

Projects in the ORDIAmur network

No.	Title of the sub-project	Supervisor
P1	Creation, deployment and maintenance of experimental plots with ARD ¹	Dr. A. Wrede, LKSH
P3	Microbial interactions for plant exudates and secondary metabolites	PD Dr. S. Kusari, TU Do
P4	Soil physical and chemical (micronutrient) heterogeneity as driver of ARD ¹	Prof. Dr. E. Lehndorff, UBT
P5	Role of spatial organization for the occurrence of ARD ¹ – low mobility of agents as a key to develop management strategies	Prof. Dr. D. Vetterlein, UFZ
P6	Identification and characterization of innovative tolerant genotypes against ARD ¹ based on vegetative and physiological reactions and release of metabolites	Prof. Dr. M. Schmitz, HBRS
P7	Identification of genetic factors influencing ARD ¹	Prof. Dr. H. Flachowsky, JKI
P8	Studies on biotic factors in root systems of apple plants affected by ARD ¹	Prof. Dr. E. Maiss, LUH
P9	Bacterial endophytes in various apple rootstock genotypes: Localization and studies on the interaction with the plant	Prof. Dr. T. Winkelmann, LUH
P10	Contributions of the soil microbiome to ARD ¹	Prof. Dr. K. Smalla, JKI
P11	The role of organismic interactions in the development of ARD ¹ in different apple rootstocks	Prof. Dr. M. Schloter, HMGU
P12	Nematodes involved in replant disease and as indicators of soil quality	Dr. H. Heuer, JKI
P13	Functional biodiversity of soil mesofauna and impact on ARD ¹ : early indication, interactions and management	PD Dr. R. Meyhöfer, LUH
P15	Assessment of selected ARD ¹ management strategies and further development of a research-practice network in specialized growing regions	Dr. B. Hardeweg, ZBG
P17	Contribution of phytoalexins to ARD ¹	Dr. B. Liu, TUBS
PK	Project coordination	Prof. Dr. T. Winkelmann, LUH

BonaRes is short for “Soil as a sustainable resource for the bio-economy” and is a funding initiative of the German Federal Ministry for Education and Research (BMBF) within the scope of the National Research Strategy Bio-economy 2030. The BonaRes center for soil science coordinates the funded research networks.

<https://www.bonares.de>



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für Bildung
und Forschung

Contact

BonaRes (Module A): ORDIAmur

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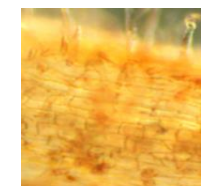
BonaRes (Module A)

ORDIAmur

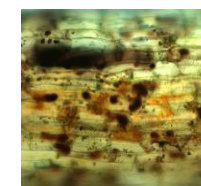
Overcoming Replant Disease by an Integrated Approach

Phase II (2019 – 2021)

healthy soil



diseased soil



Pictures: T. Winkelmann, G. Grunewaldt-Stöcker

www.ordiamur.de

ordiamur = lat.: let's get started

¹ARD: apple replant disease

Soil as a sustainable resource (BonaRes)

Fertile soils are the central resource for producing food and other biomass. The world's population will grow to about 9 billion over the next 30-40 years but the land cover for global food production is limited. To ensure food supply, global land productivity must therefore be increased by 60 % until 2050. As part of the BMBF funding initiative BonaRes, strategies have to be developed to manage soils from a bio-economic point of view and at the same time make them more productive.

The ORDIAmur project is investigating apple replant disease (ARD). The 15 projects (see back page) are structured in five work packages (Fig. 1). The joint project ORDIAmur aims at developing sustainable means to overcome ARD.



Fig. 2: Root formation of apple in healthy and diseased soil (Picture: K. Smalla/D. Vetterlein)

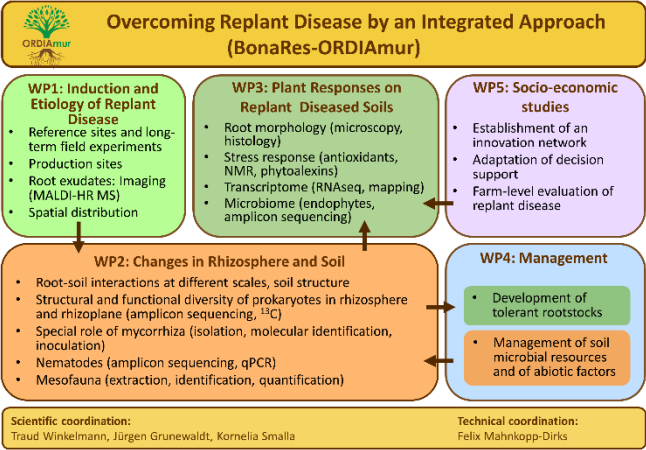





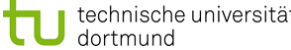

Fig. 1: Structure of the ORDIAmur network

Apple replant disease

Replant disease ("soil sickness") in apple and other plant species has long been known but, however, it is barely understood scientifically. In case of repeated replanting, the soil loses its ability to serve plants of the same species as a substrate for producing constantly high yields. If the soil is not disinfected the replant disease can persist 20 to 30 years. However, common disinfection methods are based on thermal and chemical processes which are complicated, expensive and ecologically controversial or no longer permitted. The findings of ORDIAmur on the etiology of replant disease will be used to derive urgently needed management measures in order to overcome the problem and to restore soil health.

In the first project phase a bio-test was developed to detect apple replant disease. Further results are to be mentioned: The replant disease is immobile and local (Fig. 2). The composition of the soil biota changes structurally and functionally in replant soil. Early indicators of soil fatigue were identified in apple plants, e.g. root formation.

Project partners

- Gottfried Wilhelm Leibniz Universität Hannover (LUH) 
- Helmholtz-Zentrum München GmbH (HMGU) 
Deutsches Forschungszentrum für Gesundheit und Umwelt
- Helmholtz-Zentrum für Umweltforschung (UFZ) 
- Hochschule Bonn-Rhein-Sieg (HBRS) 
University of Applied Sciences
- Technische Universität Braunschweig (TUBS) 
- Julius Kühn-Institut (JKI) 
- Landwirtschaftskammer Schleswig-Holstein (LKSH) 
- Universität Bayreuth (UBT) 
- Technische Universität Dortmund (TU Do) 
- Zentrum für Betriebswirtschaft im Gartenbau (ZBG) e. V. 



Joint meeting of the ORDIAmur network, Dresden (18-09-2019)