

PLANT PHYSIOLOGY

Effect of induced polyploidy in ecophysiological processes in plants.

supervisor: doc. RNDr. Peter Paľove-Balang, PhD.(peter.palove-balang@upjs.sk)

consultant: Mgr. Vladislav Kolarčík, PhD.

study form: full time

Annotation: Polyploidization, the multiplication of the nuclear genome of all cells of an organism, is one of the most significant evolutionary mechanisms in plants that affects their ability to adapt to environmental changes. Our knowledge on direct effects of polyploidisation on ecophysiological processes is very limited. Most of studies was performed on natural diploids and polyploids, which are not necessarily genetically identical, which complicates interpretation of experimental studies. An advantage represents plant systems, which includes diploids and synthesized polyploids. The aim of student during PhD period will be to induce polyploids in selected model plant group, characterise them and used to study the role of polyploidy in ecophysiology of plants. The aims of the work are: 1. to clarify the relationship between the level of endopolyploidy and selected stress factors (e.g. water deficit, salinity, UV radiation, biotic stress), while the level of stress response of plants will be monitored by measuring standard stress parameters (ROS, plant photosynthetic activity, secondary metabolites production...) and 2. to elucidate the effect of polyploidy on expression of selected genes, which are exprimed during induced stress reaction of plants.

Environmental role of lichen secondary metabolism.

supervisor: prof. RNDr. Martin Bačkor, DrSc. (martin.backor@upjs.sk)

consultant: RNDr. Michal Goga, PhD.

study form: full time

Annotation: Lichens are the dominant vegetation of approximately 8% of terrestrial ecosystems and are typically found in environments subject to extremes such as temperature, desiccation and nutrient status. One of the most fascinating results of symbiosis between mycobionts and photobionts is production of more than 1000 specific compounds, mostly restricted to this group of organisms. Typical secondary metabolites of lichens are secreted by the fungal partner. These are deposited mainly as crystals on the surface of mycobiont hyphae including dibenzofuran derivatives, depsides, and depsidones. Lichen substances have many ecological roles, including mainly antimicrobial activity, antiherbivory, allelopathy, protection against UV radiation and are also involved in rock mineralization and pedogenesis. Lichen substances are known as chelators of cations, which include also the heavy metals. Main aim of this study is deepen understanding of complex role of secondary metabolism in lichen ecology.