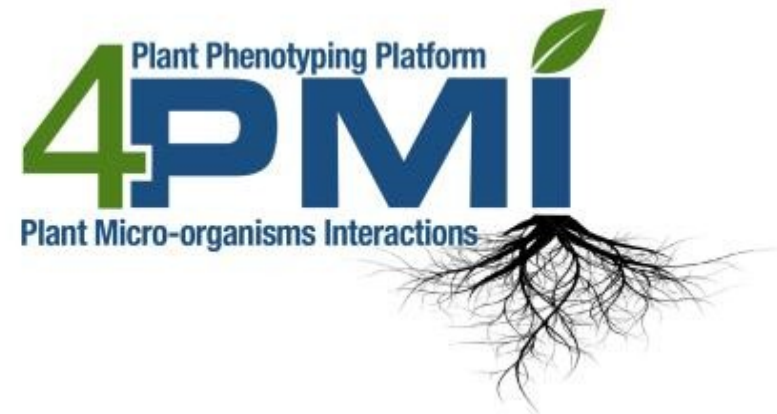




European and international phenotyping initiatives

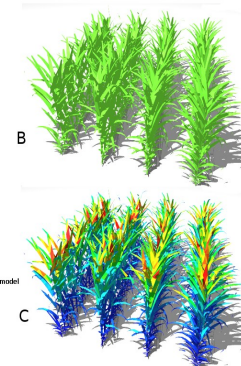
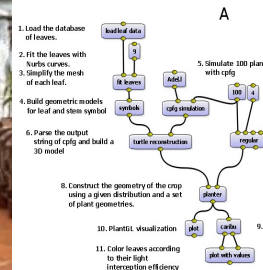
Christophe SALON
UMR Agroécologie, INRA
France



French Plant Phenotyping Network (FPPN) F Tardieu & J Legouis

INVESTISSEMENTS D'AVENIR
INFRASTRUCTURES NATIONALES DE
BIOLOGIE ET SANTE

Sept 2012 – Dec 2019



1. Provide the French plant community with a high throughput phenotyping infrastructure
Academic and private research, technical institutes
Platforms + associated tools and technics
2. Characterize large genotype series needed for studies of genetic variability :
100x parcels - 1000x plants
Populations - varieties- mutants - GMO
3. Create various environmental scenarios including climatic change
water deficit, nitrogen deficiency, ...
in interaction with other constraints: [CO₂], temperature, ...
4. Disseminate techniques and methods to plant community

Expected results:

- Measure plant agronomic traits/environmental conditions **with precise and high throughput methods, organize and analyze big data sets** at different time and space levels.
- *In fine*, **contribute** to selection of plant varieties more tolerant to different stress

Partners: LEPSE Montpellier, GDEC Clermont, Agroécologie Dijon, AGAP, AGIR Toulouse, BFP Bordeaux, BIA, EMMAH Avignon, Mistea Montpellier, URGI, ARVALIS, CETIOM

European collaborations : ICG Jülich (Allemagne) sensors, ARCI (Italie) FACE, CIMMYT (Mexique) field trials and Australian Plant Phenomic Center.

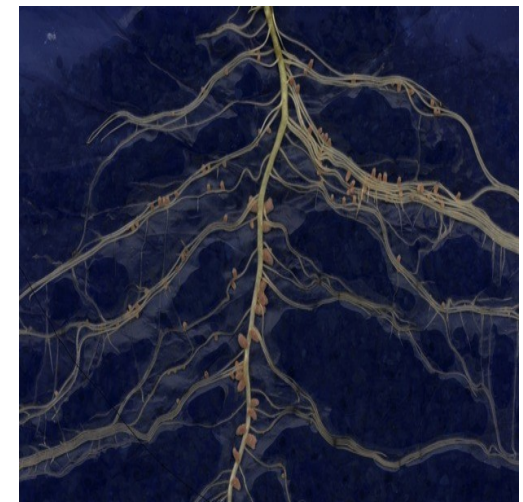
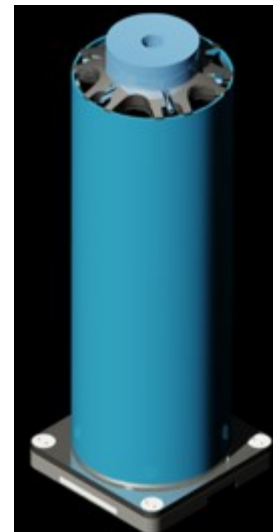
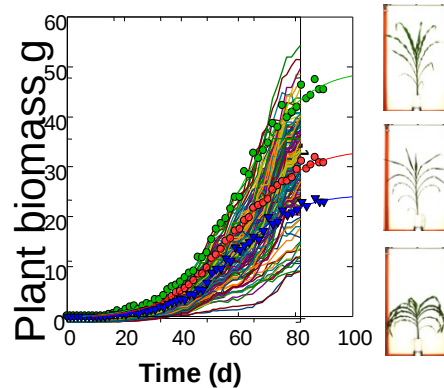
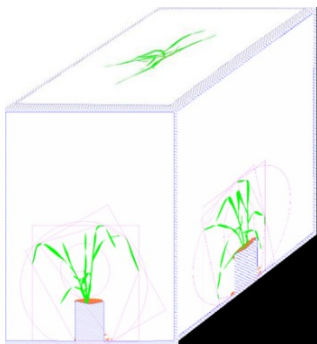
Budget : 24M€ of subvention, 3M€ for 4PMI root phenotyping

- Homogenous High Throughput : 200 – 500 genotypes
“realize with these genotypes what we did on 10”
- Control / measure environmental conditions sensed by plants
- Measure traits of interest
 - « *We measure in platforms (controled or in the field) what we can't measure elsewhere* »
 - **reproducible characters / heritability / yield (quality) predictives “hiden”** (RUE rather than biomass, sensitivity rather than « only » yield)
 - **genotypic parameter** for ecophysiology models
- Flexibility to work on different species

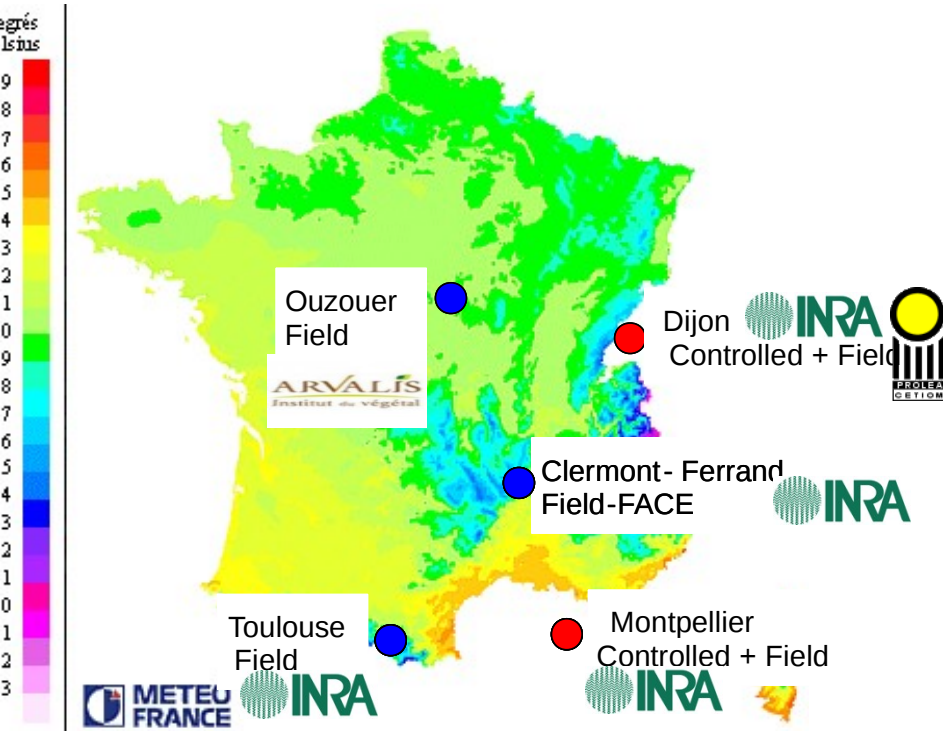
PhenoArch (Montpellier)



PPHD 4PMI (Dijon)



Different pedo climatic conditions



Share characteristics

- climate sensors (soil and atmosphere)
- plant sensors
- Local database

Have specificities

- water shelters (rain)
- FACE = [CO₂]
- soil nitrogen and water reserve
- root phenotyping

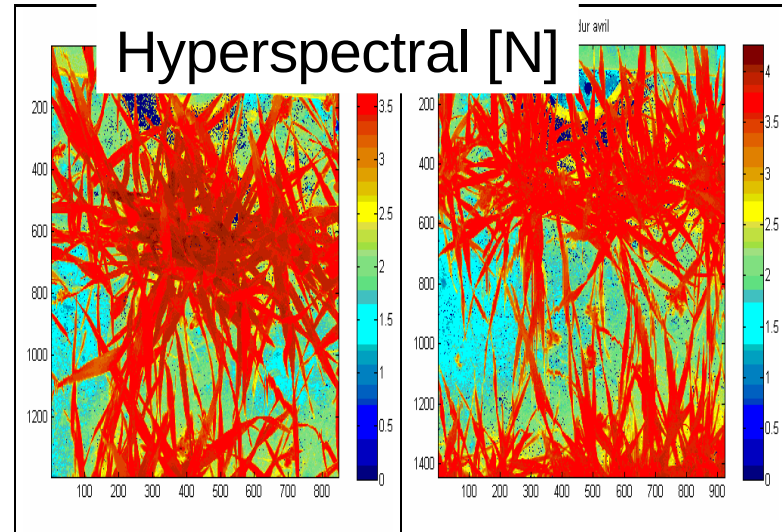
Constitutes « models »

- Dissemination of tools and methods
- Private sector, technical institutes and INRA units

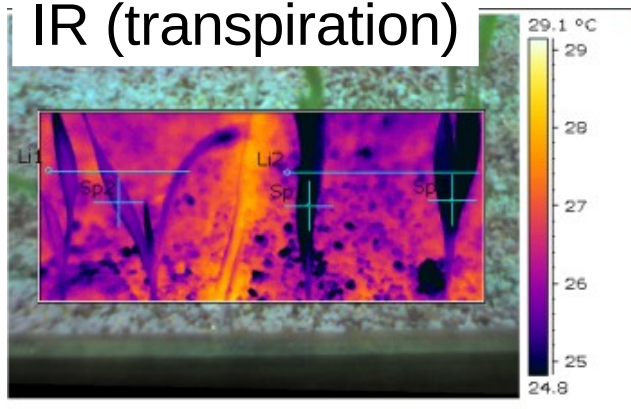
LiDAR (LAI)



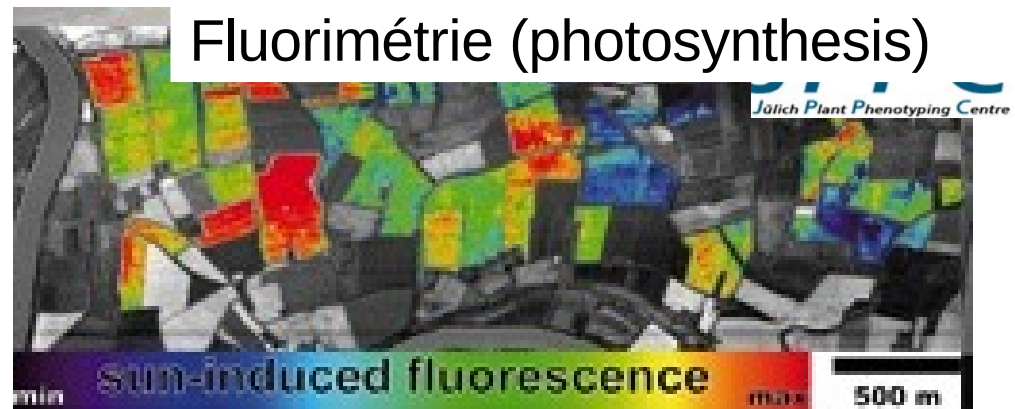
Hyperspectral [N]



IR (transpiration)

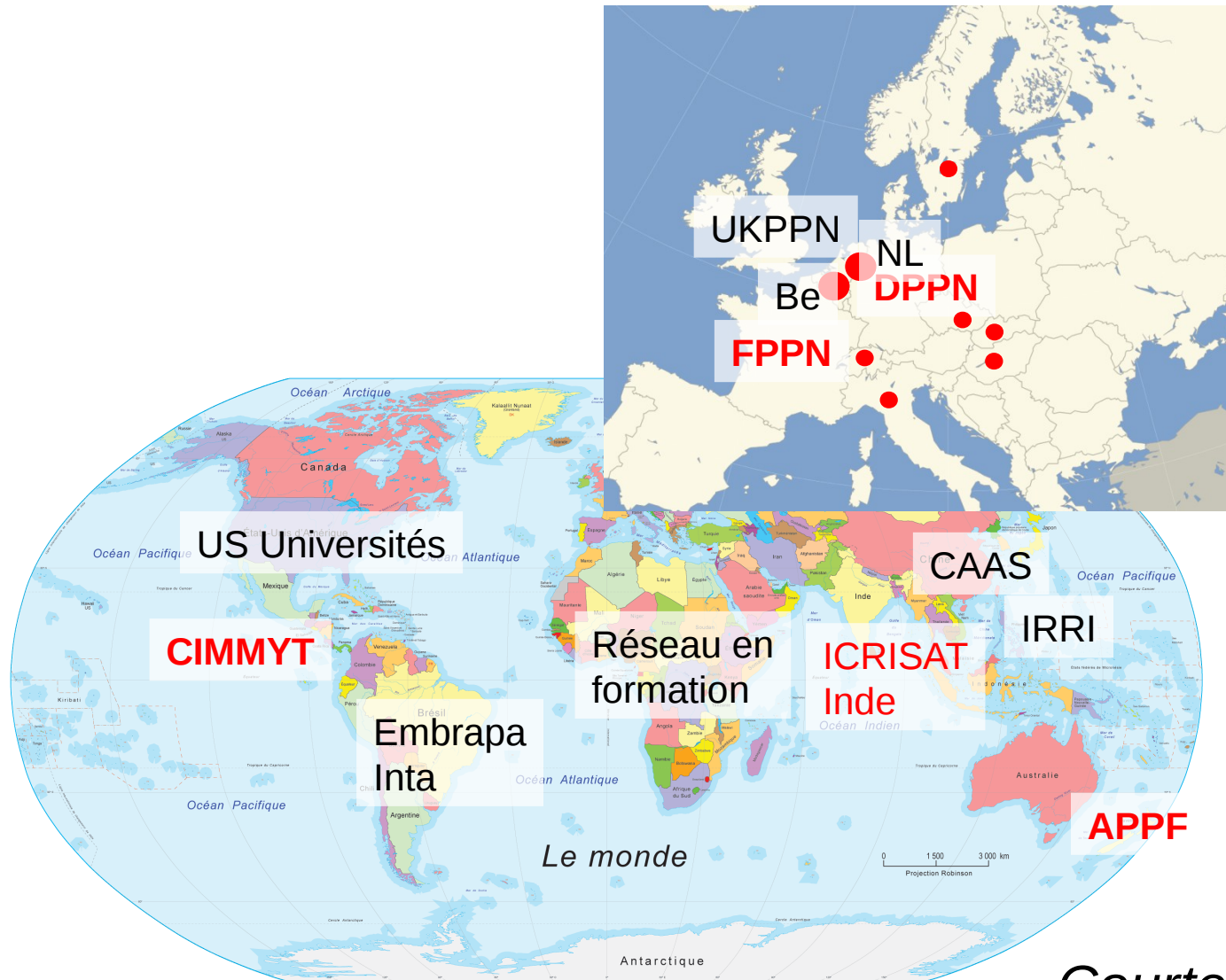


Fluorimétrie (photosynthesis)



International landscape

EPPN, IPPN, EMPHASIS, CG and others



Courtesy F. Tardieu

Projet I3 'Starting community'

2012-2015

Coordination **U. Schurr**

5.5 M€

All. (3) , Fr. (2) , UK (2), NL, Tcheq. , Hungria



- Transnational Access (TA) : 67 access of EU public group
- Joint research activities :
 - Imaging (**R van Zedde** NL)
 - 'Good practices' (**F. Tardieu** Fr)
 - Information systems (**B. Usadel** All)
- Networking: seminars

*Interest : exchanges during TA expériences
(some) methodological research
set up a « community »*

Projet I3 'Advanced community'

2017-2020 ~~deadline~~: 30 March 2016

Coordination **F. Tardieu**

10 M€

All., Fr., UK, NL, Tchec. , Hungria, Belgium +
'Controlled conditions'



- Transnational Access : ☐ 100 access of public teams. Private?
- Joint research activities : Model assisted phenotyping
Information systems
Trans-platform analysis
- Networking: seminars, strategy, sustainability

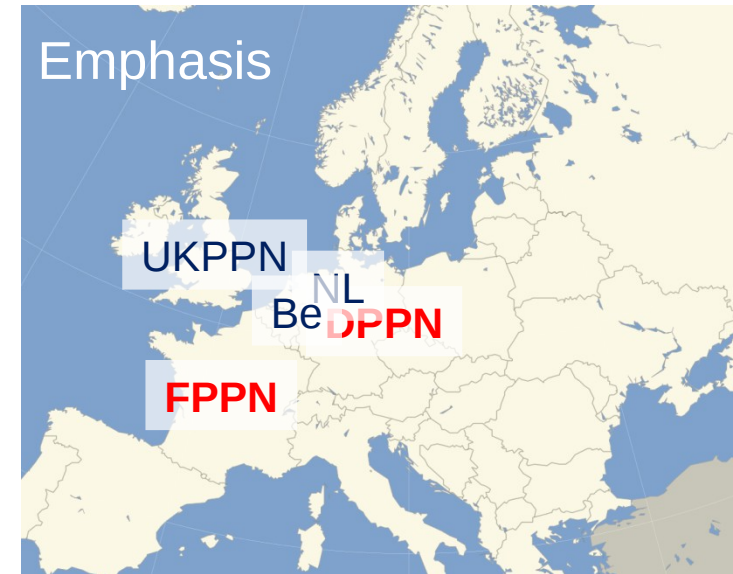
*interest : exchanges during TA experiences
strengthen the « community »*

methodological research

European Institute, perennial, juridical statute

- Issued from National initiatives
- Labeled par l'Europe
- France and Germany only full members
- Financed by state

Coordination **U. Schurr**,
Scientifique resp **F. Tardieu**



*Interest : exchanges during TA experiences
methodological research
strengthen the « community »*

*Interest : Infrastructure considered as a priority in France (post 2020)
Priority in Europe
Could become a quality label for EU, French ANR projects*

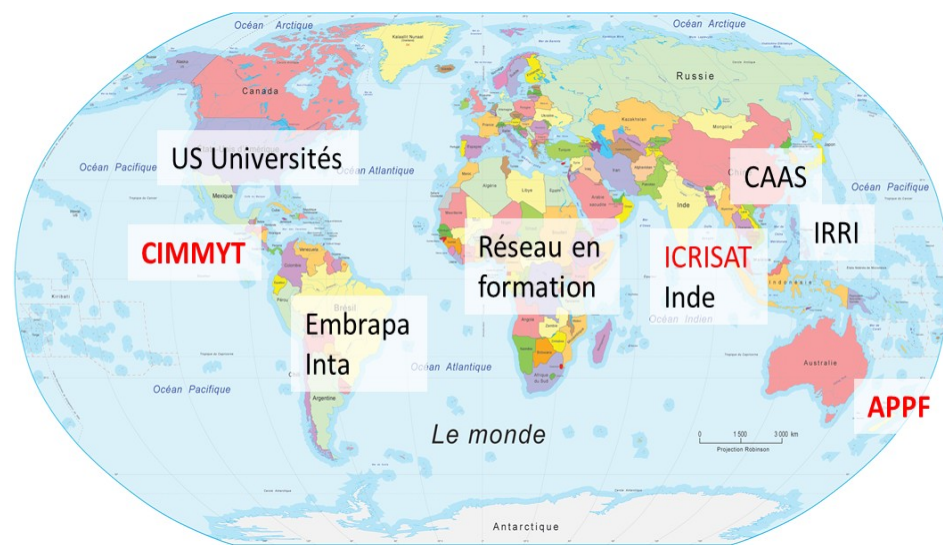
Formalized Network (association)

Financed by members contributions (3000€/year)

President **U. Schurr**

INRA is represented by **C. Salon**

*Interest : very large network,
bisanual congress, informal
work groups, towards IN
projects*



A scientific experiment setup featuring a red laser beam that creates a glowing plasma column. The setup includes various mechanical components, cables, and a camera mounted on a rail system. The background is a red-lit enclosure.

!gracias por su atención!

Merci pour votre attention!

Thanks for your attention

**Σας ευχαριστώ για την προσοχή
σας**