



## **The plant microbiome: ecology and functioning of bacterial endophytes and how plants can benefit**

Angela Sessitsch, Birgit Mitter, Stéphane Compant, Friederike Trognitz, and Günter Brader  
AIT Austrian Institute of Technology, Austria (angela.sessitsch@ait.ac.at)

Endophytic microorganisms colonize plants internally and may have beneficial effects on plants by providing nutrients, antagonizing pathogens and reducing plant stress symptoms. Microbiome analyses have shown that the plant genotype, tissue, the vegetation stage as well as stress factors influence the structure and possibly functioning of endophyte communities. Metagenome analysis as well as genome, transcriptome and functional analysis of individual strains have provided important functional insight leading to as well as of a rice root community revealed characteristics like various plant growth promoting characteristics, cellulolytic enzymes, quorum sensing, degradation of aromatic compounds, methane oxidation, nitrogen fixation as well as nitrification and denitrification. In addition, isolated endophytes serve as a source of microbes to be applied as bio-fertilizers or biocontrol agents. Some strains tested in detail proved to efficiently colonize many plants such as maize, strongly promote plant growth, reduce drought stress and to induce systemic resistance responses. In addition, the analysis of individual strains and their interaction with plants provide valuable information on the mechanisms responsible for beneficial effects.