# BIOVEXO

# Biocontrol of *Xylella* and its vector in olive trees for integrated pest management

September, 2025

*This project has received funding from the Bio Based Industries Joint Undertaking (JU) under grant agreement No 887281. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Bio Based Industries Consortium.*

# The Challenge

## The Urgency

The bacterium was **first detected in Europe in 2013** and has since caused major damage, especially to olive groves in Italy and Spain. **There is currently no cure** for plants infected with *Xylella fastidiosa*.

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## Xylella Fastidiosa

*Xylella fastidiosa* **is one of the world's most dangerous plant bacteria**, able to infect over 350 plant species, including olive groves.

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## The Vector

*Xylella fastidiosa* is a bacterial plant pathogen transmitted by xylem fluid-feeding insects such as **the spittlebug** (*Philaenus spumarius*).

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# The Challenge

## Economic Consequences if *Xylella* becomes widespread in Europe

| Crop | Estimated yield loss (median) |
|---|---|
| Olive trees younger than 30 years | 34.6% |
| Olive trees older than 30 years | 69.1% |
| Almond | 13.3% |
| Wine grape in southern EU | 2.1% |
| Table grape in southern EU | 1.0% |
| Wine grape in northern EU | 0.5% |
| Citrus spp. | 10.9% |

From: EFSA Journal 2019;17(5):5665

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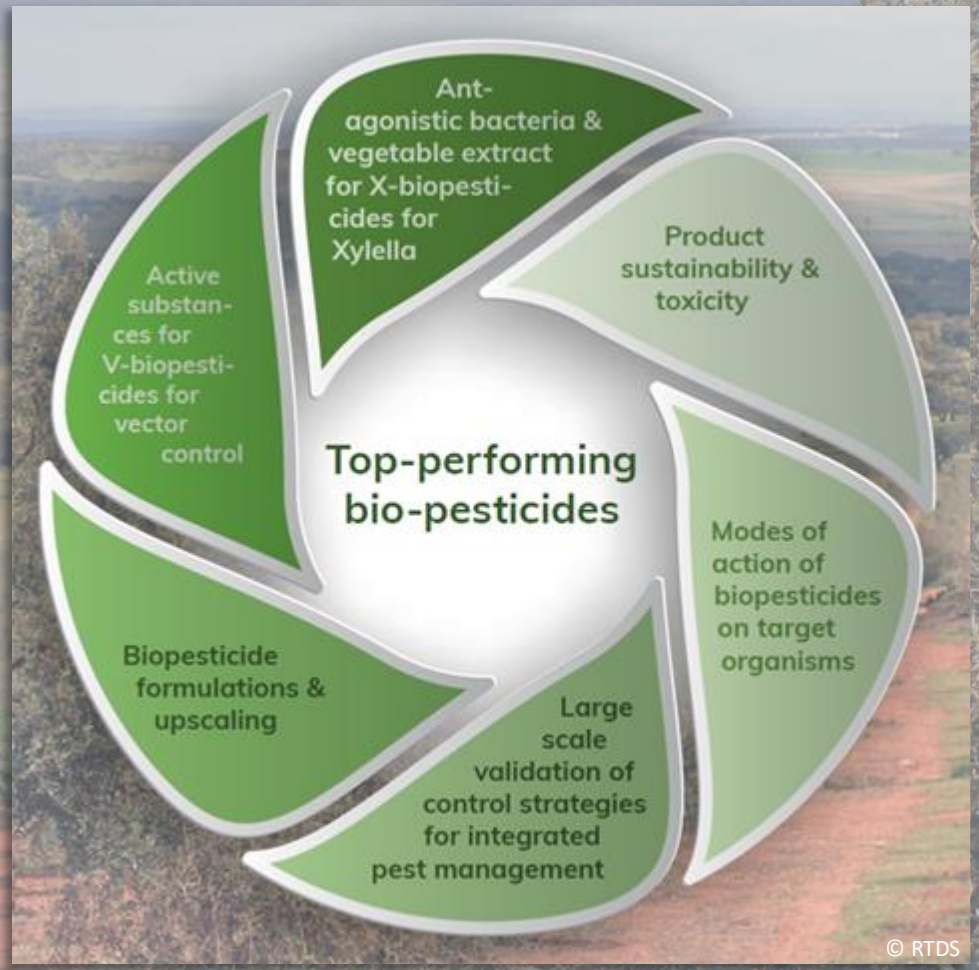
# Project Objectives

BIOVEXO project explores innovative biopesticides, targeting the *Xylella fastidiosa* bacterium.

Several biocontrol solutions are being tested acting either against *Xylella fastidiosa* or its vector.

## TESTED SOLUTIONS INCLUDE:

- Bacterial strains
- Microbial metabolite
- Plant extracts
- Entomo-pathogenic fungus

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# Project Impact

- Reducing *Xylella* pressure and disease severity in olive cultivation;
- Protecting and securing long-established olive orchards;
- Preventing *Xylella* infections and disease in new olive plantations;
- Securing and sustaining jobs in disease affected areas;
- Ensuring continued olive and almond cultivation

**BIOVEXO Field Trials Locations**

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# Project Partners

## BIOVEXO

**Grant agreement ID: 887281**

Status
**Ongoing project**

| Start date | End date |
|---|---|
| 1 May 2020 | 31 December 2025 |

Funded under:
**H2020-EU.2.1.4.**
**H2020-EU.3.2.6.**

Overall budget:
€ 8 025 112,41

EU contribution
€ 6 612 227,48

Coordinated by:
**RTDS - VEREIN ZUR FORDERUNG DER KOMMUNIKATION UND VERMITTLUNG VON FORSCHUNG, TECHNOLOGIE UND INNOVATION (RTDS VEREIN, ENGL. RTDS ASSOCIATION)**
Austria

### Coordinator

**RTDS - VEREIN ZUR FORDERUNG DER KOMMUNIKATION UND VERMITTLUNG VON FORSCHUNG, TECHNOLOGIE UND INNOVATION (RTDS VEREIN, ENGL. RTDS ASSOCIATION)**

| Address | Activity type | EU Contribution |
|---|---|---|
| Lerchengasse 25/2-3<br>1080 Wien | Other | € 880 000 |

Austria

| | EU Contribution |
|---|---|
| AIT AUSTRIAN INSTITUTE OF TECHNOLOGY GMBH<br>Austria | € 1 305 116,25 |
| CENTRO DI RICERCA, SPERIMENTAZIONE E FORMAZIONE IN AGRICOLTURA BASILE CARAMIA<br>Italy | € 744 065 |
| CONSIGLIO NAZIONALE DELLE RICERCHE<br>Italy | € 660 646,25 |
| UNIVERSIDAD DE SEVILLA<br>Spain | € 655 603,75 |
| DOMCA SA<br>Spain | € 563 020,83 |
| ACIES BIO BIOTEHNOLOSKE RAZISKAVE IN RAZVOJ DOO<br>Slovenia | € 540 531,25 |

| | EU Contribution |
|---|---|
| GLOBACHEM NV<br>Belgium | € 507 969 |
| UNIVERSITEIT ANTWERPEN<br>Belgium | € 288 125 |
| AIMERIT SL<br>Spain | € 257 225,15 |
| ASOCIACIÓN AGRARIA DE JÓVENES AGRICULTORES<br>Spain | € 209 925 |

Source: Cordis

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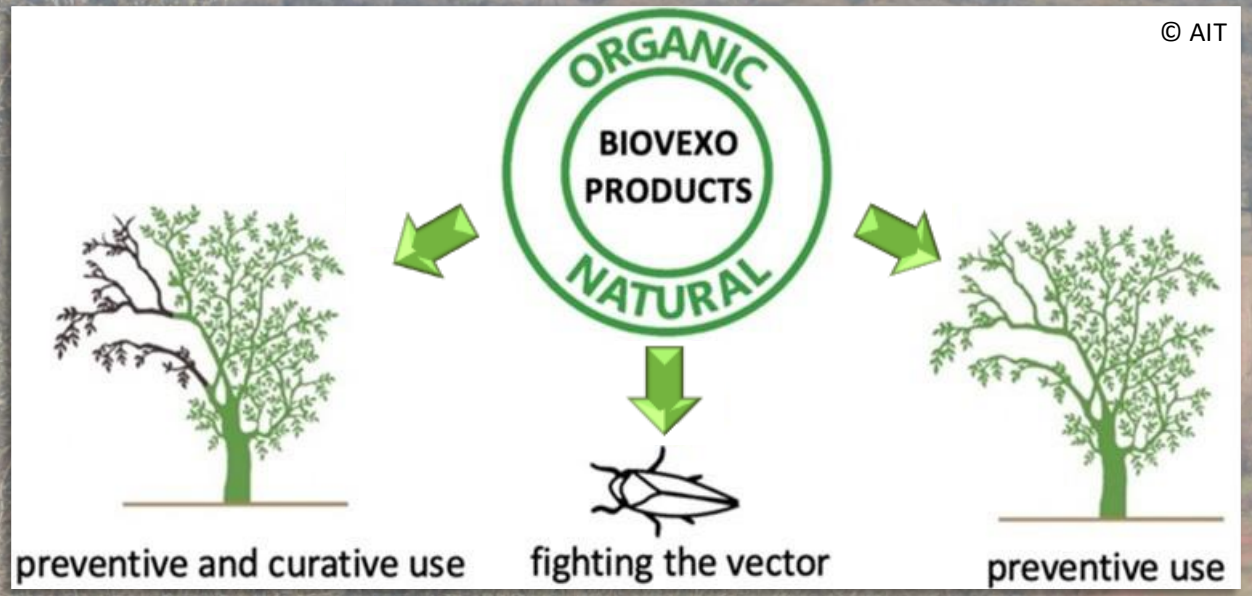
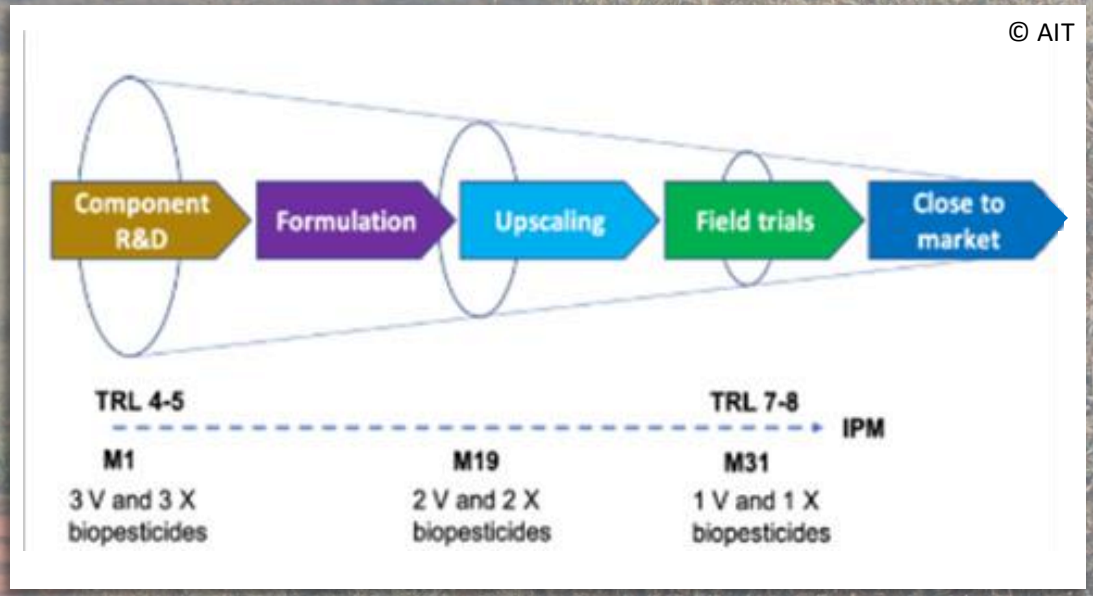
# Project Methodology

BIOVEXO is combining the use of *Xylella*-targeting biopesticides (**X-biopesticides**) with biopesticides combatting the insect vectors transmitting the disease (**V-biopesticides**).

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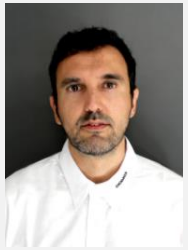
# X-Biopesticides for Xylella Control 1/2

- Formulation of bacteria and plant-based extract targeting Xylella;
- First testing is being conducted through small field trials in two locations:
  - In olive orchards in Apulia (Italy)
  - In almonds and olive orchards in Mallorca (Spain)
- Identification of best application methods of biocontrol agents for Xylella prevention and curative approaches;
- Collection of test results and thorough evaluation;
- Promising bacterial strains & plant-based extracts have been selected and applied in further small field trials;
- Evaluation of efficacy and most promising bacterial strains & plant-based extracts have been selected and applied in large-scale field trials and IPM;

**Work Package led by:**

DOMCA
INNOVATIVE FOOD SOLUTIONS

**Jose M. Garcia Madero**



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# X-Biopesticides for Xylella Control 2/2

## Curative Approach

**CURATIVE**
*Xylella* infected olive trees

**Application Methods:**
Foliar spray, by endotherapy (trunk injection) and irrigation.

**Monitoring:**
- Quantitative PCR (Q-PCR) every 6 months for 2 years
- Olive quick decline syndrome

## Preventive Approach

**PREVENTIVE**
Newly planted healthy olive trees

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# V-biopesticides for vector control

- Production of active substances for vector targeting V-biopesticides
- Identification of best application methods for preventing Xylella infections
- Lab testing of V-biopesticides against the different life stages of insects
- Establishment of a protocol for optimized production
- Small-scale field trials in Apulia, Spain

**Work Package led by:**

Globachem
Your Crop Counts

**Dr. Lisbeth Zwarts**

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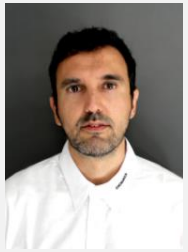
# Biopesticide formulation and upscaling 1/2

- Formulation of X- and V-biopesticides from lab-scale to industry scale, including production for field trials
- Development of parameters of bio-process control
- Evaluation of optimal efficacy and economic viability

**Work Package led by:**

DOMCA
INNOVATIVE FOOD SOLUTIONS

**Jose M. Garcia Madero**



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# Biopesticide formulation and upscaling 2/2

1

**Optimization of formulation on a laboratory scale**
- Adjuvant and protection technologies (emulsions, lyophilization, encapsulation or microencapsulation)
- Prototype formulations

2

**Upscaling and optimization of formulation on an industrial scale**
- Upscaling of bioprocess and downstream process
- Stability and shelf life studies
- Prototype biopesticides

3

**Biopesticide production for large field trials**
- X-biopesticides
- V-biopesticides

4

**Small-scale fild trials with different formulations**
- Field trials to test X and V-biopesticide formulations, studying safety aspects & effectiveness in planta.

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# Large scale validation of control strategies for integrated pest management 1/2

- Testing of X-and V-biopesticides in real field management conditions in southern Italy and mainland Spain
- Large scale field trials to reduce bacterial spread
- Large scale field trials for Xylella control
- Assessment of integrated control strategies
- Recommendation for integrated pest management strategies (IPM)

**Work Package led by:**

National Research Council of Italy

**Pasquale Saldarelli**
IPM Coordinator

**BIOVEXO Field Trial Locations**

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# Large scale validation of control strategies for integrated pest management 2/2

## No Xylella Infection

## Xylella Infection

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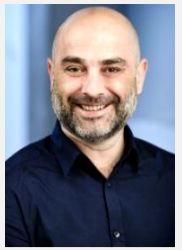
# Mode of action of biopesticides

- Evaluation of plant strengthening effects
- Definition of mode of action of X- and V-biopesticides
- Studying behaviour of applied biopesticides
- Support in product development and registration

**Work Package led by:**

AIT AUSTRIAN INSTITUTE OF TECHNOLOGY

**Stephane Compant**
Scientific Coordinator



X-biopesticide antagonism in vitro against *Xylella*

X-and V-Colonisation of spittlebugs

X- and V-boosting of immune Plant defense reaction

X-Microbial niche colonisation inside plants- *Xylella* competition

→ Characterisation of direct and indirect MOA for registration dossiers + persistence of biopesticides

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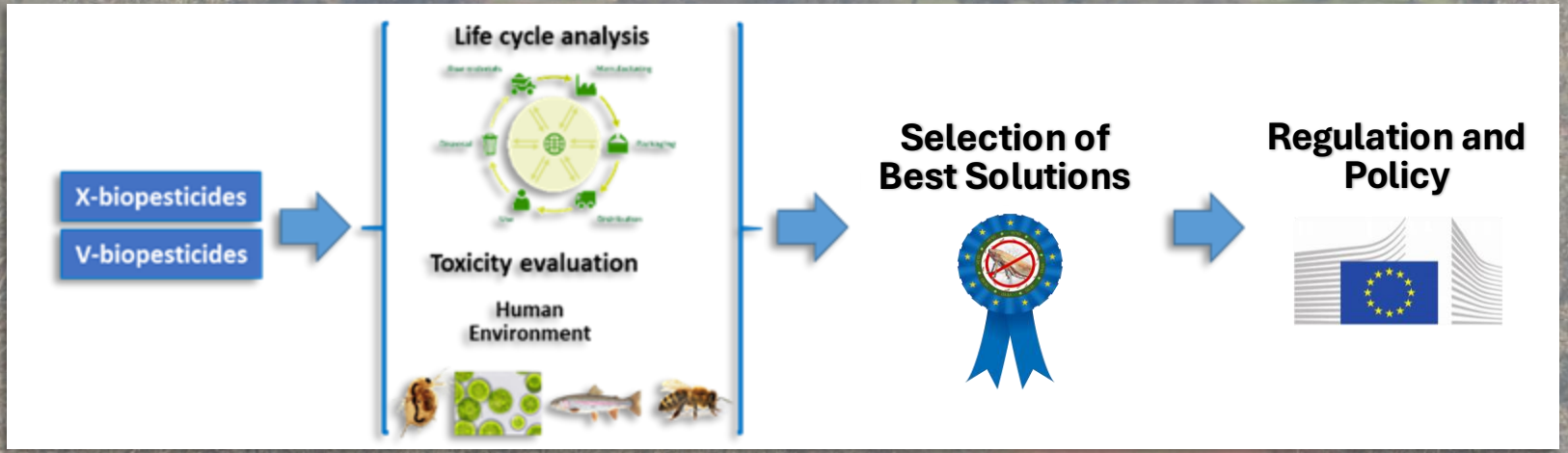
# Product sustainability and toxicity

- Life-cycle assessment of the selected biopesticides
- Toxicity testing and evaluation (safety guarantee)
- Regulatory compliance for market introduction of the biopesticide
- Economic sustainability via economic risk-benefit analysis

**Work Package led by:**

Globachem
Your Crop Counts

**Dr. Lisbeth Zwarts**



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# Dissemination, Exploitation & Communication

- Development & implementation of a DEC strategy to enhance the innovation capacity of the BIOVEXO Project
- Continuous communication of BIOVEXO's objectives
- Dissemination of project results
- Establishment of communication tools and building relevant audiences to maximise impact of the project
- Establishment of a project community through DEC activities
- IP management and exploitation planning

**Work Package led by:**

RTDS GROUP

**Ben Leitner**
D&C Manager

**Website**

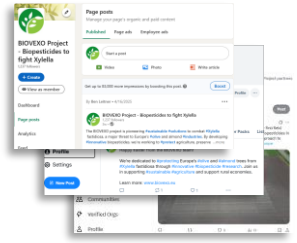
**Webinars**

**Newsletters**

**Videos**

**Magazine**

**Social Media**



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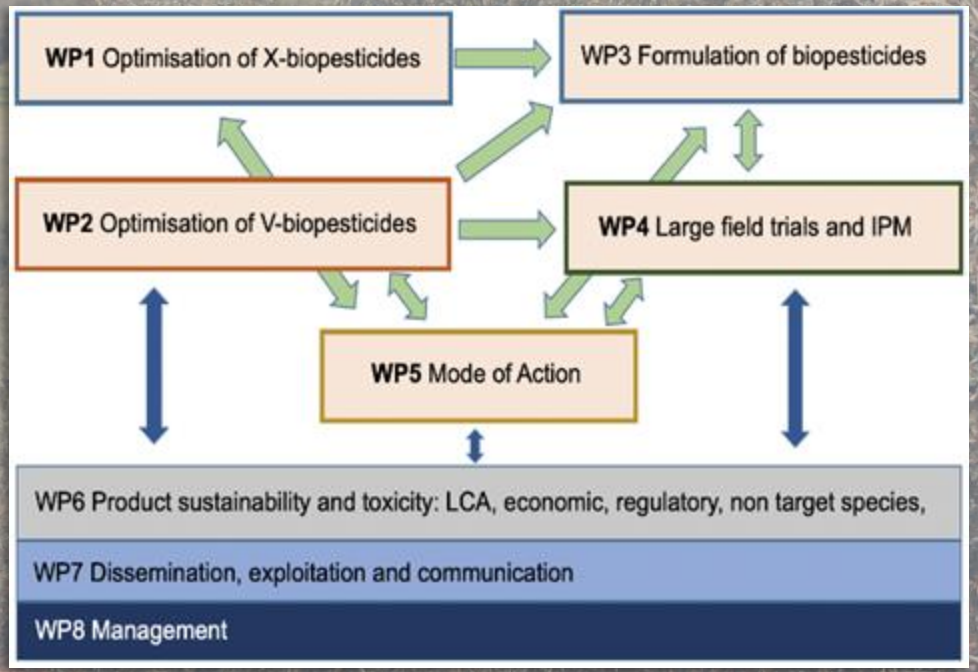
# Management

- Monitoring of the BIOVEXO project and risk management
- Overall coordination and organization of partner meetings
- Facilitation & implementation of a common strategy
- Management of administrative tasks (internal reporting, periodic cost reporting, deliverables, etc.)
- Communication with the funding authority (BBI-JU)
- Data management
- Financial management
- Project coordination: RTDS Association
- Scientific coordination: AIT Austrian Institute of Technology

**Work Package led by:**

RTDS GROUP

**Francine Martin**
Project Manager

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# Stay in Touch

www.biovexo.eu

BIOVEXO Project - Biopesticides to fight Xylella

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# Biocontrol of Xylella and its vector in olive trees for integrated pest management

# Thank You

Ben Leitner

D&C Manager

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