

Spray-induced gene silencing as a potential tools to control plant diseases

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SCIENCE AND EDUCATION
FOR SUSTAINABLE LIFE

Pathogen
overcoming
resistance

Climate
change

Extensive
fungicide
usage

Research focus of the group SUSTAINABLE DISEASE CONTROL

RNAi



Genetic engineering
dsRNA synthesis
Protein-protein interactions



Protein localization
Visualization of plant-pathogen interactions



PCR based analysis
Sequencing

NGS/
Risk assesment

Plant systems

Potato
Tomato
Taro
Tobacco
Arabidopsis
Cereals



Bioinformatics

Biocontrol / Biostimulants



Screening

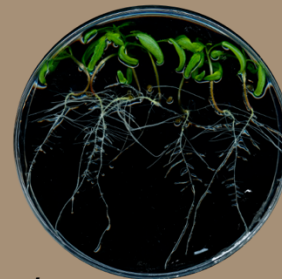


Characterization

Isolation of
rhizobacteria



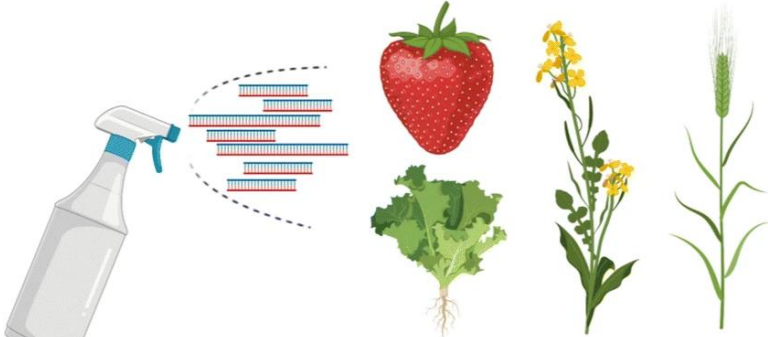
Metagenomics /
Microbiome



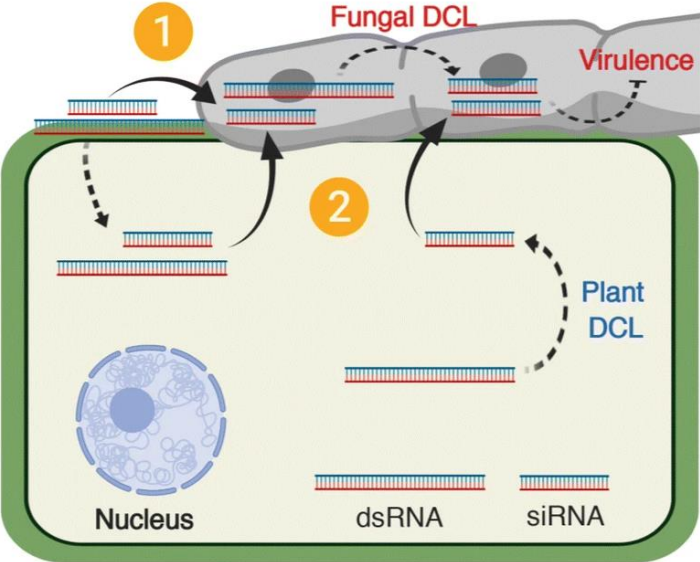
Plant growth promotion/
Biocontrol



Spray-Induced Gene Silencing



Spraying dsRNAs and siRNAs



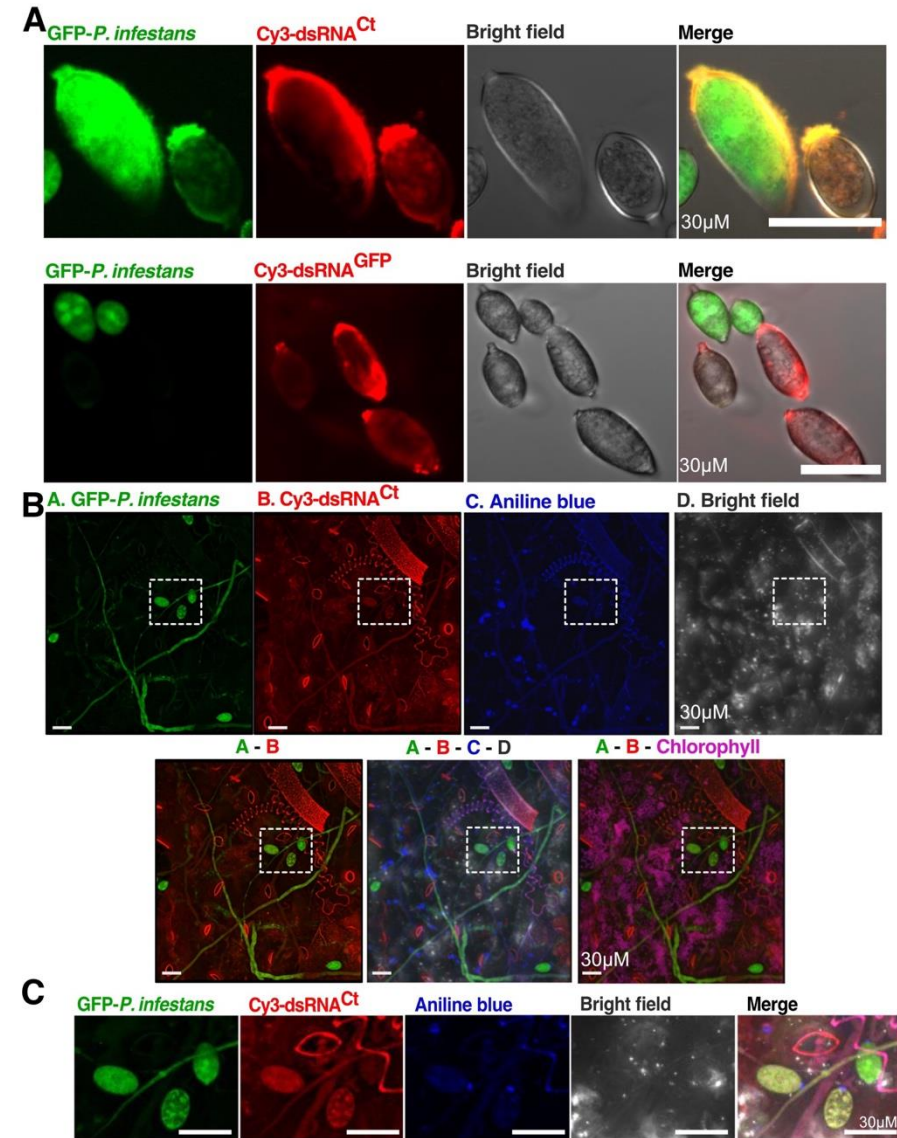
SIGS

Potato – *Phytophthora infestans*

Wheat/ Barley - *Fusarium graminearum*

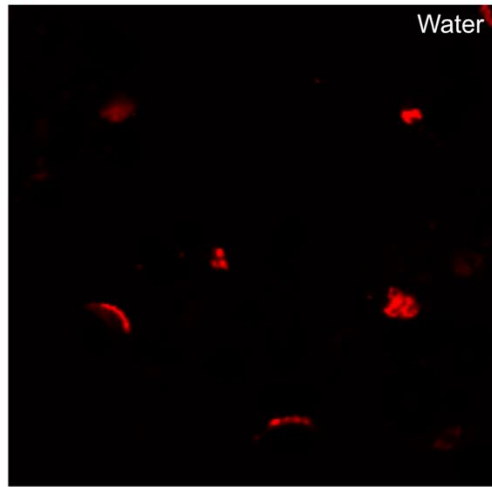


Spray induced gene silencing and uptake of dsRNA by *P. infestans* sporangia

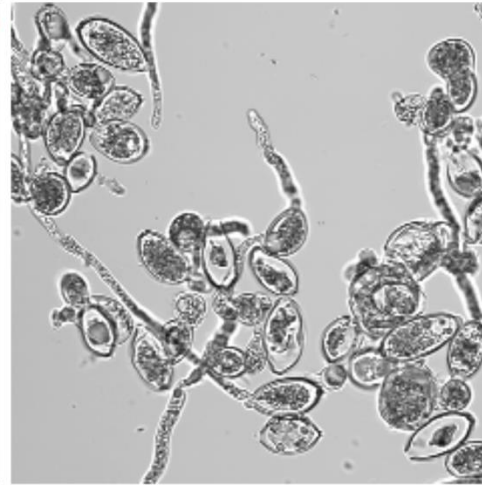


Optimizing uptake of dsRNA by *P. infestans* sporangia

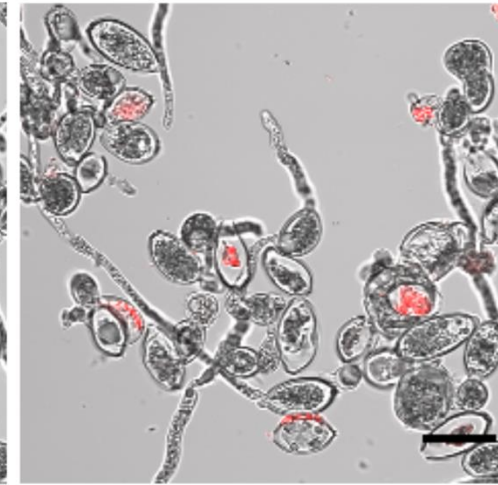
A Cy3-dsRNA^{Ct}



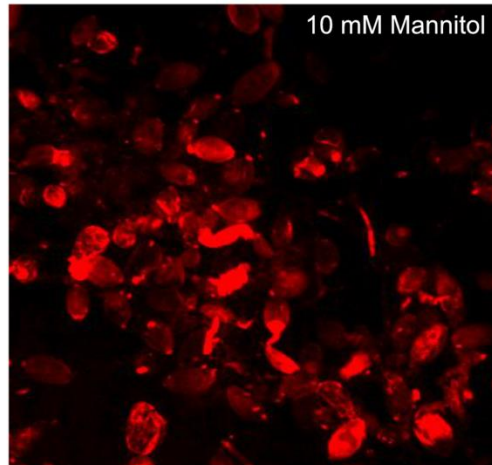
Bright field



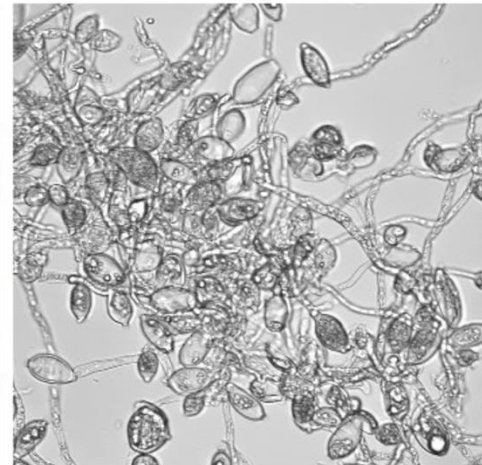
Merge



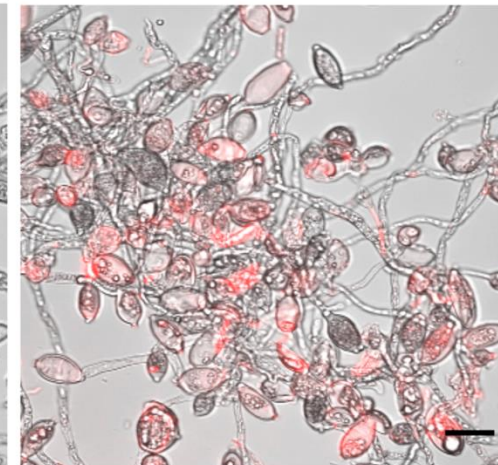
B Cy3-dsRNA^{Ct}



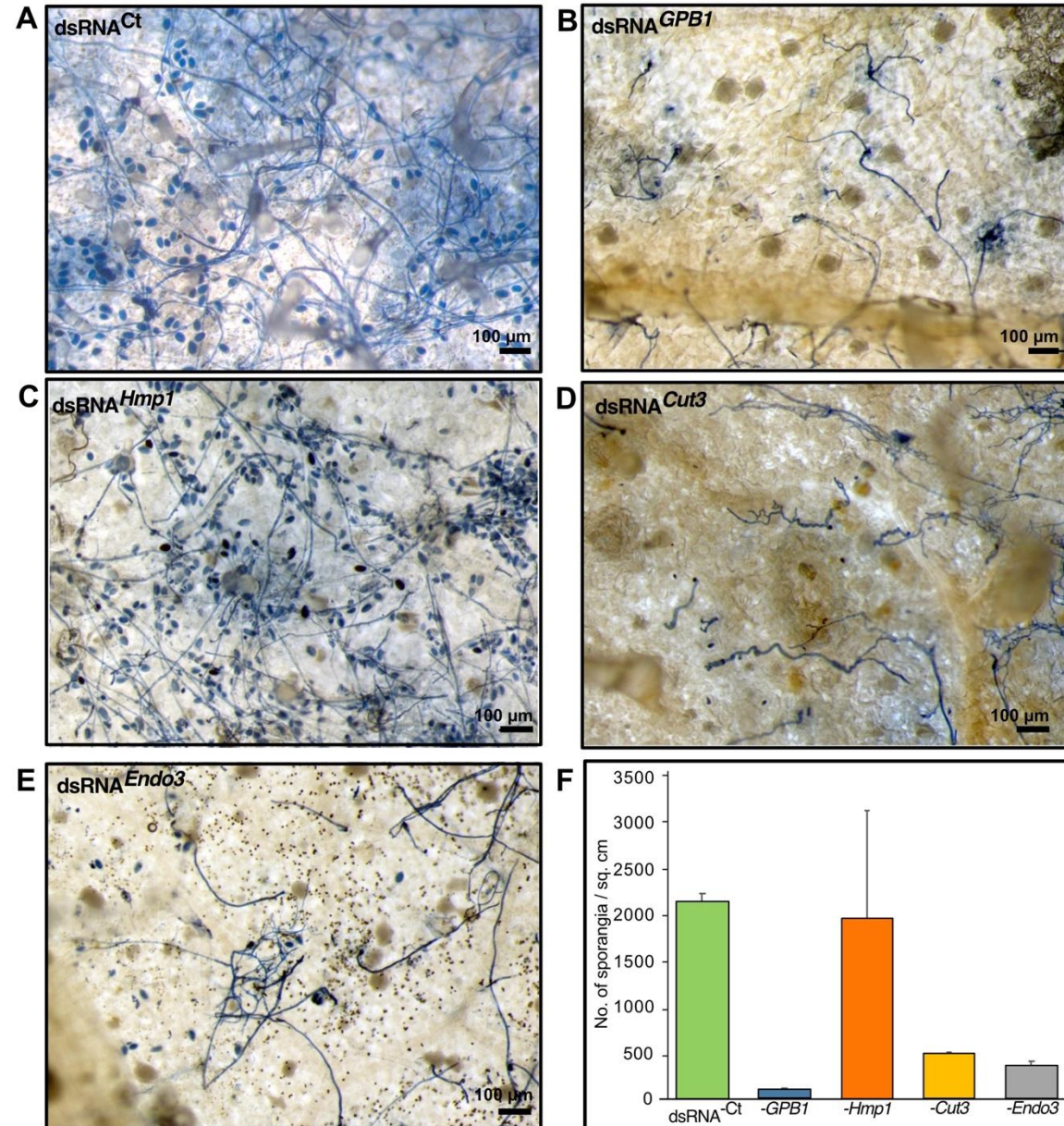
Bright field



Merge

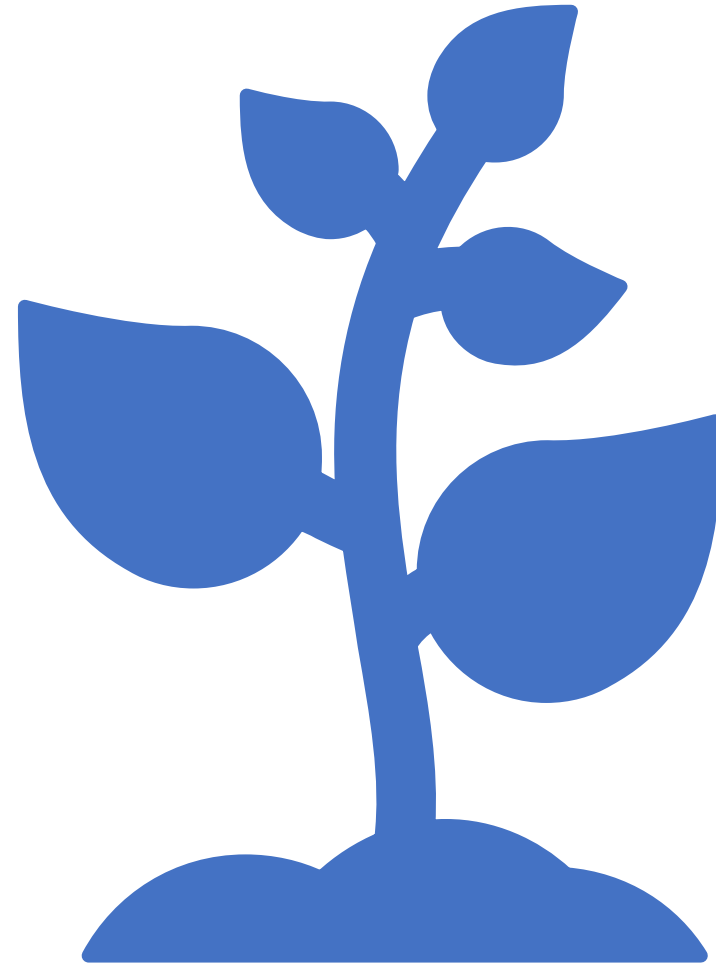


Effect of SIGS on *P. infestans* infection morphology



SIGS for potatoes

- non-GMO
- It can be mass produced and can cost only 144 SEK per hectare
- 10 grams is enough for the one hectare
- No extra costs for the plants
- Faster and less resource intensive
- no issues with residue persistence.
- naturally occurring biochemical
- cultivation of diverse varieties
- sustainable agricultural practices
- Can target multiple diseases including pests, SIGS is easy to design and produce
- Can be used for organic and conventional farming



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