WinEsca Chair: Agroecological protection to control ESCA, a grapevine wood disease

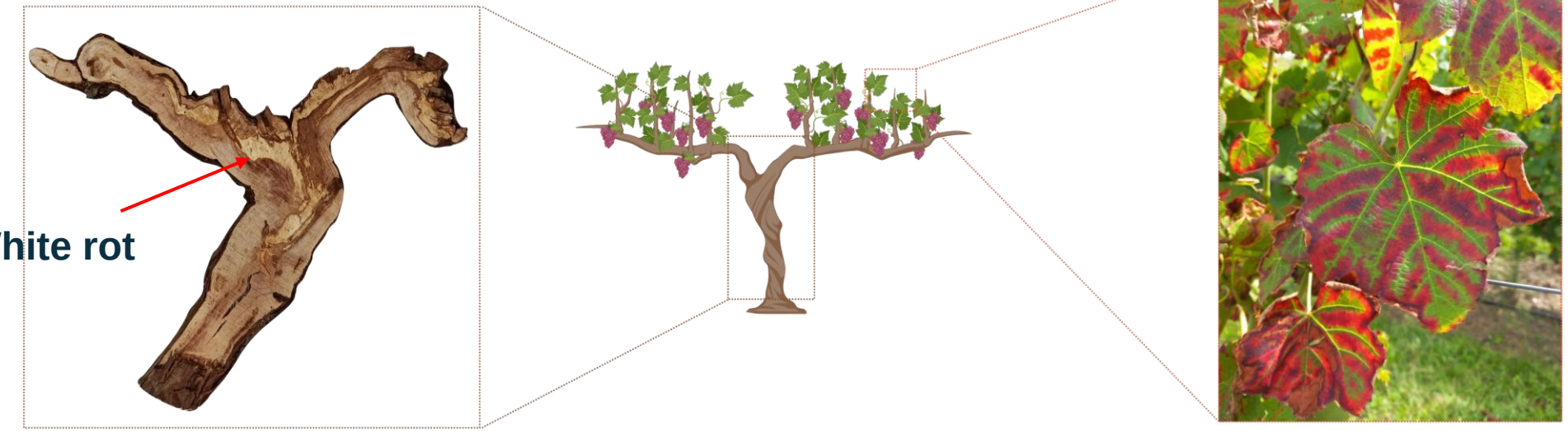
Eléonore ATTARD, Patrice REY

Context: Esca a Grapevine Trunk disease

Grapevine **Trunk** Diseases

~13% of French vineyards affected

Estimated losses 1 billion €



- **Complex disease with several fungal pathogen involved → white rot**
- ***Fomitiporia mediterranea* (Fmed) is the most abundant fungus in the white rot**
- **No curative treatment is available to control Esca**

(Bruez et al. (2020); Bekris et al. (2021))

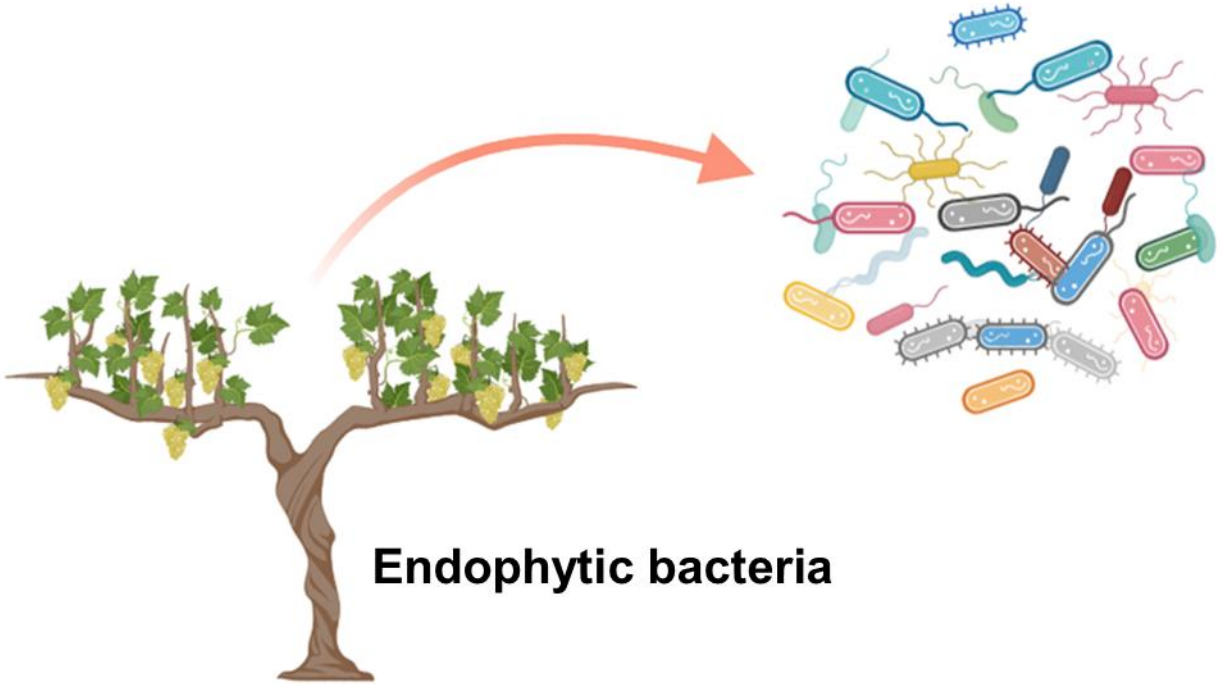
Aim : find solutions and understand the mechanisms

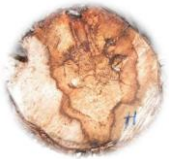
Our targets: Fmed and the white rot

Aim n° 1 : Biocontrol solutions

Origin of biocontrol bacteria

58 bacterial strains



Wood  **Collection of 33 strains**

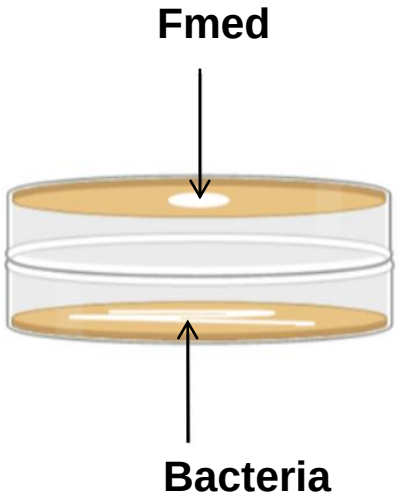
Sap  **Collection of 25 strains**

Aim n° 1 : Biocontrol solutions

Screening of biocontrol bacteria

- ***In vitro* antagonism : how biocontrol bacteria decrease Fmed growth**

Direct Confrontation



Volatile Organic Compounds (VOCs)

Microcosms : grapevine sawdust

→ ***Paenibacillus polymyxa* SV13 and *Pseudomonas paracarnis* S45.**

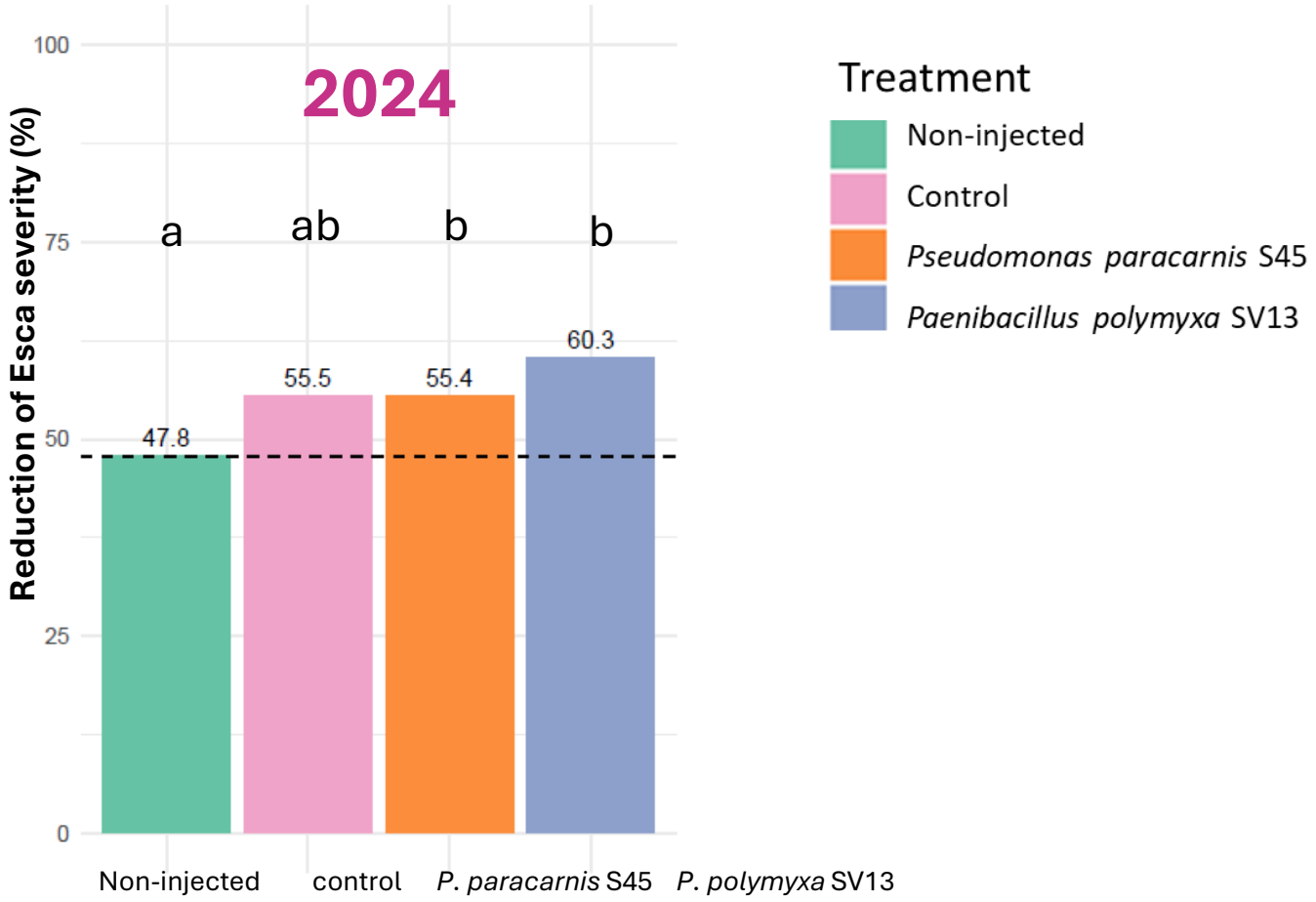
Aim n° 1 : Biocontrol solutions

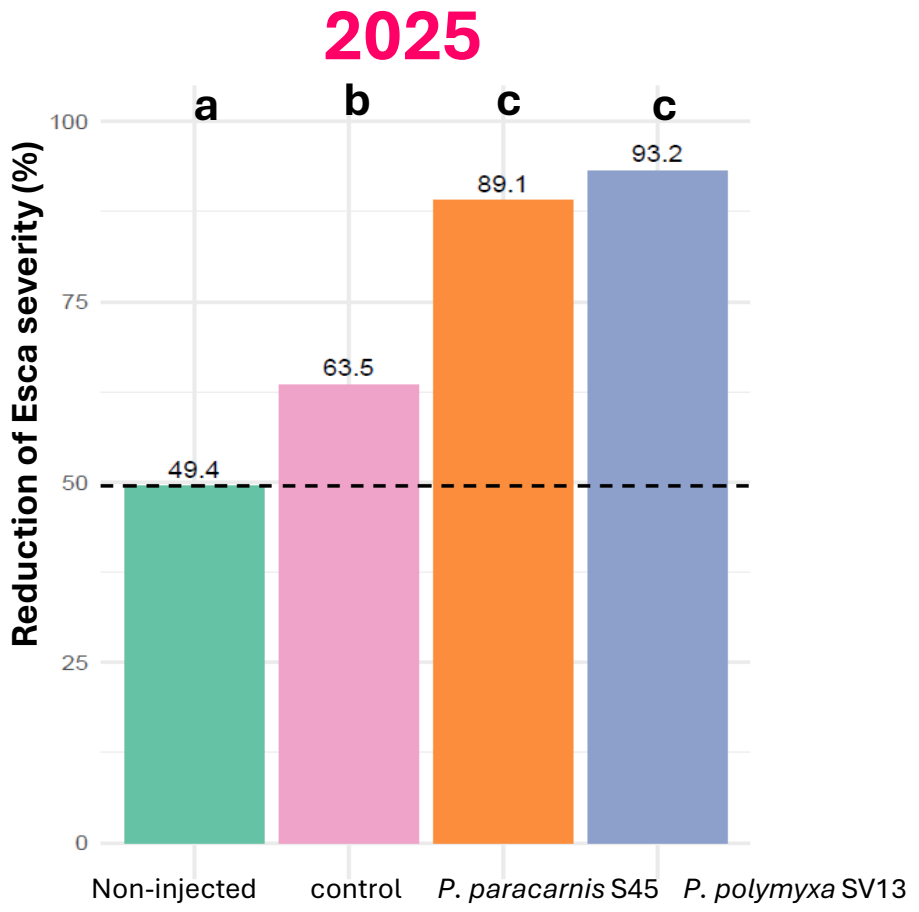
Field Trials : Bacterial trunk injections

4 treatments
-Non-injected (NI)
-Injection of the lactose (Control)
-Injection of the strain *Pseudomonas paracarnis* S45
-Injection of the strain *Paenibacillus polymyxa* SV13

Aim n° 1 : Biocontrol solutions

Reduction of Esca severity





Improvement of our injection / Climatic effect ?

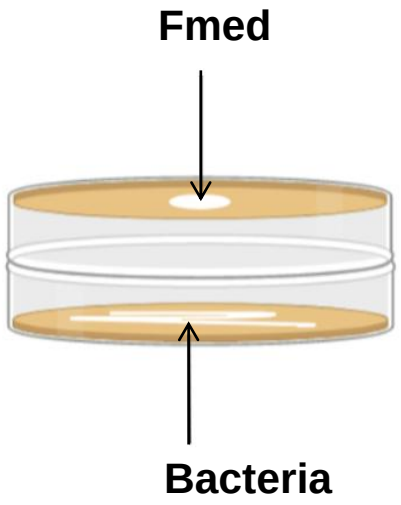
Cumulative effect of double injections

Aim n° 2 : Understand the Mechanisms

Metabolomics

- **Which metabolites are active against Fmed growth**

Direct Confrontation



Volatile Organic Compounds (VOCs)

Mickael Le Bechec presentation 11h10

Aim n° 2 : Understand the Mechanisms

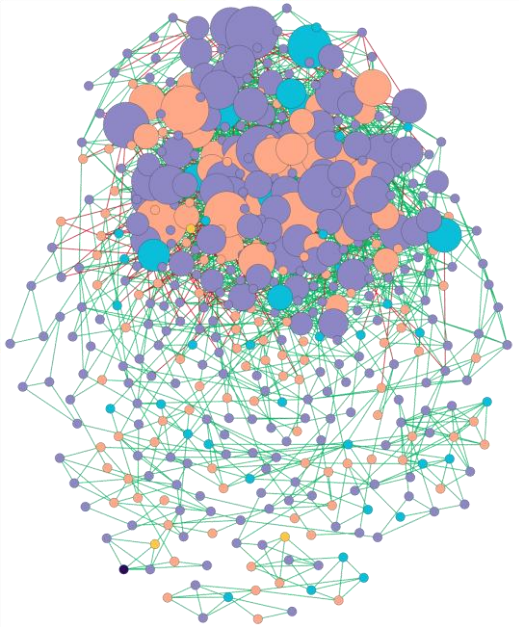
Metabarcoding / Metagenomics

- How and which microorganisms are involved in the interaction with the fungal pathogens

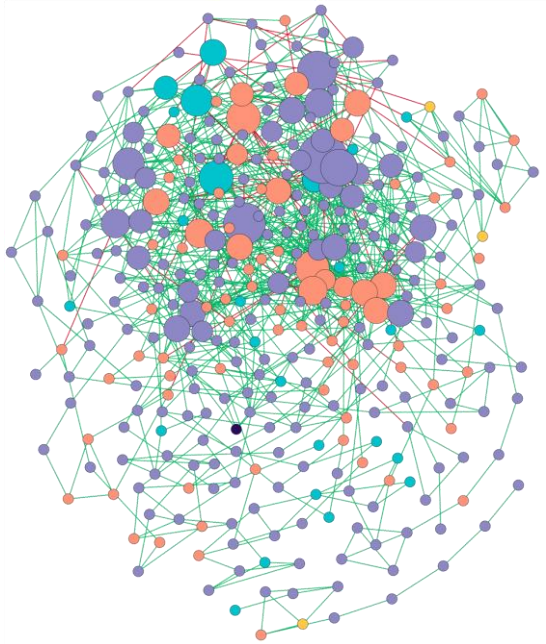
Fungal co-occurrence network

Intense vs Light pruning

Intense pruning



Light pruning



More co-occurrences

→ indicator of more “interactions” in the intense pruning fungal network

Aim n° 3 : Assessment of the socio-economic aspects

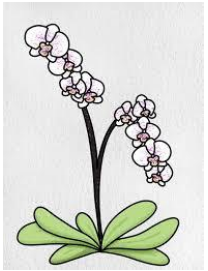
Ongoing : 1- Understanding Winegrowers' Perceptions of Grapevine Trunk Diseases and the proposed solutions

2- Assess the cost of the proposed solutions compared to production loss, uprooting, curetage

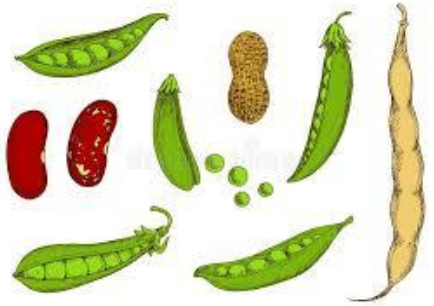
→ Same approach to other plants

CROC Biocontrol agents against a chestnut disease

Plant microbiome for breeding strategies



Plant microbiome for biocontrol strategies



Legumis New POCTEFA 2026

Plant microbiome of specific varieties

Thank you for your attention

Patrice Rey

Rémy Guyoneaud

Claire Gassie

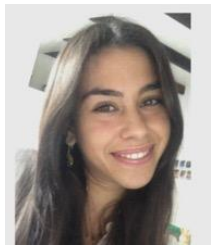
Mickael Le Bechec

Rana Haidar

Renaud Travadon

Amira Yacoub

Emilie Bruez



Lisa Chaboussie

Karen Corrales

Ouiza Mesguida