Pl@ntAgroEco

New perspectives on plant disease characterization and taxa associations based on deep learning and citizen science

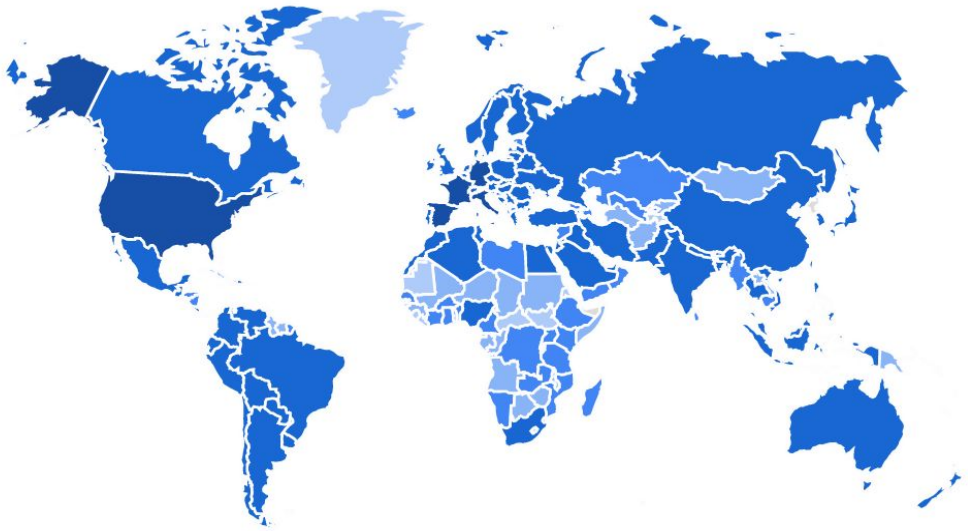
Journées INRAE INRIA 2023

Pl@ntNet

A participatory plant biodiversity observation platform based on artificial intelligence and mobile technologies

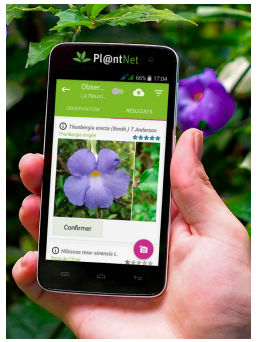
Pl@ntNet

25 Millions Users
200+ Countries
Up to 2M of identifications per day



Personal Use

Nature, Walks



Gardening

Phytotherapy

Professional use

Agro-ecology

Managing natural areas

Education, networking

Tourism

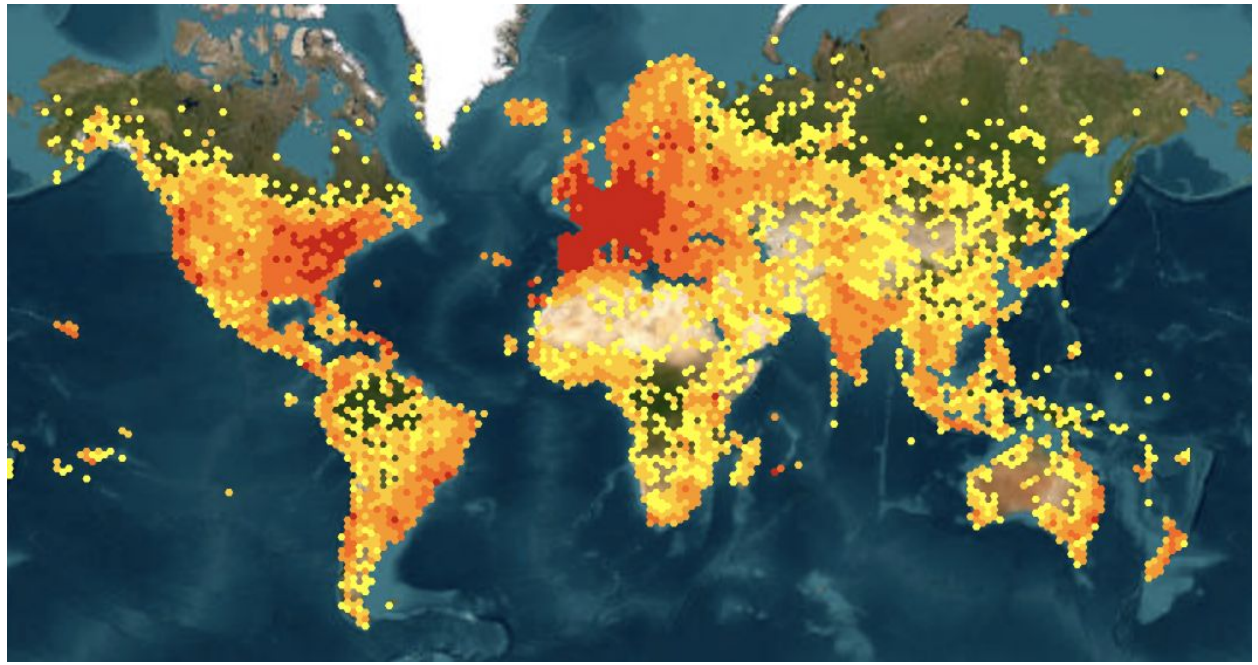
Trade

Pl@ntNet

Top-4 data provider to the world's largest biodiversity platform

GBIF

13 026 218 OCCURRENCES



348 CITATIONS

IUCN RED LIST

nature

PLOS ONE

ANNALS OF BOTANY Founded 1887

WILEY Publishers Since 1807

NON SOLUS

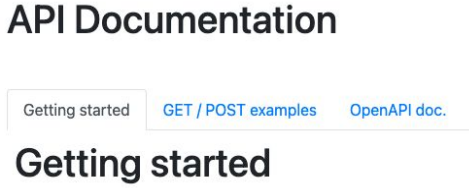
ELSEVIER

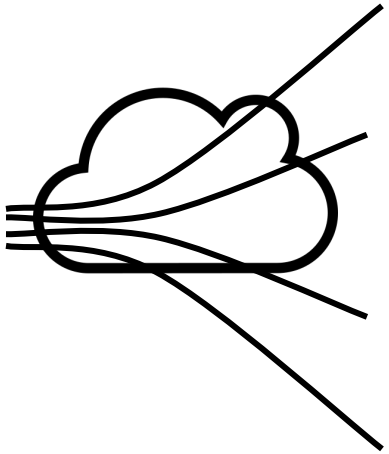
Pl@ntNet

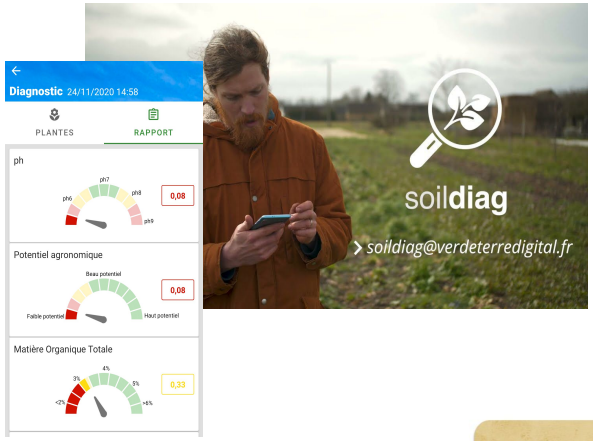
EUROPEAN OPEN SCIENCE CLOUD

A secure API for application developers using Pl@ntNet services

- ***6K developer accounts** (companies, citizen observatories, researchers)*
- *Integrated in **European Open Science Cloud** (EOSC)*







GARDENA

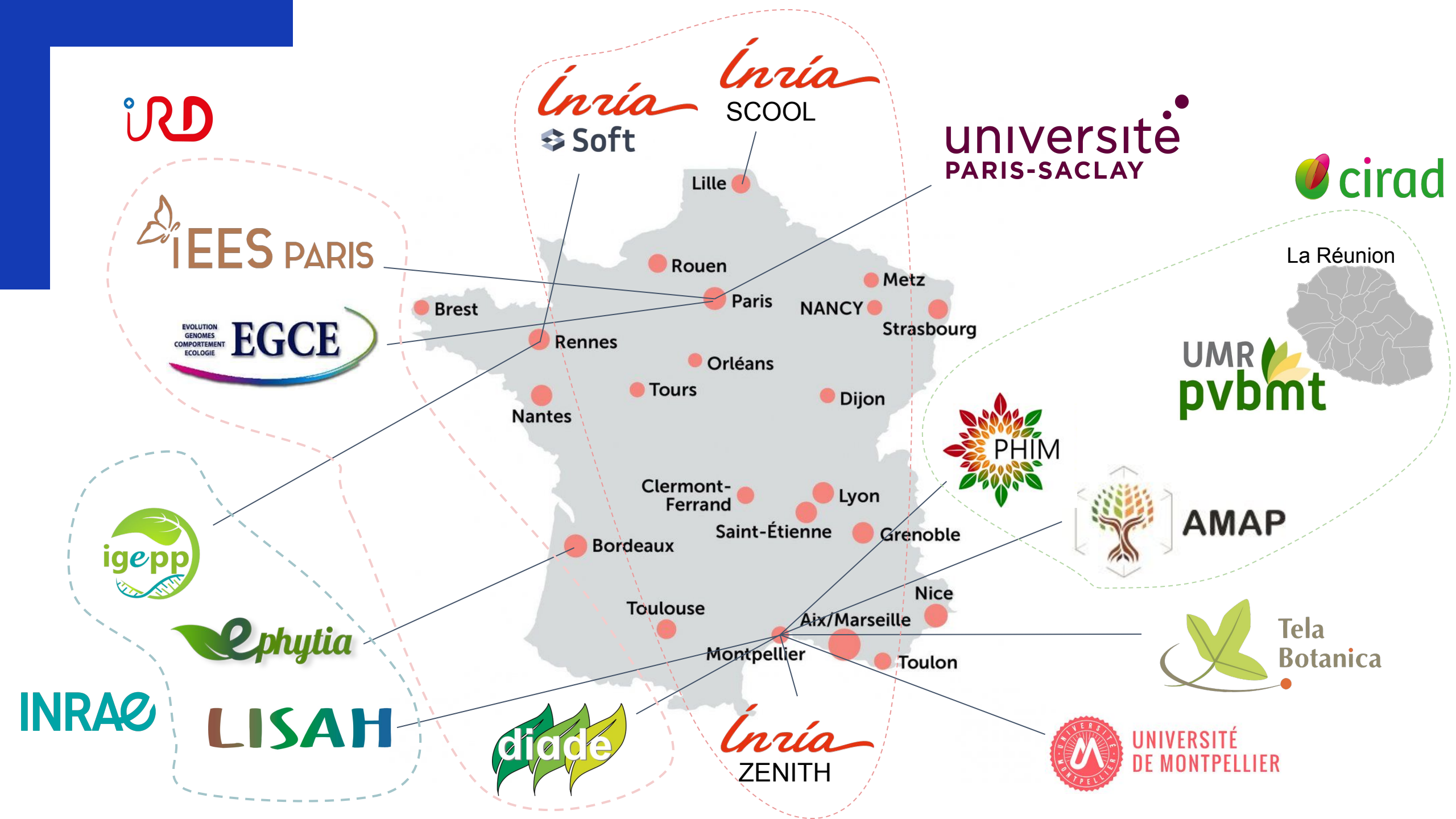
TRUGREEN
Professional Lawn Care

WWF

Pl@ntAgroEco

Designing and testing new services for agroecology on the Pl@ntNet platform

+


IRD
Inria Soft
Inria SCOOL
université PARIS-SACLAY
cirad
IEES PARIS
EVOLUTION GENOMES COMPORTEMENT ECOLOGIE EGCE
La Réunion
UMR pvbmt
Lille
Rouen
Metz
Paris
NANCY
Brest
Strasbourg
Rennes
Orléans
Tours
Dijon
Nantes
PHIM
AMAP
Clermont-Ferrand
Lyon
Saint-Étienne
Grenoble
Bordeaux
Nice
Toulouse
Aix/Marseille
Montpellier
Toulon
Tela Botanica
igepp
ephytia
INRAE
LISAH
diade
Inria ZENITH
UNIVERSITÉ DE MONTPELLIER

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Designing and testing new services for agroecology on the Pl@ntNet platform

Objective 1: Plant disease recognition and detection

- **New AI models for diagnosis**
  - ePhytia data (INRAE)
  - use of context (geolocalization, time, environnemental data)

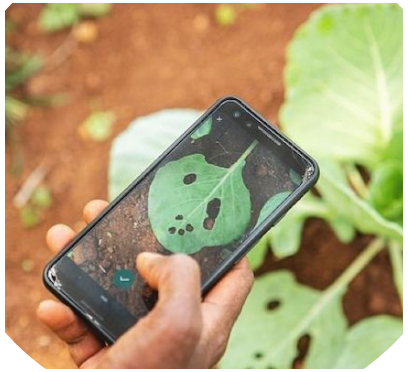
- **Integration** with **Pl@ntNet** and **Di@gnoplant (ePhytia)**

Di@gno-Pom

Vigne INRAE

ephytia

Collaborative epidemiological surveillance



Pl@ntNet

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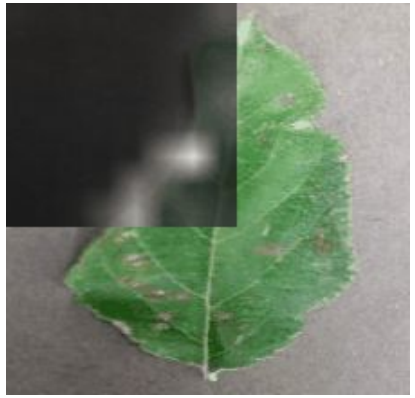
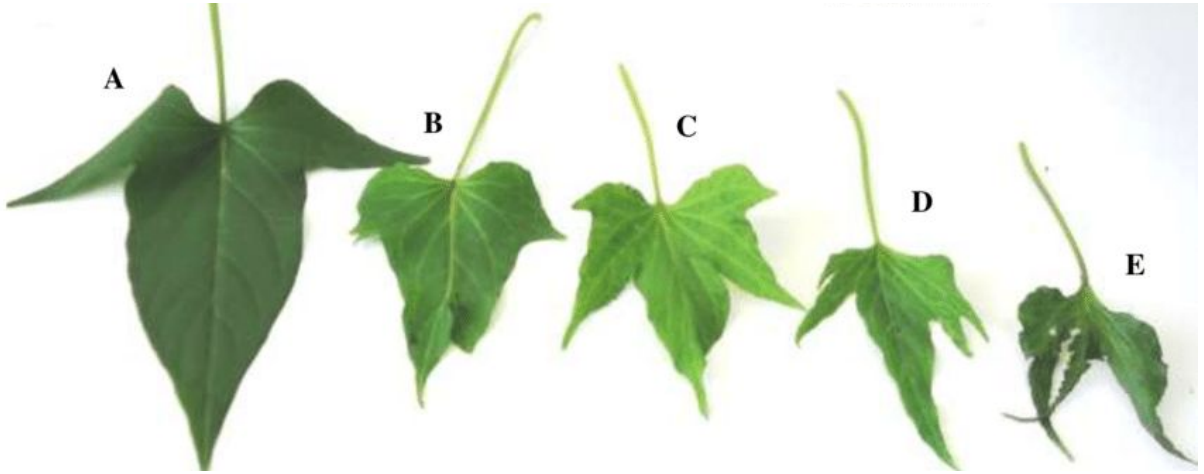
Objective 2: Estimation of symptom severity, stages of decline, and water stress degree

→ Towards better management: biological control, reduction of phytosanitary products

Early blight disease



Cedar apple rust disease



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Objective 3: Infra-specific levels identification

→ Examples: fruit varieties, horticultural cultivars, ...

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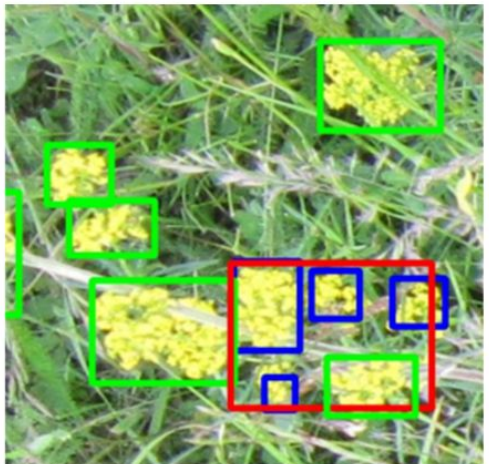
Designing and testing new services for agroecology on the Pl@ntNet platform

Objective 4: Characterization of crop-associated biodiversity using coverage images (inter-row, agricultural ditches, etc.)

→ Diagnosis of impact on the crop: beneficials, invasives, ...
→ Biodiversity indicators



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Objective 5: Increased knowledge of species

→ Collaborative knowledge production

- TelaBotanica: network of french-speaking botanists (40K members)
- Involvement of Paris-Saclay master's students from Biodiversity, Ecology, Evolution (BEE) track

→ Knowledge enhancement through *reinforcement learning*

- User's expertise profiling
- Adaptive querying of complementary expert

SCOOL

Pl@ntAgroEco

***Budget = 1.5 M€** funding (**+ 3M€** equity)*

Work organization:

WP4
Interaction with other platforms

WP5
Animation and Communication

WP6
Management and Exploitation

WP3
Integration into the Pl@ntNet infrastructure

WP1
New Models Artificial Intelligence

WP2
Data and knowledge aggregation

Pl@ntAgroEco

1st Feb 2023 — 31 Jan 2028

Work packages and Tasks	Year 1				Year 2				Year 3				Year 4				Year 5			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
WP1 New image-based AI models for agro-ecology																				
T1.1 - Plant disease recognition																				
T1.2 - Estimation of symptom severity																				
T1.3 - Infra-specific identification																				
T1.4 - Species ID in multi-specimen images																				
WP2 Knowledge aggregation and data production																				
T2.1 - Tela Botanica/OSER plant species knowledge base																				
T2.2 - Field data production by experts																				
T2.3 - Images annotation by experts																				
T2.4 - Reinforcement Learning for knowledge enrichment																				
WP3 Integration in Pl@ntNet infrastructure and maintenance																				
T3.1 - Backend development & maintenance																				
T3.2 - Front-end development & maintenance																				
T3.3 - Infrastructure evolution, monitoring & maintenance																				
WP4 Interactions with other platforms and initiatives																				
T4.1 - Interoperability with ePhytia applications																				
T4.2 - Interactions with PHENOME-EMPHASIS PEPR project																				
T4.3 - Joint analysis of LUCAS+Pl@ntNet data																				
T4.4 - Organization of a researchers school in the context of #DigitAg virtual lab																				
WP5 Citizen science programs, animation and communication																				
T5.1 - Tela Botanica Citizen science programs																				
T5.2 - Pl@ntNet users community management and animation																				
WP6 Management and exploitation																				
T6.1 - Scientific and Technical coordination																				
T6.2 - Financial and administrative management																				
T6.3 - Exploitation																				

Pl@ntAgroEco Management

Overall scientific and Technical coordination:

- Alexis JOLY (Inria ZENITH)
- Pierre Bonnet (CIRAD AMAP)

Work package leaders:

- Nicolas Parisey (WP1, INRAE IGEPP)
- Pierre Bonnet (WP2, CIRAD AMAP)
- Antoine Affouard (WP3, Inria ZENITH)
- Jean-Marc Armand (WP4, INRAE SAVE)
- Sophie Nadot (WP5, Paris-Saclay ESE)

Pl@ntAgroEco Management

General meetings

M6.1.b - Kick-off meeting organized - M3 → Feb 2023

M6.1.c - 1st general meeting organized - M12 → Jan 2024

M6.1.d - 2nd general meeting organized - M24 → Jan 2025

M6.1.e - 3rd general meeting organized - M38 → Mar 2026

M6.1.f - 4th general meeting organized - M52 → May 2027

End of Project - M60 → 31 Jan 2028

Pl@ntAgroEco Management

Communication & Management Tools

M6.1.a - project coordination tools setup - M2

Emails

plant_agro_eco@inria.fr

Mattermost (instant messaging)

Sign-up link

Follow-up Meetings

File sharing and collaborative editing

Lien

Pl@ntAgroEco Management

Financial and administrative management (Inria)

(i) Inria national unit (pepr@inria.fr) responsible for managing the administrative and financial aspects of PEPR projects

(ii) Financial appendix and signed awarding contract.

(iii) Consortium and repayment agreements : V1 proposed by Inria based on a CNRS & CEA template "approved" by Inria, INRAE, INSERM and IRD

(iv) Reporting ANR: annual intermediate reports and one final report

Delivrables:

D6.2.a - Consortium agreement - M10 (nov 2023)
M6.2.x - Intermediate reports - March 2024 / March 2025 / March 2026 / (March 2027 ?)
D6.2.b - Final report on all the results obtained - M58 (Nov 2027)

Pl@ntAgroEco Exploitation

Pl@ntNet, an open consortium hosted by InriaSOFT program

Current members:

- Foundator members:

- Invited member: 

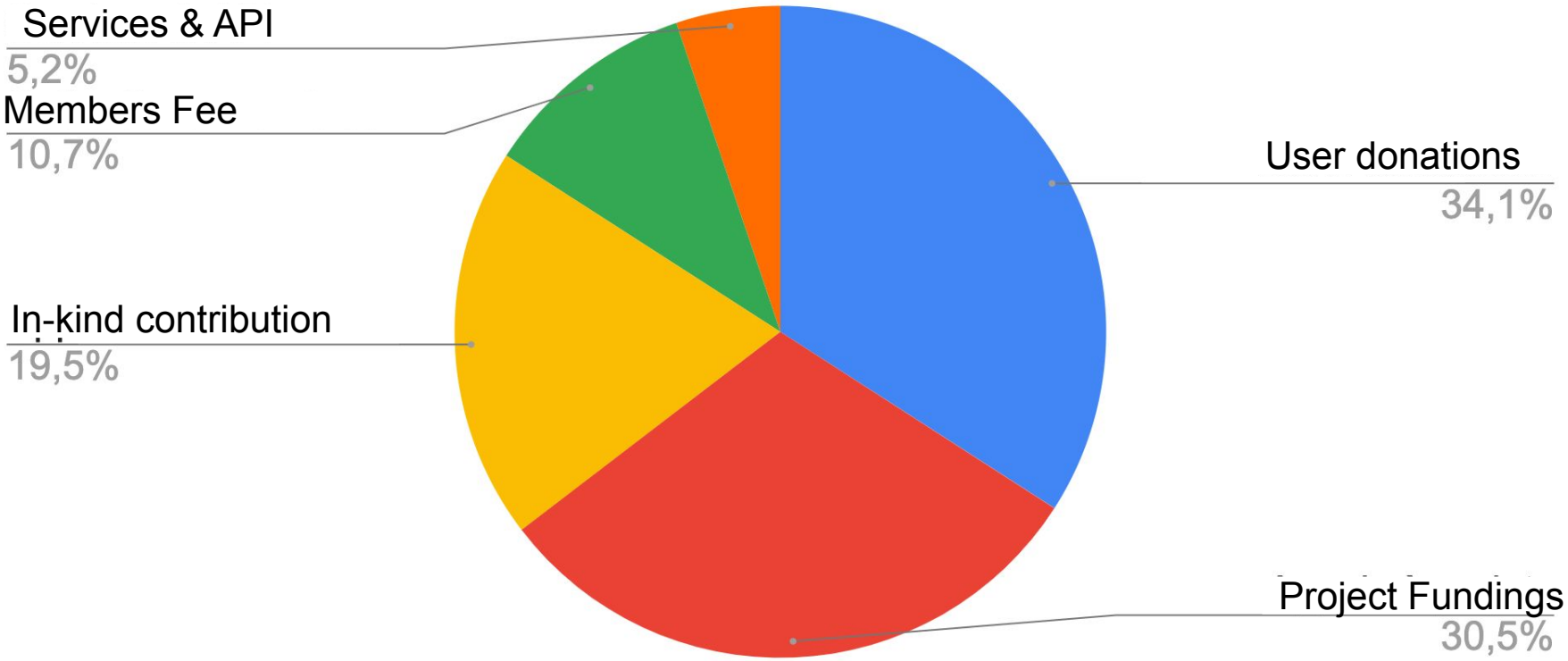
New members (in progress):

	Local partner	Member	Premium Member
Executive Committee (primary governance)			vote
Scientific & Technical Committee (technical choices)		vote	vote
Rights to use the trademark	Pl@ntNet local partner	Pl@ntNet member	Pl@ntNet
Number of half-days of engineering for access to Pl@ntNet services	3	15	30
API access https://my.plantnet.org/	500K/year	2.5M/year	Unlimited access
Amount of the membership fee	2K euros / year	10K euros / year	20K euros / year

Pl@ntAgroEco Exploitation

Current Pl@ntNet business model (revenues)

Total revenue 2022 (excluding contributions in kind):
450K euros



Pl@ntAgroEco DMP

Data Management Plan

- *“A data management plan is already maintained by Pl@ntNet consortium and will continue to be maintained.”*
- Partners wishing to share their data via Pl@ntNet will be able to join or manage their data according to their own DMP.

Terms of use - Pl@ntNet
identify.plantnet.org

Positive opinion from the Inria homologation commission

Pl@ntAgroEco Communication

Webpage on Pl@ntNet website

Pl@ntNet communication areas

PlantNet
@PlantNetProject

Plantnet

plantnet

Thank you for your attention