

Thursday, September 25, 2:00-2:30 p.m.

“*Structure and functions of the Arabidopsis bacterial root microbiota*”

Stijn Spaepen¹, Yang Bai¹, Nina Dombrowski¹, Stephane Hacquard¹, Kei Hiruma¹, Thomas Nakano¹, Haruhiko Inoue¹, Ruben Garrido Oter^{1,2,3}, Girish Srinivas¹, Alice McHardy^{2,3}, and Paul Schulze-Lefert^{1,2}

Affiliations

1. Department of Plant Microbe Interactions, Max Planck Institute for Plant Breeding Research, 50829 Cologne, Germany

2. Cluster of Excellence on Plant Sciences (CEPLAS), Max Planck Institute for Plant Breeding Research, 50829 Cologne, Germany

3. Department for Algorithmic Bioinformatics, Heinrich Heine University, Universitätsstrasse 1, 40225 Düsseldorf, Germany

We have previously shown that healthy roots of *Arabidopsis thaliana*, grown in natural soil, are colonized by a bacterial consortium with well-defined taxonomic structure. A comparison of the bacterial root microbiota of *A. thaliana* with *A. thaliana* relatives demonstrated a largely conserved microbiota structure with quantitative, rather than qualitative, species-specific footprints. Moreover, the bacterial root microbiota of barley and *A. thaliana*, grown in the same soil type, revealed a remarkably similar structure with few bacterial taxa uniquely enriched in the Brassicaceae. This suggests that the bacterial root microbiota structure is either an ancient plant trait or that microbe-microbe interactions serve as a dominant structuring force for community assembly. We have isolated > 60% of the *A. thaliana* root-enriched microbiota members as pure bacterial cultures and have started generating annotated whole-genome sequence drafts, enabling future systematic analysis of root microbiota functions under laboratory conditions. Using gnotobiotic *Arabidopsis* plants, we have shown that single microbiota members or synthetic bacterial communities have strong plant growth promoting activities. In addition, they are a rich source to protect *Arabidopsis* roots against colonization by soil-borne fungal pathogens. Thus, the bacterial root microbiota appears to have a major role in plant growth promotion and health.