Scanalyzer\textsuperscript{Field} enables comprehensive phenotyping of field grown plants

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Future crops – multiple challenges

Crop plants

- Higher yield requirement
- Food/bio-based products
- Climate change
- Stress, Pathogens
- Limited resources
Crop varieties and wild relatives provide large genetic resources

Selection of beneficial traits allows tackling future challenges

Trait selection depends on precise phenotypic characterisation

Phenotypic properties
- Size, growth
- Shape, architecture
- Photosynthesis
- Gas exchange
- Colours, pigments
- Metabolite content
- Yield
Phenotyping bottleneck

- Multiple properties
- Time series
- Large numbers of plants
- Multi-dimensional comparisons
- Automation
- Data handling
What happens in the field?

- Lab- and greenhouse test provide important information in basic questions.
What happens in the field?

- Lab- and greenhouse test provide important information in basic questions.
- Field trials are essential for assessing plant performance under agronomically relevant growth conditions.
Novel concept for field phenotyping machine

High precision, accurate positioning of sensors

High repeatability

Fully automated for daily measurements

Robustness, independent from weather conditions
Sensor box containing multiple sensor types

- IR
- VNIR
- ExVNIR
- PSII
- VIS
- Halogen Lights
- Laser Height Scanner
- CO₂ and NDVI

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Sensors and measured properties

VIS
Laser Height Scanner
VNIR
ExVNIR
NDVI
PSII
IR

Digital biomass
Geometric parameters
Colour distribution
Canopy height
Vegetation indices
Biomass estimation
Chlorophyll fluorescence
Canopy temperature

Plant size, growth
Stress status
Pigments
Pathogens
Water status
Biomass
Photosynthetic parameters

Analysis Software

LemnaGrid

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Autonomous robot platform

Phenotyping sensors

- Powered by batteries and a fuel generator

- Slot for application module

- Reconfigurable joints (adaptive track width)

- 3D sensing for autonomous navigation

- Total of 12 DoF

Easy Changing of Modules  Soil Penetrometer  Precision Spraying  Mechanical Treatment
Applications

- Crop genetics
- Cultivar comparison
- Biodiversity
- Ecological studies
- Fertilizer effects
- Plant protective agents
- Plant breeding
- Crop improvement
- Stress responses
Synergies: Cropsense and LemnaTec

- Your Cropsense-project resulted in a sensor producing image data?
- We are open for tests and collaborations combining novel sensors to LemnaTec analysis software
Synergies: Cropsense and LemnaTec

- You are looking for a partner in commercialisation of your sensor?
- Let’s see what we can do for you!
You have clever concepts in management of big data and meta data handling?
Let’s discuss

PhenoDays 2014

Palais des Congrès Beaune (FR) near Dijon
Start: Wednesday | October 29th | 15:00 h
End: Friday | October 31st | 14:00 h