

## Advances in plant phenotyping for more sustainable crop production

Edited by Professor Achim Walter, ETH Zurich, Switzerland



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## New title information

# Advances in plant phenotyping for more sustainable crop production

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### Endorsement:

“Phenotyping is fundamental for crop improvement and has been undergoing a revolution thanks to new capabilities in imaging, computing and data analysis. This book provides an excellent overview of both the technological advances that have underpinned this revolution and the link through to application in tackling some of the major problems facing breeders.”

*Prof. Peter Langridge, University of Adelaide, Australia; and The Wheat Initiative, Julius Kühn Institute (JKI), Germany*

### Description:

Plant phenotyping is an emerging technology that involves the quantitative analysis of structural and functional plant traits. However, it is widely recognised that phenotyping needs to match similar advances in genetics if it is to not create a bottleneck in plant breeding.

*Advances in plant phenotyping for more sustainable crop production* reviews the wealth of research on advances in plant phenotyping to meet this challenge, such as the development of new technologies including hyperspectral sensors such as LIDAR, NIR/SWIR, as well as alternative delivery/carrier systems, such as ground-based proximal distance systems and UAVs. The book details the development of plant phenotyping as a technique to analyse crop roots and functionality, as well as its use in understanding and improving crop response to biotic and abiotic stresses.

### Key features:

- Comprehensive review of the development of plant phenotyping as a research field in a wide range of scientific communities
- Explores key advances in the use of plant phenotyping techniques to improve yield, growth and resource-use efficiency, such as robotics, aerial systems, sensors and controlled environments
- Offers a detailed analysis of the benefits of plant phenotyping through selected case studies that demonstrate the use of phenotyping techniques in optimising root architecture, analysing crop functionality and improving crop responses to abiotic and biotic stresses

### Audience:

University and other researchers in plant science, as well as those in computer and engineering science with a research focus on computer vision, data mining and image-based plant phenotyping; plant breeders, government and private agencies involved in advocating for a more sustainable agriculture, agricultural engineers, as well as suppliers of agricultural technology.

### Editor details:

**Dr Achim Walter** is Professor of Crop Science and Head of the Crop Sciences Group in the Department of Environmental Systems Science in the Institute of Agricultural Sciences in ETH Zurich, Switzerland. Professor Walter is a member of the scientific advisory boards of several national and international agricultural research institutions. He is internationally-renowned for his research in image-based phenotyping of plant shoots and roots.

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