



European and international phenotyping initiatives

Christophe Salon

► To cite this version:

Christophe Salon. European and international phenotyping initiatives. Scientific Workshop on the effects of biotic and abiotic stresses in legumes: the ABSTRESS and BIOTECISOJASUR projects, Mar 2016, Balcarce, Argentina. hal-02742022

HAL Id: hal-02742022

<https://hal.inrae.fr/hal-02742022>

Submitted on 3 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Fonds Européen
de Développement Régional



European and international phenotyping initiatives

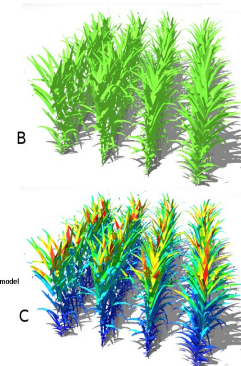
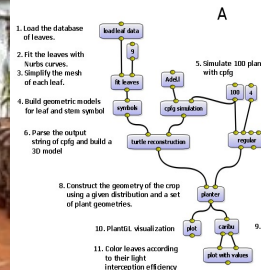
Christophe SALON
UMR Agroécologie, INRA
France



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.

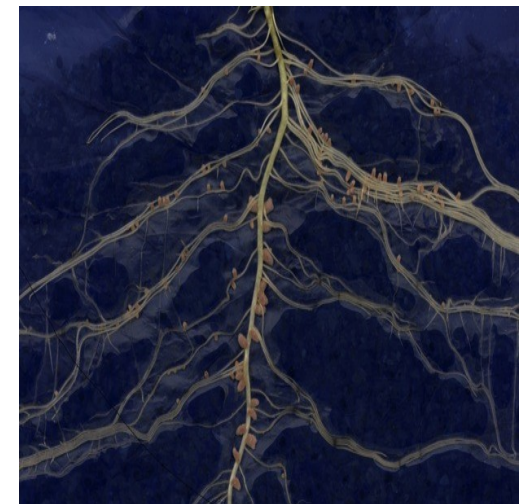
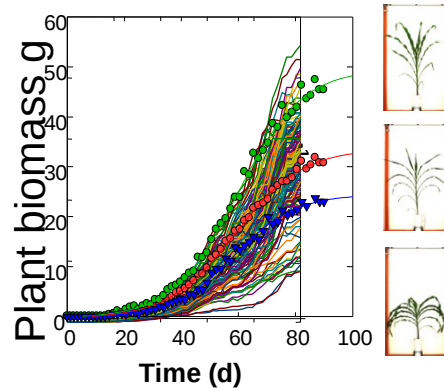
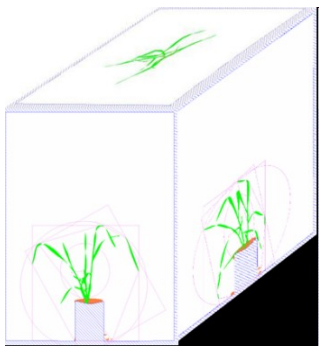
Budget : 24M€ of subvention, 3M€ for 4PMI root phenotyping

- 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 (controlled or in the field) what we can't measure elsewhere* »
 - **reproducible characters / heritability / yield (quality) predictives “hidden”** (RUE rather than biomass, sensitivity rather than « only » yield)
 - **genotypic parameter** for ecophysiology models
- Flexibility to work on different species

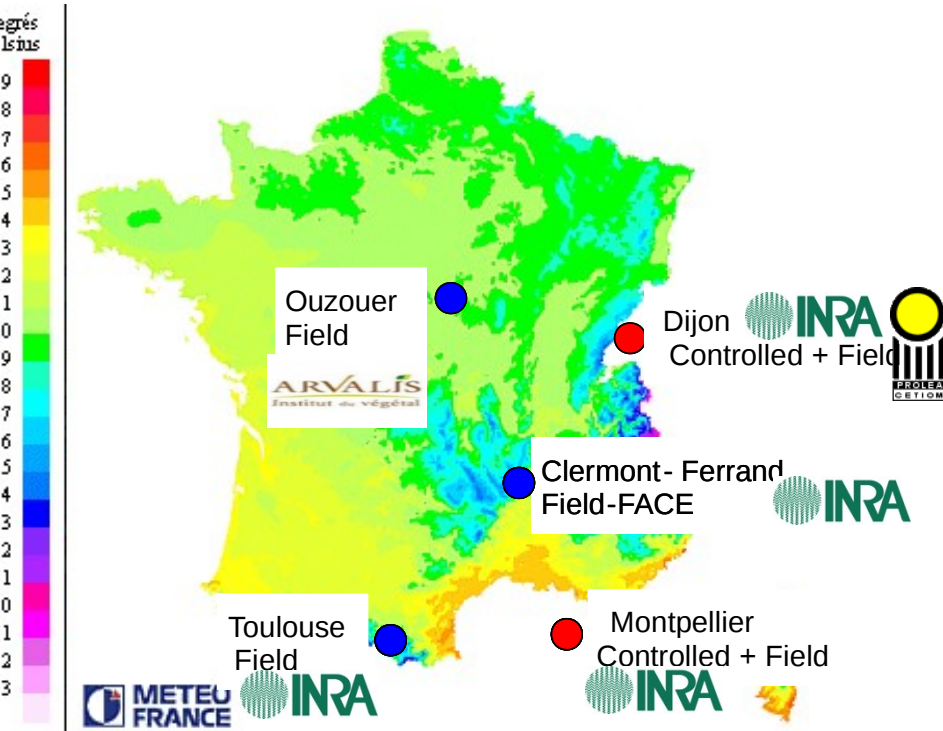
PhenoArch (Montpellier)



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

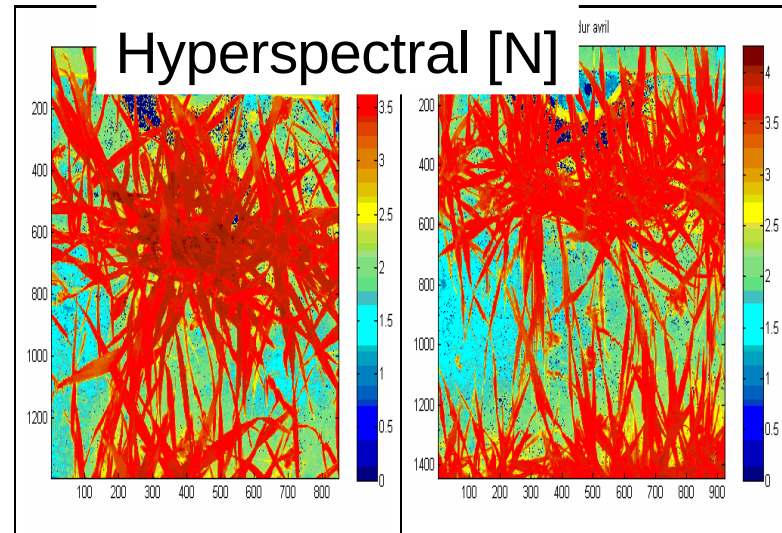
Constitutes « models »

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

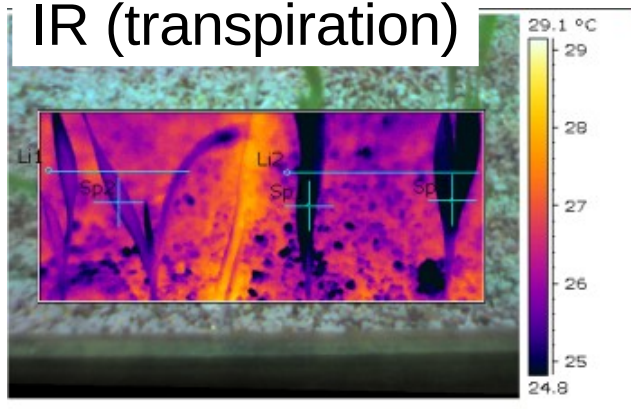
LiDAR (LAI)



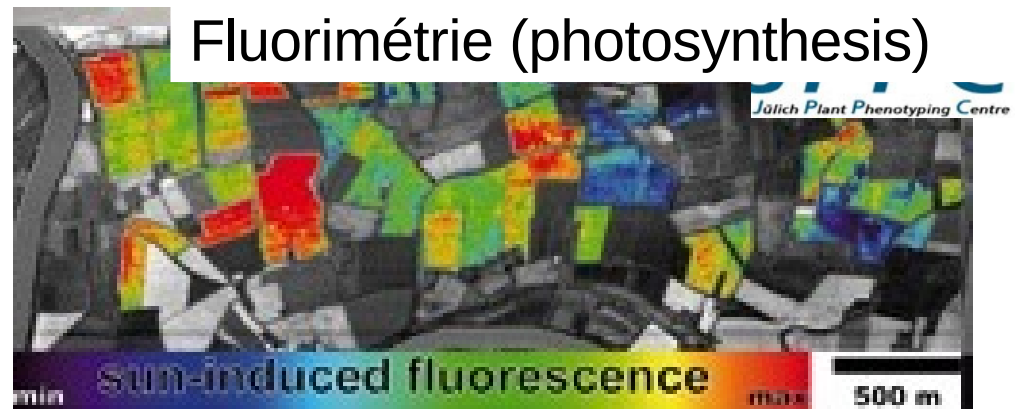
Hyperspectral [N]



IR (transpiration)

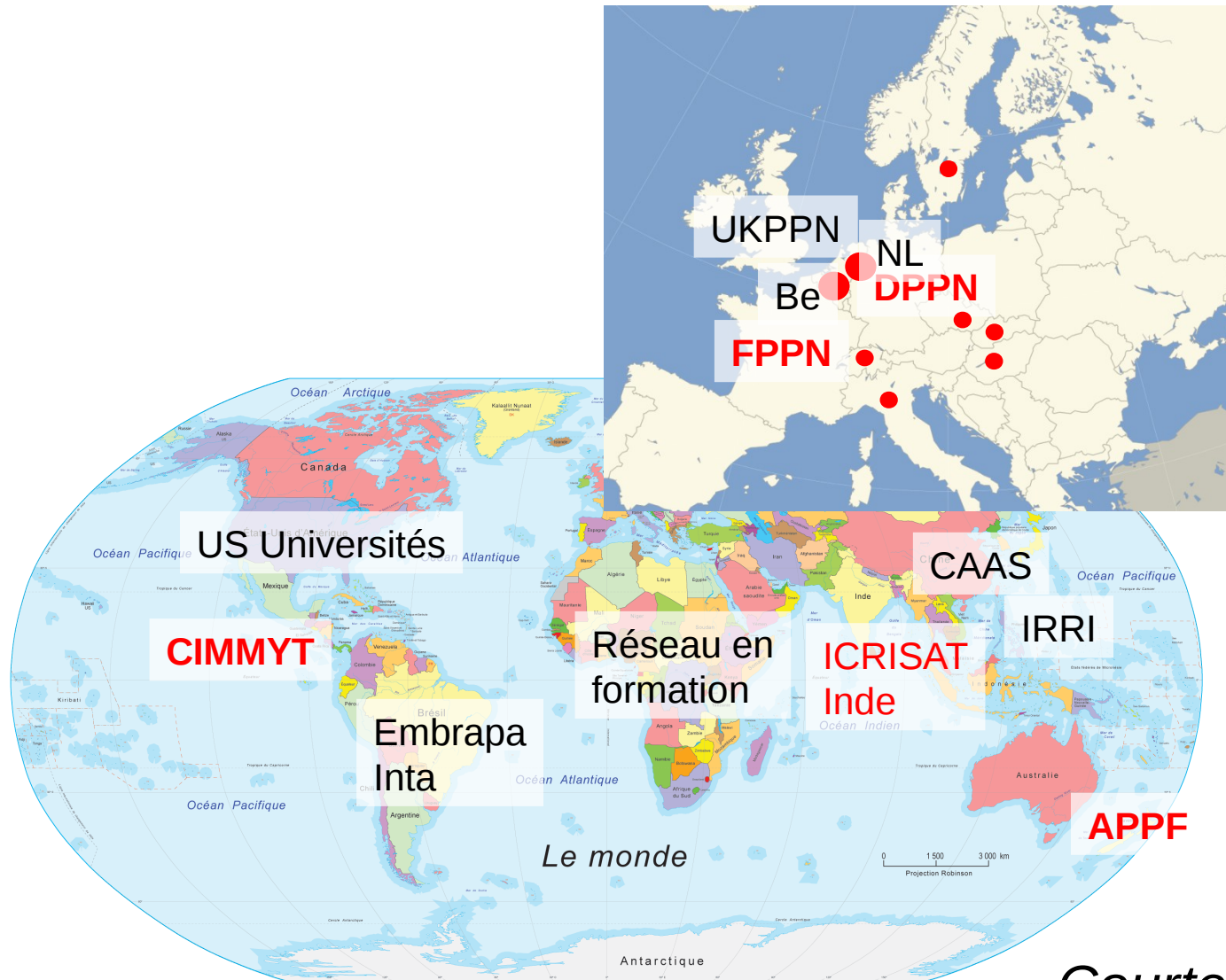


Fluorimétrie (photosynthesis)



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, Tchec. , 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, Tcheq. , 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

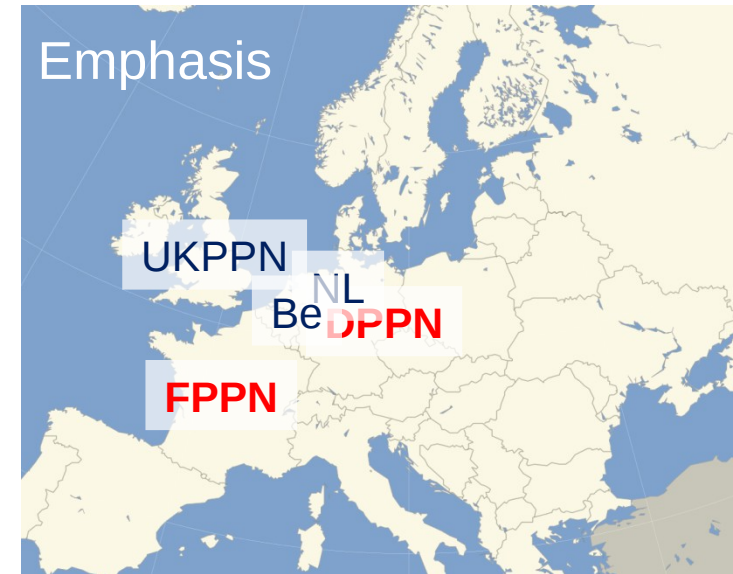
*interest : exchanges during TA experiences
strengthen the « community »*

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*

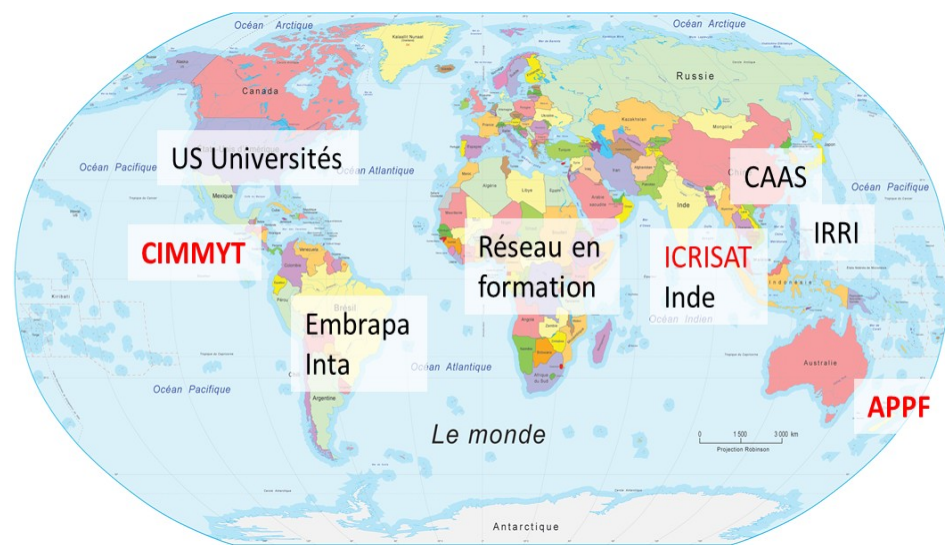
Formalized Network (association)

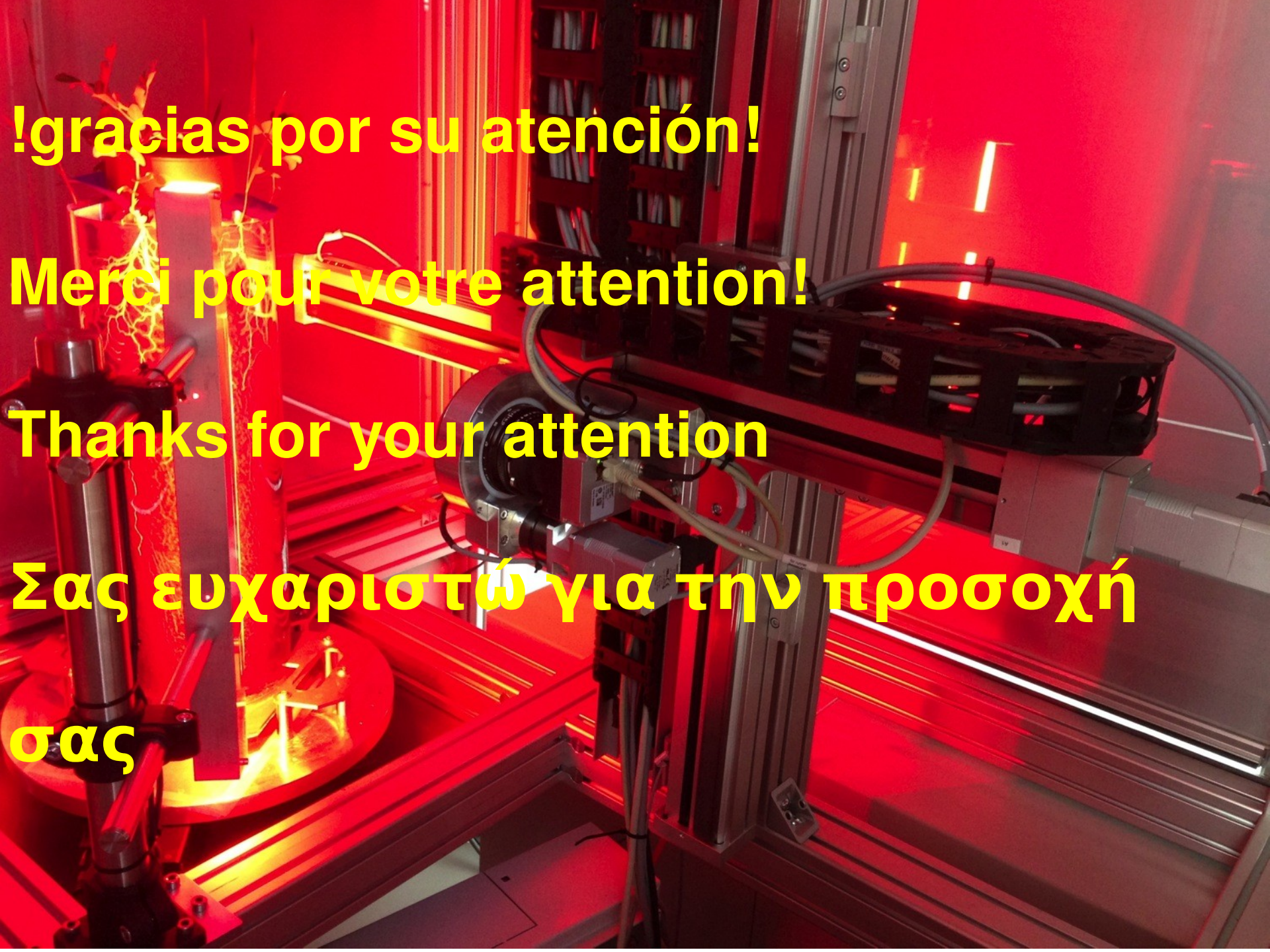
Financed by members contributions (3000€/year)

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, likely a laser plasma experiment. A red laser beam is directed through a series of mirrors and lenses, creating a bright red path. A glowing, yellow-orange plasma column is visible in the center of the beam. The setup is mounted on a metal frame with various cables and components.

!gracias por su atención!

Merci pour votre attention!

Thanks for your attention

**Σας ευχαριστώ για την προσοχή
σας**