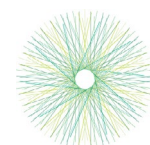


Beyond *Xylella*, Integrated Management Strategies
for Mitigating *Xylella fastidiosa* impact in Europe

PRACTICE abstract 1 - Extended Version

Main PROJECT Research INVESTIGATIONS and EXPECTED Research OUTCOMES



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The BeXyl Project IN a SNAPSHOT

Xylella fastidiosa (**Xf**) is a “special observed” pathogen in the European Union, as is one of the most detrimental and priority plant pest threatening EU agriculture, landscape and environments. **BeXyl** is the second international research project in Europe entirely devoted to develop a multidisciplinary research program on **Xf**. **BeXyl** stands for ‘Beyond *Xylella*’ and means integrating different scientific approaches to propose and test practical solutions to manage **Xf** outbreaks in the EU.

BeXyl consortium fosters the convergence of top worldwide scientists and the bottom-up demand of stakeholders, providing the best possible opportunity for synergic collaborations to tackle **Xf**. The project workplan has been designed to address the research needs of farmers, nursery producers, risk managers and policy makers presented and discussed during the European EFSA Conferences 2019-2023 on **Xf**.

BeXyl IS EXPECTED TO:

Capitalize results, experiences, experimental materials and protocols generated by the large partnership and deriving from recent H2020 projects (POnTE, XF-ACTORS, BIOVEXO), for advancing and extending the currently limited tools and strategies available to effectively counteract the impact of this harmful pathogen.

Aggregate biological information acquired under a wide range of latitudes/conditions to i) identify critical environmental drivers favouring *Xf* establishment and spread, considering climate change scenarios, and ii) secure information on the resilience of crops exposed under a wide range of different inoculum/management/climatic conditions.

Create a **multi-stakeholder community**, from end- users to policy makers, which is the core of the project, deciding on which disease management solutions to converge major efforts, while promoting their full adoption and implementation.

Validate **optimized statistical designs for surveillance of *Xf* and its vectors** to improve EU prevention and preparedness.

Developing and validating **solutions** for improving plant health at **nursery, farm and landscape level** including **a wide range of plant species** (crops, ornamental and forestry species) for conventional and organic sectors.

Broad dissemination of solutions from the diagnostic laboratory, to nurseries and farms, thanks to different types of research tasks, including IPM decision support systems and guidelines tailored to infected and noninfected areas.

Why BeXyl has been funded?

To propose a **multidisciplinary approach** to efficiently advance the development of practical solutions to fill the practical gaps and the lack of optimized approaches to manage *Xf*.

To not reinvent the wheel. Capitalize on previous successful research projects, focusing research in providing an overarching interpretation and exploitation of results.

To co-creates science-based solutions with a large number of stakeholders, highly interconnected national and internationally, with high economic and societal impact on the exploitation and adoption of the project results.

Excellent value for money, integrating and building on previous and ongoing worldwide experiences.

BeXyl final aim is to better tackle new *X. fastidiosa* introductions in Europe and to develop and implement tailored Integrated Pest Management (IPM) strategies to mitigate the impacts of current *X. fastidiosa* outbreaks, helping the agricultural/forestry sectors to remain productive and sustainable at long-term.

To accomplish its global aim **BeXyl** has been built mainly on the foundations of the knowledge generated by the H2020 project XF-ACTORS to strengthen the EU research network tackling *Xf* outbreaks, to ensure the best use and exploitation of the research outputs gained so far. **BeXyl** project has set eight **specific objectives** to address the main issues indicated in the call scope (Figure 1) and those research needs specified by farmers and foresters, nursery producers, risk managers and policy makers during EFSA conferences (Figure 2).

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Figure 1. BeXyl Specific objectives build to address the research needs identified by farmers and foresters, nursery producers, risk managers and policy makers during EFSA conferences on *Xf*




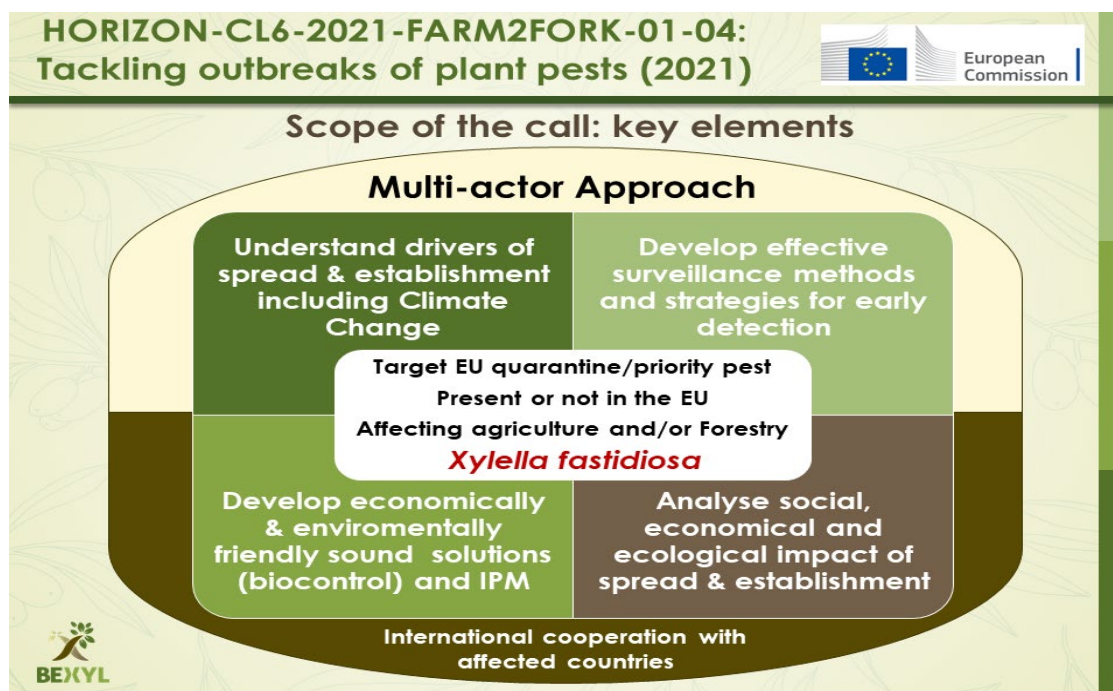
Beyond Xylella, integrated management strategies for mitigating <i>Xylella fastidiosa</i> impact in Europe (BeXyl)				
Stakeholders	Research needs	BeXyl specific objectives	WP	
A  Farmers	A D Sustainable management strategies for containment and recovery of infected areas	Develop new knowledge and fill existing research gaps to understand the drivers of <i>Xf</i> introduction including the effects of climatic change	1	
	A B D C Early / quick / simple / reliable diagnostic tools in the field for detection and monitoring	Develop new strategies and improved methods for surveillance, early detection and monitoring of <i>Xf</i> and its vectors to better tackle new <i>Xf</i> introductions	2	
B  Nurserymen	A B D C Search/develop resistant cultivars/new varieties & Improve genetic resources management	Develop non-chemical treatments for <i>Xf</i> in nursery stock to boost safe trade and market of plant propagating materials	3	
	A B C D Methods for monitoring and controlling vector populations	Facilitate outbreak area restoration through the characterization and exploitation of resistant genotypes in major EU affected crops	4,7	
C  Risk managers	B Use of thermotherapy to improve phytosanitary standards of nursery stocks	Develop innovative control solutions targeting insect vectors and <i>Xf</i> to increase plant resilience to infections	5,6,7	
	B C D Curative methods for infected plants	Integrate effective control measures in IPM programs for the sustainable management of <i>Xf</i> in outbreak areas	7	
D  Legislators	D Better knowledge of host, vector, pathogen interactions under a climate change scenario	Estimate the ecological, social and economic impacts of <i>Xf</i> establishment and spread and outbreak management approaches	8	
	D Deliver scientific information using communication language designed for different target groups	Promote dissemination/communication, technology transfer, public awareness and stakeholder engagement for tackling <i>Xf</i> outbreaks through plant health policies and the implementation of effective IPM programs	9	

Figure 2. Key elements and scope of the topic HORIZON-CL6-2021-FARM2FORK-01-04 addressed by BeXyl



Xf WORLDWIDE

Several variants and strains of **Xf** are known worldwide, and more than 650 plant species can be colonized by one or more strains of the bacterium. In several plant species, it can remain latent, but the bacterium is well known as the causal agent of important diseases in grapevine, almond, oleander, orange, peach, citrus, coffee, avocado, olive tree, and oak. The bacterium affects the normal physiological processes of the plants and can lead to their death.

EU Research on Xf

In October 2013, for the first time in the EU and in the Mediterranean Countries, scientists reported the presence of **Xf** on olive trees in Puglia, southern Italy. Since then, surveillance has led to the discovery of outbreaks in regions of France, Spain and Portugal. Several species of xylem sap-sucking insects, mainly “spittlebugs”, have also been identified as vectors of the bacterium.

Since 2015 the European Union has been financing research to find ways to reduce the impact of **Xf**. At the time, very little was known about the characteristics of European outbreaks. The POnTE (2015-19) and XF-ACTORS (2016-21) projects enabled the EU scientific community to develop knowledge about the ‘behaviour’ and interactions of the bacterium with European ecosystems. This process represented the factual-based guidance for economic operators and policymakers to put in place emergency measures to curb the spread of the bacterium in the EU.



BeXyl a STEP FORWARD

BeXyl aims to secure and exploit the research outcomes achieved by advancing and transferring into practice the most promising prevention and containment strategies. **BeXyl** means “Beyond Xylella”. That suggests the time is ripe to move away from emergency mode to more sophisticated management strategies against *Xylella fastidiosa* current outbreaks and prevent new introductions in Europe.

The project fills gaps in research, dedicating substantial analysis to the **socio-economic and environmental impact of the pathogen under climate change scenarios**. Stakeholders’ involvement is another distinctive characteristic. More than 40 research institutions, government agencies, nurseries and farmer’s associations, NGOs, and “operational groups” of the EU-funded European Innovation Partnership, participate in the project. The goal is to create a community of scientists, citizens, economic operators, and policymakers to **shorten the distance between research and on-field applications**.



BeXyl will support studies on both basic research and technological innovation. In the first group, there is work on **the drivers of *Xf* epidemics in the EU**, considering climate change. Scientists will also be modelling the impact and **sustainability of different practical tactics** to contrast the pathogen's spread in different agroecosystems and landscapes. In the second group, we find **improved detection methods for the bacterium and its vectors**, with tools ranging from remote sensing technology to dogs' sense of smell. **BeXyl** will also establish a **global network of "sentinel plots"** acquiring data from a wide range of latitudes and conditions.

Other research lines include **thermal treatment** to secure **safe plant material exchange**. To support specific plant breeding programs, scientists will improve the **understanding of genetic mechanisms leading to resistance to *Xf***. Findings in the studies carried out in former research projects encourage exploring beneficial bacteria (bacteriophages), innovative antimicrobial compounds, and microbial formulations that reduce the spread of *Xf* within plants. BeXyl will also outline new solutions for helping farmers to **use integrated pest management to control the bacterium and its vectors**.

