

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

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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"**

Antioxidant activity, total phenolic content and allelopathic effects of *Juniperus communis* essential oil

PP5-8

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There is a great demand for different medical and aromatic plants in the world. Nowadays their use is limited to pharmaceutical and cosmetic industry. However, by exploring the biochemical properties of essential oils, their usage could expand further to medicine, ecology and agriculture. The aim of this research was to examine antioxidative properties, total phenolic content and allelopathic effects of the commercially purchased *Juniperus communis* essential oil on lettuce (*Lactuca sativa*) and radish (*Raphanus sativus*) seeds. The antioxidant potential of the extract was determined using DPPH free radical scavenging method. Antioxidant activity was expressed as IC₅₀ value. The total phenolic content was determined using Folin Ciocalteu reagent. The IC₅₀ value of *J. communis* essential oil was 20.30 mg mL⁻¹, while the total phenolic content was 0.06 mg GAE mL⁻¹. The inhibitory effect of different essential oil concentrations (10, 20 and 30 µg mL⁻¹; water was used as a control) on the germination rate and the root and seedling length was also analysed. *J. communis* essential oil did not cause noticeable variations in germination percentage in seeds of both tested species. The average germination rate for all treatments was above 82%. According to these results, the *J. communis* essential oil at applied concentrations did not have an inhibitory effect on the growth of both salad and radish seedlings.

Keywords: essential oil, *Juniperus communis*, allelopathy

Dry matter content in sunflower plant organs depending on the seed size

PP5-9

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The mass of the plants depends on assimilates, which are formed in the process of photosynthesis and their amount varies depending of different factors. In this study the influence of seed size on the sunflower plant dry matter content at the bud stage was examined. Natural seeds of sunflower hybrid Oliva were separated into six grades. First, seeds were separated in two grades according to the dimensions, and then seed separation according to the specific weight within these grades was carried out. The field experiment during two growing seasons was carried out at two localities. The accumulation of dry matter was observed in bud stage. The individual plant organs were analyzed – stems, leaves, petioles and buds. Data were analyzed using three-way ANOVA for a split-split-plot model design. The dry matter content in the plant organs was significantly influenced by weather conditions in experimental years, localities, as well as the seed grades. At this stage, the highest content of dry matter was in the buds (39.22%), followed by leaves (13.86%),

stems (9.99%) and finally the petioles (7.68%). The highest dry matter content of stems was observed in grades of large and heavy seeds (10.01%-10.41%), while the lowest was observed in grades of small and light seeds (9.72%-9.93%). The results obtained for leaves were the same as the results for stems, while the dry matter content of petioles and buds was reversed. Also, the results of this study indicate that there is no regularity in the amount of dry matter collected by the seed grades of the tested hybrid.

Keywords: sunflower, seed size, plant organ, dry matter content

This research is part of the Project TR 31025: Development of new varieties and production technology improvement of oil crops for different purposes, funded by The Ministry of Education, Science and Technological Development of the Republic of Serbia.

Comparison of seed germination and seedling growth of wild and cultivated sunflower

PP5-10

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The physiological parameters of the seeds were monitored in 4 annual wild sunflower species and 7 genotypes of cultivated sunflower. Seed germination and parameters of growth (seedling mass and length of seedling shoots and roots) were tested under laboratory conditions using the standard laboratory test. Wet sterilized filter paper was used as the germination medium. The emergence in field conditions of cultivated sunflower was also tested. Field emergence is determined by counting the plants between the phase of well-developed first pair and the beginning of development of the second pair of leaves. The obtained results indicate differences in seed germination of wild (averaged 73%) and cultivated sunflower (averaged 95%), where the germination of cultivated sunflower was expected to be higher. Comparing the germination of cultivated sunflower in laboratory and field conditions, it is noted that the germination was lower in the field (averaged 72%), and that in laboratory conditions it was uniform in all genotypes, while significant differences were observed in the field. After analyzing the results of growth parameters measurements, the differences between the length of wild sunflower seedling roots (1.5-2.5 cm) and shoots (1.7-3.1 cm) and the length of cultivated sunflower seedling roots (3.4-9.0 cm) and shoots (3.9-6.9 cm), as well as within the studied groups, were observed. However, in the case of seedling dry mass, the differences were observed between genotypes but not among the studied groups. Furthermore, it was noticed that some wild sunflower genotypes created twice as much amount of dry matter (6.0-26.0 g per plant) as compared to cultivated genotypes (4.28-11.17 g per plant).

Keywords: wild and cultivated sunflower, germination, length of seedlings roots and shoots, dry matter

This research is part of the Project: Anatomic characterization of wild sunflower collection as a potential genepool for cultivated sunflower breeding in Vojvodina (Grant No. 114-451-2126/2016-03), funded by The Provincial Secretariat for Higher Education and Scientific Research, APV.