

BOOK OF ABSTRACTS

3rd International Conference on Plant Biology (22nd SPSS Meeting)



9-12 JUNE 2018
BELGRADE

Serbian Plant Physiology Society

Institute for Biological Research "Siniša Stanković", University of Belgrade

Faculty of Biology, University of Belgrade

**3rd International Conference
on Plant Biology
(22nd SPPS Meeting)**



9-12 June 2018, Belgrade

.....

CIP - Каталогизacija у публикацији - Народна библиотека Србије, Београд
581(048)(0.034.2)

INTERNATIONAL Conference on Plant Biology (3 ; 2018 ; Belgrade)

[Book of Abstracts] [Електронски извор] / 3rd International Conference on Plant Biology [and] 22nd SPPS Meeting, 9-12 June 2018, Belgrade ; [organized by Serbian Plant Physiology Society [and] Institute for Biological Research "Siniša Stanković", University of Belgrade [and] Faculty of Biology, University of Belgrade ; [editor Branka Uzelac]. - Belgrade : Serbian Plant Physiology Society : University, Institute for Biological Research "Siniša Stanković" : University, Faculty of Biology, 2018 (Beograd : Друштво за физиологију биљака Србије). - 1 USB fleš memorija ; 1 x 3 x 8 cm

Тираж 230. - Регистар.

ISBN 978-86-912591-4-3 (SPPS)

1. Друштво за физиологију биљака Србије. Састанак (22 ; 2018 ; Београд)
2. Институт за биолошка истраживања "Siniša Stanković" (Београд)

а) Ботаника - Апстрактни

COBISS.SR-ID 264421900

3rd International Conference on Plant Biology
(22nd SPPS Meeting)
9-12 June, Belgrade

Organizing Committee

Marijana Skorić-President, Dragana Matekalo, Tatjana Ćosić, Milan Borišev, Branislav Šiler, Neda Aničić, Jelena Božunović, Milica Milutinović, Ljiljana Tubić, Nina Devrnja, Suzana Živković, Jasmina Nestorović Živković, Mihailo Jelić, Vladan Jovanović

Scientific Committee

Adisa Parić (Sarajevo, Bosnia and Herzegovina)	Jovanka Miljuš- Đukić (Belgrade, Serbia)
Alain Tissier (Halle, Germany)	Jules Beekwilder (Wageningen, The Netherlands)
Angelina Subotić (Belgrade, Serbia)	Ljiljana Prokić (Belgrade, Serbia)
Angelos Kanellis (Thessaloniki, Greece)	Marko Sabovljević (Belgrade, Serbia)
Antonio Granell Richart (Valencia, Spain)	Milan Borišev (Novi Sad, Serbia)
Autar Mattoo (Beltsville, USA)	Milka Brdar-Jokanović (Novi Sad, Serbia)
Daniel Chamovitz (Tel Aviv , Israel)	Miroslav Nikolić (Belgrade, Serbia)
Danijela Mišić (Belgrade, Serbia)	Mondher Bouzayen (Castanet-Tolosan Cedex, France)
Dragana Miladinović (Novi Sad, Serbia)	Pavle Pavlović (Belgrade, Serbia)
Guido Grossmann (Heidelberg, Germany)	Peđa Janačković (Belgrade, Serbia)
Hrvoje Fulgosi (Zagreb, Croatia)	Roque Bru Martínez (Alicante, Spain)
Ivana Dragičević (Belgrade, Serbia)	Sokol Abazi (Tirana, Albania)
Ivana Maksimović (Novi Sad, Serbia)	Stevan Avramov (Belgrade, Serbia)
Jasmina Glamočlija (Belgrade, Serbia)	Václav Motyka (Prague, Czech Republic)
Jelena Aleksić (Belgrade, Serbia)	Vuk Maksimović (Belgrade, Serbia)
Jelena Savić (Belgrade, Serbia)	Živoslav Tešić (Belgrade, Serbia)

<u>Publishers</u>	Serbian Plant Physiology Society Institute for Biological Research "Siniša Stanković", University of Belgrade Faculty of Biology, University of Belgrade
<u>Editor</u>	Branka Uzelac
<u>Graphic design</u>	Dejan Matekalo
<u>Prepress</u>	Marija G. Gray
<u>Electronic edition</u>	230 pcs

PROGRAMME



Saturday 9th June

09:00-14:00 *Registration*

14:00-14:30 *Opening Ceremony*

Section 2 • Plant Stress Physiology

Chairs: Sonja Veljović-Jovanović & Ivana Maksimović

- 14:30-15:00 (Plenary lecture) **Hrvoje Fulgosi** Sifting the elements of FNR-TROL bifurcation
- 15:00-15:30 (Plenary lecture) **Autar Mattoo** Tomato (*Solanum lycopersicum*) lipoxygenase (LOX) gene family: Delineating gene members associated with growth, development and abiotic stresses
- 15:30-15:50 (Invited talk) **Tamara Rakić** Two-year study of ecophysiological parameters of *Miscanthus × giganteus* grown on tailing pond at the mine "Rudnik" (Serbia)
- 15:50-16:10 (Invited talk) **Vladimir Crnojević** Data science in biosystems
- 16:10- 16:40 *Coffee break*
- 16:40-17:00 (Invited talk) **Ingeborg Lang** Tolerance to heavy metals – some examples in bryophyte species
- 17:00-17:15 (Selected talk) **Predrag Bosnić** Silicon mediates sodium (Na⁺) transport in maize under moderate NaCl stress
- 17:15-17:30 (Selected talk) **Milan Borišev** Dynamics of Cd accumulation and metabolic adaptation of *Salix alba* grown hydroponically
- 17:30- 17:45 (Selected talk) **Slavica Dmitrović** Nepetalactone-rich essential oil mitigates BASTA-induced ammonium toxicity in *Arabidopsis thaliana* L. by maintaining glutamine synthetase activity
- 17:45-18:00 *Group Photo*
- 18:00-19:00 *Poster session: Plant Stress Physiology (Section 2)*
- 19:00-21:00 *Welcoming cocktail (Rectorate of the University of Belgrade)*

Sunday 10th June09:00-14:00 *Registration*

Section 1 • Plant Growth, Development, Metabolism and Nutrition

Chairs: Snežana Zdravković-Korać & Miroslav Nikolić

09:30-10:00	(Plenary lecture) Guido Grossmann	Cellular growth regulation in roots - how to adapt in a complex environment
10:00-10:20	(Invited talk) Ondrej Novák	Tissue- and cell-specific analysis of phytohormones
10:20-10:40	(Invited talk) Ksenija Radotić	Plant cell walls – mechanical and chemical modifications underpin growth and stress response
10:40-11:00	(Invited talk) Herman Heilmeier	Bioavailability of elements for effective phytoremediation and phytomining: the role of rhizosphere processes
11:00- 11:30	<i>Coffee break</i>	
11:30-11:50	(Invited talk) Václav Motyka	Comprehensive phytohormone profiling during Norway spruce (<i>Picea abies</i>) somatic embryogenesis
11:50-12:05	(Selected talk) Danijela Paunović	Are receptor tyrosine kinases chimeric AGP's?
12:05-12:20	(Selected talk) Jelena Pavlović	Silicon increases iron use efficiency in cucumber- a strategy 1 model plant
12:20-12:35	(Selected talk) Katarina Ćuković	Characterization of <i>Arabidopsis</i> <i>GLN1;5</i> knockout mutant
12:35- 14:00	<i>Lunch break</i>	

Sunday 10th June

Section 4 • Phytochemistry

Chairs: Vuk Maksimović & Vladimir Mihailović

14:00-14:30	(Plenary lecture) Alain Tissier	Engineering plant diterpenoid pathways in yeast: increasing yield and expanding product diversity
14:30-14:50	(Invited talk) Roque Bru Martinez	Metabolic engineering and elicitation strategies to produce stilbenoids in plant cell cultures
14:50-16:10	(Invited talk) Sokol Abazi	New fatty acids discovered for the first time in <i>Vitex agnus-castus</i>
16:10-16:30	(Invited talk) Peđa Janačković	Do plant volatiles reflect taxonomy?
16:30- 17:00	Coffee break	
17:00-17:20	(Invited talk) Angelos Kanellis	The <i>Cistus creticus</i> terpene synthase gene family
17:20-17:40	(Invited talk) Marina Soković	Terpenes and terpenoids: linking bioactivity, opportunities and challenges
17:40-18:00	(Invited talk) Jules Beekwilder	Plant terpenes and bioplastics
18:00-18:15	(Selected talk) Jelena Dragišić Maksimović	Enzymatic behavior of edible berries – “Beroxidases”
18:15-18:30	(Selected talk) Elma Vuko	Inhibition of satellite RNA associated cucumber mosaic virus infection by essential oil of <i>Micromeria croatica</i> (Pers.) Schott
18:30-18:45	(Selected talk) Dorisa Čela	Structure elucidation of a new alkaloid and other 11 known compounds isolated from <i>Gymnospermium</i> species
18:45-19:45	Poster sessions: Plant Growth, Development, Metabolism and Nutrition; Phytochemistry (Sections 1 and 4)	

Monday 11th June

Section 5 • Applications in Agriculture, Pharmacy and Food Industry

Chairs: Jasmina Glamočlija & Slavica Ninković

09:00-9:30	(Plenary lecture) Mondger Bouzayen	New factors controlling fruit development: epigenetic modifications associated with the fruit set transition in tomato
09:30-10:00	(Plenary Lecture) Andrew Allan	New breeding technologies for fruit trees
10:00-10:20	(Invited talk) Slađana Žilić	Food and pharmacy application of anthocyanins originating from colored grains
10:20-10:40	(Invited talk) Eligio Malusa	Microbial-based inputs: opportunities and challenges for sustainable and resilient agricultural productions
10:40-11:10	Coffee break	
11:10-11:30	(Invited talk) Dragana Miladinović	Old problems, new tools - Integrated approach to oil crop breeding
11:30-11:45	(Selected talk) Brankica Tanović	Prospects of cabbage leaf debris use in the control of <i>Fusarium</i> wilt of pepper
11:45-12:00	(Selected talk) Nina Devrnja	Effects of tansy essential oil on fitness and digestion process of gypsy moth larvae
12:00-12:15	(Selected talk) Zora Dajić-Stevanović	Advantages and limitations of phytogetic feed additives
12:15-14:00	Lunch break	

Monday 11th June

Section 3 • Biodiversity, Conservation and Evolution of Plants

Chairs: Jelena Aleksić & Aleksej Tarasjev

- 14:00-14:30 (Plenary lecture) **Hendrik Poorter** Meta-Phenomics: Converting data into knowledge
- 14:30-15:00 (Plenary lecture) **Antonio Granell Richart** The biodiversity present in European tomato, phenotypes galore and a first insight in the underlying genetics
- 15:00-15:20 (Invited talk) **Zlatko Šatović** Origin and genetic diversity of Croatian common bean landraces
- 15:20-15:50 **Coffee break**
- 15:50-16:10 (Invited talk) **Aneta Sabovljević** Conservation physiology of bryophytes
- 16:10-16:30 (Invited talk) **Nataša Barišić Klisarić** Biomonitoring: Plants' (in) perspective
- 16:30-16:50 (Selected talk) **Sanja Budečević** Morphological diversity of functionally distinctive floral organs in *Iris pumila*: Does the flower color matter?
- 16:50-17:05 (Selected talk) **Žaklina Marjanović** First data on arbuscular mycorrhizal communities from selected climatic borderline forest ecosystems of the Balkan Peninsula
- 17:05-17:20 (Selected talk) **Tijana Banjanac** Verification of interspecies hybridization within the genus *Centaureum* Hill using *EST-SSR* molecular markers
- 17:20-18:20 **Poster sessions: Applications in Agriculture, Pharmacy and Food Industry; Biodiversity and Conservation, Evolutionary Plant Biology (Sections 5 and 3)**
- 18:20-18:30 **Closing Ceremony**
- 18:30-19:00 **SPPS General Assembly Meeting**
- 21:00-01:00 **Gala dinner: Restaurant "Vizantija"**

Tuesday 12th June

- 10:00-16:00 **Excursion: Special Nature Reserve "Carska bara"**

Wounding alters gene expression of secoiridoid glucosides metabolic pathway in leaves of common centaury

PP2-24

Jelena Božunović, Marijana Skorić, Dragana Matekalo, Suzana Živković, Neda Aničić, Jasmina Nestorović Živković, Danijela Mišić
(jelena.boljevic@ibiss.bg.ac.rs)

Institute for Biological Research "Siniša Stanković", University of Belgrade, Bulevar despota Stefana 142, 11060 Belgrade, Serbia

Common centaury (*Centaureum erythraea* Rafn) is rich in secoiridoid glucosides (SG's): sweroside, swertiamarin and gentiopicrin. These glycosides are believed to be a part of dual defense system in which the SG's are bio-activated by hydrolytic enzymes. Upon tissue disruption, SG's are released from storage compartments and hydrolyzed via β -glucosidase to yield unstable and highly reactive aglycones. This two-component system provides plants with an immediate chemical defense against herbivore-induced wounding of leaves. Plants react to mechanical damage by activating a set of genes, the products of which are involved in defensive functions. Current study was conducted in order to determine how wounding affects the expression of SG metabolic pathway genes. Gene expression patterns of five SG biosynthetic pathway-related genes (*CeGPPS*, *CeGES*, *Ce8HGO*, *CeIS*, and *Ce7DLGT*) and of β -glucosidase (*CeBglu*) were examined in a time-dependent manner to determine the molecular mechanisms underlying wounding-induced changes in SG metabolism. Gene expression results were correlated with SG profiles in centaury shoots. The relative expression of *CeGES*, *Ce8HGO* and *Ce7DLGT* showed an increasing trend, reaching maximum at 24h/48h after wounding. Interestingly, two enzymes of the pathway with opposite functions, *Ce7DLGT* catalyzing the glycosylation reaction, and *CeBglu* having role in deglycosylation, showed opposite gene expression profiles. In conclusion, severe changes in gene expression profiles in response to wounding might lead to the reprogramming of SG metabolism in centaury leaves, and thus alter its defense strategies against herbivores.

Keywords: *Centaureum erythraea*, gene expression, mechanical injury, secoiridoid glucosides, UHPLC-MS/MS analysis.

This work was funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia, Grant No. OI173024.

The investigation of sugar beet responses to drought at the Institute of Field and Vegetable Crops, Novi Sad

PP2-25

Ksenija Taški-Ajduković¹, Nevena Nagl¹, Živko Ćurčić¹, Dario Danojević¹, Milan Borišev², Milan Župunski², Ivana Ičević-Borišev², Aleksandar Đorđević²
(ksenija.ajdukovic@ifvcns.ns.ac.rs)

¹ Institute of Field and Vegetable Crops, Novi Sad, Maksima Gorkog 30, Novi Sad, Serbia

² Faculty of Sciences, University of Novi Sad, Trg Dositeja Obradovića 2, Novi Sad, Serbia

Drought is the prime abiotic factor that limits sugar beet (*Beta vulgaris* L.) production in Serbia and other regions where the crop is not usually irrigated. As increased irrigation is not an economically viable solution, the most effective one is development of varieties adapted for successful growth in drought-prone environments. Within the framework of ongoing projects, in Institute of Field and Vegetable Crops Novi Sad (IFVCNS) research was performed with the aim to select drought tolerant sugar beet genotypes, improve production under water deficit conditions, and clarify the physiological processes of drought tolerance in sugar beet. Genotypic diversity for

drought-related tolerance indices were assessed in the field trials and the strength of association between them and crop performance was measured. As the drought tolerance is a complex trait, very difficult to evaluate in the field, the study was also conducted through the greenhouse experiments and *in vitro* screening. The plant material was studied for morphological and physiological parameters of water regime and the expression of genes that are known to respond to osmotic stress. There are reasons to believe that fullereneol ability to form hydrogen bonds with water molecules makes this nanoparticle a potential intracellular water depot, which can be used if osmotic stress occurs. In collaboration with colleagues from the Faculty of Science, Novi Sad we have started to analyze the influence of fullereneol on sugar beet plants exposed to drought stress. Results indicate that application of fullereneol can modify intracellular water metabolism and enable adaptation of plants to drought stress.

Keywords: drought, sugar beet, Institute of Field and Vegetable Crops

High temperature-related changes in gas-exchange parameters in oak (*Quercus* spp.) populations

PP2-26

Milan Župunski¹, Rita Horak², Slobodanka Pajević¹, Danijela Arsenov¹, Nataša Nikolić¹, Andrej Pilipović³, Saša Orlović³, Milan Borišev¹
(milan.zupunski@dbe.uns.ac.rs)

¹ University of Novi Sad, Faculty of Sciences, Department of Biology and Ecology, Serbia

² University of Novi Sad, Hungarian Language Teacher Training Faculty in Subotica, Serbia

³ University of Novi Sad, Institute of Lowland Forestry and Environment, Novi Sad, Serbia

One of the first evidence of climate changes is a rising temperature that significantly affects plant physiology. The elevation of temperature is one of the leading problem at the global scale, thus selection of plants with adaptive response to high temperatures is necessary for reforestation process. The key aim of this research was to understand physiological mechanisms involved in high temperature acclimatization. The impact of high temperature (HT) stress in short term exposure was analyzed in two oak species: Pedunculata oak (*Quercus robur* L.) and Turkey oak (*Quercus cerris* L.) originating from four populations in different forest localities in Serbia. Eight-month old seedlings were grown under semi-controlled conditions in glasshouse and were exposed to the acute HT stress (temperature range: 42-47 °C) for two and five days. Plant response to HT comprised of different traits, depending on the exposure time, intensity of the heat waves and particularly on the selected population. Elevated temperature led to disturbance of photosynthetic gas exchange parameters, water status, concentration of proline and chlorophyll content. Significant declines of photosynthetic and transpiration rates, water use efficiency and stomatal conductance were observed in all tested populations. In addition, proline content was significantly increased in comparison to control treatment, which might be attributed to the strategies of plants to cope up with heat stress by accumulation of compatible osmolyte. Taking into account all analyzed parameters, it can be concluded that among investigated oak species, population of *Q. cerris* has the greatest adaptive potential with fast acclimatization response to high temperatures.

Keywords: oak population, heat stress, photosynthesis, proline accumulation

The authors would like to express their sincere gratitude to their colleague Marko Đurakić for helping with multivariate data analysis. This research is a part of the Grant No. III 043002, funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia.