHARACTERISATION IN RELATION TO SOIL CONDITIONS	24
Vrána, P. EFFECT OF TEMPERATURE ON GRAPEVINE PHENOLOGICAL DEVELOPMENT IN THE 2023 YEAR	25

THE EFFECT OF LIGHT SPECTRAL COMPOSITION ON COMPOUND IN VEGETABLE SPECIES

Botek, P.

Mendel University in Brno, Faculty of Horticulture, Department of Vegetable Growing
and Floriculture, Valtická 337, 691 44, Lednice, Czech Republic, xbotek@mendelu.cz

Abstract

Plants of lettuce and basil species were examined within controlled environment conditions. Firstly, the effect of short UV–A region wavelengths (343, 367, 385 and 402 nm) on lettuce organic acid (ascorbic acid, gallic acid and quercetin) assimilation was evaluated. Secondly, the effect of nine spectral compositions (WW, CW, R, B, FR) on basil and lettuce antioxidant capacity, nitrate accumulation and chlorophyll content was examined. Low lighting intensities induced nitrate accumulation in lettuce to 3746 mg/kg. The highest organic acid content was observed with 385 and 402 nm, decreasing with other variants of higher and lower wavelengths. Lower light intensity of 45 $\mu\text{mol}/\text{m}^2/\text{s}$ caused increase in chlorophyll *a* and *b* content of 6333 and 3648 mg/kg respectively. The spectrum with missing green colour had significantly lower antioxidant capacity compared to other variants with 1091 and 2064 ($p>0,05$) in basil. Low light intensities induce nitrate accumulation in basil 4069 and 4345 mg/kg with 139 and 45 $\mu\text{mol}/\text{m}^2/\text{s}$ respectively. Short wavelengths of 385 and 402 nm improved secondary metabolite assimilation in lettuce. Most important light factor of nitrate accumulation was shown to be the lighting intensity within both basil and lettuce. Green colour wavelengths play an important role in antioxidant capacity ability of basil plant.

Keywords: light spectrum, substances content, lettuce, basil

SUBSTANCE COMPONENTS AND ORGANOLEPTIC PROPERTIES OF ABSINTHE

Dočekalová, H.

**Mendel University in Brno, Faculty of Horticulture, Department of Post-Harvest
Technology of Horticultural Products, Valtická 337, 691 44, Lednice, Czech Republic,
xdoceka3@mendelu.cz**

Abstract

Absinthe, an alcoholic beverage renowned for its aniseed bittersweet flavor, herbal bouquet, and elevated alcohol content ranging typically between 45 % and 80 % by volume, is primarily composed of the revered "holy trinity" of botanicals, namely wormwood, anise, and fennel. This study involved the production of macerates and distillates from these botanicals for comprehensive analysis. The research delved into the suitability of various wormwood species (wormwood, pontine wormwood, black wormwood) for macerate production, aiming to discern which species exhibited optimal material composition and organoleptic attributes. Monitoring substance component concentrations within macerates was conducted across varying ratios of the three botanicals and diverse herb-to-alcohol proportions, encompassing distillation and subsequent secondary maceration phases. Furthermore, the study scrutinized alterations in color and macerate composition over a one-year period, as influenced by storage conditions. The research also investigated the influence of the conditions on the degree and stability of the emulsion in the beverage during its serving. The final segment of this investigation focuses on sensory evaluations of the macerates, considering the correlation between flavor and aromatic substance content.

Key words: absinthe, wormwood, anise, fennel

USABILITY OF ALTERNATIVE SUBSTRATES IN THE HYDROPONIC SYSTEM OF VEGETABLE PRODUCTION

Ferby, V.

Mendel University in Brno, Faculty of Horticulture, Department of Vegetable Growing and Floriculture, Valtická 337, 691 44 Lednice, Czech Republic,
vojtech.ferby@mendelu.cz

Abstract

In the hydroponic vegetable growing system, mineral wool and coconut shell substrate are the most used substrates. Due to their ecological burden on the environment, carbon footprint and the impossibility of recycling in the case of mineral wool, it is necessary to look for alternatives that meet the conditions of sustainability, circularity and the ability to achieve the same or higher vegetable yields. To meet the objective, a series of experiments was carried out with a model crop of lettuce and cucumber. The use of wood fiber and sand can be considered for growing lettuce. Substrates tested in the main cucumber cultivation experiment include wood fiber, two types of sheep's wool, hemp fiber and moss substrate. The yield of cucumbers grown in wood fiber was 10.8 % higher than in mineral wool and 5.2 % lower than in coconut substrate. The yield of cucumbers in other substrates was lower by 8.5-47.3 % compared to mineral wool.

Key words: hydroponics, substrate, sustainability, lettuce, cucumber

COMPARISON OF A SELECTED ASSORTMENT OF ASIAN PEAR VARIETIES AND PEAR HYBRIDS

Fiala, J.

Mendel University in Brno, Faculty of Horticulture, Department of Fruit Growing,
Valtická 337, 691 44, Lednice, Czech Republic, jonas.fiala@mendelu.cz

Abstract

The thesis is based on a comprehensive evaluation of the pear assortment. Specifically, 22 Asian varieties, 10 European, 4 interspecific hybrids and 24 new hybrids from the production of the Department of Fruit Growing. The evaluation of the phenophases focuses on the onset of budburst, flowering, the ripening period and the period of leaf fall. Growing and pomological traits are expressed using valid descriptors or in metric units. A number of quality parameters and compounds are evaluated in laboratory analyses. As expected, whether in terms of agrotechnical requirements or fruit characteristics, several new hybrids and varieties in the assortment have outstanding potential for cultivation in our conditions or for further breeding. At the same time, some genotypes have proved to be clearly unsuitable, in particular because of their very unsatisfactory sensory characteristics or their strong tendency to overbearing.

Keywords: *Pyrus*, pear, pomology, fruit quality, phenology

USE OF BIOSTIMULATION ALGAE TO SUPPORT PLANT GROWTH IN THE HYDROPONIC SYSTEM

Franková, Š.

Mendel University in Brno, Faculty of Horticulture, Department of Vegetable Growing and Floriculture, Valtická 337, 691 44, Lednice, Czech Republic, xkubick9@mendelu.cz

Abstract

The benefit of the experiment is the possibility of extending the protection of plants and strengthening their physiological state in a natural way. The content of the work is to verify the possibilities of using freshwater algae with stimulating and protective effects on specific types of vegetables when grown in a hydroponic nutrient solution system, where the emphasis is on ecological and sustainable cultivation. In the last 3 years, freshwater algae (*Chlorella* sp.) have been applied to lettuce varieties in the hydroponic unit with a focus on ensuring the strengthening of the root system, as a prevention against potential pathogenic fungi, and also algae that allow the action of stimulating substances (hormones) to improve plant growth parameters. Water from the system was continuously tested, where values of NH₄, NO₃, PO₄, K, NO₂, Ca, Mg, pH and EC were measured. During the experiment, it was found that it is ideal to separate the cultivation of the algae and the use of the nutrient solution. And a great benefit of the testing was the finding that the best form of application of the algae *Chlorella* sp. is a common watering when using plant cultivation in the substrate. When applying algae in hydroponics, it is advantageous to use algae extract. The aim of the work is also to find out whether other freshwater algae can be successfully propagated in the hydroponic environment. A fundamental aspect of the project is the possibility of economic cost savings associated with algae cultivation.

Keywords: hydroponics, *Chlorella* sp., biostimulation, algae

INCREASING THE EFFICIENCY OF GRAPEVINE BREEDING BY USING DNA MARKERS LINKED TO GENES FOR RESISTANCE TO FUNGAL DISEASES

Hádlik, M.

Mendel University in Brno, Faculty of Horticulture, Mendeleum - Institute of Genetics,
Valtická 334, 691 44, Lednice, Czech Republic, martin.hadlik@mendelu.cz

Abstract

The dissertation is focused on interspecific grapevine genotypes harboring resistant loci (R-loci) to the pathogen *P. viticola*. Initially, selected genotypes originating from breeding in Czech Republic were analysed for the presence of important R-loci. This analysis revealed, that many of them are comparable in number of R-loci to other international hybrids. During these analyses, a group of 3 genotypes harboring Rpv12, Rpv12+1, Rpv12+1+3 was selected and used in transcriptomic experiment. The resulting bioinformatic evaluation revealed significantly higher gene expression in the genotype with three R-loci in the genome. A higher expression of compounds synthesized by the plant pathogen infection was also revealed, such as: monooxygenases, cystatins or aspartic acid protease inhibitors. Simultaneously, additional experiment focused on the possibility of long-term preservation of *P. viticola* spores in different temperature conditions was established. An inoculum is created from the spores at regular intervals and using real-time PCR, their mortality is currently evaluated.

Keywords: grapevine, resistance, *P. viticola*, transcriptomics, long-term preservation

STUDY OF FERMENTATION GASES DURING THE FERMENTATION OF GRAPE MUST

Humaj, J.

Mendel University in Brno, Faculty of Horticulture, Department of Viticulture and Oenology, Valtická 686, 691 44, Lednice, Czech Republic, xhumaj@mendelu.cz

Abstract

During alcoholic fermentation, a considerable amount of CO₂ is produced, and the stream of carbon dioxide can strip aromatic substances from the fermenting must. Aroma losses during fermentation can be significant and may lead to a reduction in wine quality. This project is focused on new fermentation gas capture technology. In the experiment, gas was captured during the fermentation of sauvignon blanc must. The concentration of individual volatile compounds in the fermentation gas was determined using gas chromatography, and the highest values were achieved by isoamyl acetate, isoamyl alcohol and ethyl decanoate. Ethyl dodecanoate achieved the lowest values of the investigated volatile substances. For sensory assessment, quantitative descriptive analysis (QDA) compared water carbonated with fermentation gas and water carbonated with commercial carbon dioxide for food purposes. Quantification of fermentation gas capture was also performed.

Key words: Carbon dioxide, Carbonation, Volatile substances

THE IMPACT OF TOURISM ON LANDSCAPE CHARACTER AND SUSTAINABLE DEVELOPMENT

Kohoutková, K.

**Mendel University in Brno, Faculty of Horticulture, Department of Landscape
Architecture, Valtická 686, 691 44, Lednice, Czech Republic,
kristynakohoutkova@mendelu.cz**

Abstract

This work aims to compare various approaches to landscape planning and landscape protection and their effectiveness in different wine regions. The landscape in the wine region has specific cultural features that make the landscape very attractive to tourists. However, high tourist pressure can negatively impact landscape character and landscape values. The study compares three wine regions in the Czech Republic and Germany and looks for factors that determine the attractiveness and impact of tourism. The work examines landscape recreational potential, tourism pressure and development of the built-up area. Moreover, the work also studies the impact of landscape structure on human perception and preference.

Key words: landscape character, landscape recreational potential, wine regions, urbanisation, tourism

STUDY OF THE INFLUENCE OF TECHNOLOGICAL OPERATIONS ON OXYGEN CONSUMPTION DURING WINE PRODUCTION

Kulhánková, M.

**Mendel University in Brno, Faculty of Horticulture, Department of Viticulture
and Oenology, Valtická 686, 691 44, Lednice, Czech Republic, xkulhan4@mendelu.cz**

Abstract

The dissertation thesis with the influence of technological operations on oxygen consumption during wine production. The literature search consists of a detailed review of the substances reacting with oxygen and the effect of oxygen on the chemical composition of wine. In the experimental part, two technologies were compared - the use of yeast lees and coarse filtration immediately after fermentation, in inert vessels and wooden barrels. The amount of dissolved oxygen was measured and the amount of substances related to wine oxidation such as total phenols, SO₂, iron and copper ions were determined. The results of all three consecutive vintages showed a higher antioxidant activity in wines with yeast lees, as well as a higher resistance to oxygen supply and a lower SO₂ requirement. In the case of the use of yeast lees in inert containers, it was possible to reduce the total SO₂ dose by up to 25%.

Key words: oxygen, wine oxidation, yeast lees, phenolic compounds

CHANGING IN WINE THE COMPOSITION DURING THE AGING ON YEAST LEES

Mikuš, J.

Mendel University in Brno, Faculty of Horticulture, Department of Viticulture
and Oenology, Valtická 686, 691 44, Lednice, Czech Republic, xmikus@mendelu.cz

Abstract

The dissertation deals with the influence of yeast autolysis and their subsequent impact on the composition of still wine. The experiment compares the technology using yeast sludge in wooden barells and no yeast sludge in inert containers. Total polyphenols, total aminoacids, carbonyl coumpounds, single higher fatty acids, higher alcohols were determined. Experimental results showed many times higher amount of aminoacids, higher alcohols and higher fatty acids for the variant in wooden barrels with yeast lees. Sensory analysis has shown that wines aged with no yeast lees in inert container are lighter, fresher, emptier.

Key words: yeast lees, aminoacids, higher alcohols

HYPEROXYGENATION OF GRAPE MUST IN WINEMAKING PROCESS

Řihák, Z.

Mendel University in Brno, Faculty of Horticulture, Department of Viticulture and Oenology, Valtická 686, 691 44, Lednice, Czech Republic, xrihak2@mendelu.cz

Abstract

The dissertation thesis is focused on the hyperoxidation of grape musts during the production of white wines with the aim of applying this pre-fermentation operation in practice. The basis of the experiment is the enzymatic oxidation of phenolic compounds in grape must using pure oxygen. The investigation of different concentrations and composition of phenolic substances is the main object of the work. The entry of oxygen into the must also affects the composition of aromatic substances in the resulting wine. The analysis of volatile substances prove again similar differences between the variants of the experiment. Sensory analysis of the resulting wines did not reveal a negative effect of must hyperoxidation on the selected variety.

Key words: oxygen, enzymatic oxidation, phenolic compounds, volatile compounds

EXPLOITATION OF BENEFICIAL MICROORGANISMS IN VEGETABLE CROPS

Saleem, S.

Mendel University in Brno, Faculty of Horticulture, Department of Vegetable Growing and Floriculture, Valtická 337, 691 44, Lednice, Czech Republic, xsaleem@mendelu.cz

Abstract

The most promising approach to crop protection, environmentally safe farming practises, and sustained agricultural output is the utilisation of beneficial microorganisms. The purpose of the experiment was to look into how *Serendipita indica* affected the cabbage growth and development as well as the occurrence of black rot disease. The experiment also included *in vitro* study of effect of *S. indica* on pathogens like *Alternaria brassicicola* and *Xanthomonas campestris*. *S. indica* indicated a beneficial effect on plant development and growth, as well as a decrease in the severity of disease. Furthermore, no antagonistic impact of *S. indica* on *Alternaria brassicicola* and *Xanthomonas campestris* was seen, under *in vitro* test indicating indirect suppression of the disease by *S. indica*.

Keywords: *Serendipita indica*, biotic stress, *Alternaria brassicicola*, *Xanthomonas campestris*

TRAINING OPERATIONS IN THE PRODUCTION OF ALCOHOLIC BEVERAGES OF THE CIDER TYPE

Seriš, D.

**Mendel University in Brno, Faculty of Horticulture, Department of Post-Harvest Technology of horticultural Products, Valtická 337, 691 44, Lednice, Czech Republic,
xseris@mendelu.cz**

Abstract

Apple cider is a low-alcohol beverage made from apple juice. The alcohol content of this drink is usually between 5 and 6 % vol. The low alcohol content and high pH are some of the reasons why this drink does not have as long a shelf life as wine. The first part of this study deals with the effect of clarifiers on the chemical composition and sensory profile of apple cider. Eight clarifiers were tested and their influence on the antioxidant capacity, total polyphenols, selected polyphenols and turbidite was investigated in order to assess which clarifier is the most effective and has the least influence on the quality of the cider. The research in the second phase deals with the use of sulphur dioxide, lysozyme enzyme and pure yeast culture as supporting agents to optimize the technological process of production. The effect of these preparations during the maturation of cider is being monitored. The final segment of the research focuses on sensory evaluation with emphasis on the flavor and aromatic substances between samples.

Key words: cider, clarifiers, lysosyme, sulphur dioxide

THE INHIBITORY EFFECT OF *SACCHAROTHRIX* ISOLATES AGAINST GRAPEVINE TRUNK DISEASE PATHOGENS

Štůsková, K.

Mendel University in Brno, Faculty of Horticulture, Mendeleum – Institute of Genetics,
Valtická 334, 691 44, Lednice, Czech Republic, katerina.stuskova@mendelu.cz

Abstract

Grapevine trunk diseases (GTD) cause serious damage that harms grape production. Research is concentrated on a preventive strategy for protecting grapevines against GTD, with a specific emphasis on the treatment of grapevine seedlings using a beneficial *Saccharothrix* bacteria. In an *in vitro* test conducted on Petri dishes, three *Saccharothrix* bacterial isolates (SAR, SAL, and SES) exhibited inhibitory effects against GTD pathogens. In the *in planta* test conducted on grapevine seedlings, the bacterial isolate SES demonstrated the most pronounced inhibitory effect. Additionally, pathogens were re-isolated from the tested seedlings, and DNA and RNA were extracted from the roots and wood of these seedlings. This genetic material will be subsequently employed for metagenomic analysis of the fungal community and gene expression analysis of specific genes linked to grapevine defense mechanisms.

Key words: grapevine, *Saccharothrix*, GTD, inhibitory effect

EVALUATION OF TERROIR CONDITIONS AND VINEYARD MANAGEMENT DURING THE CULTIVATION OF WELSCHRIESLING

Šulík, M.

Mendel University in Brno, Faculty of Horticulture, Department of Viticulture and Oenology, Valtická 686, 691 44, Lednice, Czech Republic, xsulik@mendelu.cz

Abstract

The dissertation deals with the influence of natural conditions on the cultivation of Welschriesling in the Pálava region, specifically in the village of Perná. The experiment takes place in six different vineyards (one of the vineyards is divided into two parts, due to the large height difference), the microclimate in the vineyards is investigated using data loggers that measure temperature and relative humidity every fifteen minutes. These stations are located directly in the leaf wall of the vine. In one vineyard there is also a weather station that provides measurements at a height of 30, 60, 90, 120, 150 and 200 cm above the ground. Furthermore, the microbial diversity of soil and grapes from these vineyards was investigated. A phenological evaluation is also done in the vineyards. A reference sample of 15 vines is harvested every year, and then a wine is made from these grapes, in which aromatic and phenolic substances are determined.

Key words: Welschriesling, microclimate, terroir, microbiome

AN OVERVIEW OF THE PRODUCTION OF VEGETABLES WITH LOW OR NO PESTICIDE RESIDUES

Chikte, T.

Mendel university in Brno, Faculty of Horticulture, Department of Vegetable Growing and Floriculture, Valtická 337, 691 44, Lednice, Czech Republic,
xchikte@node.mendelu.cz

Abstract

Using chemical pesticides in modern agricultural operations to control pests and diseases has historically raised questions about the effects on the environment and human health. Diverse technologies and approaches have been incorporated in response to the demand for low-residue, sustainable vegetable production methods. In order to explore the low pesticide vegetable production, an experiment was carried out in a greenhouse at the Faculty of Horticulture, Lednice, Mendel University, Brno. The experiment included four treatments (control, harpin protein, mospilan and harpin protein + mospilan) and four replications of the tomato crop. Leaf and fruit samples were collected for residue analysis prior to, immediately following, and three times at a four-day interval. To assess the degree of pesticide degradation, the results were subjected to gas chromatography analysis. The treatment harpin protein + mospilan revealed that the residues 12 days after spraying (DAS) were 2.67 mg.g^{-1} , whereas mospilan revealed 2.81 mg.g^{-1} on leaves. Additionally, the residues on fruits on 12 DAS were examined, and treatment harpin protein + mospilan revealed $0.0735 \text{ mg.kg}^{-1}$ whereas mospilan revealed $0.0763 \text{ mg.kg}^{-1}$. As a result, it will be more fascinating to see how many additional days it will take to totally dissolve the pesticides utilizing the harpin protein combination.

Keywords: Low residues, pesticide, harpin protein, mospilan, degradation and gas chromatography

STUDY OF THE PRIMARY AND SECONDARY METABOLITES OF STONE FRUIT TREES INFECTED WITH '*CANDIDATUS PHYTOPLASMA PRUNORUM*'

Trempetic, G.

Mendel University in Brno, Faculty of Horticulture, Department of Fruit Science, Valtická
337, 691 44, Lednice, Czech Republic, gabriela.trempetic@mendelu.cz

Abstract

The PhD research project is focused on analysing metabolite changes underlying biochemical responses of several *Prunus* species to infection with the bacterial organism '*Candidatus Phytoplasma prunorum*'. The experimental groups of phytoplasma-infected and phytoplasma-free peach and apricot trees of different genotypes were established. Leaf samples were collected in late spring and late summer. The most affected metabolites, according to literature, such as sugars and pigments, but also plant stress metabolites were analysed. To analyse pigments, phenols, antioxidants and flavonoids, spectrophotometric protocols were adopted. Bradford protein assay was used for protein analysis while sugars were analysed using HPLC. Results were statistically analysed. This project was funded by IGA under the number IGA-ZF/2023-SI1-003.

Keywords: ESFY, *Prunus*, biochemical response

OPTIMIZATION OF THE LANDSCAPE STRUCTURE OF THE CZECH REPUBLIC IN THE CONTEXT OF CLIMATE CHANGE

Urban, V.

Mendel University in Brno, Faculty of Horticulture, Department of Landscape Architecture, Valtická 686, 691 44, Lednice, Czech Republic, xurban9@mendelu.cz

Abstract

The dissertation deals with the design of possible generalized landscape optimization procedures, which, using functional and generally applicable landscape elements, will improve the water retention of the landscape, the joint functioning of individual activities and landscape elements among themselves, while the process will be sustainable with respect to all values of the landscape. Research conducted directly in the land registers of municipalities proves the 3rd main hypotheses of the work concerning the layout of the given landscapes, the reorganization of the landscape in order to increase its water retention and the provability of the effect of changes. The methodology is oriented practically primarily on the basis of case studies. The result will be a set of generalised elements and recommendations that are universally applicable, taking into account the individual circumstances of the given landscapes.

Key words: Optimizing landscape structure, global climate change, water retention of the landscape, landscape features

COMPOSITION OF THE MICROBIOME IN VINEYARDS AND ITS CHARACTERISATION IN RELATION TO SOIL CONDITIONS

Vavřiník, A.

Mendel University in Brno, Faculty of Horticulture, Department of Viticulture and Oenology, Valtická 686, 691 44, Lednice, Czech Republic, vavrinik1@seznam.cz

Abstract

The main part of the dissertation focuses on the mapping of the microbiome in the vineyard. For this purpose, the fungal community from selected vineyards in the wine-growing regions of Bohemia and Moravia was identified using molecular biological techniques. Currently, most of the results are already in final form. Different variants were considered based on soil conditions and agrotechnical management measures. Particular attention was paid to the characterisation of the chemical and physical properties of the soils, which is very important for the relevance of the experiments. Over the last year, the work has been supplemented with information on selected vineyards. Attention has been focused on the meteorological conditions prior to the actual sampling, on the geographical description of the vineyards selected and, last but not least, on the management approach to the protection and fertilisation of the vines where the research was carried out.

Key words: chemical-physical analysis of soils, vine, soil fungal community

EFFECT OF TEMPERATURE ON GRAPEVINE PHENOLOGICAL DEVELOPMENT IN THE 2023 YEAR

Vrána, P.

Mendel University in Brno, Faculty of Horticulture, Department of Viticulture and Oenology, Valtická 337, 691 44, Lednice, Czech Republic, xvrana@node.mendelu.cz

Abstract

Temperature is a fundamental factor for grapevines that controls the main physiological events, the course of phenological stages and the overall fertility and quality. Short-term climatic changes, on the other hand, represent key factors that influence the production of grapes and wine within a certain growing season. The designation "heat wave" is used for a weather pattern where there are 5 consecutive days with maximum daily temperatures above 35°C or 3 consecutive days with maximum daily temperatures above 40°C. Damage to vines caused by high temperatures is comparable to damage caused by drought. Both stress factors lead to damage to the photosynthetic apparatus, oxidative stress and a negative impact on grape quality. The optimal temperatures for photosynthesis are between 25-30°C. During the ripening period, the optimum temperature is around 25°C, due to the influence of the compounds in the berries. High night temperatures, once they hover around 20°C, also have a negative effect. High temperatures during the night increase the level of respiration and transpiration of sugars, which can otherwise be used for the growth and development of the plant. Periods with maximum temperatures higher than 35°C occurred several times in Lednice during the growing season, which mainly affected the veraison date. The period of high maximum temperatures and tropical nights in July occurred between 15.7.-18.7. The highest temperatures were then recorded on 9.7. and 24.7. always 36.4°C. The period of high temperatures and other short-term rises affected the course of photosynthesis and led to a delay in veraison date. The delay in onset of veraison represented the following time compared to long-term averages: Solaris (+10 days), Sauvignier gris (+12 days), Bronner (+14 days), Donauriesling (+12 days), Saviion (+14 days), Regent (+10 days), Cabernet Cortis (+14 days). August also saw a period of high temperatures in the form of a heat wave between August 16. – 25/08/2023. The maximum temperatures were measured on 21.8. (37.6°C), 22.8. (36.9 °C) and 25.8. (36.1°C). These temperatures also led to a deepening of the delay in phenological stages. However, the course of the weather during September caused the grapes to ripen faster.

Key words: grapevine, phenological stage, heat waves, photosynthesis

Title: Trends in horticulture and landscape architecture 2023
Editor: Aleš Eichmeier, Jana Čechová, Kristýna Kříčková
Published by: Mendelova univerzita v Brně, Zemědělská 1, 613 00 Brno
Print: Mendelova univerzita v Brně, Zemědělská 1, 613 00 Brno
Edition: first, 2023
Pages: 28
Load: 50
ISBN: 978-80-7509-948-8

