

First study of the varietal response to plant defense induction by COS-OGA in flax

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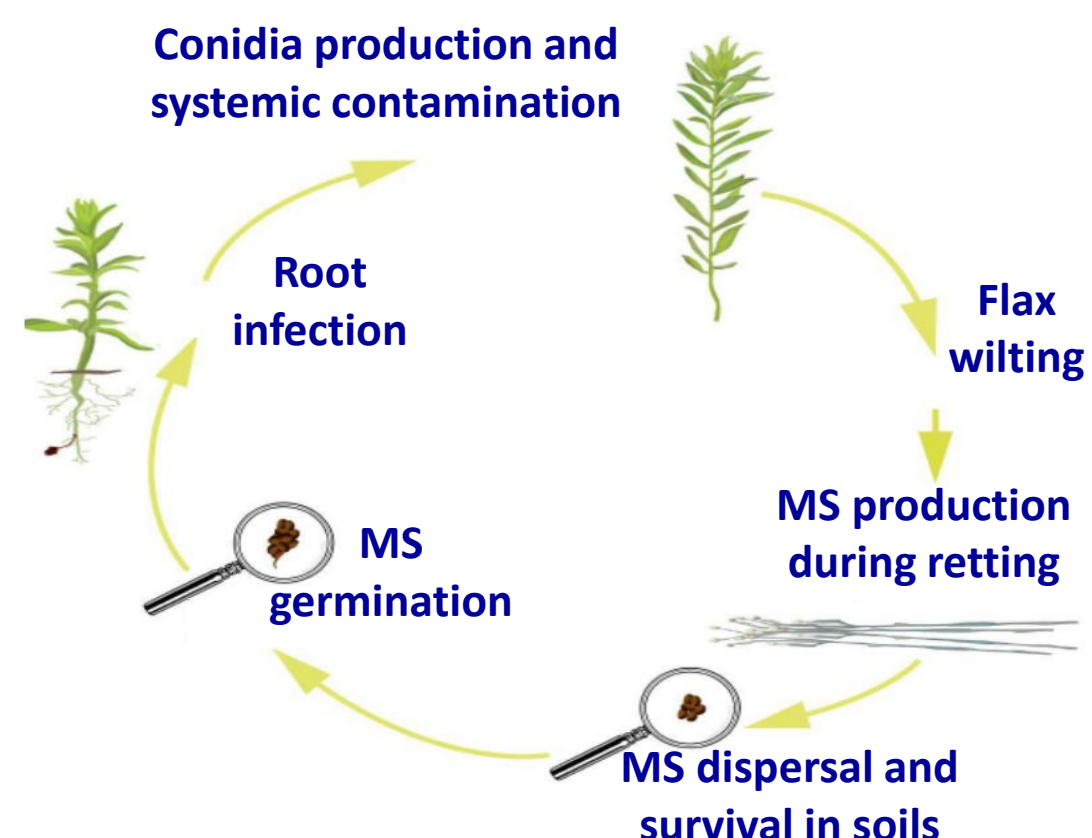
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Currently no control method of verticillium wilt disease in flax

Verticillium wilt of flax is caused by the telluric fungus *Verticillium dahliae*. It penetrates roots, colonizes xylem vessels and progresses slowly to the shoot.

During the retting process, *V. dahliae* produces microsclerotia (MS), infectious resting structures able to remain active in soils for more than 10 years.

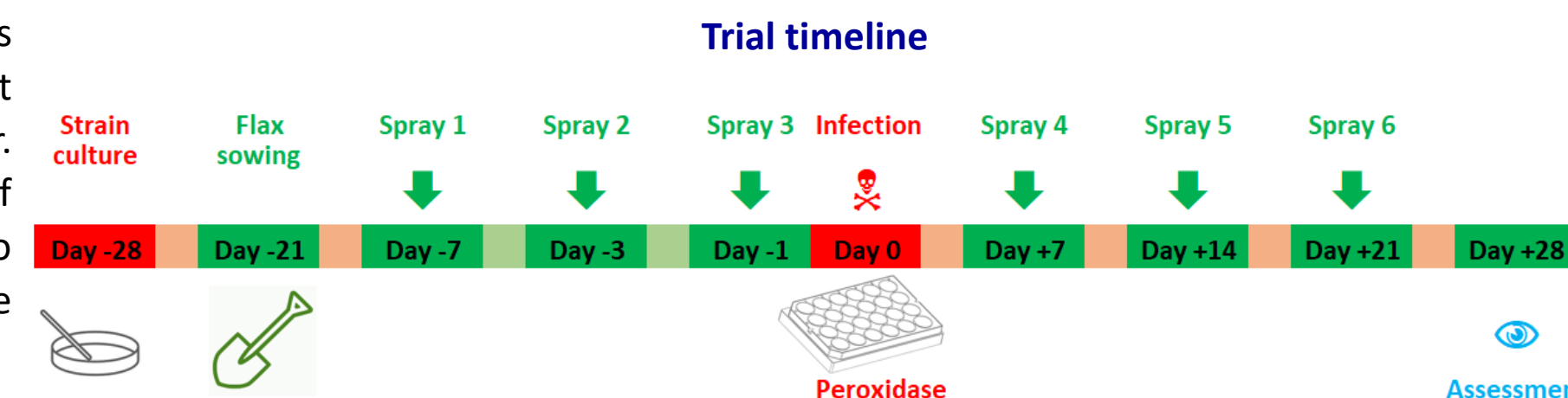
There is no protection method for this pathogen that strongly affects yield and quality of flax fibers.



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Dark MS develop on the surface and inside flax shoots during the retting process, resulting in a blue deposit on stems.

Fast screening method for plant defense induction and protection against *V. dahliae*

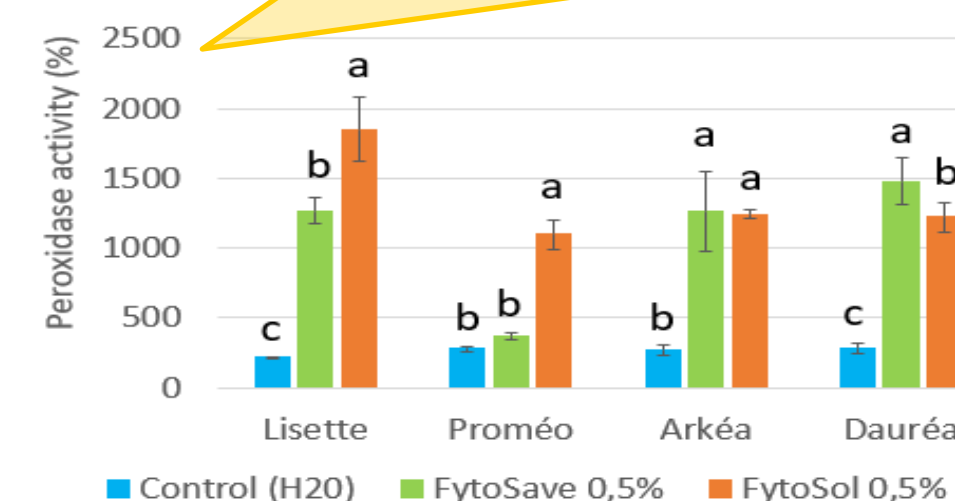
Flax varieties (Linea and Terre de Lin) were sprayed with water (control), 0.5% FytoSave or 0.5% FytoSol. The shoots of half of the plants were collected 24h after the last spraying to assay peroxidase activity, an elicitation marker. The remaining plants were infected by watering the base of the plants with 2.5*10⁷ conidia/ml of *V. dahliae*. Two parameters strongly affected by verticillium wilt were evaluated: dry weight and stem length.



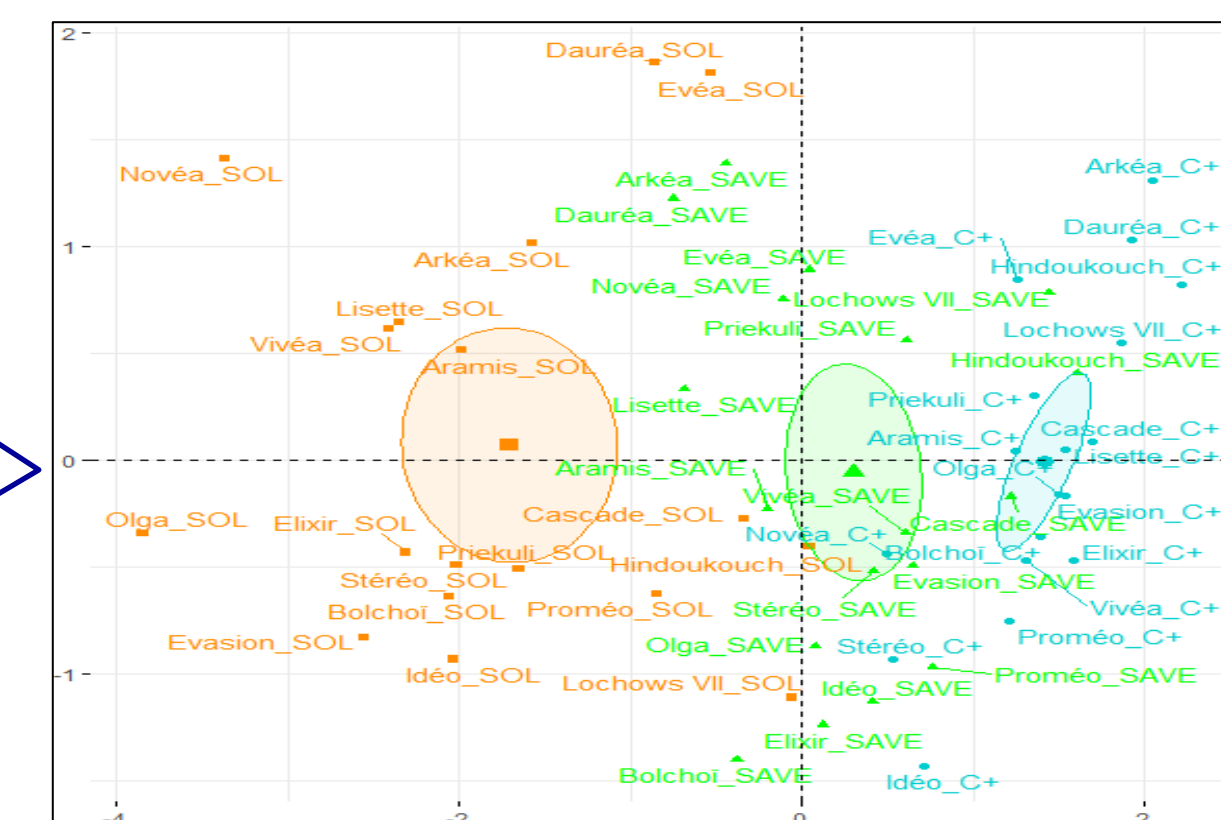
Screening outcomes and further experiments

Response to plant defense induction by COS-OGA

Most plants responded with increased peroxidase levels, often higher for FytoSol than for FytoSave. But there was a clear a varietal effect in the response to COS-OGA as the magnitude of peroxidase response varied greatly among varieties.

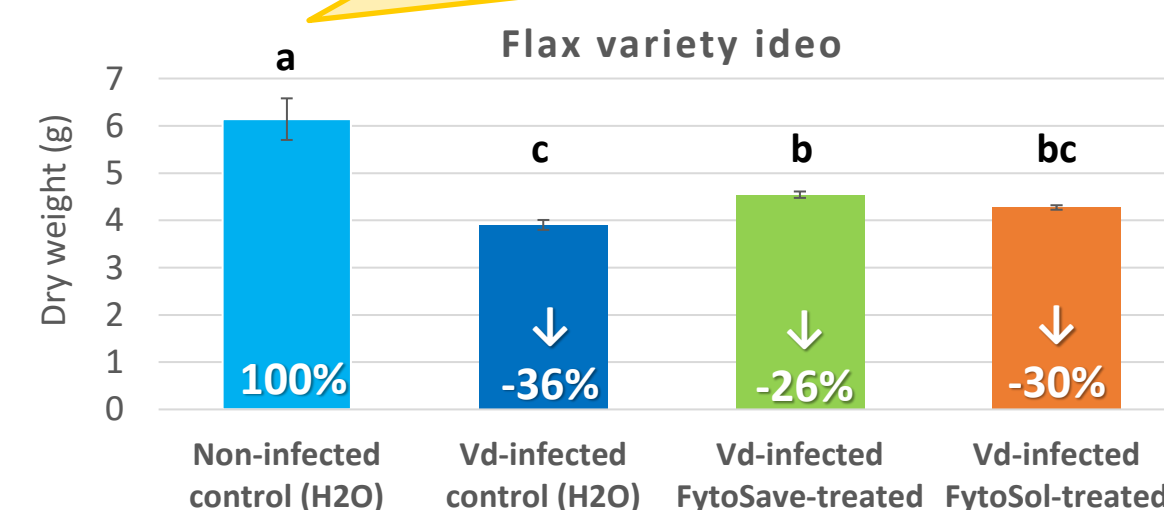


Treatments appeared distinctly dispersed on principal component analysis (PCA) plot using peroxidase activity and protein content as variables (C+ = H₂O-control, SAVE = FytoSave, SOL = FytoSol, each preceded by the name of the variety).

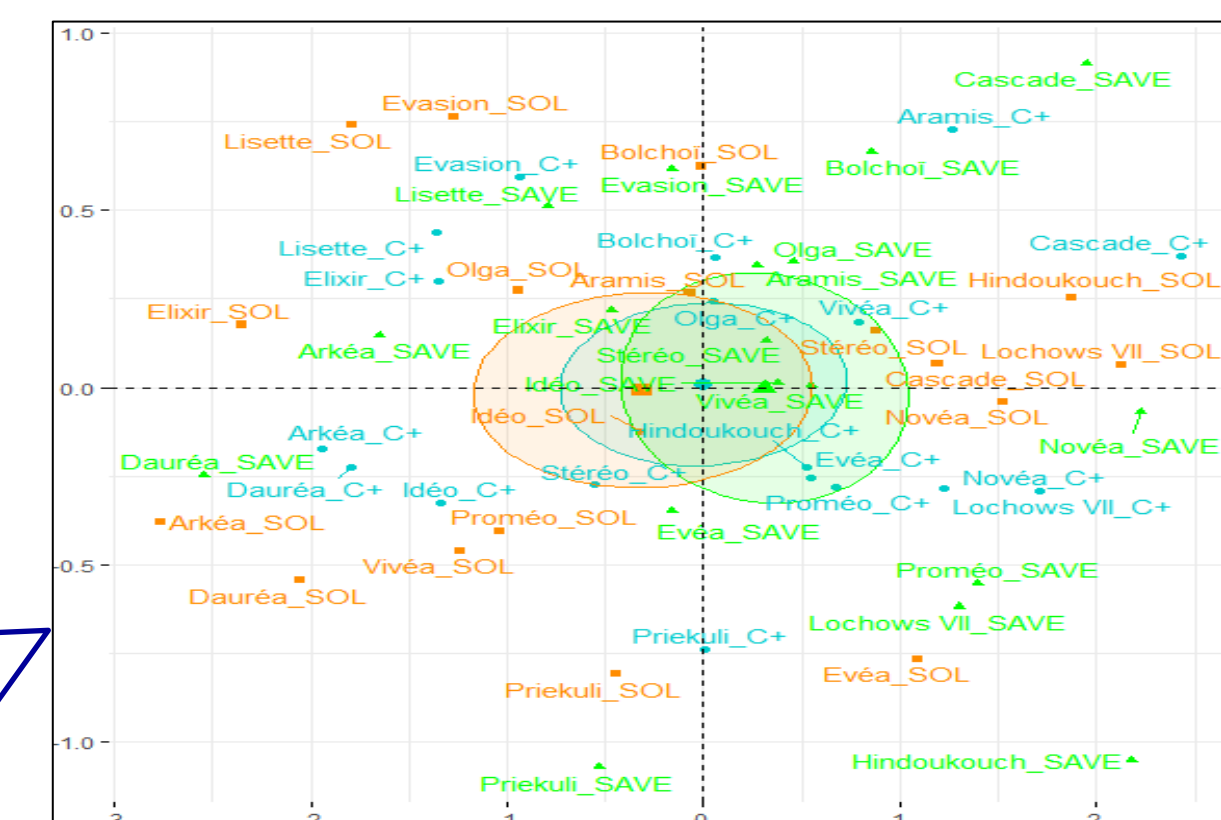


Protection of flax against verticillium wilt by COS-OGA

Strong conidia-based infection used in this screening gave severe symptoms with drastic reductions in plant height and dry weight. Only four elicitor-variety pairs offered a reduction of disease symptoms. Analysis will be repeated with a lower conidia concentration as well as with an infection method based on MS.



Treatments cluster together on PCA plot of morphological variables including dry weight and stem size measured 28 days post-infection with *V. dahliae* (C+ = H₂O-control, SAVE = FytoSave, SOL = FytoSol, each preceded by the name of the variety).



Pathoflax aims to test biocontrol products against verticillium wilt disease

Pathoflax is a research consortium of 11 partners from France and Belgium whose objective is, among others the evaluation of a variety of biocontrol methods against *Verticillium* wilt in flax.

PATHOFLAX
with the support of the European Regional Development Fund, Wallonia and Flanders

Chitosan fragments
Mimic pathogen presence

Pectin fragments
Mimic plant cell wall degradation

COS-OGA

COS-OGA BENEFITS:

- ✓ Bio-sourced material, no residue, compatible with IPM and organic farming
- ✓ Not affected by UV, rainfastness and stable at room temperature

It is in this context that the company FytoFend tested FytoSave and FytoSol. Both are plant defense inducers and contain 12.5 g/L of the registered active substance COS-OGA, an oligosaccharide complex based on chitosan oligomers (COS) and pectin fragments (OGA).

fytofend
Pioneering Biological Alternatives

fytoSave

fytoSol