



The tell-tale signs of *Xylella fastidiosa* – a pathogen that poses a threat to the whole EU region and beyond  
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# Spatial information in the fight against new plant diseases

New and exotic plant diseases are on the rise, with grave consequences for agriculture and the natural environment. Stephen Parnell from UNIGIS UK looks at how spatial data, technologies and modelling are improving our ability to fight back.

The British landscape was once full of elm trees. The introduction of a microscopic fungus in the 20th century changed all of that. Over the course of two epidemics, 60 million elm trees were lost, landscapes were irreversibly changed, and ecosystems altered forever.

Since then, our forests and woodlands have faced an onslaught of new invasions. From *Phytophthora ramorum*, a 'fungus-like' organism that infects a number of trees including larch and some species of oak, to ash dieback, a disease first discovered in the UK in 2012 and causing such alarm that the government convened Cobra, the UK government emergency response committee usually reserved for terrorist threats and other such national emergencies.

## Global issue

It's not just the UK that's affected; this is a global issue and agricultural crops and natural environments around the world are facing similarly grave threats. Most commentators point to changing trends in world trade and travel and the consequent movement of plant material. In the US and Brazil, citrus industries have suffered from a spate of exotic diseases originating from South East Asia which have devastated production; in Florida citrus canker arrived in 1995 and \$1 billion was spent trying to eradicate it. In 2005 the towel was thrown in on the eradication program and, that same year, a far more devastating disease - citrus greening

- arrived and subsequently spread throughout the State. Global banana production is currently facing a severe threat from a strain of 'Panama disease' called Tropical Race 4. Global wheat production is being challenged by a new virulent strain, Ug99 of stem rust disease, so named because it was first discovered in Uganda in 1999, and has since spread across Africa and the Middle East. The list goes on...

The latest threat to Europe - *Xylella fastidiosa* - is particularly concerning however. This bacterial pathogen has spread through Italy and poses a potential threat to the whole EU region. The pathogen has a long history in some parts of the world but it has never been found in Europe before. That is until 2013, when the disease - thought to have arrived accidentally on coffee plant's from Costa Rica - was found on olive trees in Apulia. It's spread by sap-feeding insects such as spittlebugs and invades a plant's water distribution system, preventing essential water and nutrients from being transported around the plant.

But here's the really worrying part: whereas many plant diseases are capable of infecting only a small number of host species, *Xylella* has a vast list of potential host plants. Different sub-species of the pathogen can infect a range of species, from Britain's native pedunculate oak, to citrus trees, and olive.

## Emergency measures

In an attempt to prevent the further spread of *Xylella*, the European