

Serbian Plant Physiology Society

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

# 2<sup>nd</sup> International Conference on Plant Biology

## 21<sup>th</sup> Symposium of the Serbian Plant Physiology Society

### COST ACTION FA1 106 QUALITYFRUIT Workshop



Petnica Science Center, June 17-20, 2015

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

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## PROGRAMME

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

#### Wednesday 17<sup>th</sup> June, 2015

09:00-14:00 *Registration*

14:00-15:00 *Lunch*

#### Section I: **Plant Biotechnology**

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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 Georgi** 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 17<sup>th</sup> June, 2015

08:00-09:00 *Breakfast*

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

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

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

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

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**Section IV: Phytochemistry**

17:30-18:00	(Invited talk) <b>Roque Bru Martínez</b>	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) <b>Sokol Abazi</b>	Chemical analysis of secondary metabolites isolated from endemic Albanian plants with subcritical CO <sub>2</sub>
18:20-18:40	(Invited talk) <b>Vuk Maksimović</b>	Composition and therapeutic values of berry wines - bitter truth about sweet product
18:40-19:00	(Invited talk) <b>Maja Natić</b>	Phenolic profiles of wild fruits grown in Serbia
19:00-19:15	(Selected talk) <b>Dorisa Cela</b>	NMR structure elucidation of a new alkaloid isolated from <i>Gymnospermium maloi</i>
19:15-19:30	(Selected talk) <b>Đura Nakarada</b>	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	<i>Dinner</i>
21:00-21:30	<i>Presentation of Petnica Science Center</i>
21:30-22:30	<i>Tour around Petnica Science Center</i>

### Friday 19<sup>th</sup> June, 2015

08:00-09:00 *Breakfast*

#### Section V: Biodiversity and Conservation

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

#### Section VI: Evolutionary Plant Biology

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

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

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

16:40-17:10	(Invited talk) <b>Cathie Martin</b>	Engineering the production of health-promoting metabolites in tomato for studies of comparative nutrition
17:10-17:40	(Invited talk) <b>Giovanni Giuliano</b>	Tomato fruit carotenoid biosynthesis: regulation and evolutionary aspects
17:40-18:10	(Invited talk) <b>Panagiotis Kalaitzis</b>	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 20<sup>th</sup> June

08:00-09:00 *Breakfast*

#### Section VIII: Abiotic and Biotic Stress and Ecophysiology

09:00-09:30	(Invited talk) <b>Harro Bouwmeester</b>	Strigolactones. Key players in the adaptation of plants to the abiotic environment
09:30-09:50	(Invited talk) <b>Miroslav Lisjak</b>	H <sub>2</sub> S and NO signalling in plants
09:50-10:10	(Invited talk) <b>Jelena Savić</b>	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) <b>Živko Jovanović</b>	<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) <b>Dejana Panković</b>	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) <b>Zorana Katanić</b>	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) <b>Nevena Nagl</b>	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) <b>Marija Vidović</b>	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/Coast Action FA1106</i>	
14:30-15:30	<i>Lunch</i>	
16:00-19:30	<i>Excursion (Gradac Canyon and "Ćelije" Monastery)</i>	
19:30	<i>Departure</i>	
21:00	<i>Arrival in Belgrade</i>	

## Genetic mapping of a broomrape resistance gene in sunflower line LIV-17

PP1-7

Ivana Imerovski, Aleksandra Dimitrijević, Dragana Miladinović, Boško Dedić,  
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Broomrape (*Orobancha cumana* Walr.) is becoming the most important limiting factor in sunflower production in Europe. The parasite considerably reduces sunflower yield and reduces seed oil content, leading to great economic losses. While the application of herbicides is limited for health and economic reasons, breeding for resistance is regarded as the most effective and environmentally friendly solution. Still, broomrape race composition constantly changes and new, more aggressive physiological races appear. Therefore, finding new sources of resistance and developing molecular markers for detecting *Orobancha* resistance genes are of immense importance in sunflower breeding. Line LIV-17 is a sunflower inbred line that was found to be resistant to new races of broomrape in heavily infested locations in Spain, Romania and Turkey during trials conducted from 2007 to 2010. In the present study, preliminary molecular analyses with the use of bulked segregant analysis (BSA) were conducted with the aim of identifying the region of the genome that could potentially carry the resistance locus. For this purpose, a mapping F<sub>2</sub> population from a cross LIV-17/HA-26-PR was used. Two contrasting bulks were prepared, each containing DNA from extremely resistant or susceptible F<sub>2</sub> plants. In total 210 SSR markers were selected from 17 linkage groups from the public genetic map of sunflower. Preliminary results indicated that the resistance gene was placed in LG3 of the sunflower genetic map. Identification of closely linked molecular markers which will enable marker-assisted selection is underway.

**Keywords:** sunflower, broomrape, SSR

## Recent advancements in the production of a red *Iris* flower through genetic engineering

PP1-8

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The elusive red iris (*I. germanica*, *I. hollandica*) has been a subject of interest for over a century as it does not exist naturally and efforts with classical breeding methods have failed to produce it. Genetic engineering, on the other hand, offers alternative ways of introducing this desirable trait by expanding the color-determining gene pool that is available. We first studied the effects of ectopic expression of a bacterial phytoene synthase gene (*crtB*) from *Pantoea agglomerans* in the pink *I. germanica* cultivar 'Fire Bride'. This approach aimed to increase the flux of metabolites into the carotenoid biosynthetic pathway, and ultimately lead to elevated accumulation of lycopene, thus generating darker pink or red flowers. *CrtB*-transgenic plants showed prominent color changes in the ovaries (green to orange), flower stalk (green to orange), and anthers (white to pink) when compared to control plants, while the standards and falls showed no significant color change. Next, we studied the feasibility of using a gene for capsanthin-capsorubin synthase (*Llcs*) from tiger lily (*Lilium lancifolium* 'Splendens') in yellow iris flowers to alter their color to red. This approach aimed to produce the flower-specific accumulation of two red  $\kappa$ -xanthophylls, capsanthin and capsorubin. *Llcs*-transgenic iris