Exchange event between the European phenomic community and industry

Introduction

EPPN2020 and Phenome Emphasis fr

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Exchange event?

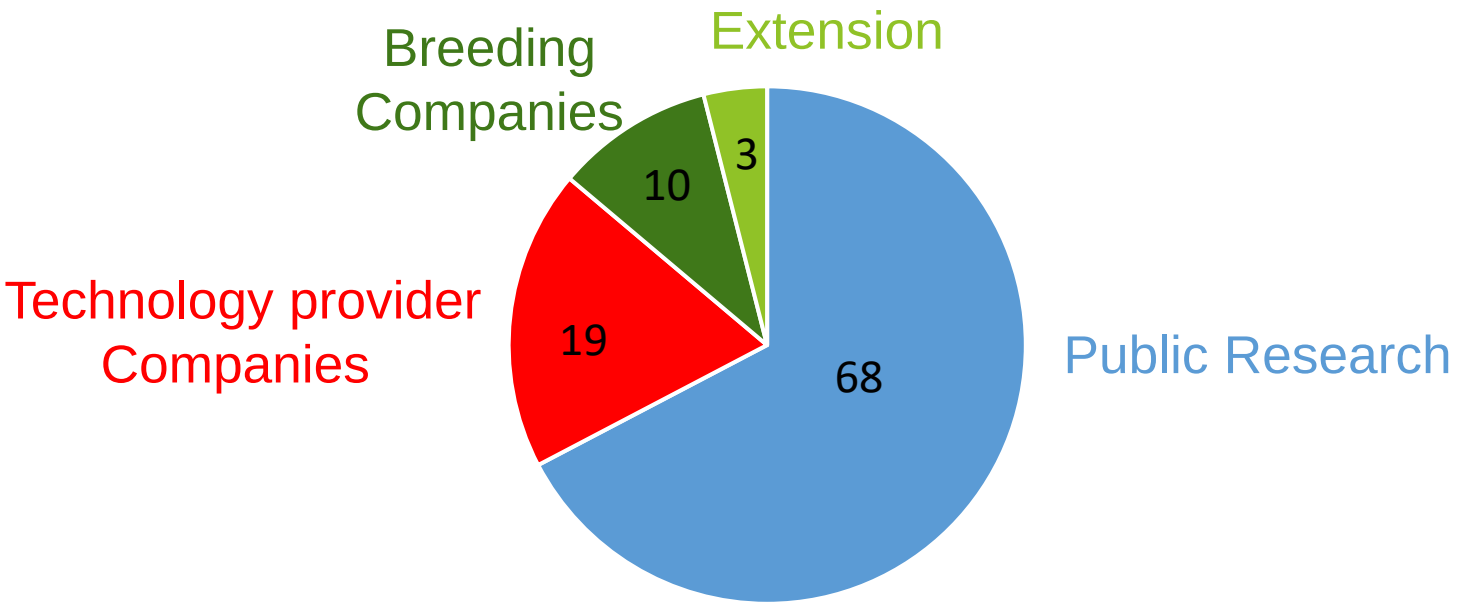
Occurs every year in the French project Phenome Emphasis
Extended this year to the European phenotyping community, EPPN^{2020}

An exchange with stakeholders (seed companies, technology providers, extension, scientists interested in phenomics)

Objective: - **Inform** on the progress of technology
- **Inform** on the new European landscape of Phenotyping
- **Collect feedback** from stakeholders: interest, priorities, gaps

Audience (who are you?)

102 registered



Who are we ?

EU project ‘advanced community’
2017-2021
15 countries
22 institutions (3 SMEs)
31 installations

French infrastructure
2012 - …
8 local infrastructures
3 institutions
15 installations

European infrastructure (ESFRI)
2017-…
(see U. Schurr’s presentation)

Phenomic information?

Genome

Environment

Phenotype

- Phenomic information time consuming and expensive
  Obtain complex datasets, extract maximum information from them
  Which genotypes perform better where?
  Can we predict harvest time of a variety from existing datasets?

- Phenotypic datasets cannot be reproduced (*set of conditions differ)*
  Can we infer plant behavior for new genotypes, new conditions?

- complemetarity indoor, field, big data

Phenomic information: complications?

Genome

Environment

Phenotype

But

Plant structure changes with environment
(same genome, different structures:
"different plants")

Short day

Long day

Phenomic information: complications?

Genome

EnvironmentS

Phenomic datasets

Multi scale PhenotypeS in a range of environments

But

Plant structure changes with environment (same genome, different structures: "different plants")

Short day

Long day

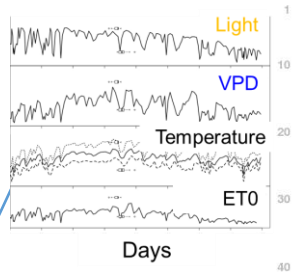
Tardieu et al 2019 Current Biology 'from sensors to knowledge'

Phenomic information?

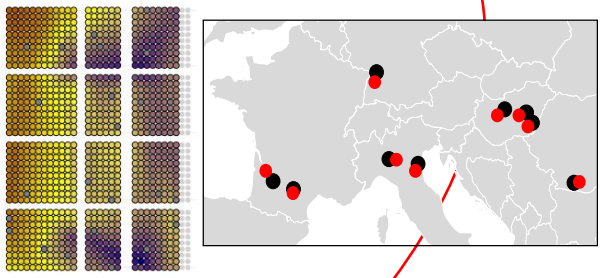
Genome

EnvironmentS

Temporal Variations



Spatial Variability



Multi scale phenotypeS in a range of environments

Phenomic datasets

Tardieu et al 2019 Current Biology 'from sensors to knowledge'

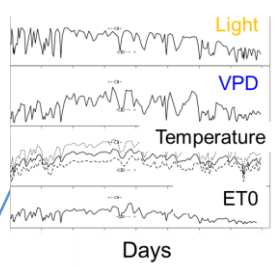
Challenge 1: sensorics

Sensors networks for envirotyping

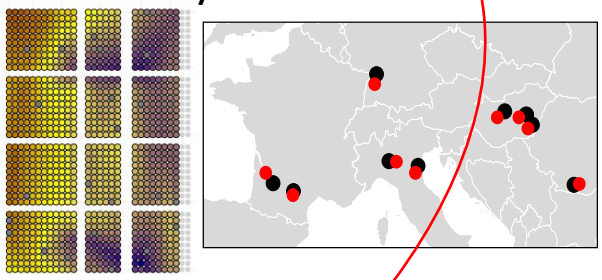
Genome

EnvironmentS

Temporal Variations



Spatial Variability



Multi scale phenotypeS in a range of environments

Phenomic datasets

Sensors, imaging for phenotyping

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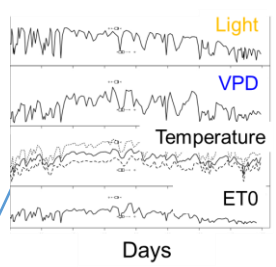
Challenge 2: Data analysis

Experimental designs
Spatial corrections

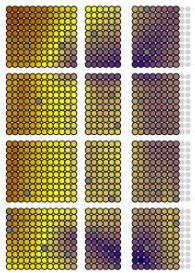
Genome

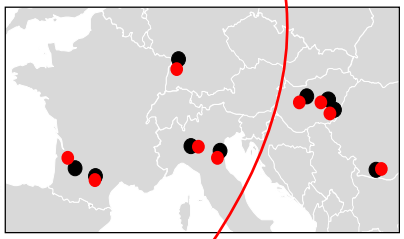
EnvironmentS

Temporal Variations



Spatial Variability





Multi scale phenotypeS in a range of environments

Phenomic datasets

Statistical analyses
Genetics

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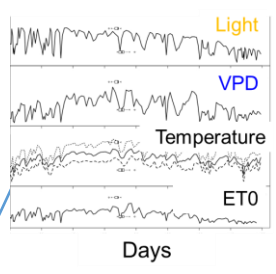
Challenge 3: Data management

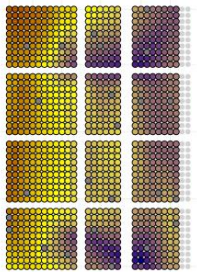
Genome

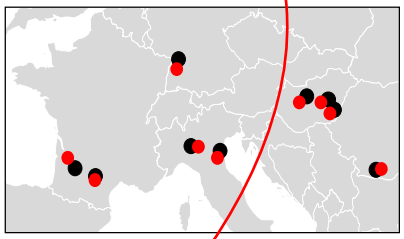
EnvironmentS

Temporal Variations



Spatial Variability





Multi scale phenotypeS in a range of environments

Phenomic datasets

Organising datasets so they can be re-analysed
FAIR: Findable, Accessible, Interoperable, Reusable

Tardieu et al 2019 Current Biology 'from sensors to knowledge'

Methodological projects

‘Joint research activities’

1. Sensors and images
2. Statistical applications
3. Data management

‘Methodological common projects’

1. Sensors, images, artificial intel.
2. Data handling and information systems

Some words about EPPN2020

10 M€ budget

‘Joint research activities’
1. Sensors and images
2. Statistical applications
3. Data management

} 45% budget; presentations this morning

‘Transnational accesses’ — 45% budget; presentation morning R Pieruschka

‘Networking’ — 10% budget; same + Questions to M Bennett

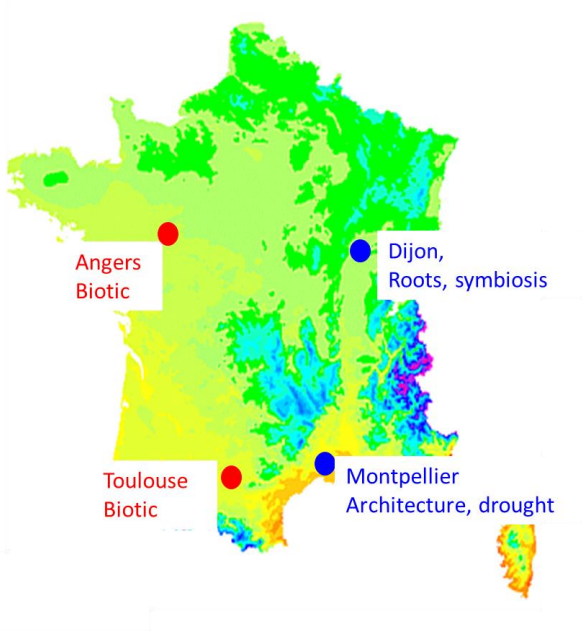
Some words about Phenome-Emphasis Fr

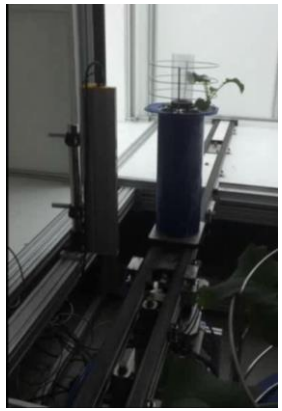
ANR grant 29 M€. Full cost 140 M€. *24* M€ *co funding, 87* M€ *in-kind*

Some words about Phenome-Emphasis Fr

ANR grant 29 M€. Full cost 140 M€. *24* M€ *co funding, 87* M€ *in-kind*

Four robotized installations



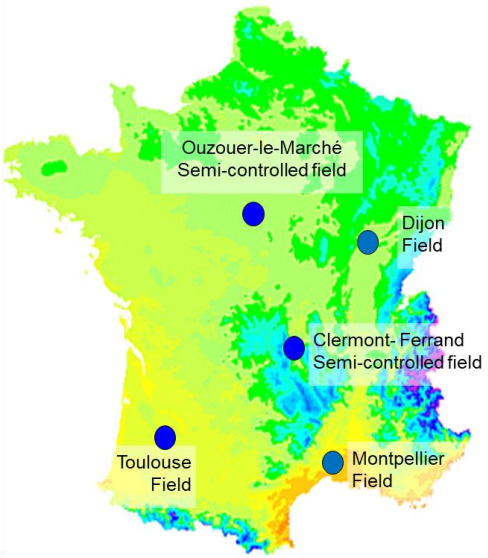


Some words about Phenome-Emphasis Fr

Five field installations

Including FACE and rainout shelters

Imaging, phenomobile and drones



+2 omic services

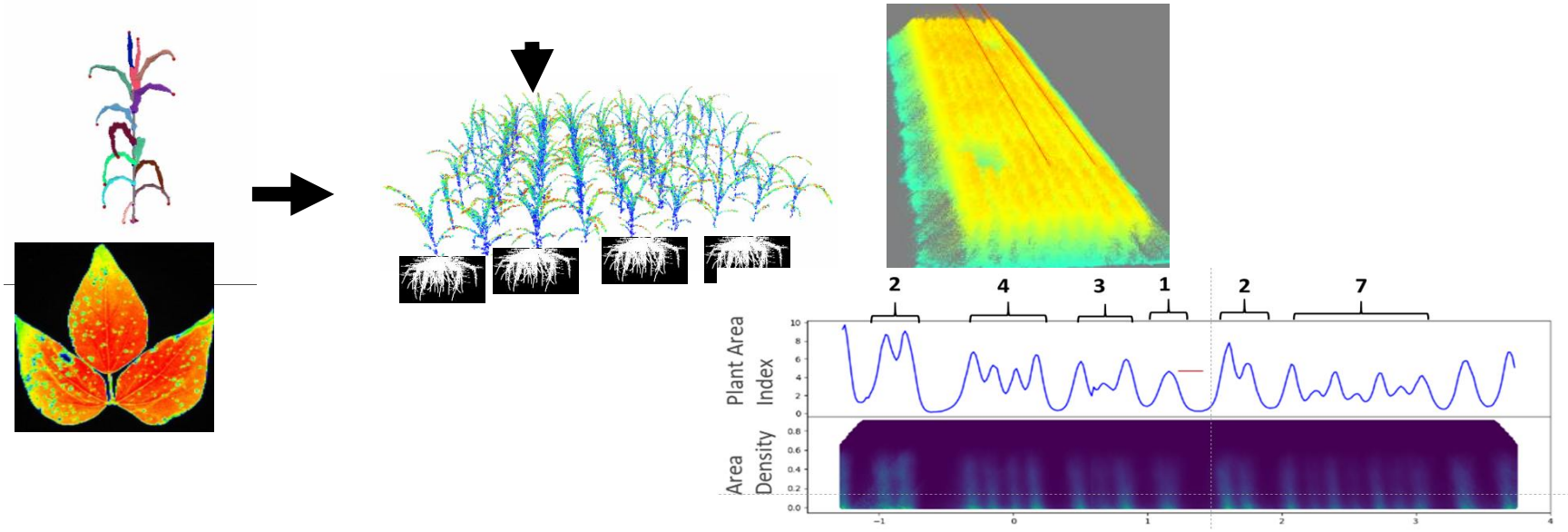
Metabolomics, chemiotyping

Some words about Phenome-Emphasis Fr

‘Methodological common project’

Sensors, images, artificial intelligence

(priority biotic interactions)

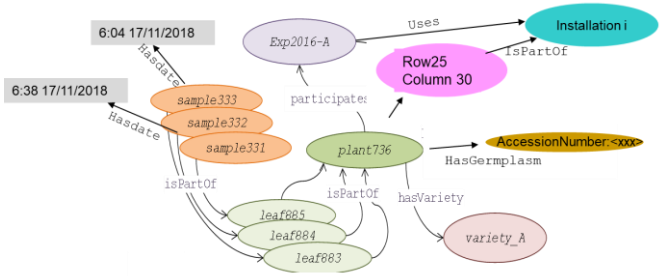


An automated image analysis pipe line (4P), from drones/phenomobile to traits.

Some words about Phenome-Emphasis Fr

‘Methodological common project’

Data handling and information systems



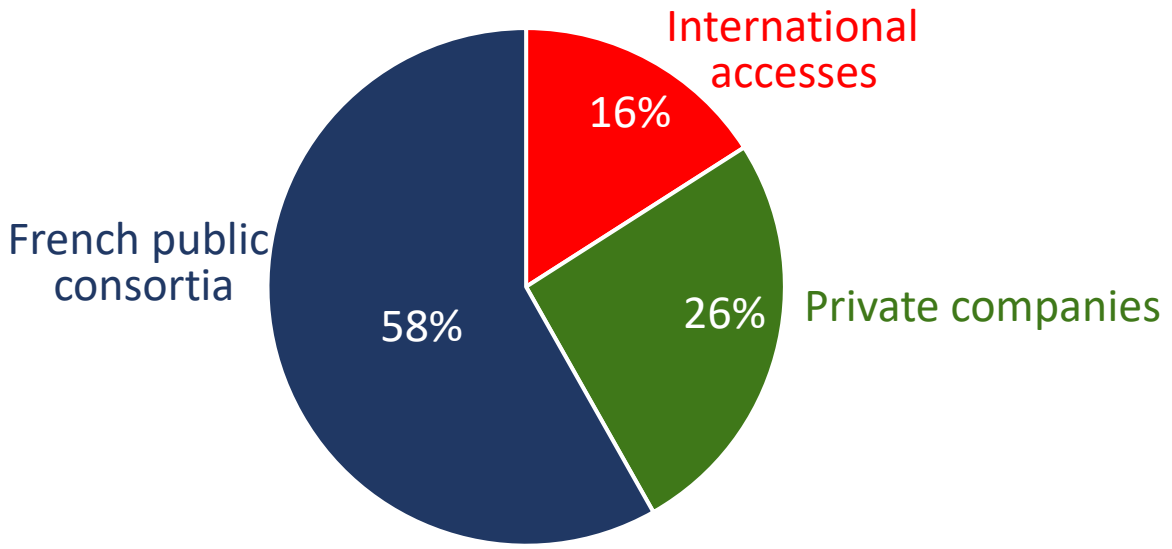
PHenome Information System (PHIS), deployed in French nodes, some EU nodes

Available to anybody

Some words about Phenome-Emphasis Fr

464 accesses

2017-2020



Schedule today

The European context

- European landscape (EMPHASIS) – *U. Schurr*
- EPPN^{2020} Trans-National Access, networking - R. Pieruschka

Technical progress

- Sensors and imaging technologies, environment – X Draye, T Pridmore
- Design and analysis of phenotyping experiments – F van Eeuwijk, E. Millet
- Data management, information systems – I. Alic, B Usadel

- Discussion, organization of the breakout session afternoon

14:30 **Breakout sessions**
16:00 **Wrap up**