

Serbian Plant Physiology Society

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

2nd International Conference on Plant Biology

21th Symposium of the Serbian Plant Physiology Society

COST ACTION FA1106 QUALITYFRUIT Workshop



Petnica Science Center, June 17-20, 2015

2nd International Conference on Plant Biology • 21th Symposium of the Serbian Plant Physiology Society • COST ACTION FA1106 QUALITYFRUIT Workshop
PETNICA SCIENCE CENTER 17-20 JUNE, 2015

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PROGRAMME

2nd International Conference on Plant Biology • 21th Symposium of the Serbian Plant Physiology Society • COST ACTION FA1106 QUALITYFRUIT Workshop PETNICA SCIENCE CENTER 17-20 JUNE, 2015

Wednesday 17th June, 2015

09:00-14:00 *Registration*
14:00-15:00 *Lunch*

Section I: **Plant Biotechnology**

15:00-15:30 *Opening Ceremony*
15:30-16:00 (Invited talk) **Alain Tissier** Systems biology of a plant cell factory, the tomato glandular trichomes
16:00-16:20 (Invited talk) **Jules Beekwilder** Biotechnological production of plant compounds
16:20-16:40 (Invited talk) **Milen Georgiev** Metabolomics, lead, discovery and plant biotechnology: perfect holistic match?
16:40-17:00 (Invited talk) **Dragana Božić** Exploring the secondary metabolism in trichomes of *Salvia fruticosa* and *Rosmarinus officinalis*: the case of carnosic acid
17:00-17:30 *Coffee break*
17:30-17:45 (Selected talk) **Milica Bogdanović** Problems in detecting activity of fluorescent reporter genes – case of DsRED and GFP
17:45-18:00 (Selected talk) **Stevan Jeknić** Alteration of flower color in *Solanum lycopersicum* through ectopic expression of a gene for capsanthin-capsorubin synthase from *Lilium lancifolium*
18:00-18:15 (Selected talk) **Miloš Prokopijević** Characterization of soybean hull peroxidase immobilized on glycidyl methacrylate copolymers
18:30-19:30 *Poster session: Plant Biotechnology*
20:00-21:00 *Dinner*
21:00- *Wine tasting*

Wednesday 17th June, 2015

08:00-09:00 *Breakfast*

Section II: **Plant Growth, Development, Metabolism and Nutrition**

09:00-09:30 (Invited talk) **James Giovannoni** Harnessing genetic diversity to better understand regulation of tomato fruit ripening and nutritional quality
09:30-09:50 (Invited talk) **Christian Fankhasuer** Photosensory receptor-mediated growth responses in Arabidopsis
09:50-10:10 (Invited talk) **David Honys** Male germline development: lesson from the -omics
10:10-10:30 (Invited talk) **Dragan Vinterhalter** Acid growth theory, auxin and potato phototropism
10:30-10:50 (Invited talk) **Bojana Banović** How to avoid self-fertilization in plants- a buckwheat story
10:50-11:20 *Coffee break*

11:20-11:50	(Invited talk) Hrvoje Fulgosi	Revisiting alternative electron partitioning pathways in photosynthesis
11:50-12:10	(Invited talk) Miroslav Nikolić	The rhizosphere: perspective and challenges for plant nutrition
12:10-12:30	(Invited talk) Jelena Samardžić	Silicon alleviates oxidative stress in cucumber plants grown under copper excess
12:30-12:45	(Selected talk) Lidija Begović	Lignin deposition and synthesis in the internodes during barley (<i>Hordeum vulgare</i> L.) development
12:45-13:00	(Selected talk) Milan Dragičević	DUF1070 is a conserved signature domain of some arabinogalactan peptides
13:00-13:15	(Selected talk) Jan Fíla	Phosphoproteomics profiling of tobacco mature pollen and pollen activated <i>in vitro</i>
13:15-13:30	(Selected talk) Václav Motyka	New findings about the role of <i>cis</i> -zeatin-type cytokinins in plant physiology and evolution
14:00-15:00	<i>Lunch</i>	

Section III: Plant and Fungal Natural Products in Human Nutrition and Medicine

15:00-15:30	(Invited talk) Autar Mattoo	Functional Foods & Nutrition: Facts, Fiction, and Needs
15:30-15:50	(Invited talk) Nataša Simin	Wild-growing <i>Allium</i> species (sect. <i>Codonoprasum</i>) as promising sources of novel herbal drugs
15:50-16:10	(Invited talk) Marina Soković	Alternative sources of natural products: mystery of mushrooms and beyond
16:10-16:25	(Selected talk) Miloš Đorđević	<i>Centaurium erythraea</i> extract improves redox-status and antioxidant enzyme activity of STZ-treated pancreatic β -cells and diabetic rat liver and kidney
16:25-16:40	(Selected talk) Bojan Jevtić	Effects of cucumber extracts on cytokine production in encephalitogenic cells
16:40-16:55	(Selected talk) Filis Morina	Quercetin 7- <i>O</i> -glucoside inhibits the formation of dinitrocatechins and their quinones in catechin/nitrite systems under stomach simulating conditions
16:55-17:10	(Selected talk) Milica Pešić	Development of natural product drugs in a sustainable manner
17:10-17:30	<i>Coffee break</i>	

Section IV: Phytochemistry

17:30-18:00	(Invited talk) Roque Bru Martínez	Early and late molecular mechanisms involved in the biosynthesis and accumulation of stilbenoids in elicited grapevine cell cultures established from berries
18:00-18:20	(Invited talk) Sokol Abazi	Chemical analysis of secondary metabolites isolated from endemic Albanian plants with subcritical CO ₂
18:20-18:40	(Invited talk) Vuk Maksimović	Composition and therapeutic values of berry wines - bitter truth about sweet product
18:40-19:00	(Invited talk) Maja Natić	Phenolic profiles of wild fruits grown in Serbia
19:00-19:15	(Selected talk) Dorisa Cela	NMR structure elucidation of a new alkaloid isolated from <i>Gymnospermium maloi</i>
19:15-19:30	(Selected talk) Đura Nakarada	Thapsic acid, a rarely found natural product among bryophyte species
19:30-20:30	Poster sessions: <i>Plant Growth, Development, Metabolism and Nutrition; Plant and Fungal Natural Products in Human Nutrition and Medicine; Phytochemistry</i>	

20:30-21:00	Dinner
21:00-21:30	Presentation of Petnica Science Center
21:30-22:30	Tour around Petnica Science Center

Friday 19th June, 2015

08:00-09:00 Breakfast

Section V: Biodiversity and Conservation

09:00-09:30	(Invited talk) Goran Anačkov	Phenotypic plasticity or new taxa?
09:30-09:50	(Invited talk) Jelena Aleksić	What does Balkan Peninsula has to offer to conservation biologists?
09:50-10:10	(Invited talk) Maja Lazarević	Plant diversity drivers in the Balkans: ploidization, hybridization and cryptic speciation
10:10-10:25	(Selected talk) Zora Dajić Stevanović	Conservation of floristic and vegetation diversity in Southeast Europe: sustainable use and ecosystem services approach
10:25-10:40	(Selected talk) Mihailo Jelić	Assessment of genetic integrity and diversity of <i>Populus nigra</i> in protected areas along the Danube River
10:40-10:55	(Selected talk) Marko Sabovljević	Conservation biology of European bryophytes
11:10-11:30	Coffee break	

Section VI: Evolutionary Plant Biology

11:30-12:00	(Invited talk) Petr Smýkal	Past legume crop domestication and agriculture of tomorrow
12:00-12:20	(Invited talk) Stevan Avramov	Comparative approach in evolutionary ecology of plants
12:20-12:40	(Invited talk) Yuval Sapir	Population divergence and speciation within a species: ecology and the Royal Irises
12:40-12:55	(Selected talk) Aleksej Tarasjev	Population scale multi-year monitoring of <i>Iris pumila</i> in Deliblato Sand: flowering phenology
12:55-13:10	(Selected talk) Vukica Vujić	Light induces variation in size and shape of <i>Iris pumila</i> flower parts in two natural habitats
13:10-13:25	(Selected talk) Sanja Manitašević Jovanović	How do <i>Iris pumila</i> plants respond to photo-oxidative stress in the wild: the variation of leaf functional traits?
13:30-13:45	Group photo	
14:00-15:00	Lunch	

Section VII: Molecular mechanisms underlying health compounds biosynthesis in fruits (COST ACTION FA1106)

11:50-15:40	(Invited talk) Angelos Kanellis	Introduction to Session Genetic improvement of fruits and vegetables for health
15:40-16:10	(Invited talk) Mondher Bouzayen	Cross-talk between multiple hormone signaling pathways associated with the ripening of tomato fruit
16:10-16:40	(Invited talk) Julia T Vrebalov	The role of transcription factors in regulation of tomato fruit ripening and quality

16:40-17:10	(Invited talk) Cathie Martin	Engineering the production of health-promoting metabolites in tomato for studies of comparative nutrition
17:10-17:40	(Invited talk) Giovanni Giuliano	Tomato fruit carotenoid biosynthesis: regulation and evolutionary aspects
17:40-18:10	(Invited talk) Panagiotis Kalaitzis	Suppression of a tomato prolyl 4 hydroxylase results in multiple alterations on fruit development, ripening and health components
18:10-18:30	<i>Coffee break</i>	
18:30-19:30	Poster sessions: <i>Biodiversity and Conservation; Evolutionary Plant Biology</i>	
21:00-	<i>Gala dinner</i>	

Saturday 20th June

08:00-09:00 *Breakfast*

Section VIII: Abiotic and Biotic Stress and Ecophysiology

09:00-09:30	(Invited talk) Harro Bouwmeester	Strigolactones. Key players in the adaptation of plants to the abiotic environment
09:30-09:50	(Invited talk) Miroslav Lisjak	H ₂ S and NO signalling in plants
09:50-10:10	(Invited talk) Jelena Savić	Essential oils elicit defense genes in potato: Can volatiles released from damaged plants prime defense in their undamaged neighbours?
10:10-10:30	(Invited talk) Živko Jovanović	<i>Alyssum markgrafii</i> as a model organism to study metal hyperaccumulation
10:30-10:45	<i>Coffee break</i>	
10:45-11:00	(Selected talk) Dejana Panković	The influence of <i>Trichoderma</i> spp. treatment on water regime, ABA content and gene expression in leaves and roots of tomato in drought conditions
11:00-11:15	(Selected talk) Zorana Katanić	Effect of dynamic changes of vegetative compatibility types in <i>Cryphonectria parasitica</i> populations on biological control of chestnut blight in Croatia
11:15-11:30	(Selected talk) Nevena Nagl	Effect of <i>in vitro</i> induced water deficit on lipid peroxidation intensity and antioxidant capacity of sugar beet
11:30-11:45	(Selected talk) Marija Vidović	High PAR and UV-B radiation-induced differential responses in green and white leaf sectors of <i>Pelargonium zonale</i> in relation to sugar, antioxidative and phenolic metabolism
12:00-13:00	Poster session: <i>Abiotic and Biotic Stress and Ecophysiology</i>	
13:00-13:30	<i>Closing Ceremony</i>	
13:30-14:30	<i>Meeting of the Serbian Plant Physiology Society/Cost Action FA1106</i>	
14:30-15:30	<i>Lunch</i>	
16:00-19:30	<i>Excursion (Gradac Canyon and "Čelije" Monastery)</i>	
19:30	<i>Departure</i>	
21:00	<i>Arrival in Belgrade</i>	

ea but also by reduction in concentrations of photosynthetic pigments in the presence of 10^{-3} and 10^{-4} M Y. At applied concentrations Y did not show any stimulating effect on growth of young maize and sunflower plants.

Keywords: yttrium, *Helianthus annuus*, *Zea mays*

Financial support of the Ministry of Education, Science and Technological Development of the Republic of Serbia (TR 31016) is highly acknowledged.

Specificity of aquatic macrophytes *Phragmites communis* Trin, *Salvinia natans* L. and *Utricularia vulgaris* L. in the accumulation of manganese and iron in the Bardača area (Republic of Srpska)

PP8-27

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The paper deals with Fe and Mn content analysis in water, sediment and tissue of *Phragmites communis* Trin, *Utricularia vulgaris* L. and *Salvinia natans* L. on two localities in the area of Bardača (Necik and Sinjak – active fish ponds) in May–October the period. During the season, Fe and Mn concentration in the water was in the range of maximum permitted values (0.05 – 0.240 mg L⁻¹ for Fe and 0.037 – 0.086 mg L⁻¹ for Mn), while manganese value in the sediment during October was higher than regulated (618.33 mg kg⁻¹). Fe and Mn concentrations in the tissue of studied macrophytes varied in relation to species, locality and period of sampling. The highest Fe concentration was recorded during June for *Salvinia natans* (1.646 mg kg⁻¹) on both examined localities, while the highest determined Mn value was during May in *Utricularia vulgaris* (620 mg kg⁻¹). In terms of Fe content, the accumulation sequence in studied macrophyte species on both researched pools was declining in the following sequence: *Salvinia natans* > *Utricularia vulgaris* > *Phragmites communis* – rhizome > *Phragmites communis* – above-ground part. For Mn, bioaccumulation sequence was somewhat different: *Utricularia vulgaris* > *Salvinia natans* > *Phragmites communis* – above-ground part > *Phragmites communis* – rhizome. Results obtained in the paper indicate a different capacity for Fe and Mn accumulation between the studied species, which may be of great importance at selection of potential species in phytoremediation technique.

Keywords: heavy metals, phytoremediation, *Phragmites communis* Trin, *Utricularia vulgaris* L., *Salvinia natans* L.

Changes in polyphenols content in soybean and *Datura stramonium* after treatment with the herbicides and Delfan Plus®

PP8-28

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The most common herbicide combination for weed prevention in soybean is Pulsar 40 and Harmony 75WG, but when applied during hot days these herbicides may induce oxidative stress in plants. Delfan Plus®

is a biostimulator with high amino acid content which can be used in combination with herbicides. Manufacturer advertises it as a supplement for faster protein synthesis and thus, overcoming stress conditions caused by high and low temperatures, drought, herbicides etc. In order to investigate the ability of Delfan Plus® to mitigate the effect of herbicides on soybean plants (and its weed species *Datura stramonium* L.), we analyzed the accumulation of polyphenolic compounds (total polyphenols, tannins, flavonoids and proanthocyanidins), as well as phytotoxicity and grain yield. In addition, we determined the antioxidant capacity of plant extracts in DPPH and NBT-tests. Soybean cultivar Sava was treated with Pulsar 40 + Harmony 75WG (1 L ha⁻¹ + 8 g ha⁻¹ and 2 L ha⁻¹ + 16 g ha⁻¹, respectively), with or without Delfan Plus® (1 L ha⁻¹ and 2 L ha⁻¹, respectively). Biochemical parameters analyzed showed that Delfan plus® did not decrease the level of stress in plants. Most parameters increased their values 7 days after the treatment, compared to day 1, which was expected. Specimens of *D. stramonium* were especially stressed after herbicide treatment. Although soybean yield was somewhat higher after the treatment with normal dose of herbicides and Delfan plus® (3.28 t ha⁻¹), there were no statistical differences between the treatments. Hence, the question of the application of this biostimulator in agronomic practice may be raised.

Keywords: abiotic stress, herbicides, soybean, biostimulators, polyphenols

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Tomato fruit growth under regulated deficit irrigation

PP8-29

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Under current climate conditions of drought and scarce water supply, the challenge for agricultural production is to increase irrigation water use efficiency and sustained crop yield. Regulated deficit irrigation (DI) is a new deficit irrigation strategy which may decrease demand for agricultural use of water for many crops, including tomato. The aim of this study was to investigate the effects of DI on tomato fruit growth, the activity of cell wall-associated peroxidase and ABA content in the pericarp of tomato cultivar Ailsa Craig. The experiment was done in controlled conditions and plants under DI received 50% of water given to fully irrigated (FI) plants. ABA content in fruit pericarp was measured by ELISA test and cell wall-associated peroxidase activity by a guaiacol test. Fruit growth rate was significantly higher in FI plants than DI and the final diameter of tomato fruits was higher in FI than in DI fruits. ABA content in tomato pericarp showed significant difference in the initial stages of fruit development (15 and 20 dpa) in DI treated plants compared to FI. During tomato fruit development ABA content declined until the end of cell growth phase without significant differences between DI and FI plants. The significant increase in the activity of the enzyme cell wall-associated peroxidase in DI tomato fruit pericarp coincided with the end of cell growth and the beginning of the ripening process. These results pointed out that this enzyme may control tomato fruit maturation and may have influence on fruit growth rate.

Keywords: regulated deficit irrigation, tomato fruit growth, ABA, cell wall-associated peroxidase

The study was supported by projects TR 31005 and FP7 AREA.