Rubiaceae and Gentianales Conference

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VII International Rubiaceae and Gentianales Conference

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ORAL

Microscopic evidence for vertical transmission of the leaf nodulated endosymbiont in *Psychotria punctata*

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Symbiotic interactions between microorganisms and plants are ubiquitous and crucial for the survival of plants. These mutualistic associations enhance plant fitness by increasing the uptake of nutrients or boosting plant defence, while the endophytes obtain shelter and carbohydrates in return. It is in the plant's benefit to maintain this positive interaction for the next generations by transferring the beneficial microorganisms to their offspring. Vertical transmission of microorganisms from the mother plant to the next plant generation via the seed is relatively unknown, but interest is growing. Previous research has revealed that seed microbiomes can be fundamental for the germination and growth of seedlings.

In Rubiaceae, several plant species belonging to three genera (***Psychotria***, ***Pavetta***, and ***Sericanthe***) house a specific bacterial endosymbiont of the genus ***Burkholderia*** in leaf nodules. In previous research, only one endophytic species was identified in the leaves of a host plant. Due to this specificity, the interaction seems to have an obligatory character, but most of the benefits of the interaction are still unresolved. One of the advantages of the interaction for the host is the production of insecticidal secondary metabolites, which increase the defence of the host plant. To increase the survival chances of the offspring, these endophytes should be transferred vertically to the next generation of plants. This was already hypothesised in previous research due to it specific and obligatory character.

Our research aims to clarify the transfer of the endophyte of ***candidatus*** Burkholderia kirkii throughout the floral and seed development of ***Psychotria punctata*** using Fluorescence In Situ Hybridisation. This microscopic technique allows detection of specific endophytes in plant organs and tissues, and is the most suitable approach to elucidate the vertical transmission of the endosymbiont. ***In situ*** location of the endophytes in the context of floral and seed development is key to a mechanistic understanding of the (obligatory nature of) microbial endosymbiosis in ***Psychotria***.