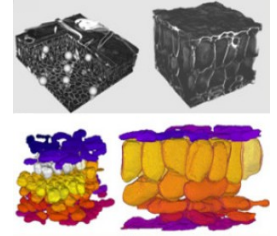
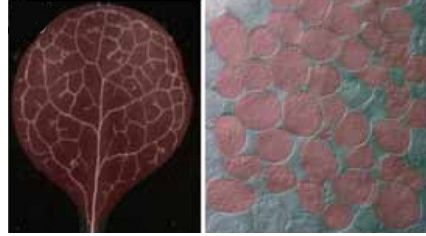
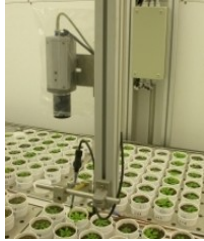


## Automated 2D and 3D leaf phenotyping of numerous *Arabidopsis thaliana* genotypes

- Area
- Thickness
- Expansion rate
- Volume by cell type
- Fresh weight/Dry weight
- Whole cell number
- Cell number by cell type
- Photosynthetic rates
- Respiration rates

### PHENOPSIS platform

- 15 experiments
- 620 genotypes analyzed
- 48,171 phenotypic data
- Over 93,000 plant images



Tisne et al 2008 Plant Phys; Wuyts et al 2010 Plant Methods; Fabre et al 2011 BMC Plant Biol; Pérez-Pérez et al 2011 Plant Cell Environ

## High-throughput leaf growth data

Molecular profiles are studied across leaf developmental stages and in contrasted growth conditions.

- Transcript profiling
- Metabolites in C/N
- Enzyme activities in C/N
- Protein concentration
- Organelle genome copy number
- Ribosome numbers
- iTRAQ proteomics
- Primary metabolites
- Secondary metabolites
- Lipids
- Cell wall polysaccharides
- Cell ploidy distribution

## Identification of novel leaf growth regulators

**Forward genetics:** mapping and cloning EMS leaf mutants

10 new loci

**Reverse genetics:** screening T-DNA lines for leaf phenotypes

14,200 lines screened; 255 confirmed mutants

**Map-based approach**

1,487 unique crosses between 311 accessions

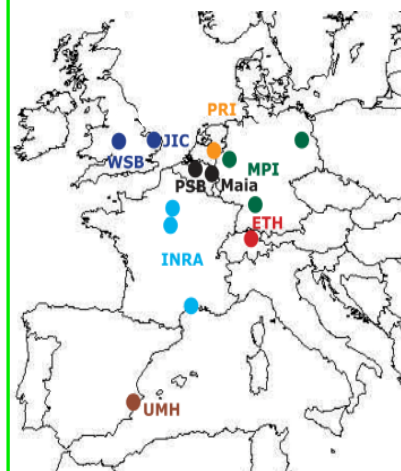
Schneeberger et al 2009 Nat Methods; Vlad et al 2010 PLoS Genet; Todesco et al 2010 Nature; Mollá-Morales et al 2011 Plant J; Horiguchi et al Plant J 2011

## Tools and knowledge

- TILING arrays covering both genome strands (Rehrauer et al 2010 Plant Phys)
- Peptide Atlas and proteome data analysis (Baerenfaller et al 2008 Science; Reiland et al 2009 Plant Phys; Joshi et al 2010 Plant Phys; Baerenfaller et al 2011 Integr Biol)
- ORFome resources and cloning resources (Karimi et al 2009 Plant Phys; <http://cnrgv.toulouse.inra.fr/en/>)
- Protein-protein interaction networks (Van Leene et al 2010 Mol Syst Biol; Arabidopsis Interactome Mapping Consortium 2011 Science)
- Improved methods for protein localization studies (Marion et al 2008 Plant J)
- Enzymatic and metabolic networks involved in biomass production (Lisec et al 2007 Plant J; Piques et al 2009 Mol Syst Biol; Sulpice et al 2009 PNAS; Sulpice et al 2010 Plant Cell)
- Leaf growth and cell cycle control (Dhondt et al 2010 Plant Phys)
- Cell wall biosynthesis (Crowell et al 2009 Plant Cell)
- Growth responses to water stress (Skirycz et al 2011 Plant Cell; Skirycz et al 2011 Nat Biotechnol)
- Data mining and integration (Tsesmetzis et al 2008 Plant Cell; De Bodt et al 2010 Plant Physiol)
- Construction of a relational database for integrative analysis and publication of the AGRON-OMICS data sets

To date 67 articles published in peer-review journals

## Consortium



Duration: 2006-2012

<http://www.agron-omics.eu/>