Impact of the colonization pattern on beneficial properties of plant-associated bacteria

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Microorganisms have a significant impact on plant growth and health. Plant Growth-Promoting Rhizobacteria (PGPR) and especially those among them, which have endophytic lifestyle, draw increasing attention in the last years. Previous research showed that the soil-borne bacterium *Ensifer meliloti (Sinorhizobium meliloti)* primed *Arabidopsis thaliana* for enhanced resistance against diverse fungal and bacterial pathogens. *Pseudomonas* spp. and *Pantoea* spp., which were isolated from within barley seeds, could also improve barley resistance against fugal pathogens and promote the growth. However, little is known on how the positive influences depend on the colonization pattern expressed by beneficial bacteria while colonizing plants.

In order to assess this question, all three bacteria were first marked with the plasmid pSM1890-GFP, which carries the gene encoding for green fluorescent protein (GFP). We used biparental and triparental mating systems to transform the PGPRs with the pSM1890-GFP plasmid. Assessing the colonization pattern in *Arabidopsis* and barley, our first results revealed that all of three strains (*E. meliloti*, *Pseudomonas* spp. and *Pantoea* spp.) could colonize roots of *Arabidopsis Col*-0 plants however, with diverse patterns. The colonization patterns are being assessed now for the above-ground plant parts (phyllosphere). Our research will further aim at the correlation between the colonization patterns and beneficial properties of plant-associated bacteria.