New insights to below: phenotyping spatial and temporal dynamics of root

Erhellendes aus dem Untergrund: neue Erkenntnisse zur räumlichen und zeitlichen Dynamik von Wurzeln durch Phänotypisierung

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Lack of adequate solutions for quantitative analysis of plant root architecture and function as well as their interaction with the dynamic environment hampers progress in fundamental and breeding related research. In recent years significant interdisciplinary approaches have been started to overcome this “phenotyping bottleneck”. Mostly non-invasive techniques were developed to quantify plant root structure and function as well as of environmental cues.

We will present technologies including high-resolution analysis for mechanistic understanding of root growth in a 3D environment (like Magnetic Resonance Imaging in tandem with Positron Emission Tomography for monitoring structure, growth and carbon allocation to roots). Further, we give insight into high-throughput approaches (like ‘GROWSCREEN-Rhizo’) for analysis of large numbers of plant genotypes and environmental conditions. Finally, field approaches indicate the relevance of traits obtained from lab and greenhouse experiments. The talk will also present recent developments in infrastructure platforms that have been and will be established in Germany, in Europe and globally.