

FiBL Research Institute of Organic Agriculture (FiBL) www.fibl.org

OPEN FiBL DAY
Organic agriculture and beyond

Utilising plant-microbiome interactions to enhance resistance breeding against pathogen complexes

Pierre Hohmann, Lukas Wille, Monika Messmer

Open FiBL Day, 27.05.2021

Microorganisms – a solution to maintain yields with reduced inputs

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This is et al 2016

EUCARPIA workshop on breeding for plant-microbe interactions

Opportunities for breeding

- Yield stability and productivity (reduced inputs)
- Tools:** High-throughput phenotyping, machine learning and modelling, seed treatments, genetic markers, gene editing
- Monitoring and decision tools for genotype selection, but also for crop selection and agricultural practices
- From controlled conditions to field >> farmer participation

FEMS MICROBIOLOGY ECOLOGY perspective article
Hohmann et al. 2020

Main Research priority:
Identify genetic determinants that steer beneficial plant-microbiome interactions

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Advancing pea resistance breeding

Improving disease resistance of pea through selection at the plant-soil interface

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Wille et al. 2018

LIVSEED STIFTUNG MERCATOR SCHWEIZ

Advancing pea resistance breeding

Verification of the complexity of pea root rot

Wille et al. 2018

Microbial markers for resistance breeding

Wille et al. submitted

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<https://www.youtube.com/watch?v=yKTUyEuPygQ>

clideo.com


Advancing pea resistance breeding

WISSENSCHAFT. BEWEGEN
ZUSAMMEN IST S. BETERE

AGRIBIOME – Plant microbiome recruitment for superior agricultural systems

Three genome-wide association studies related to disease resistance:

1. Standard plant genetic markers based on disease phenotype
2. Advancing plant genetic markers for functional microbiome diversity and the recruitment of microbial key taxa
3. Holobiont genetic markers: combined action of plant+microbiome markers



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Thank you for your attention!



Partners:

ETH zürich **INRAE** **gzkp** **AIT** **AGROSCOPE** **Universität Basel** **LIVESEED** **ReMiX** **WISSENSCHAFT. BEWEGEN**



Main Funding:

STIFTUNG MERCATOR SCHWEIZ **WISSENSCHAFT. BEWEGEN**

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Resistenzzüchtung der Erbse

Ein Komplex and Pathogenen befallt die Erbse, z.B.:

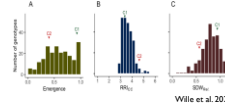




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Resistenzzüchtung der Erbse

Vererbare Variation der Resistenz gegen einen Wurzelfäule-Komplex

Wille et al. 2020

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Resistenzzüchtung der Erbse

Vererbare Variation der Resistenz gegen einen Wurzelfäule-Komplex

Validiert in 6 Umwelten




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Resistenzzüchtung der Erbse

Vererbare Variation der Resistenz gegen einen Wurzelfäule-Komplex

Screenimplenentierung bei gzkp



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