

BOOK OF ABSTRACTS

3rd International Conference on Plant Biology (22nd SPSS Meeting)



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

Faculty of Biology, University of Belgrade

**3rd International Conference
on Plant Biology
(22nd SPPS Meeting)**



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Diploid and tetraploid *Centaurium erythraea* Rafn: a comparative study of regenerative *in vitro* potential and biosynthetic capacity

PP4-2

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Polyploidy, or duplication of the entire genomes, is a widespread mechanism in plants which can lead to changes in cytological, biochemical, physiological and developmental characteristics, including conspicuous changes in morphology and metabolite production. In this study, we examined the impact of ploidy level on regenerative *in vitro* potential and biosynthetic capacity of *C. erythraea* plants. Ten genotypes of diploid (2x) and autotetraploid (4x) centaury, with ploidy levels confirmed by flow cytometry, were randomly selected from *in vitro* pool of seedlings maintained on hormone-free half-strength MS medium (½ MS). Root explants were excised either from basal, middle or apical root zone of 3 month-old plants. *In vitro* morphogenesis was induced on ½ MS medium. The frequency of shoot regeneration and the average number of shoots per root explant were recorded after 5 weeks in culture. Regeneration frequency was genotype dependent, but not affected by explant ploidy level. Regeneration efficiency declined from the apical to the basal root segment. Regenerated shoots were transferred onto ½ MS medium for rooting. Iridoid glycosides (loganic acid, loganin), secoiridoid glycosides (secologanin, sweroside, swertiamarin, gentiopicrin) and xanthenes (decussatin, eustomin, methylbellidifolin, desmethyleustomin) were quantified in shoots and roots of two month-old plants using targeted UHPLC-qqqMS analysis. Interestingly, diploid plants showed higher biosynthetic capacity for the production of secoiridoids and xanthenes in both shoots and roots. Furthermore, two month-old shoots of 2x genotypes produced higher shoot and root biomass than 4x plants. Results highlight a great potential of diploid *C. erythraea* genotypes for biotechnology-based sustainable production of secoiridoids.

Keywords: *Centaurium erythraea*, ploidy level, morphogenesis *in vitro*, secoiridoids, xanthenes

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Xanthone accumulation in *Gentiana utriculosa* L. hairy roots and regenerated plants

PP4-3

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Gentiana utriculosa is an annual plant, 5-30 cm in height, with deep azure-blue flowers. It has wide distribution in the mountains of Central Serbia. The aerial parts of *G. utriculosa* are characterized by the presence of xanthone-*O*-glycosides with 1,3,7,8-oxidation pattern along with xanthone and flavone-*C*-glucosides. Hairy root culture of *G. utriculosa* was established using *Agrobacterium rhizogenes* A4M70GUS. During the cultivation of hairy roots, spontaneous regeneration of