

Session ouverte:

Projets de la communauté

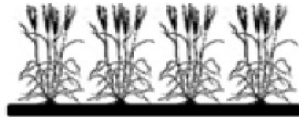
- GWAS blé-pois (*T. Flutre et J. Enjalbert, GQE Le Moulon*)
- Understanding the impact of climate change and pest outbreaks on fruit trees (*A. Cornille, GQE Le Moulon*)

GWAS blé-pois

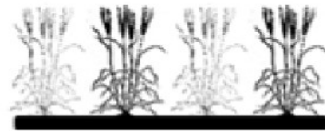
T. Flutre & J. Enjalbert
UMR GQE – Le Moulon
Équipe DEAP

Conférence de lancement de C-BASC
27/09/2021

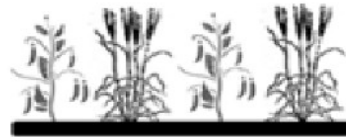
Diversification des couverts



peuplement pur

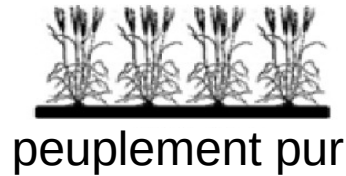


mélange variétal

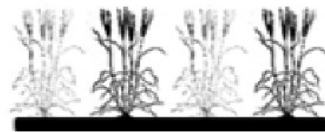


mélange d'espèces

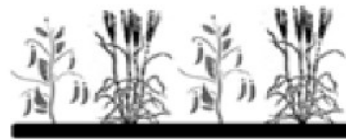
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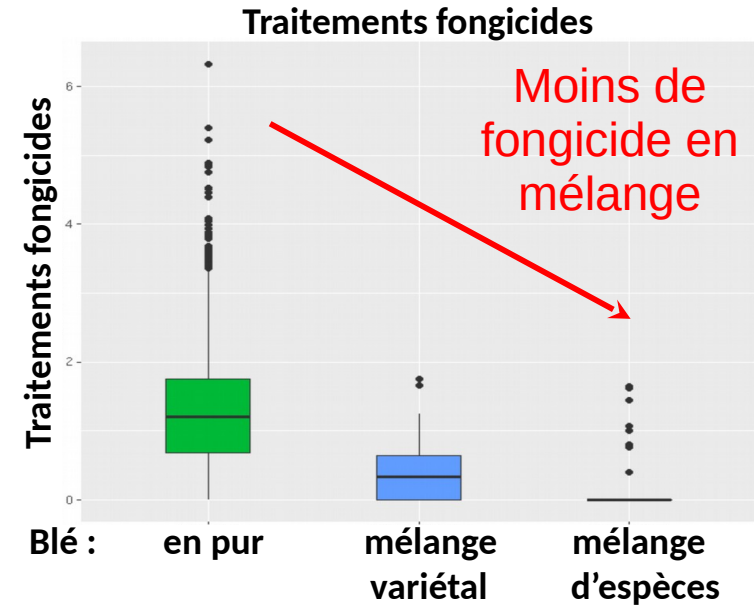
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mélange variétal

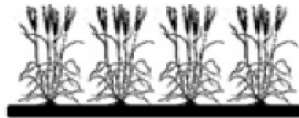


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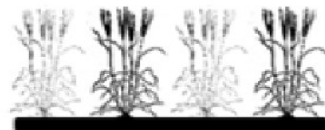


Réseau DEPHY (2005-2018, 6600 obs.)
Merhben et al.

Diversification des couverts



peuplement pur

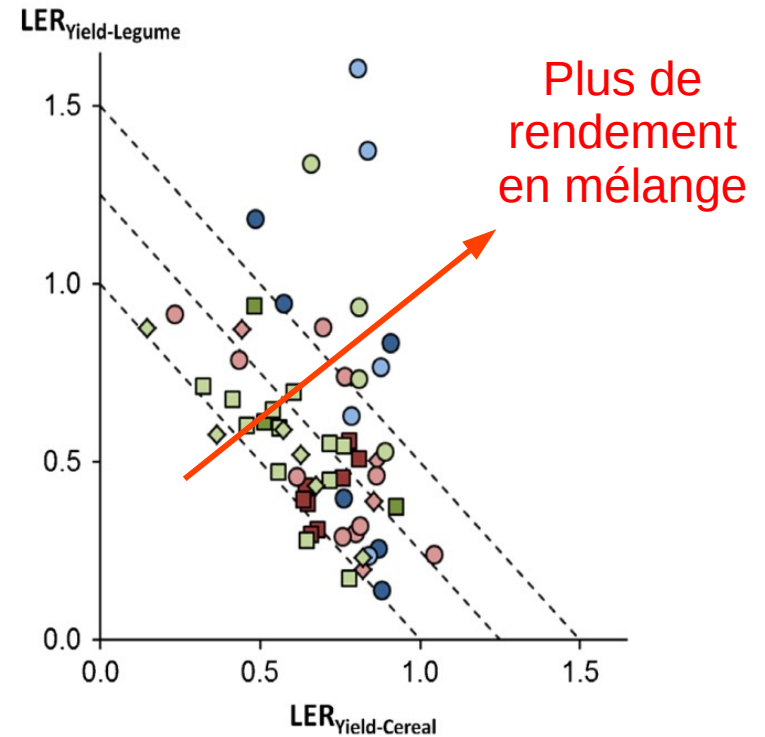


mélange variétal



mélange d'espèces

LER (Land Equivalent Ratio) : surface nécessaire en pur pour avoir le même rendement qu'en mélange



Bedoussac et al. (2015)

Expérimentation en plein champ

Quelles sont les **bases génétiques** chez le blé (céréale)
de l'**aptitude au mélange** avec le pois (légumineuse),
et de la **plasticité phénotypique** en peuplement
homogène vs hétérogène ?

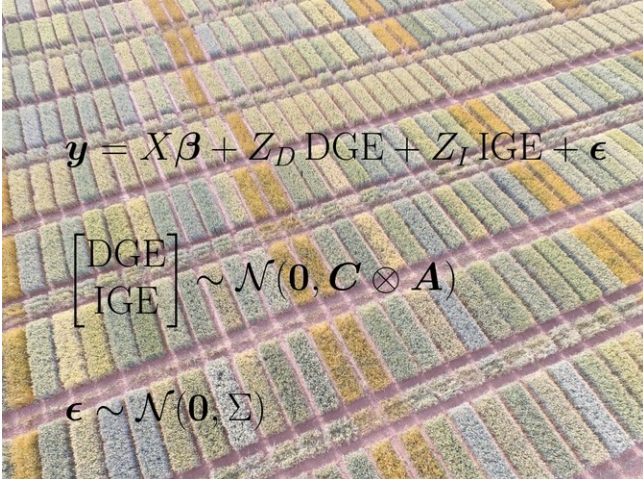
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Génétique d'association :

- 200 génotypes de blé
 - focus sur le rendement
- 2 génotypes de pois
- 2 sites : Saclay et Rennes
- 2 ans : 2023-2025




$$\mathbf{y} = \mathbf{X}\boldsymbol{\beta} + \mathbf{Z}_D \text{DGE} + \mathbf{Z}_I \text{IGE} + \boldsymbol{\epsilon}$$
$$\begin{bmatrix} \text{DGE} \\ \text{IGE} \end{bmatrix} \sim \mathcal{N}(\mathbf{0}, \mathbf{C} \otimes \mathbf{A})$$
$$\boldsymbol{\epsilon} \sim \mathcal{N}(\mathbf{0}, \boldsymbol{\Sigma})$$

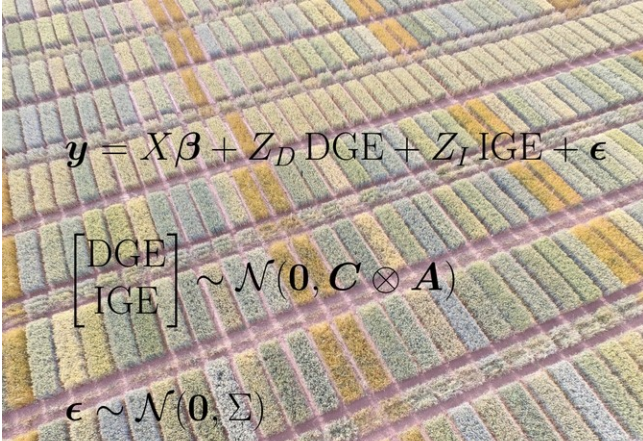
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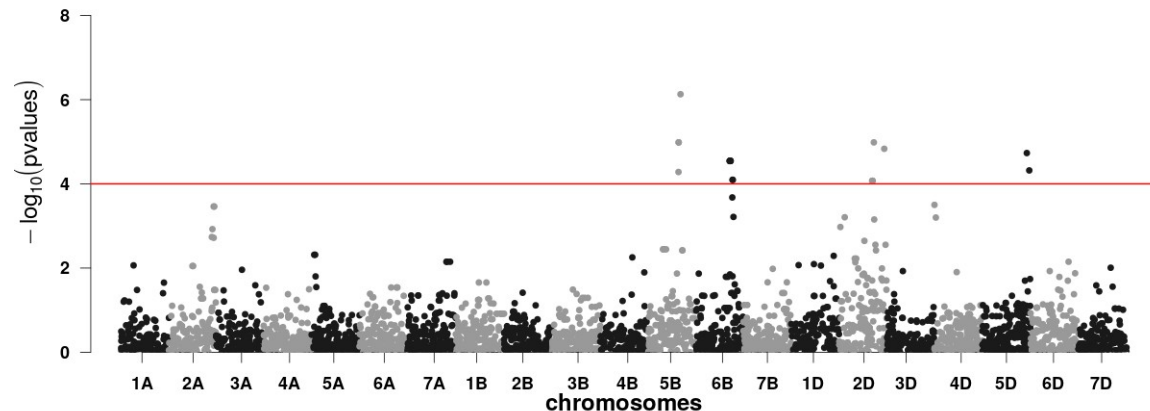




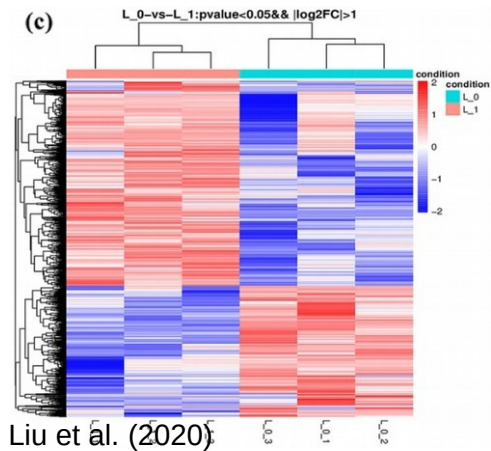
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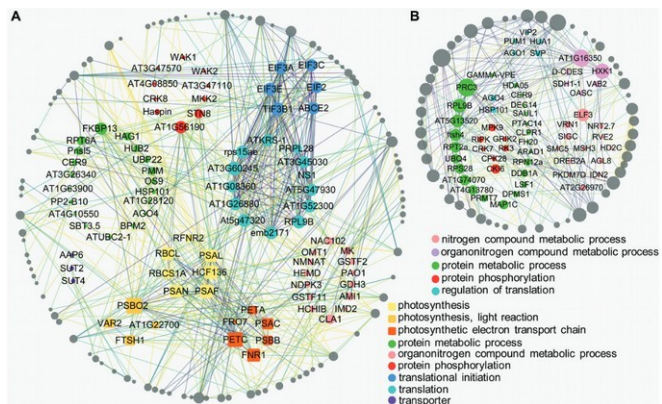
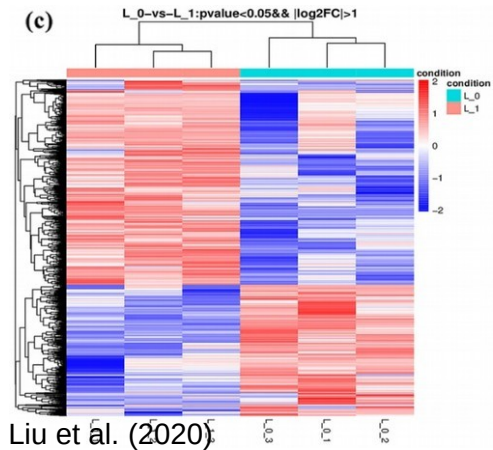
$$\epsilon \sim \mathcal{N}(\mathbf{0}, \Sigma)$$



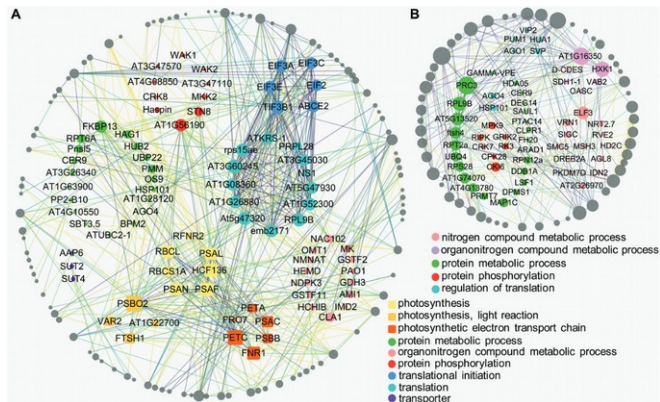
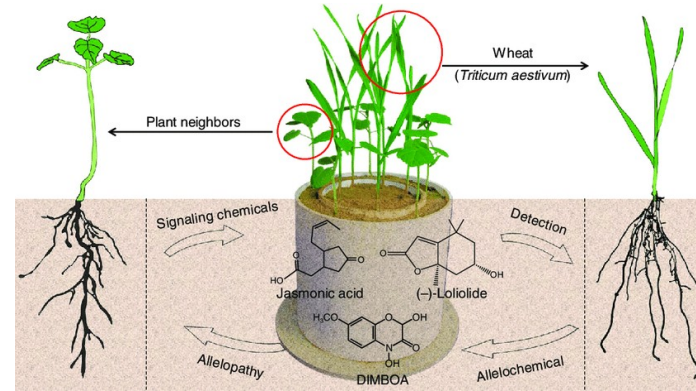
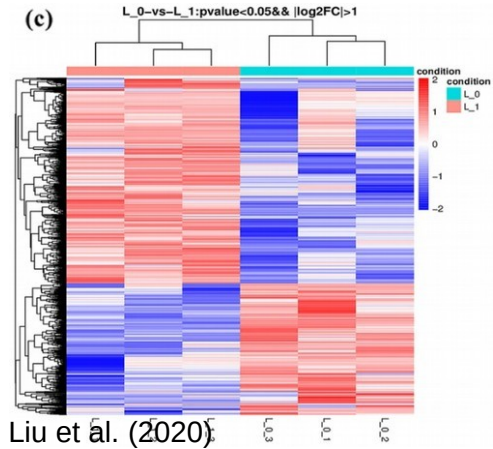
Elargir cette approche...



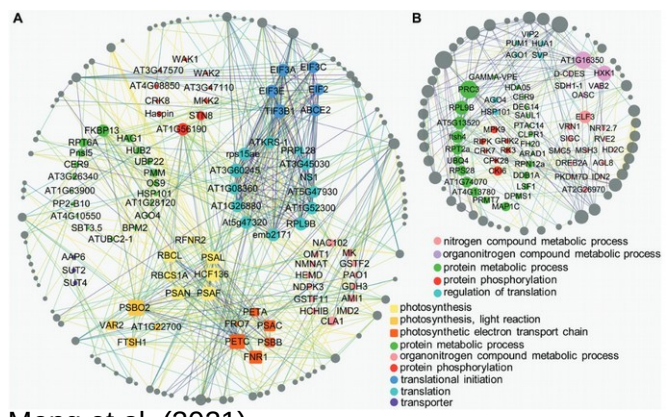
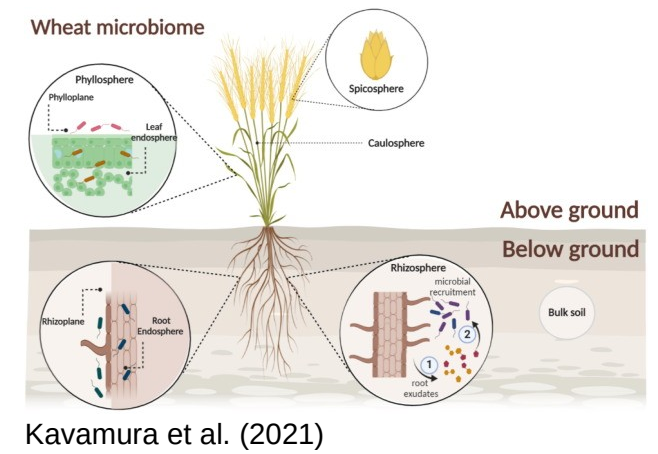
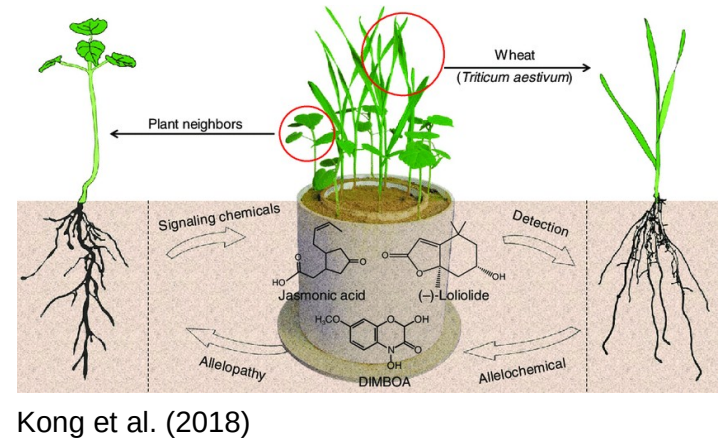
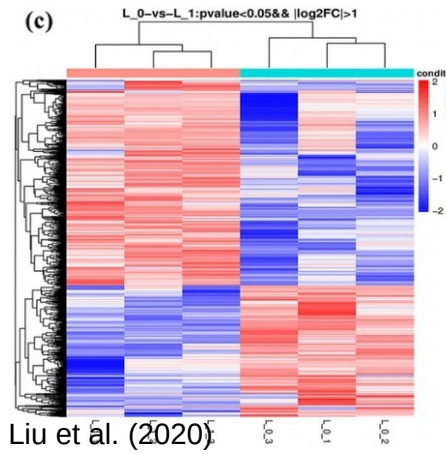
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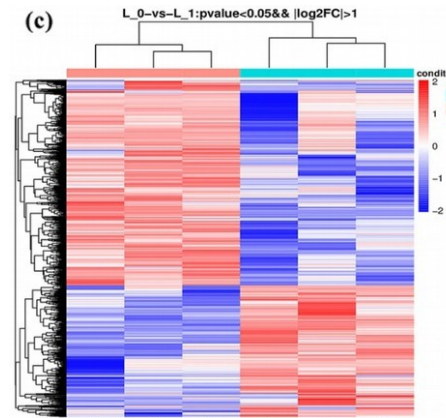
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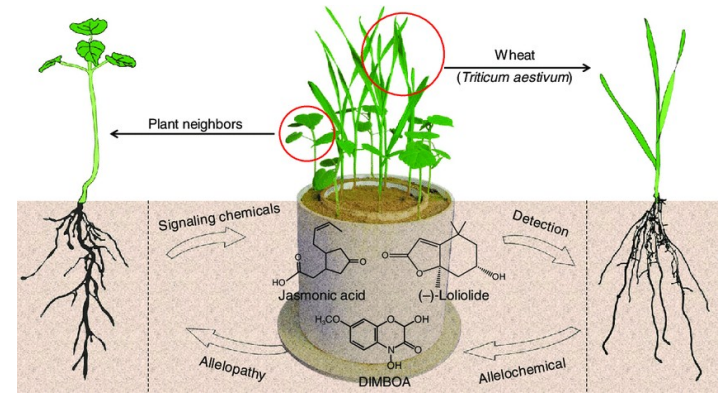
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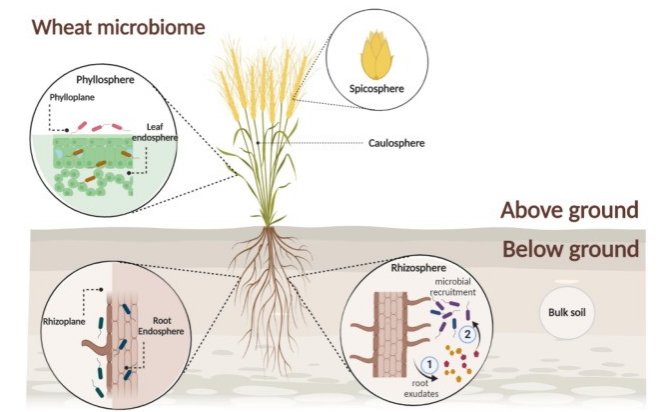
Elargir cette approche...



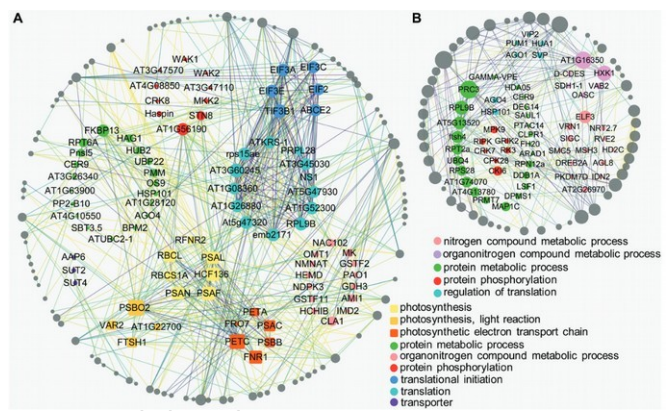
Liu et al. (2020)



Kong et al. (2018)



Kavamura et al. (2021)



Meng et al. (2021)



Intéressés ? N'hésitez pas à nous contacter pour aborder de nouvelles questions !

- timothee.flutre@inrae.fr
- jerome.enjalbert@inrae.fr



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DES SCIENCES
D'ORSAY



PROVERBIO



Understanding the impact of climate change and pest outbreaks on fruit trees

Amandine CORNILLE

CNRS researcher, Leader ECLECTIC group
Quantitative Genetic & Evolution lab – Le Moulon
Univ. Paris Saclay, France



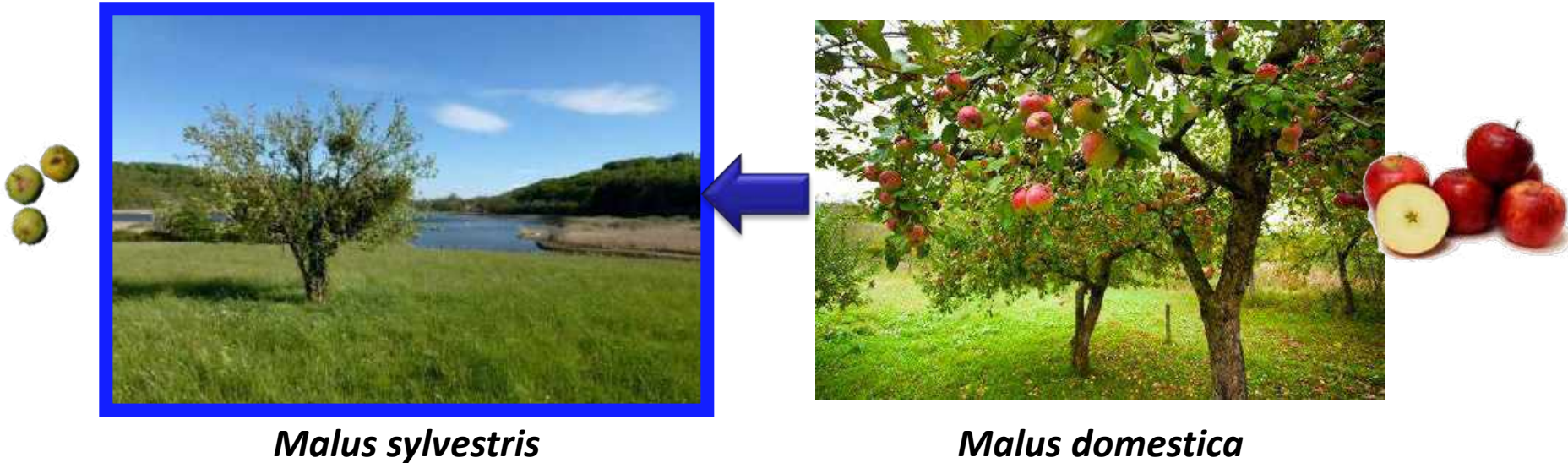
**Génétique
Quantitative
et Évolution
Le Moulon**



@CornilleAmand

Apple, a good model system to understand the impact of climate change and pest outbreak on fruit trees

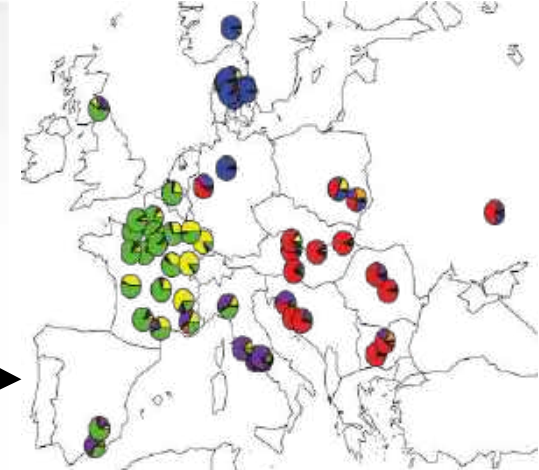
Wild contributor to the cultivated apple genome
Faced past climate changes and pathogen attacks



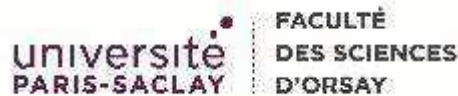
But threatened by:
-hybridization with the cultivated apple ←
-habitat fragmentation

Decrease in genetic resource levels (disease resistance, drought resistance, ..)

Conservation and experimental orchard of *Malus sylvestris* at University Paris Saclay

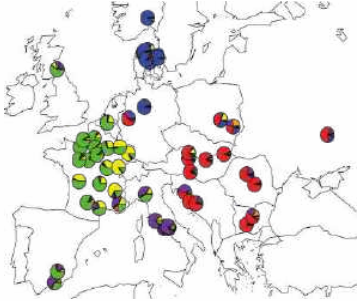


Plantation of **400 wild apple trees** from the **five genetic groups**

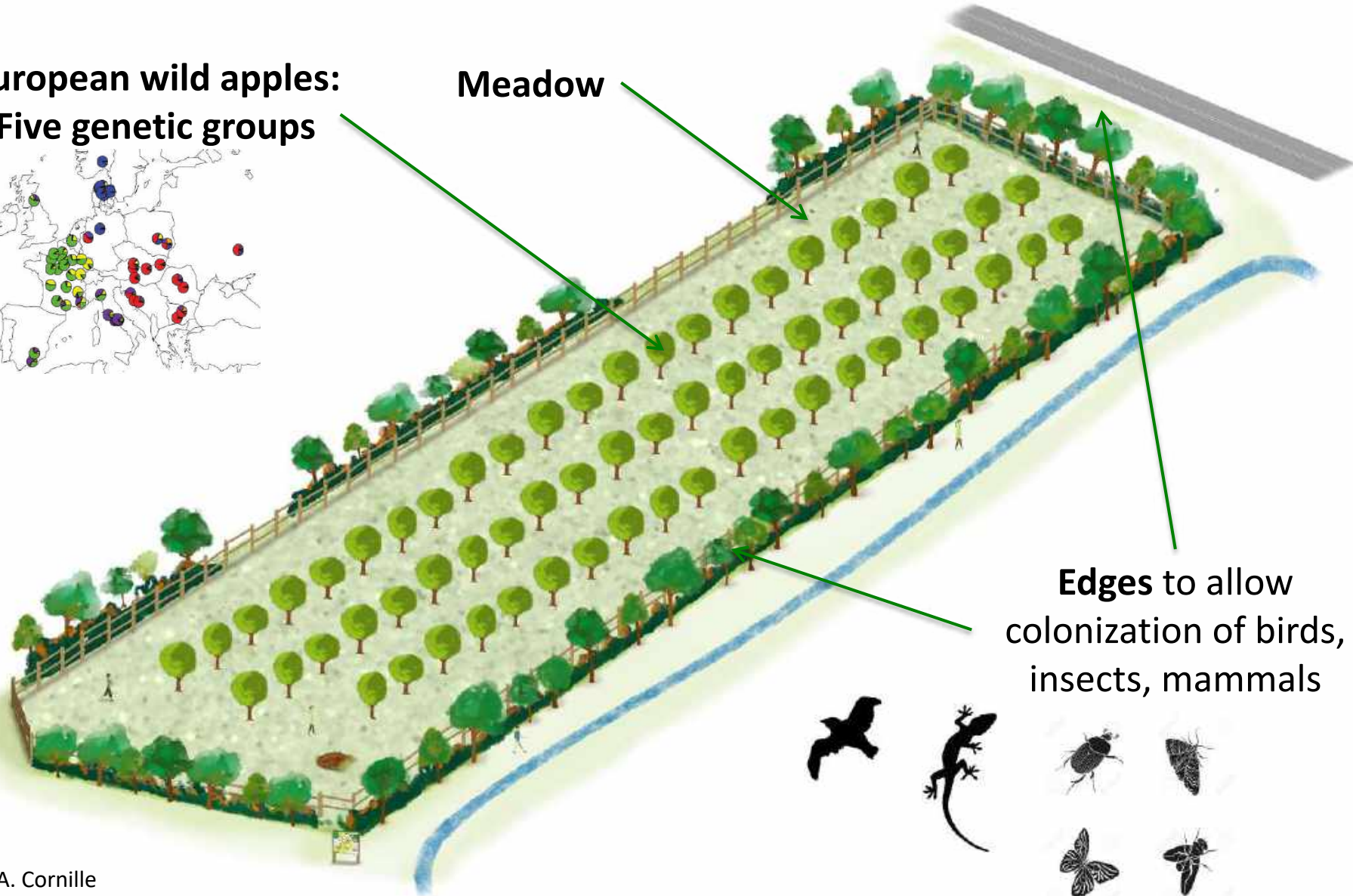


Conservation and experimental orchard of *Malus sylvestris* at University Paris Saclay

European wild apples:
Five genetic groups



Meadow



Edges to allow
colonization of birds,
insects, mammals



1800 wild apples genetically characterized

October 2019

October 2020



Nov 2020: Orchard now planted on the Saclay plateau!

 @PommierVerger



February 2020: Pedologic pedagogic hole and fences settled!

 @PommierVerger



Cécile Quantin, GEOPS



Insect hotel installed and the grass is growing a lot!

 @PommierVerger

8th june

Visit of the EPAPS
end of May



Maison des Sciences, CNRS
communication, AgroParisTech
students



End of may



Two weeks later!



First measures on the field!

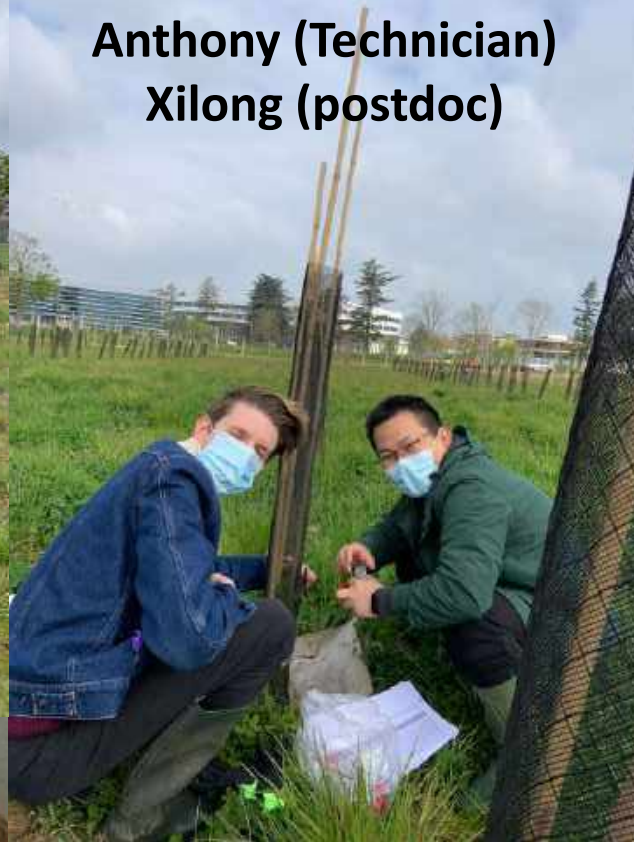
 @PommierVerger

Célia Lougmani (M1)



Anne Flore Didelot (M2)

Anthony (Technician)
Xilong (postdoc)



Noémie Delprouve
(M2)



Didier!



Thanks!!!



First measures on the field (2) !

 @PommierVerger

Mohammad Noor
L3, with Karine Alix



Carine!



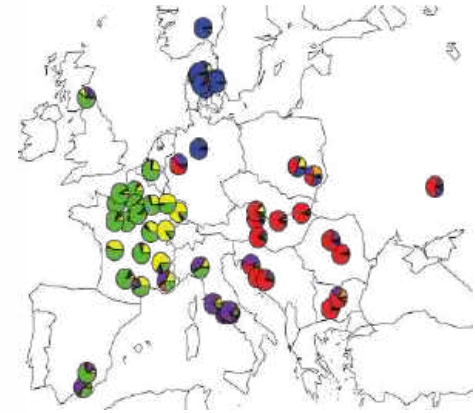
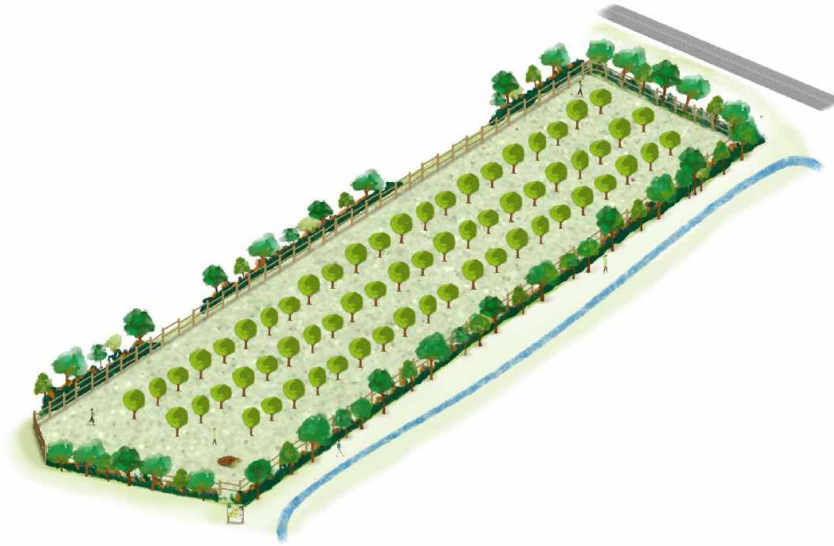
Thanks!!!



At the ESE greenhouse, thanks!

Thanks!!!

Conservation and experimental orchard of *Malus sylvestris* at University Paris Saclay



- **Experimental stations** for testing fruit tree **adaptation to climate and pests**
- **Ex-situ** source of apple seeds and/or scions for conservation & breeding programs
 - **Training and divulgation center** for students and large audience

Interesting in research project, teaching, divulgation?

- 5th and 7th october: LPO + activity with the FAB lab (CM1/CM2)
- EGCE involved (Fabrice Legeai): pollination services
- TECOMAH (surveys of plant and insect diversities)
- Pedagogic hole (GEOPS)
- Evolutionary genomics of fruit tree-pest interaction
- Any others projects ?



amandine.cornille@universite-paris-saclay.fr

 @CornilleAmand

Thanks!!

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INRAE

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Le Moulon
GÉNÉTIQUE QUANTITATIVE ET ÉVOLUTION

agroParisTech

Agence des Espaces Verts

LabEx BASC
Biodiversité, Agroécosystèmes, Société, Climat

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ATIP
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AGROFORESTERIE
association française

ON PASSE À L'ACTE

L'ÉA | TECOMAH
Les écoles des éco-activités

BOKU

INVESTISSEMENTS D'AVENIR

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Ecologie systémique evolution

ENGIE
Entreprises et collectivités

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Porté par Terre&Cité

Terre&Cité
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en Ile-de-France
avec le PRADER

