



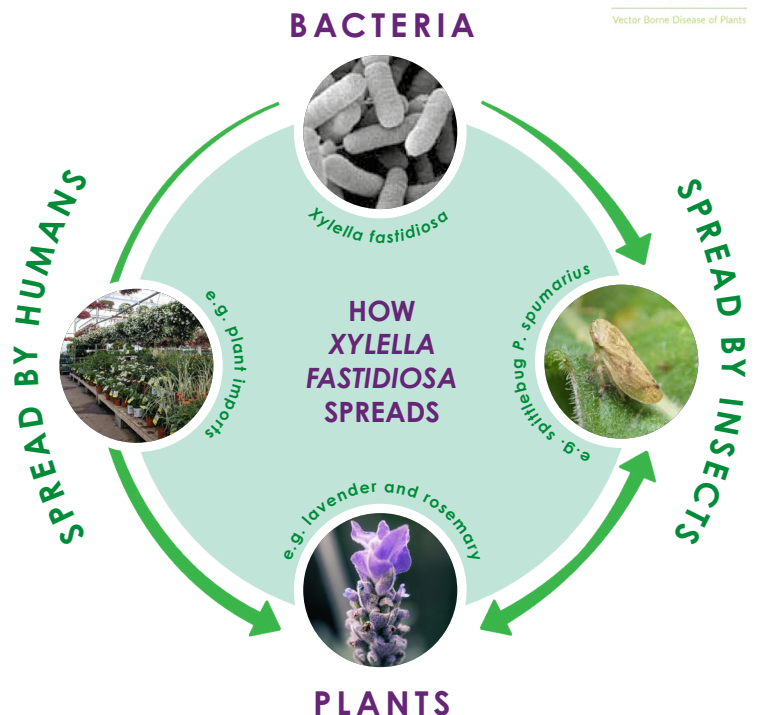
# BUILDING CAPACITY TO RESPOND TO *XYLELLA FASTIDIOSA* IN THE UK



## If introduced, *Xylella* could devastate UK crops, gardens and natural environments

*Xylella fastidiosa* is a bacterium which can infect over 500 plants causing symptoms including leaf scorch, wilt, die-back and ultimately death. Susceptible plants include important crops like citrus, coffee, grapevine and olive, ornamental plants including lavender and rosemary, and native trees like oak and elm. *Xylella* infects the plant xylem and is spread by xylem-feeding insects including leafhoppers and froghoppers/spittlebugs.

*Xylella* is not currently present in the UK, but there have been severe outbreaks in Europe, particularly in olive trees in Italy. There are concerns that the bacterium could be accidentally introduced to the UK on imported plants, with devastating consequences.



## Our research focused on understanding how *Xylella* might spread and raising awareness

We optimised sampling and diagnostic methods including developing more efficient DNA extraction, the use of whole genome sequencing and isothermal amplification techniques, and using volatile organic compounds as diagnostic markers.

To understand how the disease might spread if introduced we studied disease progression, as well as the geographical distribution and behaviour of the insect vectors. This included a nationwide citizen science spittlebug hunt which generated 30,000 records. We also studied how far and how quickly the insects can migrate, and if populations mix within and between countries in Europe.

Integrating knowledge about plant pathogen interactions, insect behaviour, human behaviour, and the plant trade we created models which predicted how *Xylella* might spread if introduced.

The protective foam produced by immature spittlebugs makes them easy to spot.



## Discoveries

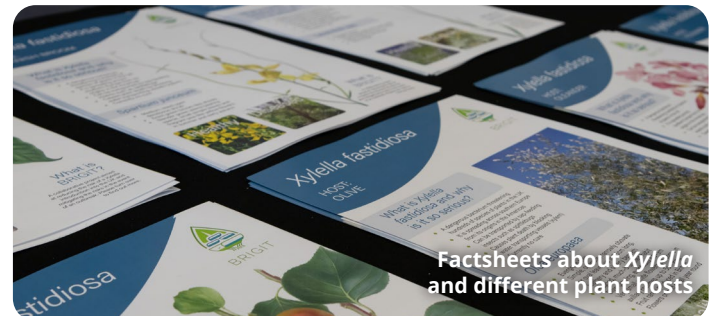
### We have optimised testing protocols and clarified the current risks from *Xylella*.

- Diagnostic protocols for *Xylella fastidiosa* and its vectors were optimised and standardised. Four laboratories (Fera, SASA, Forest Research and AFBI) were accredited to conduct testing.
- The meadow spittlebug, *Philaenus spumarius*, a confirmed vector of *Xylella* in Europe, was the most common species reported in the UK, often on high-risk plants like lavender and rosemary. Other species were less common or found on low-risk plants.
- Reduced mating (in the lab) between insect vectors from Scotland, England and Italy suggests there may be biological differences between populations, like plant preference or ability to transmit plant pathogens.
- Population genomics and other data for *P. spumarius* suggest that the populations in southern Italy are particularly well adapted to spread *Xylella* among olive trees.
- In current conditions, *Xylella* would not spread rapidly if introduced. Infection progresses slowly at typical UK temperatures (10-25°C) and the insects rarely migrate long distances. The area most at risk is southeast England.
- The plant trade relies on visual inspection of *Xylella* presence based on symptoms of the plants, and asymptomatic infections may be missed.
- Awareness-raising activities including the Spittlebug Hunt, an animation narrated by Helen Mirren, *Xylella* Awareness Week and stakeholder activities reached millions around the world.

## Recommendations

### Keeping the UK free from *Xylella fastidiosa* will require a combination of monitoring and awareness-raising.

- Verified protocols and accredited laboratories should be used for reliable diagnosis.
- Due to the possibility of asymptomatic infections, it is essential to regularly monitor plants distributed by the plant trading industry and the wider environment for *Xylella* presence via verified diagnostics protocols for *Xylella*
- Work with importers and other plant traders to ensure all biosecurity checks are completed.
- Encourage vendors to stock UK grown or certified plants.
- Continue to share the educational materials created by the project, encouraging professionals and the public to report suspected *Xylella* infections to Tree Alert.



Factsheets about *Xylella* and different plant hosts



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**To explore the underlying research visit** <https://www.jic.ac.uk/brigit/>



An interdisciplinary research consortium working together to understand bacterial plant diseases to protect UK farms, forests and gardens.

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