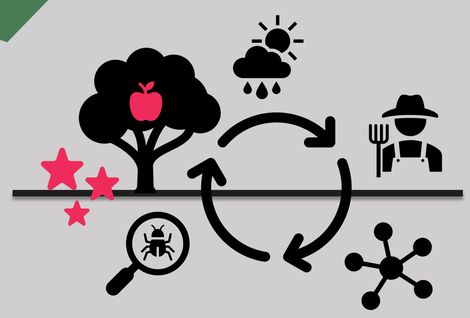
EXCALIBUR

Exploiting the multifunctional potential of belowground biodiversity in horticultural farming

Expedito Olimi[1], Samuel Bickel[1], Peter Kusstatscher[1], Tomislav Cernava[1], Gabriele Berg[1,2,3]

[1] *Institute of Environmental Biotechnology, Graz University of Technology, Graz, Austria*
[2] *Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB), Potsdam, Germany*
[3] *Institute for Biochemistry and Biology, University of Potsdam, Potsdam, Germany*

Project overview



16 partners

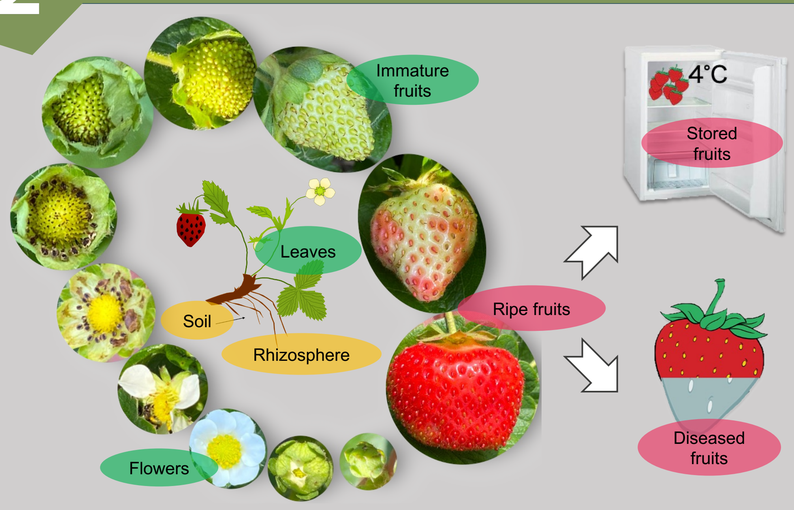
5 years

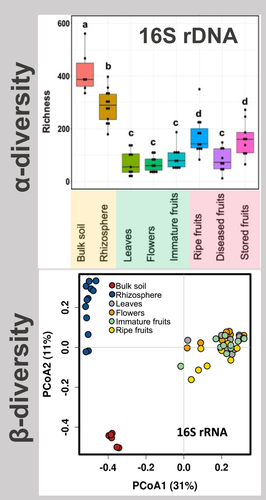
Aims and goals
- Understanding soil biodiversity dynamics
- Investigating effects of pre- and probiotic approaches in horticulture
- Development and testing of soil microbial inoculants and bio-effectors

Implementation
- Three model crops of economic importance: tomato, apple, strawberry
- Different experimental and open-field conditions across Europe
- Monitoring effects on native biodiversity across climatic conditions

Objective: To develop a comprehensive strategy of soil management for improving the effectiveness of biocontrol and biofertilization practices in agriculture.

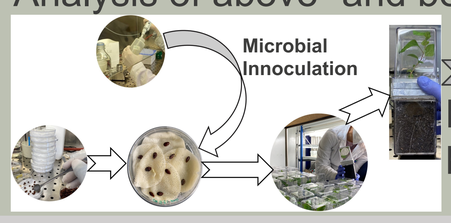
Research at TU Graz



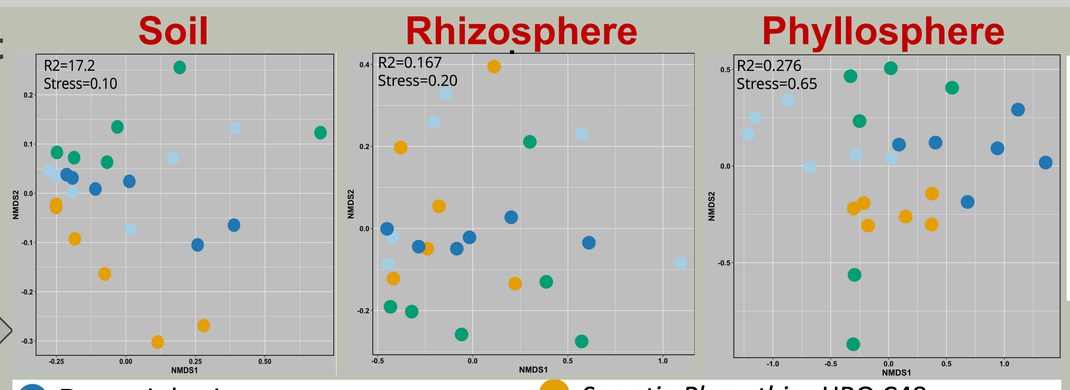


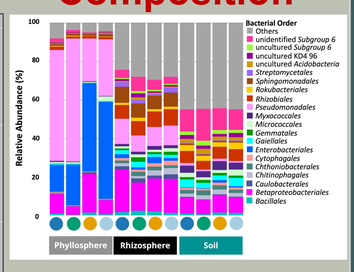
Title: Insights into the microbiome assembly during different growth stages and storage of strawberry plants
- Strawberries carry a diverse and rich microbial load
- The fruit microbiome is assembled along the fruit development (flower → fruit)
- Disease and postharvest storage induced microbiome shifts including a reduction in microbial diversity
- Microbiome management and interventions during fruit development could result in more storable and healthier fruits

Title: A Quantitative approach to assess the impact of bioinoculants and their associated volatiles
- Selection of strains based on volatile profiles
- Inoculation in compartmentalized microcosm
- Analysis of above- and belowground microbiome



High-throughput Seq. and Bioinformatics

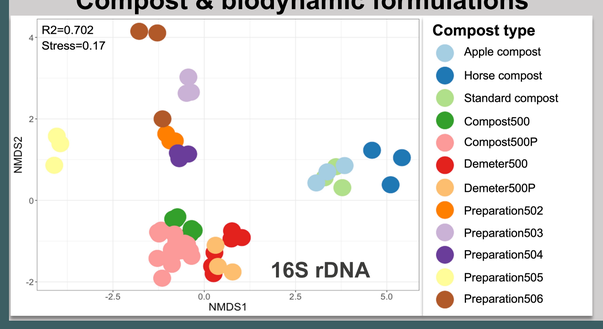




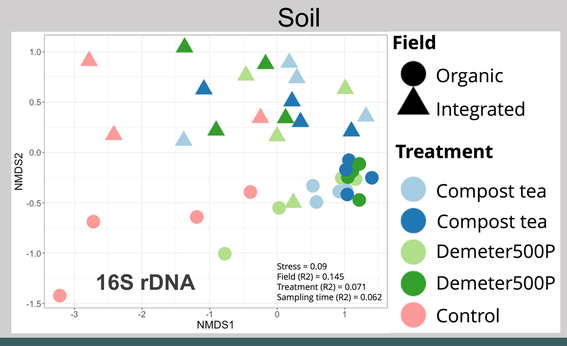
***S. plymuthica* HRO-C48 Vs Control (P<0.05)**

Title: Microbiome of biodynamic formulations and their spatio-temporal effects post field application

Compost & biodynamic formulations



Soil



Compost and soil microbiome in apple orchards
- Three compost, four biodynamic formulations, and five plant based biodynamic preparations
- Field application (● Organic and ▲ Integrated) of compost tea and Demeter500P, sampling (spring & autumn)
- Compost, biodynamic formulations and biodynamic plant preparation carry a distinct microbiome
- *Persistent differences associated with management systems*

Project information
- Duration: June 2019 – November 2024
- Budget: 6'995'107 €
- Coordination: CREA (IT)
- Web: **www.excaliburproject.eu**; E-mail: gabriele.berg@tugraz.at

@Excalibur_h2020
@OOlimi
@GBerg_ubt

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 817946

Institute of Environmental Biotechnology

Graz University of Technology

EXCALIBUR