



BOOK of **ABSTRACTS**

4th INTERNATIONAL CONFERENCE ON PLANT BIOLOGY (23rd SPPS Meeting)



**6-8 OCTOBER 2022
BELGRADE**

Serbian Plant Physiology Society

**Institute for Biological Research “Siniša Stanković”
National Institute of Republic of Serbia, University of Belgrade**

Faculty of Biology, University of Belgrade

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Transient overexpression of β -glucosidase in leaves of *Centaureum erythraea* Rafn reduces the content of secoiridoid glucosides

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Centaureum erythraea Rafn, also known as common centaury, is a rich source of pharmaco-logically active specialized metabolites among which secoiridoid glucosides (SG) predomi-nate. These compounds belong to the group of monoterpenoids, which are derived from the iridoid cyclopentan-C-pyran skeleton with β -D glucose linked at C1 position. Major SGs of *C. erythraea* (sweroside, swertiamarin, and gentiopicrin) are biosynthesized through general iridoid pathway via secologanin, and it has been recently proved that their catabolism starts with the deglycosyla-tion step catalyzed by beta-glucosidases (BGlu). Two BGlu genes from *C. erythraea* (CeBGlu1 and CeBGlu2), with previously confirmed function, were transiently overexpressed in leaves of five-month-old diploid and tetraploid centaury plants. Agroinfiltration of *Agrobacterium tumefaciens* GV3101 strain harboring genes of interest in TMV-based overexpression pJL-TRBO vector (pJL-TR-BO:CeBGlu1; pJL-TRBO:CeBGlu2) result-ed in transient *in planta* overexpression of CeBGlu1 and Ce-BGlu2. Metabolic profiling of secoiridoids in leaves of diploid and tetraploid *C. erythraea* genotypes revealed that amounts of sweroside, swertiamarin, and gentiopicrin, were significantly reduced in agroinfiltrated leaves, especially when CeBGlu1 and CeBGlu2 were co-expressed with transgene silencing suppressor p19. Diploid plants displayed more pronounced decrease in SGs content than tet-raploids. The effectiveness of gene overexpression was obviously altered by plant ploidy, and was under the control of post-transcriptional gene silencing mechanisms in the infiltrated tis-sues. Transgenes are more prone to transcriptional inactivation in *C. erythraea* tetraploids than in diploids. In conclusion, SGs-specific β -glucosidases could serve as a molecular target of biotech-nological interest, in order to shape SG profiles of centaury and related economically important species of the Gentianaceae family.

Keywords: *Centaureum erythraea*, secoiridoid glucosides, beta-glucosidase

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