Beyond *Xylella*, Integrated Management Strategies for Mitigating *Xylella fastidiosa* impact in Europe

Practice abstract 19

Development of beneficial bacterial consortia for *in planta* control of *Xylella fastidiosa*

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There are currently no curative field treatments for ***Xylella fastidiosa*** **(*Xf*)** once a plant becomes infected. Management relies mainly on surveillance, removal of infected plants, containment measures and vector control. **BeXyl** addressed this gap by exploring xylem-inhabiting endophytic bacteria as biological control agents able to suppress ***Xf*** inside the plant and/or improve host resilience.



How did BeXyl make a difference?

BeXyl moved from microbiome knowledge to the rational design of biological treatments. A collection of over 350 bacterial isolates from xylem sap, representing 49 genera, was screened for antagonism against ***Xf***, plant growth-promoting traits, stress tolerance, carbon-source use and compatibility. Candidate bacteria were also assessed for culturability, storage stability and bioprocessability, which are essential for future formulation and scale-up.

Main outcomes

Two **bacterial consortia**, SC1 and SC2, were assembled from compatible strains with complementary functions and tested in planta by endotherapy before inoculation with ***Xf.*** Both consortia reduced ***Xf*** populations in controlled assays and improved overall plant fitness, with SC1 showing the strongest effects in tobacco and olive.

SC1 and SC2 are being translated to field conditions and evaluated as preventive treatments in new established olive plantations using 1-year-old plants of 'Arbequina' in Mallorca Island (Spain), and of 'Ogliarola' in Apulia (Italy).

Additionally, both microbial consortia are being evaluated as preventive and curative treatments in an almond plantation in Mallorca Island and in an 'FS17' olive plantation in Apulia, Italy.

Impact: BeXyl has provided proof of concept that xylem-derived bacterial consortia can reduce *Xf* populations in planta. These results support their further development as biological tools for integrated *Xf* management, although long-term experiments under field conditions are still needed to confirm their persistence, efficacy and practical applicability.

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