

Department of Biology and Ecology,
Faculty of Sciences and Mathematics, University of Niš
Biological Society "Dr Sava Petrović" Niš

**11th Symposium
on the Flora of Southeastern Serbia
and Neighbouring Regions**

Vlasina Lake 13 to 16 June 2013



**11. Simpozijum
o flori jugoistočne Srbije
i susednih regiona**

Vlasinsko jezero 13. do 16. jun 2013.

**ABSTRACTS
APSTRAKTI**

Niš, 2013

elements distributions within whole, unstained, biological samples; e.g. single cell, and tissues with sub-ppm detection limit. SR-XRF may be useful method in furthering knowledge of the changes in elements distribution in plants under various environmental conditions. We obtained various elements quantity, distribution and grouping/collocation in straight and twisted *D. balcanica* internodes. Macronutrient elements (K, P, Ca, Cl) are distributed homogeneously in both straight and twisted internodes. Micronutrient elements (Cu, Zn Mn, and Fe) are mostly grouped in the vasculature scattered through parenchyma cells and in the sclerenchyma cell layer. Collocation of micronutrients is much more expressed in twisted than in straight internodes. Differences between straight and twisted internodes, observed by combination of SR-XRF and statistical/image analysis provide an additional aspect to research on mechanism and properties of twining system in climbing plants. SR-XRF may be useful method in furthering knowledge of the changes in elements distribution in plants under various environmental conditions.

Acknowledgement: This work was supported by a grant I73017 from the MESTD of the Republic of Serbia. This experiment was carried out at the light source DORIS III, beamline L at DESY, a member of the Helmholtz Association (HGF), project Number II-20080239.

Fluorescence detected linear dichroism of cellulose fibers in *Picea omorika* stems as a measure of mechanical stress

Savić, A.¹, Mitrović, A.¹, Simonović-Radosavljević, J.¹, Bogdanović-Pristov, J.¹, Steinbach, G.², Garab, G.², Radošević, K.¹

¹Institute for Multidisciplinary Research, University of Belgrade, Serbia

²Institute of Plant Biology, Biological Research Center, H-6701 Szeged, Hungary

e-mail: mita@ins.rs

Picea omorika (Pančić) Purkyně is a Balkan endemic coniferous species and Tertiary relict of the European flora. Resistance of trees to breakage or overturning depends on its structural modifications for mechanical strength. In gymnosperms, leaning stem develops reaction wood on the compression side of the lean (compression wood). Compression wood contains higher amounts of lignin and lower amounts of cellulose compared to normal wood. In order to illuminate the adaptive strategy facilitating *P. omorika* trees survival in their natural cliff habitats, characterized by strong wind, snow or rockfall, we analyzed distribution and orientation of cellulose fibers, as a measure of structural order in cell walls, in stems subjected to static bending stress. Fluorescence detected linear dichroism (FDLD) microscopy represents a unique technique that provides anisotropic molecular

architecture of different microscopic objects beyond the classical fluorescence emission microscopy. Such approach provides the examination of the finest orientation properties of the material. In our measurements FDLD microscopy exploits fluorescence originated from cellulose fibers stained by Congo red. The FDLD measurements show that structural order in the cell walls is higher in the compression wood in comparison with normal wood. Cellulose fibers in cell walls of compression wood show higher complexity in arrangement, alignment and orientation, as well as changes in microfibrillar angle in middle lamella, primary and secondary wall. Image analysis points out reinforcement of cell walls oriented normally to the direction of bending force, as opposed to weakening of cell walls parallel to the force direction.

Acknowledgement: This work was supported by a grant I73017 from the MESTD of the Republic of Serbia and bilateral Hungary-Serbia project: Structural anisotropy of the plant cell walls of various origin and their constituent polymers, using DP-LSM.

Oxidative stress in soybean seedlings treated with *Thymus serpyllum* aqueous extract

Šućur J.¹, Popović, M.¹, Prvulović, D.¹, Malenčić, D.¹, Kiprovski, B.¹

¹Faculty of Agriculture, University of Novi Sad, Serbia

e-mail: bkkiprovski@gmail.com

The aim of this study was to examine the impact of *Thymus serpyllum* L. aqueous extract on soybean antioxidant properties so as to assess its possible side effects when applied as bioherbicide in soybean organic production. The effect of different concentrations of *Thymus serpyllum* L. aqueous extracts (0.05, 0.1 and 0.2 %) on lipid peroxidation process (LP), as well as reduced glutathione content (GSH) in leaves and roots of 14-days-old soybean seedlings were examined 24 and 72 h after the treatment. Our results showed that only highest concentration of the extract used (0.2%) induced process of lipid peroxidation in soybean leaves 72 h after the treatment. However, 24 and 72 h after the treatment with 0.1% *T. serpyllum* aqueous extracts, soybean leaves had the highest GSH content, which indicate to possible stimulative effect of *T. serpyllum* aqueous extracts on antioxidant system of soybean when applied in low concentration.