„Genetic diversity of lichen photobionts of Bolivia”
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Lichen symbiosis is a complex association between lichens known also as lichenized fungi (mycobionts) and algae and/or cyanobacteria (photobionts). Variable patterns of mycobiont-photobiont associations have been detected in lichens (lichenized fungi). The extent to which these associations are specific, is still largely unknown, and likely may be correlated with the dispersal mode of the partners. However, tropical lichens are still poorly understood
in relation to their photobionts and interactions between both partners.

The first aim of my PhD thesis was to determine of the pool and genetic variability represented by selected photobionts (Trentepohliaceae and Trebouxiophyceae: *Trebouxia* and *Asterochloris*) of Bolivian lichens. A total of 581 lichen specimens representing 61 lichen genera from various Neotropical ecosystems were investigated. Various molecular markers were used, such as ITS rDNA, the nuclear 18S rRNA gene and the chloroplast rbcL; and in few cases of unique lineages of *Asterochloris* the *actin* type I gene was amplified. New phylogenetic lineages of Trentepohliaceae and Trebouxiophyceae (*Trebouxia* and *Asterochloris*) were identified in the studied lichens as a result of molecular data analyses. A large genetic diversity as well as varied habitat and climatic preferences of individual phylogenetic lineages have been demonstrated. Furthermore, the interactions between lichen bionts were determined using evaluation of selectivity and specificity levels based on different approaches for selected lichen groups, i.e., the variation partitioning in redundancy analysis and haplotype analysis were applied. It was revealed that, green algal lineages show the whole spectrum of specificity
to different taxonomic groups of mycobionts. The structure of photobionts community may be affected by many factors, and usually it is a group of factors that accumulate with each other to create specific habitat conditions. To reveal the structure of Bolivian photobiont community, we analysed their relationships with lichen-forming fungi species at different taxonomical levels, and assessed the effects of habitat conditions, such as mycobiont host, lichen secondary metabolites present in lichen thalli, dispersal mode of lichens, climate conditions, altitude,
and distribution. The taxonomic position of the mycobiont (at genus or species level) turned out to be the dominant factor influencing the selection of photobionts in all studied groups of green algae. However, from the mycobiont's perspective, specific relationships between bionts were found more frequently in typically neotropical lichen species. Lichens with a ubiquitous pattern of occurrence, showed less selective and specific choices of the photosynthetic partner.
On the other hand, most of the revealed photobiont lineages may be able to associate in lichen symbiosis with many diverse groups of lichen forming fungi, showing their own habitat preferences. Here, it was also shown that Bolivian photobionts community is shaped by altitudinal gradient.