

# Projects in the ORDIAmur network (Phase I)

No.	Title of the sub-project	Supervisor
P1	Creation, deployment and maintenance of experimental plots with ARD <sup>1</sup>	Dr. A. Wrede, LKSH
P2	Conservation and provision of long-term field trial testing site and stock	Dr. P. Lentzsch, ZALF
P3	Root exudates and endophytic microbial interaction	Prof. Dr. M. Spiteller, TUDo
P4	Nutrient cycling and potential toxin/pathogen stabilization in different replant soils	PD Dr. E. Lehdorff, Univ. Bonn
P5	Role of soil spatial organization (physical, chemical and biotic gradients extending from biopores) for ARD <sup>1</sup>	Prof. Dr. D. Vetterlein, UFZ
P6	Specific stress-responses of <i>Malus</i> under replant conditions as an indicator for the definition of tolerant apple rootstocks	Prof. Dr. M. Schmitz, HBRS
P7	Evaluation of tolerance to ARD <sup>1</sup> in <i>Malus</i> germplasm	PD Dr. H. Flachowsky, JKI
P8	Studies on biotic factors in root systems of apple plants associated with ARD <sup>1</sup>	Prof. Dr. E. Maiss, LUH
P9	Bacterial endophytes in different apple rootstock genotypes growing in ARD <sup>1</sup> or virgin soils	Prof. Dr. T. Winkelmann, LUH
P10	Contributions of the soil microbiome to ARD <sup>1</sup>	Prof. Dr. K. Smalla, JKI
P11	Organismic interactions and replant disease	Prof. Dr. M. Schloter, HMGU
P12	Nematodes involved in ARD <sup>1</sup> and as indicators of soil quality	Dr. H. Heuer, JKI
P13	Functional biodiversity of soil mesofauna and impact on ARD <sup>1</sup> : early indication, interactions and management	Dr. R. Meyhöfer, LUH
P14	Integration and evaluation of parameters for developing and testing soil management measures to overcome ARD <sup>1</sup>	K. Diehl, ZALF
P15	Economic evaluation of current and novel practices for managing ARD <sup>1</sup> problems in commercial fruit production systems	Dr. B. Hardeweg, ZBG
P16	Comprehensive socio-economic analysis of regional production systems and evaluation of adaption strategies for overcoming ARD <sup>1</sup> in horticultural soil use management	Prof. Dr. W. Bokelmann, HUB
PK	Project coordination	Prof. Dr. T. Winkelmann, LUH

<sup>1</sup>ARD: apple replant disease

BonaRes stands in the German version 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 BioEconomy 2030. The BonaRes center for soil science coordinates the funded research networks.



<https://www.bonares.de>



## Contact

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## Coordination team

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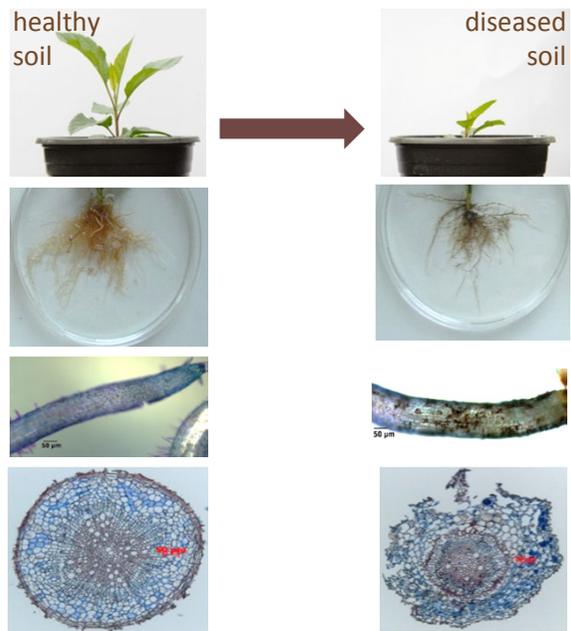
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BonaRes (Module A)

ORDIAmur

# Overcoming Replant Disease by an Integrated Approach



[www.ordiamur.de](http://www.ordiamur.de)  
 ordiamur = lat.: let's get started

# 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 within the next 30-40 years but the land cover for global food production is limited. To ensure food assurance, 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 BonaRes - ORDIAmur project is investigating apple replant disease. The 16 projects (see back page) are structured in five work packages (Fig. 1). The project coordination is headed by Prof. Dr. Traud Winkelmann at Leibniz Universität Hannover.



Fig. 2: Root formation in healthy and diseased soils

(Picture: K. Smalla/D. Vetterlein)

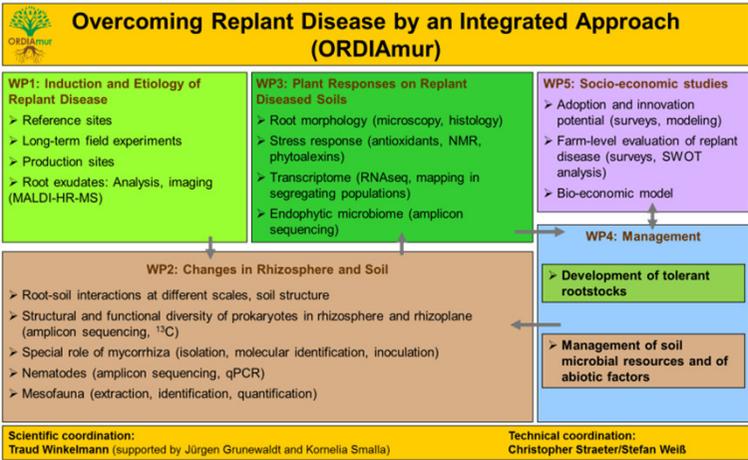


Fig. 1: Organization of the ORDIAmur network

## Apple replant disease

Replant disease ("soil sickness") in apple and other plant species has long been known but, so far, 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 (Fig. 2) and thus results in reduced yields and quality. Apart from any disinfection such soils carry the disease for 20-30 years. However, common disinfection methods are based on thermal and chemical processes which are difficult to apply, expensive and ecologically harmful or even permitted. Amongst others, plant-derived substances are assumed to cause replant disease by affecting, on the one hand, the rhizosphere and soil organism communities and, on the other hand, by exerting toxic effects when replanting the same species. 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 restore soil health.

## Project partners

- Gottfried Wilhelm Leibniz Universität Hannover (LUH)
- Helmholtz-Zentrum München GmbH  
Deutsches Forschungszentrum für Gesundheit und Umwelt
- Helmholtz-Zentrum für Umweltforschung (UFZ)
- Hochschule Bonn-Rhein-Sieg (HBRS)
- Humboldt-Universität zu Berlin (HUB)
- Julius Kühn-Institut (JKI)
- Landwirtschaftskammer Schleswig-Holstein (LKSH)
- Leibniz-Zentrum für Agrarlandschaftsforschung (ZALF) e.V.
- Rheinische Friedrich-Wilhelms-Universität Bonn (Uni Bonn)
- Technische Universität Dortmund (TU Do)
- Zentrum für Betriebswirtschaft im Gartenbau (ZBG) e.V.



Kickoff meeting of the ORDIAmur network (Hannover, December 9, 2015)