

Serbian Plant Physiology Society

Institute for Biological Research „Siniša Stanković”, University of Belgrade

1st International Conference
on Plant Biology
20th Symposium of the
Serbian Plant Physiology Society



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20th Symposium of the Serbian Plant Physiology Society

Subotica, June 4-7, 2013

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PROGRAMME

1st International Conference on Plant Biology 20th Symposium of the Serbian Plant Physiology Society

Tuesday, June 4th, 2013

Until 13.00	The arrival of participants and registration, placement of posters (Sections 1, 2, 3, 4, 5, 6)
13.30-13.35	Conference opening
Section 1.	Plant Growth and Development – Plenary lectures and Oral presentations
13.35-13.55	Václav Motyka, Petre I. Dobrev, Lenka Závieská Drábková: Cytokinins of cis-zeatin-type: their role for plant development and in the evolution of hormonal homeostatic mechanisms in plants
13.55-14.20	Brigitte Mauch-Mani, Chantal Planchamp, Dirk Balmer: Induced resistance in cereals
14.20-14.45	Sándor Kovács, Ágnes Nagy, Brigitta Véggh, Brigitte Mauch-Mani, Gábor Jakab: Pathogenesis Related LIPase 2 (PRLIP2) deficiency alters basal resistance and BABA induced priming in Arabidopsis
14.45-15.00	Branka Uzelac, Dušica Janošević, Snežana Budimir: Ultrastructural analysis of mesophyll cells during natural leaf senescence of <i>Nicotiana tabacum</i>
15.00-15.15	Martin Raspor, Václav Motyka, Slavica Ninković, Ivana Dragičević: Tuberization dynamics in AtCKX transformed potato plants grown <i>in vitro</i>
15.15-15.30	Jelena Milojević, Jelena Savić, Milan Dragičević, Ljiljana Tubić, Nina Devrnja, Snežana Zdravković-Korać: SoRIP2 gene might be a good marker for somatic embryogenesis in spinach
15.30-16.00	Coffee break



Section 2. Plant Metabolism and Nutrition – Plenary lectures and Oral presentations

16.00-16.25	Hrvoje Fulgosi, Lea Vojta, Snježana Jurić, Ana Tomašić Paić, Lucija Horvat, Renata Hanzer, Jasminka Antunović, Vera Cesar, Bernd Zechmann, Hrvoje Lepedušić: New alleys in regulation of photosynthetic energy conversion
16.25-16.40	Milan Dragičević, Milica Bogdanović, Milica Milutinović, Biljana Filipović, Slađana Todorović, Ana Simonović: Differential regulation of glutamine synthetase and glutamate synthase genes by plant growth regulators in <i>Arabidopsis</i>
16.40-16.55	Marija Vidović, Filis Morina, Sonja Milić, Jana Barbro Winkler, Andreas Albert, Sonja Veljović-Jovanović: Combined effect of UV-B irradiation with high or low light on photosynthesis in variegated plant species
17.00-18.00	Poster presentation (Sections 1, 2)
18.00	Free time



Wednesday, June 5th, 2013

Breakfast

Section 3. Plant Genome and Inheritance and Section 4. Plant Biotechnology – Plenary lectures and Oral presentations

- 9.00-9.25  Borut Bohanec: **Regulatory approaches of novel transgenic technologies related to plant breeding with emphasis on development in European Union**
- 9.25-9.50  Zlatko Šatović, Zlatko Liber, Marija Jug-Dujaković, Ivan Radosavljević, Danijela Greguraš, Mihailo Ristić, Dejan Pljevljakušić, Zora Dajić-Stevanović, Jerko Gunjača: **An association mapping approach to identify molecular markers associated with essential oil components in natural populations of Dalmatian Sage (*Salvia officinalis* L.)**
- 9.50-10.15 Alena Gajdošová, Miroslava Súkeníková, Radoslava Matúšová, Tatjana Vujović, Gabriela Libiaková: **Advances in genetic transformation of selected small fruit species**
- 10.15-10.40 Dragan Vinterhalter, Jovanka Miljuš-Đukić, Živko Jovanović, Vladimir Orbović, Branka Vinterhalter: **Circadian regulation of photo- and gravitropism in potato shoot cultures**
- 10.40-10.55 Aleksandar Cingel, Jelena Savić, Tatjana Ćosić, Martin Raspor, Jelica Lazarević, Ann Smigocki, Slavica Ninković: **Development of Colorado potato beetle larvae (*Leptinotarsa decemlineata* Say) fed on potato co-expressing rice cystatins I and II plants**
- 11.00-11.30 *Coffee break*
- 11.30-11.45 Ana Simonović, Biljana Filipović, Saša Malkov, Nikola Tanić, Vedrana Milinković, Milan Dragičević, Angelina Subotić: **Arabinogalactan protein gene family from *Centaurea erythraea* Rafn.**
- 11.45-12.00  Milica Bogdanović, Slađana Todorović, Milan Dragičević, Katarina Cankar, Jules Beekwilder, Harro Bouwmeester, Ana Simonović: **Vector construction for promoter analysis in chicory and fluorescence evaluation by agroinfiltration**
- 12.00-12.15  Daniela Đikanović, Aleksandar Kalauzi, Milorad Jeremić, Jianmin Xu, Miodrag Mičić, Jeffrey D. Whyte, Roger M. Leblanc, Ksenija Radotić: **Application of CdSe nanoparticles in plant biology research**
- 12.15-12.30  Sanja Treskić, Slaven Prodanović, Ankica Kondić-Špika, Borislav Kobiljski, Ljiljana Brbaklić, Dragana Trkulja, Nada Grahovac, Aleksandra Nastasić: **The role of DIMBOA in maize biotic stress resistance – presence of DIMBOA biosynthesis *bx1* gene in NS inbred lines**
- 13.00-14.30 *Lunch*

Section 5. Biotic Plant Interactions and Section 6. Secondary Metabolite Production – Plenary lectures and Oral presentations

- 14.30-14.55  Eleni Tsantili: **Increases in phenolic compounds during cold storage of temperate fruits**
- 14.55-15.10  Vladan Jovanović, Jasmina Nestorović Živković, Slavica Dmitrović, Mihailo Ristić, Suzana Živković, Danijela Mišić: **Allelopathic potential of *Nepeta rtanjensis* Diklić & Milojević and *Nepeta cataria* L. essential oils on selected weeds**
- 15.10-15.35 Kallina Danova, Yuliana Markovska, Vaclav Motyka, Petre Dobrev, Evelyn Wolf-ram: **Understanding plant-environment interactions is a key to successful yield of phytopharmaceuticals from medicinal species *in vitro***

- 16.00-16.15 Jelena Dragišić Maksimović, Vuk Maksimović: **Qualitative evaluation of different antioxidative compounds present in propolis originating from different locations of Serbia**
- 16.15-16.30 Gordana Tovilović, Đurđica Ignjatović, Jelena Živković, Zoran Maksimović, Mirko Tomić, Katarina Šavikin: **The influence of methanol and aqueous-acetone extracts from three *Veronica* species on wound healing process**
- 16.30-18.00 **Poster presentation (Sections 3, 4, 5, 6) + Coffee break**
- 18.00-19.00 Placement of posters (Sections 7, 8, 9)
- 20.00 *Galla Dinner*

Thursday, June 6th, 20137.00-9.00 *Breakfast***Section 7. Environmental Stress and Ecophysiology – Plenary lectures and Oral presentations**

- 9.00-9.25 Zsófia Bánfalvi: **Implication of stress tolerance and tuber yield in potato**
- 9.25-9.50 Achim Kunz, Michael M. Blanke: **Six misconceptions about climate change – from a biologist's viewpoint: Effects of recent climate change on temperature pattern, precipitation, risk of frost and apple phenology – based on 55 years of meteorological and phenological data at Campus Klein-Altendorf, University of Bonn**
- 9.50-10.15 Judit Dobránszki, Ildikó Hudák, Nóra Mendler-Drienyovszki, Mária Hevesi: **Evaluation of biotic stress tolerance using tissue culture systems**
- 10.15-10.35 Dominik Vodnik, Klemen Eler: **How to study the dynamics of stomatal response?**
- 10.35-11.00 Zorica Jovanović, Radmila Stikić, Ljiljana Prokić, Slađana Savić, Milena Marjanović, Slaviša Đorđević: **Deficit irrigation as a strategy to save water: challenge for research in stress physiology**
- 11.00-11.30 *Coffee break*
- 11.30-11.45 Živko Jovanović, Nemanja Stanisavljević, Aleksandar Mikić, Svetlana Radović: **The expression of DREB2A related gene from pea (*Pisum sativum* L.) as affected by water stress**
- 11.45-12.00 Nemanja Stanisavljević, Aleksandar Zdravković, Marija Ilić, Živko Jovanović, Jovanka Miljuš-Đukić, Aleksandar Mikić, Svetlana Radović: **Variations in antioxidative defense parameters in *Pisum sativum* var. arvense during vegetation period in field conditions**
- 12.00-12.15 Iva Pavlović, Hrvoje Lepeduš, Jutta Ludwig-Müller, Branka Salopek-Sondi: **Stress response of *Brassica rapa* plants to salt treatment**
- 12.15-12.30 Ljiljana Prokić, Filis Morina, Marija Vidović, Dejana Panković, Sonja Veljović-Jovanović: **Proposed mechanisms for drought acclimation in two *Verbascum thapsus* L. populations differing in metal tolerance**
- 12.30-14.00 *Lunch*
- 14.00-15.00 **Poster presentation (Section 7)**

Friday, June 7th, 2013

7.00-9.00 Breakfast

Section 8. Biodiversity and Conservation – Plenary lectures and Oral presentations

- 9.00-9.25 Marina Stanilova: **Conservation of endemic and endangered plant species by means of biotechnology - applicability of the results and social impact in Bulgaria**
- 9.25-9.50 Irina Holobiuc: **Stress-induced somatic embryogenesis in some threatened plant taxa**
- 9.50-10.15 Dejan Pljevljakušić: **Influence of planting time, fertilization and propagation type on yield and quality of arnica (*Arnica montana* L.)**
- 10.15-10.30 Branislav Šiler, Tijana Banjanac, Jasmina Nestorović Živković, Jelena Cvetković, Ana Simonović, Stevan Avramov, Danijela Mišić: **Genetic diversity among *Centaurium erythraea* Rafn Balkan Peninsula populations as revealed by TRAP markers, highly correlated to secondary metabolite profiles**
- 10.30-10.45 Tatjana Vujović, Đurđina Ružić, Radosav Cerović: **Cryopreservation of autochthonous plum genotypes using droplet vitrification technique**

Section 9. Evolutionary Plant Biology – Plenary lectures and Oral presentations

- 10.45-11.10 Aleksej Tarasjev: **Evolutionary biology in biomonitoring, plant population conservation and environmental protection**
- 11.10-11.25 Uroš Živković, Stevan Avramov, Danijela Miljković, Nataša Barišić Klisarić, Danijela Prokić, Aleksej Tarasjev: **Phenotypic variation in physiology and morphology of *Iris variegata* in response to different light conditions**
- 11.25-11.40 Vukica Vujić, Luka Rubinjoni, Sara Selaković, Dragana Cvetković: **Geometric morphometric study of leaf shape variation in *Mercurialis perennis***
- 11.40-11.55 Luka Rubinjoni, Sara Selaković, Vukica Vujić, Dragana Cvetković: **A matter of taste: the consequences of having separate sexes on plant-herbivore interactions**
- 12.00-13.00 **Poster presentation (Sections 8, 9) + Coffee break**
- 13.00-14.00 **DFBS general assembly: reports, awards, society elections, jubille lectures**
- 13.00-13.20 Borivoj Krstić: **20 meetings of the Yugoslav and Serbian Plant Physiology Society**
- 13.20-13.30 Ljubinka Čulafić: **Dragoljub Grubišić in memoriam**
- 13.30-13.40 **Annual report**
- 13.40-13.50 **Society awards**
- 13.50-14.00 **Election of the managing board for 2013-2015**
- 14.00-14.30 Farewell, participant departure



Plenary
Lectures

parameters (F_o-minimum fluorescence yield, F_m'- maximum fluorescence yield of light adapted leaves, the maximum quantum yield of PSII, F_v/F_m (Yield (II) dark), the quantum yield of PSII, Yield (II) and the non-photochemical quenching (NPQ) were measured during the nine days. The correlation between PAR intensity and assimilation rate, so called *light curves* were obtained for both plant species. Carbon assimilation was always lower in the control compared to UV-B treated plants as the light intensity increased, especially for *P. coleoides*. In the "low PAR" experiment the carbon assimilation rate, stomatal conductance and transpiration rate were higher in UV-B exposed plants, particularly at the end of the experiment. Regarding *P. zonale* plants, CO₂ assimilation rate, stomatal conductance and transpiration rate for statistical analysis revealed more significant changes during the first half of treatment, when values for all parameters, especially for transpiration and stomatal conductance were higher in the UV-B exposed plants. Photosynthetic parameters measured were correlated with changes in the secondary metabolism induced by different light regimes in these specific model systems. This work was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia (project No. III43010). The experimental part was done in Helmholtz Zentrum München, Neuherberg, Germany supported by the COST Action: FA0906 UV4growth.

Silicon mediates iron acquisition by Strategy 1 plants

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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 is discovered at the middle of the 19th century, Si is still not fully accepted as an essential element for higher plants. However, Si is proved to alleviate multiple environmental stresses in plants (e.g. metal excess, drought, salt, lodging, diseases and pests). Fe deficiency is considered to be one of the major limiting factors for crop production worldwide, also affecting human health in developing countries. Root responses (strategies) to a lack of Fe have mainly been studied in nutrient solution experiments devoid of Si, therefore information on the interactions between these two mineral elements in plants is still limited. Here we investigated how Si ameliorates Fe deficiency in Strategy 1 plant species (all dicots and monocots with the exception of grasses, which belong to Strategy 2), such as cucumber, sunflower, tomato and soybean, with the focus on the mechanism involved in Fe acquisition from the rhizosphere and utilization of root apoplastic Fe. A combined approach was performed including analyzes of apoplastic Fe pool, the components of reduction-based Fe acquisition machinery (using stable isotope ⁵⁷Fe and expression of *CsFRO2*, *CsIRT1*, and *CsHA1*) and accumulation of Fe-mobilizing compounds (carboxylates, phenolics and flavonoids), along with the expression of related genes involved in their biosynthesis, in the roots of model plant (cucumber). Our study indicates for the first time that the role of Si in alleviation of Fe deficiency stress includes: 1) increase of the apoplastic Fe pool in roots; 2) stimulation of Fe acquisition at the early stage of Fe deficiency stress through regulation of gene expression levels of proteins involved in this process; and 3) increase of the accumulation of Fe-mobilizing compounds in roots. Indeed, this work provides new evidence for the beneficial role of Si in plant nutrition and in perspective can be of practical importance in the development of new sustainable measures for controlling Fe chlorosis in calcareous soils, which in general are low in available Si.

Pavlovic J et al. (2013): Silicon alleviates iron deficiency in cucumber by promoting mobilization of iron in the root apoplast. *New Phytol*, doi: 10.1111/nph.12213.

The mechanisms of Si-mediated alleviation of P deficiency in wheat grown in acid soils polluted by mine tailings

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Pollution from industrial activities is increasingly creating marginal conditions for crop production worldwide. Nutrient deficiency, and in particular phosphorus (P) deficiency is an often overlooked factor which can be a severe constraint for plant growth in soils affected by mining activities (Nikolic et al., 2011). The root exudation of carboxylates (mainly citrate and malate) has been considered as the major root response to mobilize sparingly soluble P in the rhizosphere. Therefore the enhanced activity of phosphoenolpyruvate carboxylase (PEPC) appears to be a key P-independent metabolic bypass reaction of malate/citrate biosynthesis in P deficient plants. Although the beneficial role of silicon (Si) on plant growth has been reported on several plant species grown under P deficient conditions the underlying mechanism is still unknown. The pot experiments were conducted with winter wheat, including Si fertilizers in addition to the conventional reclamation amendments (e.g. cow manure, NPK and lime) in the acid soil polluted by sulphidic mine tailings (collected from the Timok floodplain). The main focus of this study was on the dynamics of P pools in wheat rhizosphere, and on the molecular mechanism of root response to P availability in the rhizosphere (expression of *TaPT1* and *TaPT2*, encoding P_i transporters, *TaPEPC* encoding PEPC, and *MATE*-family genes encoding Al-activated citrate efflux transporter). All the amendments induced a significant change in the rhizosphere P fractions (readily available, Al- and Fe-bound P). For instance, Si supply has caused significant increase in readily available P, and reduction in Al-P and Fe-P. This can be attributed to synergetic effect of pH increase and reduction of P sorption by Al- and Fe-oxides. The leaf P concentration in wheat plants treated with Si significantly increased and was in the range of leaf P concentration in P-fertilized plants. While the expressions of the root *TaPT2* and *TaPEPC* were down-regulated by P availability in the rhizosphere and plant P status, *TaPT1* and *TaMATE* showed different pattern with markedly enhanced expression at Si treatment irrespectively of the P supply. In conclusion, Si nutrition effectively alleviates P deficiency in wheat by 1) increased P availability in rhizosphere, most probably due to MATE-mediated citrate exudation, and 2) enhanced P acquisition as a consequence of Si-promoted expressions of PT1 transporter in root plasma membrane.

Nikolic N., Kostic L., Djordjevic A., Nikolic M. 2011. Phosphorus deficiency is the major limiting factor for wheat on alluvium polluted by the copper mine pyrite tailings: a black box approach. *Plant Soil* 339: 485-498.

Interveinal chlorosis phenomenon and nitrogen metabolism in substrate-grown strawberry cv. Nyoho

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Substrate-grown strawberries (*Fragaria x ananassa* Duch. cv. Nyoho) often suffer interveinal chlorosis of