Serbian Plant Physiology Society

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

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*Programme and Abstracts*

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*de novo* assembled *C. erythraea* transcriptome, five potential AGP sequences were found by BLAST-ing local leaf and root databases using known plant AGP sequences as queries. The five isolated sequences (cDNAs) were resequenced, labeled as CeAGP1 through CeAGP5, annotated and uploaded to the GenBank (accessions KC733882 through KC733886). Searching GenBank protein database using translated centaury sequences as queries revealed that CeAGP1, 2 and 4 are fasciclin-like proteins with the FAS1 domains, belonging to the Fasciclin superfamily. CeAGP3 and CeAGP5 also have homology with other plant AGPs, but have no known conserved domains. While CeAGP2, 3 and 5 appear to be complete coding sequences with 461, 64 and 202 amino acids respectively, CeAGP1 and 4 are partial sequences with more than 225 and 335 amino acids respectively. The sequenced transcripts differ in the degree of homology with other known plant AGPs. The alignments of novel putative AGPs with published plant AGPs, as well as recognized protein domains are presented. Expression of all 5 genes was confirmed in both leaves and roots by RT-PCR. The sequenced centaury AGPs will be evaluated as potential molecular markers for early developmental stages of somatic embryogenesis in centaury.

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## Vector construction for promoter analysis in chicory and fluorescence evaluation by agroinfiltration

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Chicory (*Cichorium intybus* L.) is rich in sesquiterpene lactones, compounds known for their bitter taste and medicinal properties. Most enzymes involved in the biosynthetic pathway of these secondary metabolites have recently been discovered and characterized. The first step in their biosynthesis is catalyzed by germacrene A synthase (GAS), in chicory present in two forms – long and short, and several P450 mono-oxygenases. So far, promoters of these genes have not been studied, and little is known about the spatial and temporal regulation of their expression. To address this issue, four vectors for plant transformation containing promoter-reporter gene fusions were designed and constructed by Gateway cloning, including one for GAS long, two for GAS short, and one for the cytochrome P450, germacrene A oxidase. As a marker for co-transformation, DsRED, a red fluorescent protein, was used, while the studied promoters were inserted to drive GFP/GUS fusion, to allow for visualization of promoter activity. Integrity and function of the constructs were checked by agroinfiltration in lettuce (*Lactuca sativa* Cv. Olof) – a transient transformation assay. Infiltration was performed with *Agrobacterium tumefaciens*, carrying the promoter constructs. Transformation success was checked five days after infiltration by fluorescent stereomicroscopy, and both DsRED and GFP were detected, indicating that the chicory promoters were active in lettuce. DsRED had strong and uniform fluorescence in all samples, but GFP fluorescence varied among plants infiltrated with different constructs. The GAS long promoter had strongest expression, followed by the P450 and the two rather weak GAS short promoters. The fluorescence was visible only in the infiltrated parts of the leaves, in tissues between leaf veins, but not in the veins themselves. Both abaxial and adaxial leaf sides were fluorescing. There were no differences observed between spatial distribution of DsRED and GFP: all infiltrated parts showed both markers. Since these vectors were con-





firmed to be functional, stable transform
*genes* carrying the same promoter constr
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## Application of CdSe nanopa

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Quantum dots (QDs) are semiconduc
ers. The application of QDs as markers of
vantageous because of their small size, br
and stability under relatively harsh enviro
In a plant cell the CW is a first target place
isolated from a conifer – *Picea omorika* (Pa
orescence microscopy, fluorescence and F
induce structural changes in the CW, and
The isolated CW is an appropriate object
The results obtained in this study show th
wall of *P. omorika*. QDs are linked with lig
chains. The interaction of QDs with cellulo
the cell wall, as a result of interaction with
wall. The presented results also show tha
The results have an implication on the use
This work was supported by the Grant 173
velopment of the Republic of Serbia. This
and Sciences Bridge funding.

[1] W.W. Yu, E. Chgang, R. Drezek, V.L. Colvin, Bioch

## The role of DIMBOA in maize DIMBOA biosynthesis *bx1* ge

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DIMBOA (2-4-dihidroksi-7-metoksi-1
longs to benzoxazinoid class of chemica
sects and other pests. It is present in many

firmed to be functional, stable transformants of chicory will be generated by transformation using *A. rhizogenes* carrying the same promoter constructs.

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## Application of CdSe nanoparticles in plant biology research

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Quantum dots (QDs) are semiconductor nanoparticles that are widespread in biology as fluorescent markers. The application of QDs as markers of the cells or their cell walls (CW) for plant bio-imaging would be advantageous because of their small size, brightness, independence of emission on the excitation wavelength, and stability under relatively harsh environments. They also have excellent photo stability [1].

In a plant cell the CW is a first target place for external agents. We studied interaction of CdSe QDs with CWs isolated from a conifer – *Picea omorika* (Panč) *Purkyne* branch. Binding of CdSe QDs was followed by using fluorescence microscopy, fluorescence and FT-IR spectroscopy. The aim of the study was to see whether the QDs induce structural changes in the CW, and to find out which kind of interactions between QDs and CWs occur. The isolated CW is an appropriate object for study of the interactions with nanoparticles.

The results obtained in this study show that the CdSe QDs linked primarily to cellulose and lignin in the cell wall of *P. omorika*. QDs are linked with lignin mainly through interaction with the C-C and C = C branched chains. The interaction of QDs with cellulose is accomplished through OH groups. Structural redistribution in the cell wall, as a result of interaction with QDs, is significantly dependent on the presence of water in the cell wall. The presented results also show that the QDs are suitable for homogeneous labeling of CW structure. The results have an implication on the use of the QDs in plant bioimaging.

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[1] W.W. Yu, E. Chgang, R. Drezek, V.L. Colvin, Biochem. Biophys. Res. Commun. 348 (2006) 781

## The role of DIMBOA in maize biotic stress resistance – presence of DIMBOA biosynthesis *bx1* gene in NS inbred lines

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DIMBOA (2-4-dihidroksi-7-metoksi-1,4-benzoksazin-3-on) is a secondary metabolite in grasses which belongs to benzoxazinoid class of chemical compounds and have a protective role against bacteria, fungi, insects and other pests. It is present in many species of *Poaceae* family, including maize, wheat and rye. In maize,