

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 "Синиша Станковић" (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"**

SELECTED TALKS

Are receptor tyrosine kinases chimeric AGP's?

ST1-1

Danijela Paunović, Milica Bogdanović, Milana Trifunović Momčilov, Slađana Todorović, Ana Simonović, Angelina Subotić, Milan Dragičević
(danijela.paunovic@ibiss.bg.ac.rs)

¹ Institute for Biological Research "Siniša Stanković", University of Belgrade, Bulevar despota Stefana 142, 11060 Belgrade, Serbia

Arabinogalactan proteins (AGPs) are cell wall proteoglycans with important roles during plant growth and development. They comprise one of the most complex families of macromolecules found in plants, which is in part due to the incredible diversity of the glycans decorating the protein backbone, as well as the heterogeneity of the protein backbones. While this diversity is certainly responsible for the wide array of physiological functions associated with AGPs, it hampers efforts for homology-based identification. We have developed a new method for filtering AGP sequences that exploits one of their key features, the presence of hydroxyprolines, which represent glycosylation sites. This method was used to filter potential AGPs from *Centaurea erythraea* RNA-seq data. Most of the filtered sequences had no identifiable domains, while the most frequent identified domains were the Protein kinase and Protein tyrosine kinase domains identified in the same sequences, followed by well-known AGP associates, Leucine rich repeats, Probable lipid transfer, Plastocyanin-like and Fasciclin. It is noteworthy that the Protein (tyrosine) kinase domain has thus far eluded experimental evidence for linkage with AGPs in any plant species, probably due to its transmembrane nature. The implicated sequences were examined in depth and compared to homologs from Arabidopsis.

Keywords: arabinogalactan proteins, bioinformatics, hydroxyproline prediction, finding-AGP

This research was funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia (TR31019, OI173024)

**Silicon increases iron use efficiency in cucumber – a strategy
1 model plant**

ST1-2

Jelena Pavlović, Miroslav Nikolić
(jelena.pavlovic@imsi.bg.ac.rs)

Department of Plant Nutrition, Institute for Multidisciplinary Research, University of Belgrade, Kneza Visislava 1, 11030 Belgrade, Serbia

Silicon (Si) and iron (Fe) are respectively the second and the fourth most abundant minerals in the earth's crust. While the essentiality of Fe has been discovered in the middle of the 19th century, Si is still not fully accepted as an essential element for higher plants. Due to poor Fe availability for higher plants, especially in alkaline and calcareous soils, Fe deficiency represents a major limiting factor for crop production worldwide, affecting both crop yield and quality, with a strong negative impact on human health.

Here we investigated the key physiological, biochemical and molecular parameters involved in the processes of root acquisition and tissue utilization of Fe by cucumber (*Cucumis sativus* L.), as both Strategy 1 model and Si-accumulating species.

Silicon nutrition increased the accumulation of apoplastic Fe and Fe-mobilizing compounds in roots, as well as upregulated the expression of genes (*AHA1*, *FRO2*, *IRT1*) encoding the main components of the reduction-based Fe uptake machinery (Pavlovic et al., 2013). In leaves, Si affected relative Fe distribution by enhancing Fe remobilization from old leaves via increased NA accumulation and expression of the *YSL1*, which stimulated Fe chelation and its retranslocation to younger leaves (Pavlovic et al., 2016). This for the first time demonstrated a new beneficial role of Si, i.e. in increasing nutrient acquisition, transport and utilization by crops.

Keywords: cucumber (*Cucumis sativus* L.), iron deficiency, leaf retranslocation, root acquisition, silicon.

References:

Pavlovic J., Samardzic J., Kostic L., Laursen K.H., Natic M., Timotijevic G., Schjoerring J.K., Nikolic M. (2016): Ann. Bot. 118, 271-280.

Pavlovic J., Samardzic J., Maksimović V., Timotijevic G., Stevic N., Laursen K.H., Hansen T.H., Husted S., Schjoerring J.K., Liang Y., Nikolic M. (2013): New Phytol. 198, 1096-1107.

Characterization of *Arabidopsis* *GLN1;5* knockout mutant

ST1-3

Katarina Ćuković¹, Milan Dragičević², Snežana Zdravković-Korać², Ana Simonović², Milica Bogdanović², Slađana Todorović²

(katarina.cukovic@imsi.rs)

¹Institute for Multidisciplinary Research, University of Belgrade, Kneza Višeslava 1, 11030 Belgrade, Republic of Serbia

²Institute for Biological Research "Siniša Stanković", University of Belgrade, Bulevar despota Stefana 142, 11060 Belgrade, Serbia

Glutamine synthetase is a key enzyme of plant nitrogen metabolism that assimilates ammonia into glutamine. The *Arabidopsis* genome encodes one chloroplastic (*GLN2*) and five cytosolic isoforms, *GLN1;1* through *GLN1;5*, with different expression patterns, kinetic properties, regulation and functions. Physiological roles of different isoforms have been elucidated mainly by studying knockout mutants. However, the role of *GLN1;5*, which is expressed in dry seeds, remained unknown. To elucidate the *GLN1;5* function, we have studied a *GLN1;5* knockout line (*GLN1;5KO*), homozygous for T-DNA insertion within the *GLN1;5*. The *GLN1;5* deficiency results in a phenotype with slightly delayed bolting and fewer siliques. The dry weight of *GLN1;5KO* seeds is 73.3% of WT seed weight, with seed length 90.9% of WT seeds. Finally, only 18.33% mutant seeds germinated in water within 10 days, in comparison to 34.67% of WT seeds. KNO_3 strongly stimulated germination of both *GLN1;5KO* and WT seeds, while germination in increasing NH_4Cl concentrations potentiates the differences between the two genotypes. It can be concluded that *GLN1;5* activity supports silique development and grain filling and that it has a role in ammonium reassimilation within the seed, as well as assimilation and/or detoxification of ammonium from the environment.

Keywords: Arabidopsis, glutamine synthetase, knockout mutant, phenotype, germination

This research was funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia (Grant No. 173024)