



**5TH INTERNATIONAL
STRAWBERRY CONGRESS**

WELCOME

**Connecting the dots
in a complex world
of strawberries**

Antwerp – Belgium
17 – 20 September 2025



**5TH INTERNATIONAL
STRAWBERRY CONGRESS**

Wednesday

Parallel Session 2: Integrated Pest Management

Can bee-vectored bacteria remediate the degenerated strawberry flower microbiome in intensively managed greenhouses?



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Universiteit
Antwerpen



Plant pathogens cause yield loss



Botrytis cinerea
25% harvest losses



Chemical fungicides

Resistance

Adverse impact

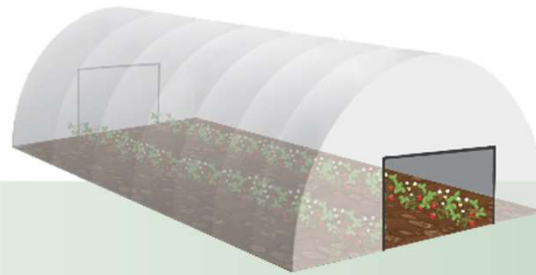


Biological solutions

Biocontrol

Plant microbiome

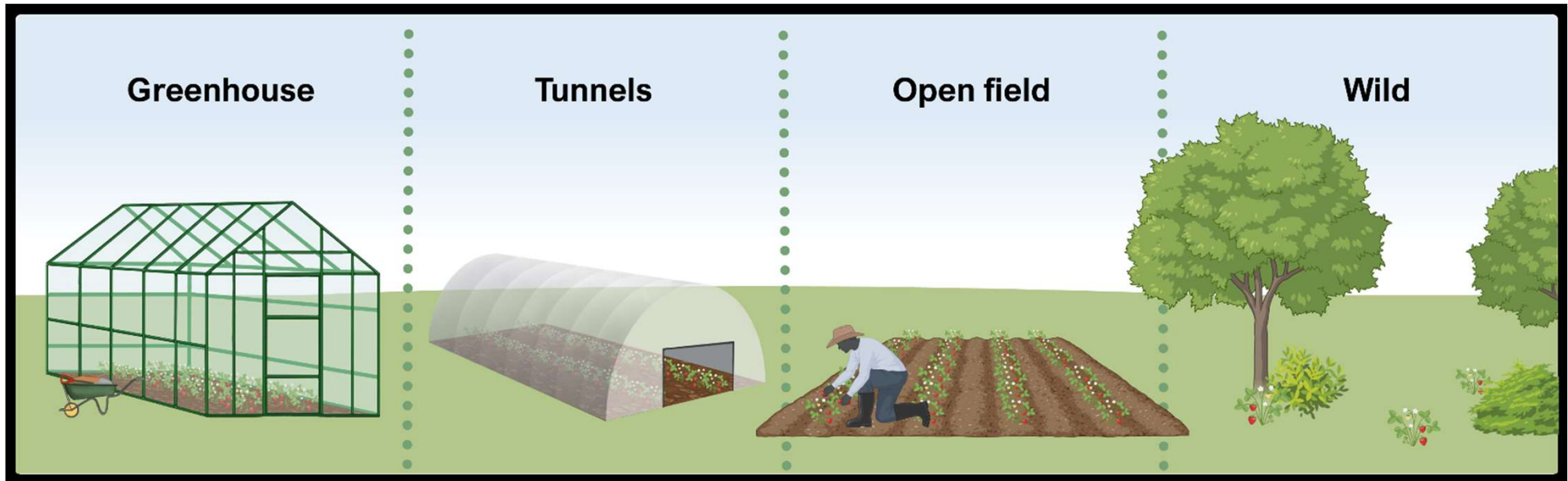
Imagine a strawberry farm...



Do agricultural practices affect the plant microbiome?



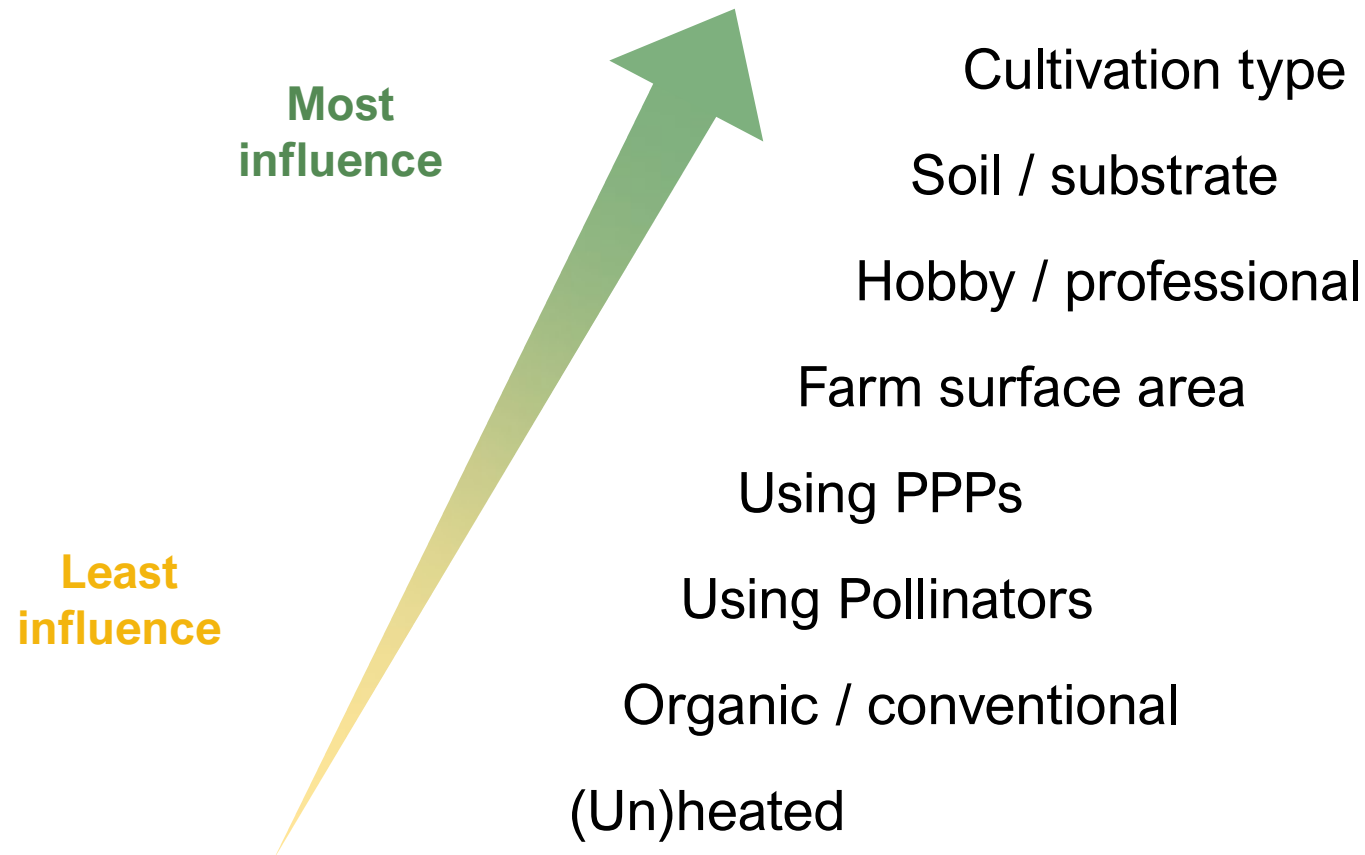
Citizen science initiative: SABOFLEUR



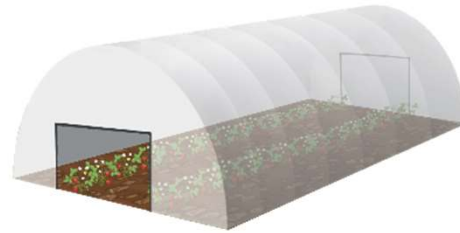
Temmermans et al. (2025)



Agro-practices influencing which bacteria are present



Sheltered cultivation reduces diversity

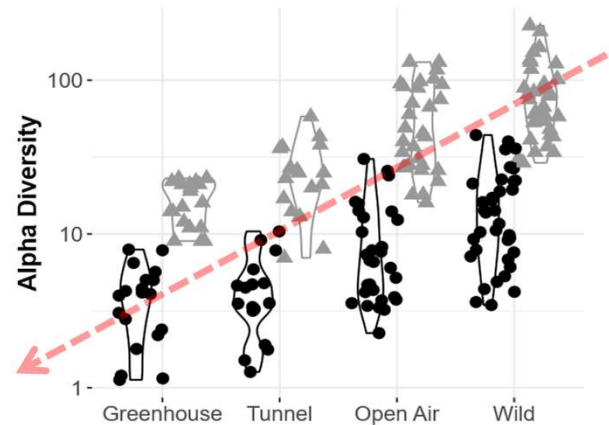


Least diverse

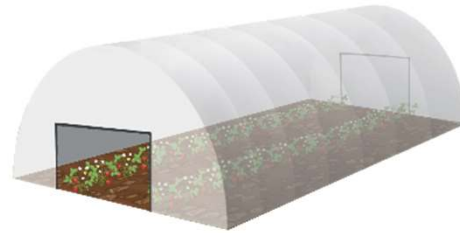
Most diverse

Less various
species of
bacteria

More various
species of
bacteria



Sheltered cultivation increases variability

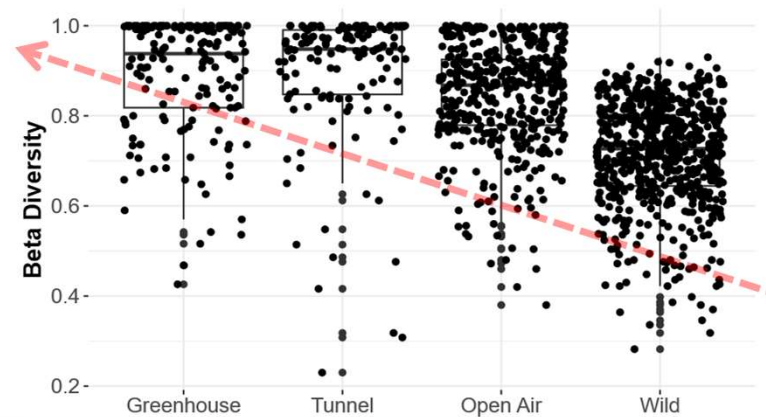


Most variable

Bacteria are
more random

Least variable

There are
core taxa



Core taxa are lost in sheltered cultivation

Cora taxon = bacterium that is almost always present on the flower and in large quantities



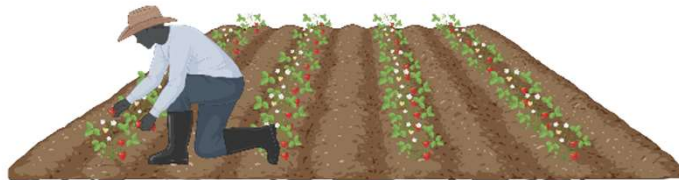
Specific core taxa, lost in sheltered cultivation

Core bacteria found more in open air

Core bacteria found more in the greenhouse

- Sphingomonas
- Microbacteriaceae
- Micrococcaceae
- Conyzicola
- Burkholderiaceae
- Pseudomonas
- Neorhizbium

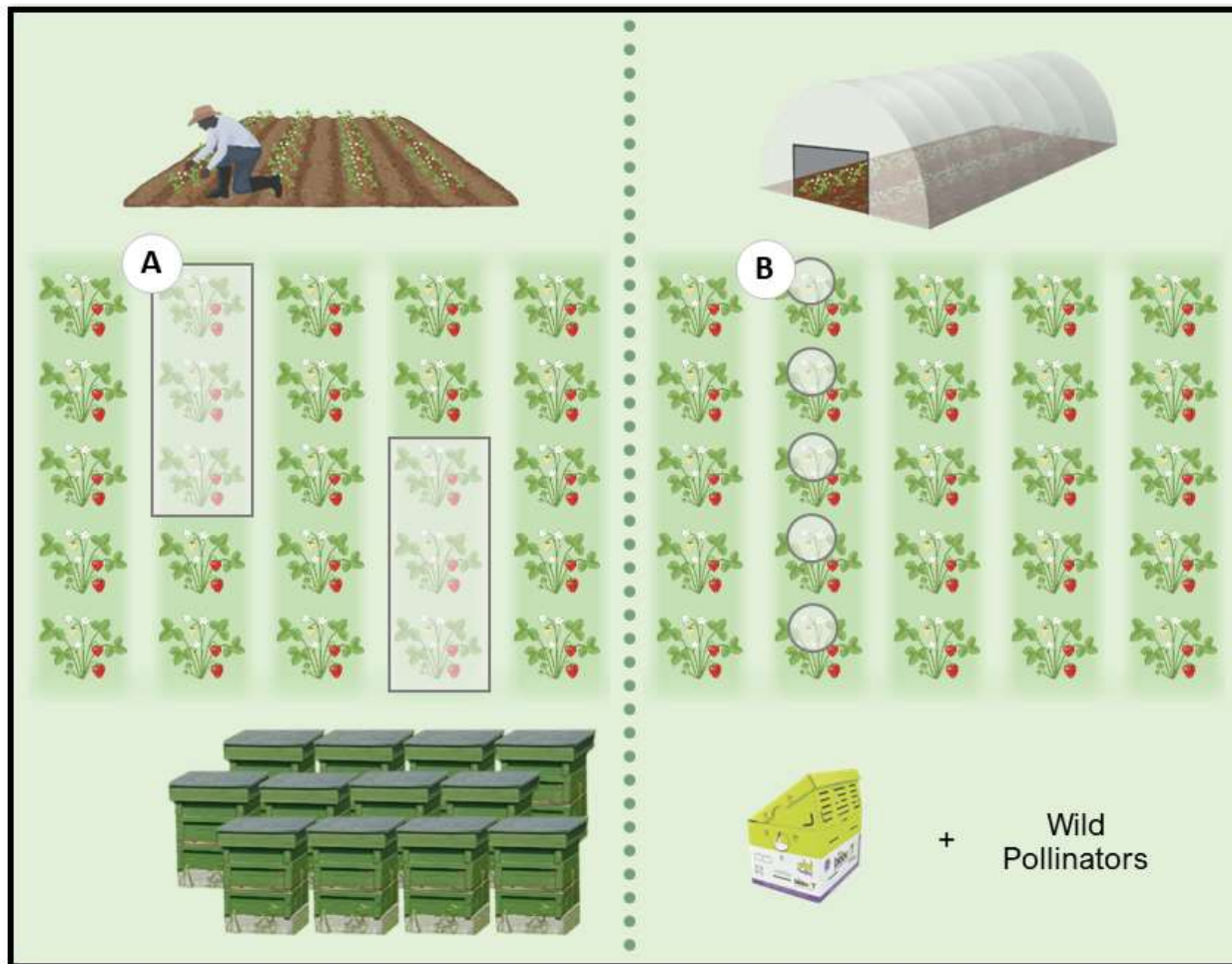
- Xanthomonas



Could pollinators restore the reduced flower microbiome?



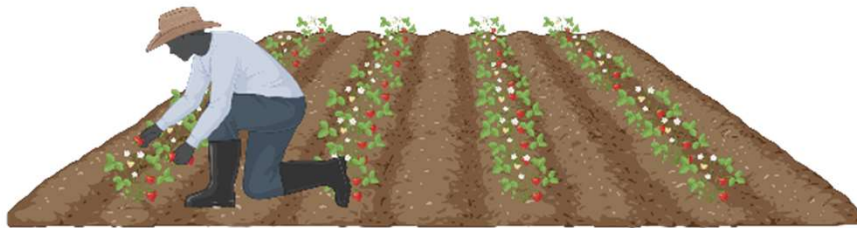
Pollinator exclusion experiment



Temmermans et al. (2025)

Results of the pollinator exclusion experiment

**Smallest
influence on
microbiome**



**Biggest
influence on
microbiome**



Can pollinators deliver beneficial bacteria to flowers?

- Entomovectoring system
- Bumblebees as flying doctors



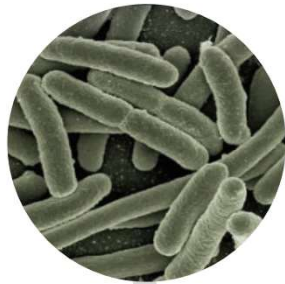
Drying bacteria for bee vectoring



F. Kiekens

1

Bacteria are
spray-dried



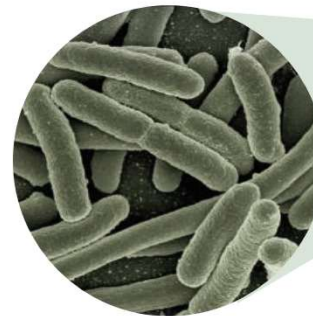
2

Pollinator gets
coated in bacteria



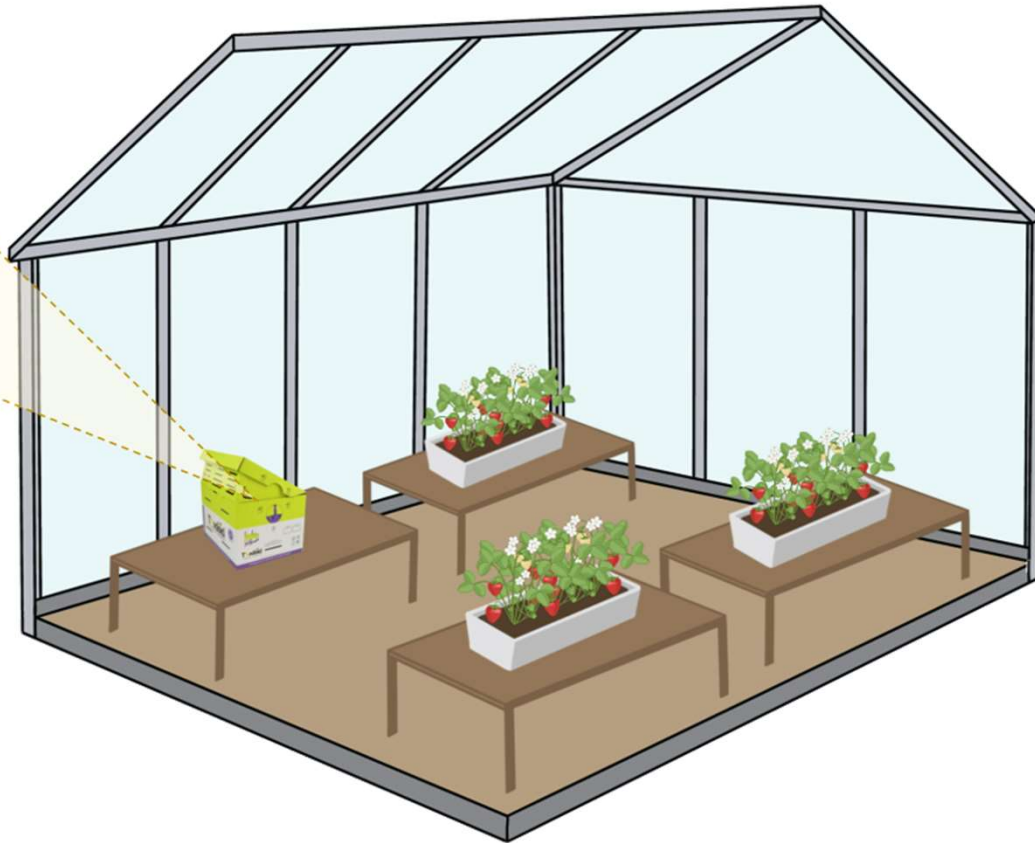
3

Pollinator transfers
bacteria



L. plantarum can be delivered by bees

Spray-dried
bacteria



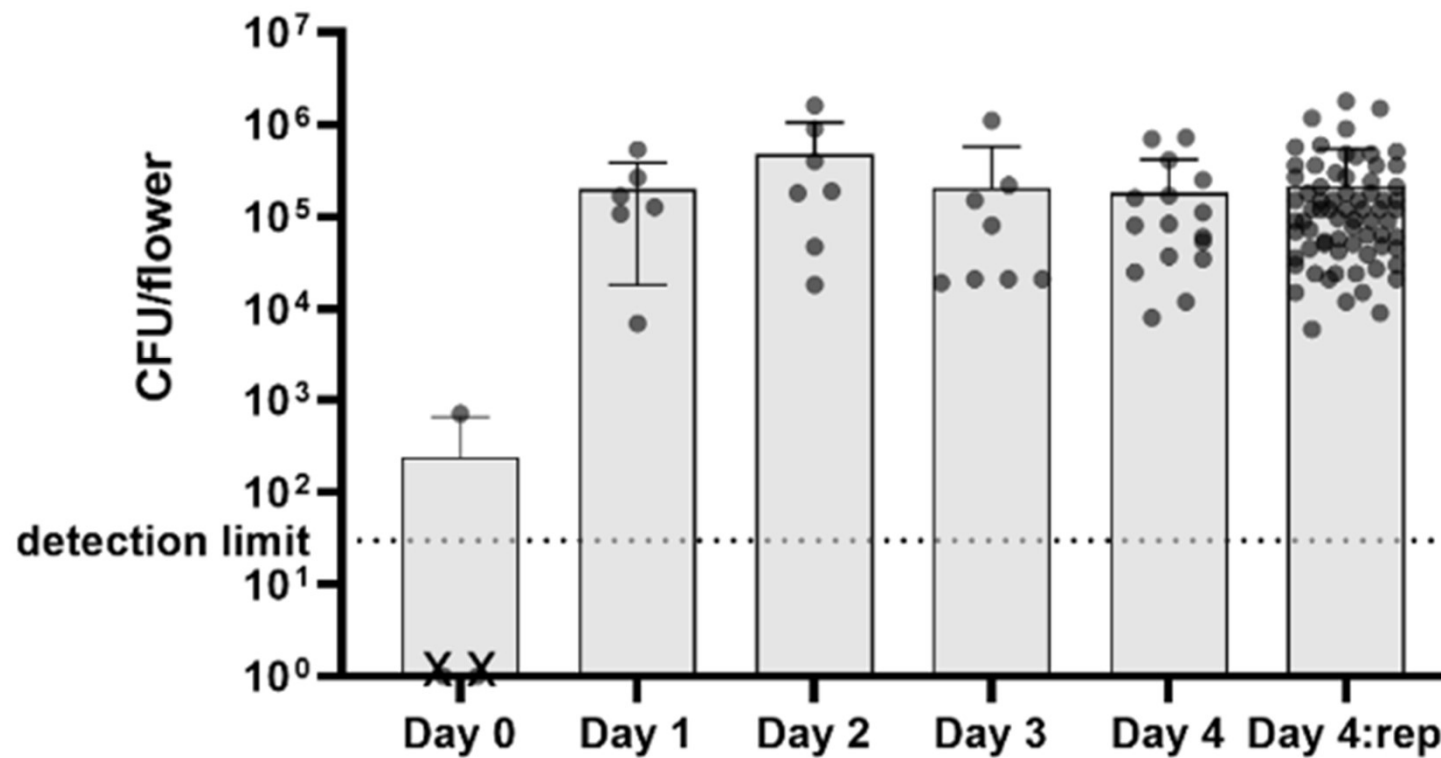
B. De Coninck



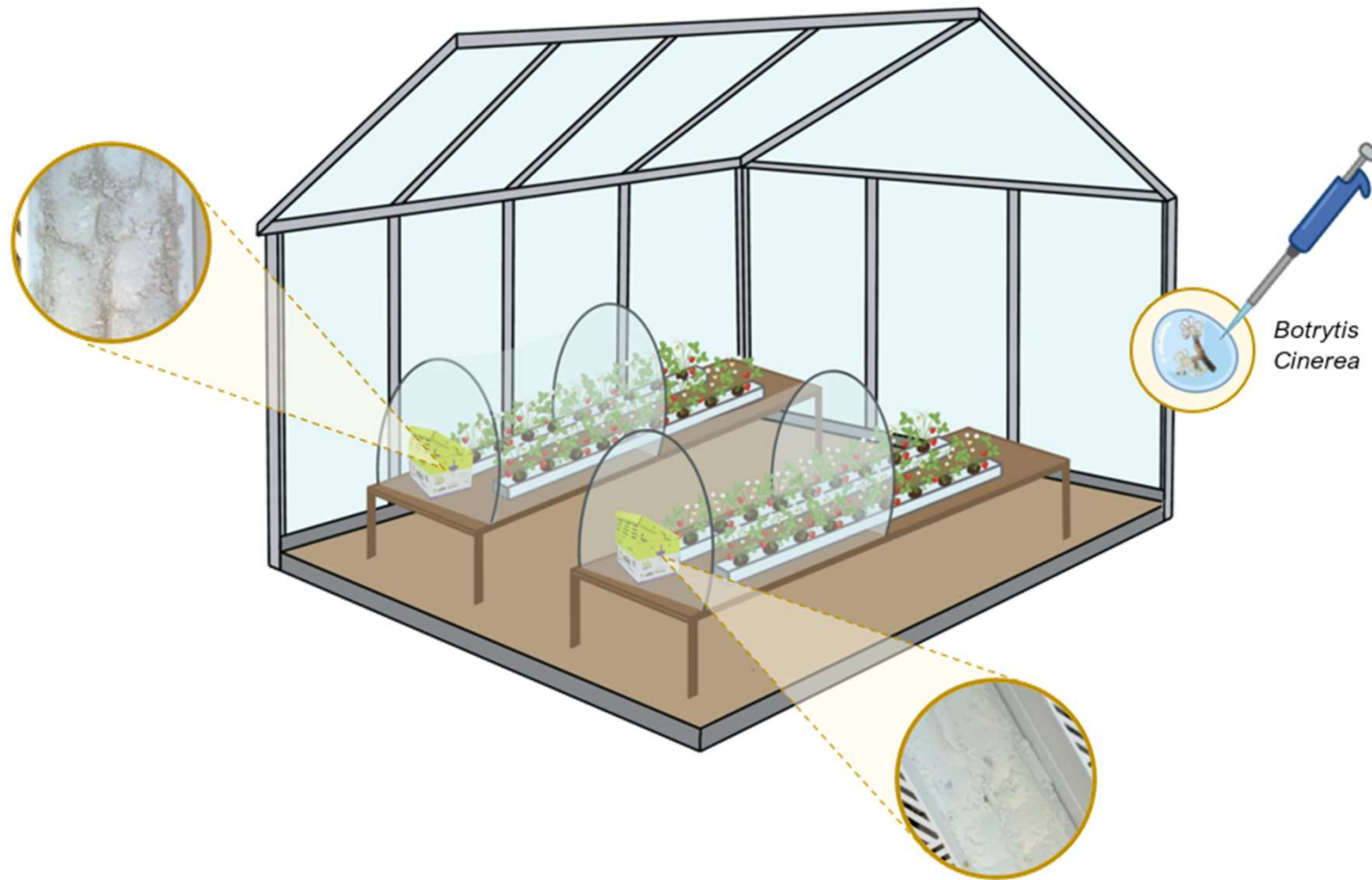
Temmermans et al. (2023)



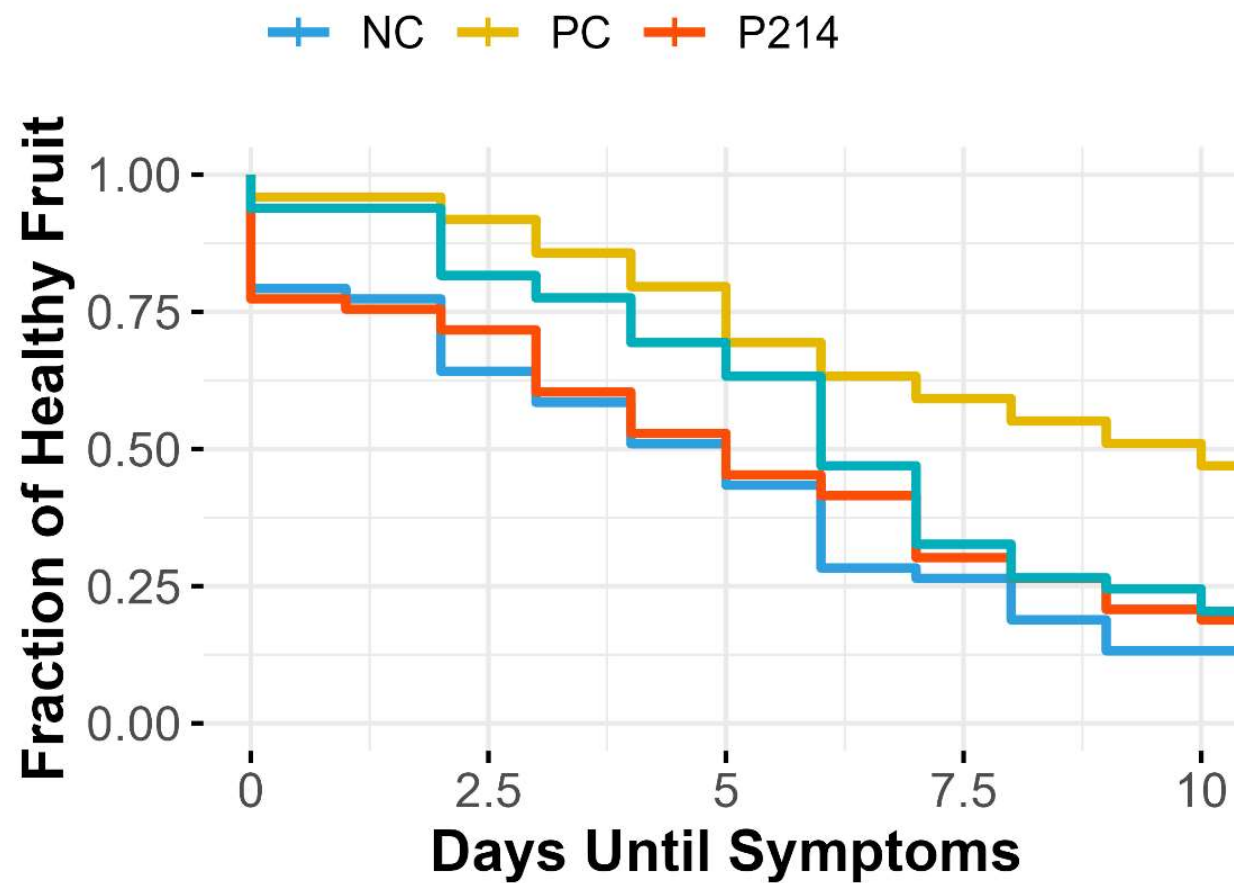
L. plantarum can be delivered by bees



Can the beneficial bacteria reduce disease symptoms?



Different field results



Preliminary results

- 1 Less disease symptoms



- 2 Disease symptoms are delayed



Future

- 1 Optimise greenhouse results

- 2 Different bacteria

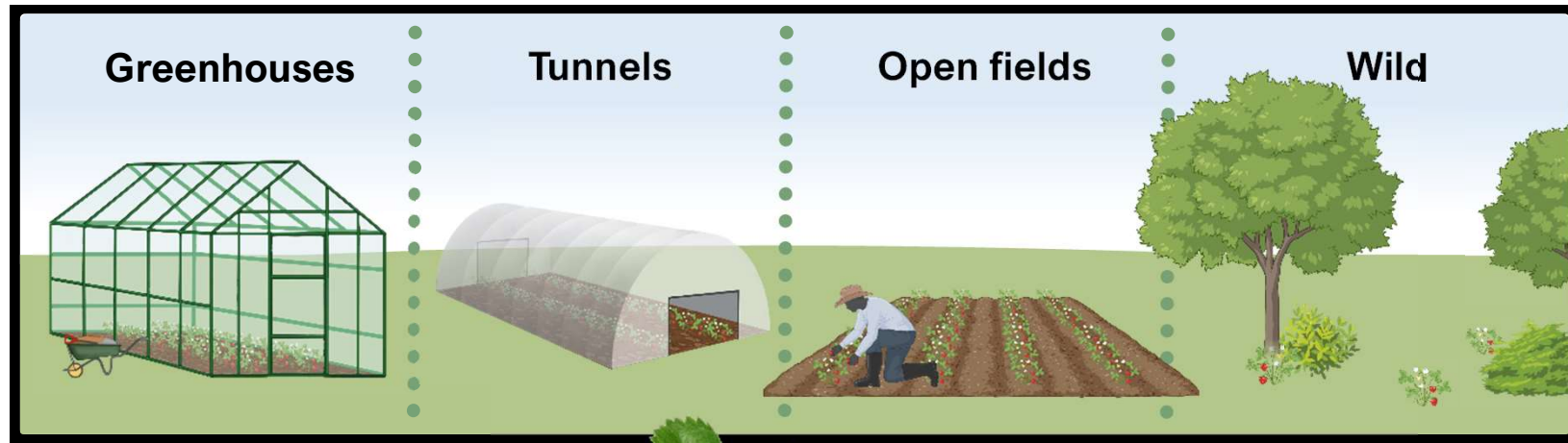


- 3 Testing inhibition against other pathogens

- 4 Optimise formulation

Conclusions:

1 Cultivation type



β-diversity
Randomness

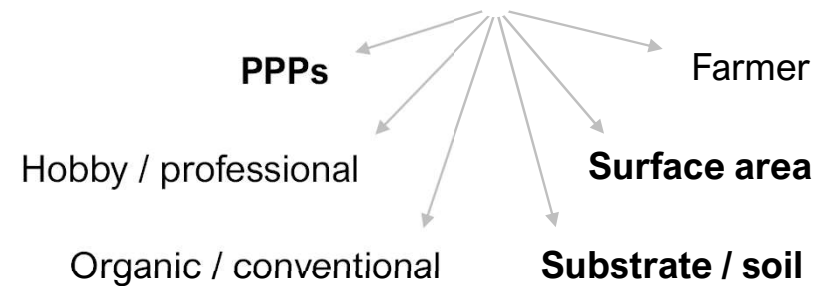
α-diversity
Core taxa

2 Pollinators

- Pollinators affect the microbiome
- **Pollinators** can be used to bring in **beneficial bacteria**

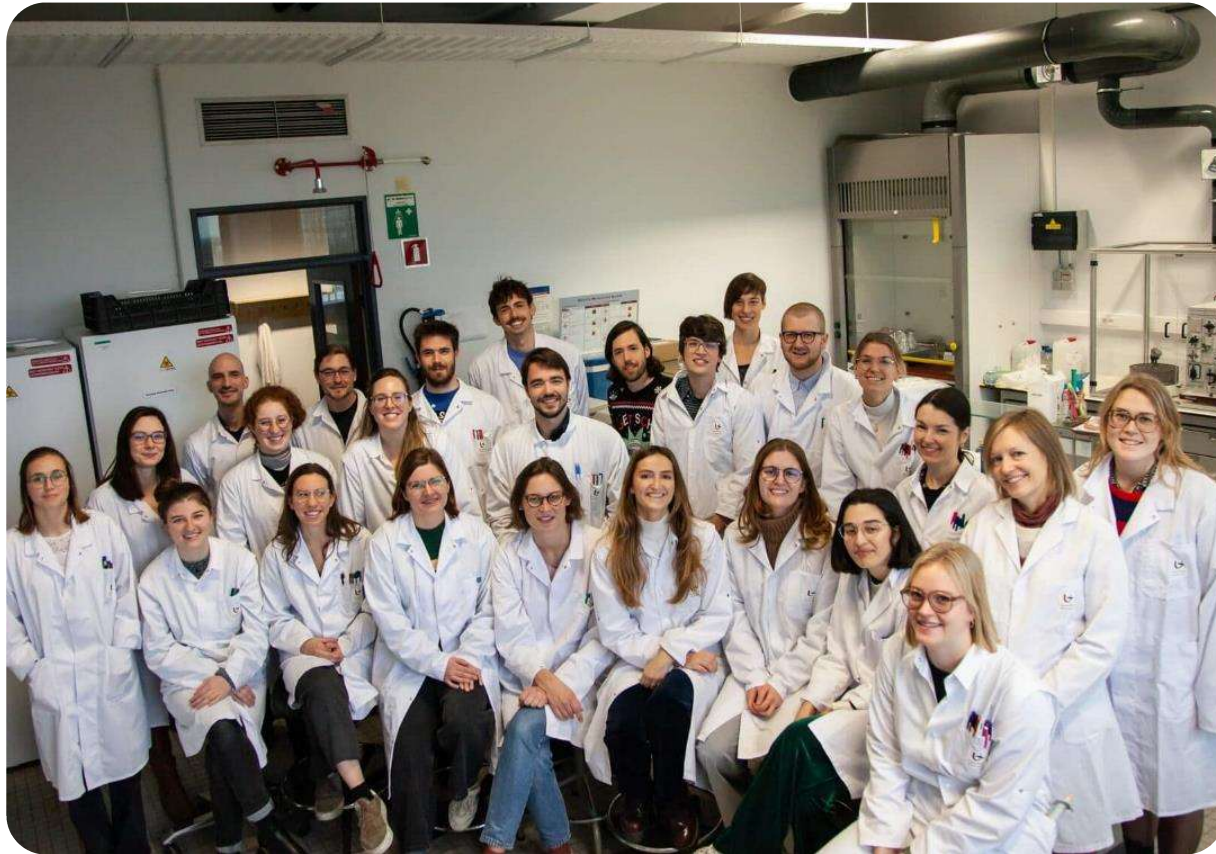


3 Other factors



Lab of Applied Microbiology and Biotechnology

UAntwerp, professor Sarah Lebeer



Thank you for your attention!



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**5TH INTERNATIONAL
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Wednesday

Congress Dinner

**At the Royal Museum
of Fine Arts Antwerp**

Sponsored by



**Smurfit
Westrock**

