Quarantine containment level pathogen *Xylella fastidiosa*: Threat on trees in the UK.

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Introduction:

Xylella fastidiosa (XF) is a gram-negative, rod shaped bacterium that causes disease in angiosperm plant. XF can colonise two substrates the plant host (xylem) or the insect vector (foregut). Bacterial colonies cause blockage in the xylem thus the symptoms reflect those similar to water stress. XF is the causal agent to many diseases that are of agricultural, commercial and ornamental value. The bacterium is originally from Central America been found in Europe in southern Italy in 2013 and has been spreading since thus the risk of **XF reaching the U.K. is high**; especially through the importation.

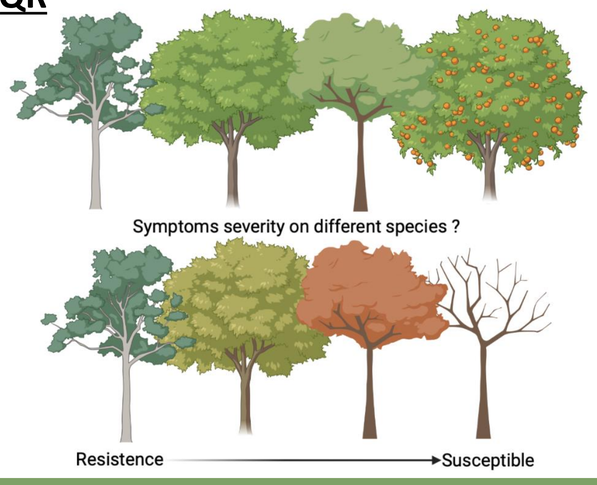
Symptoms

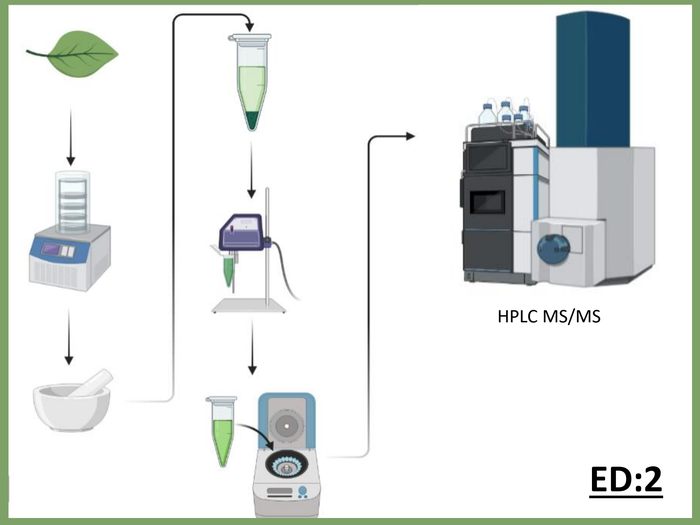
Symptoms are very similar to that of drought stress. It is caused by the blockage of of the xylem vessels when the bacterium is in the biofilm state.

Symptoms includes:

- Asymptomatic
- Leaf scorch
- Marginal leaf scorch
- Leaf wilting
- Bronzing of foliage
- Mild chlorosis
- Branch wilting
- Defoliation of sections of the tree
- Twig death
- Browning on the leaves
- Stunting
- Dwarfing of leaves
- Large instances of defoliation
- Crown dieback
- Withering of branches
- Irregular lignification of bark

QR





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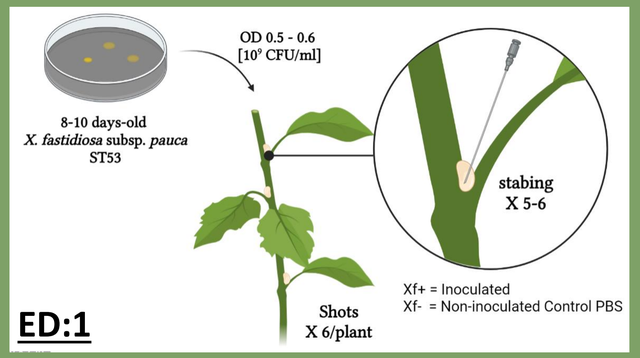

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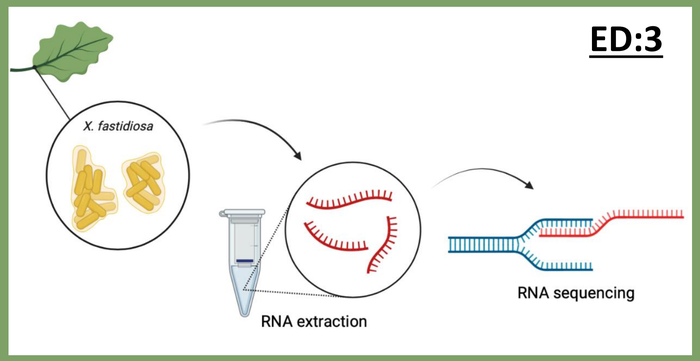

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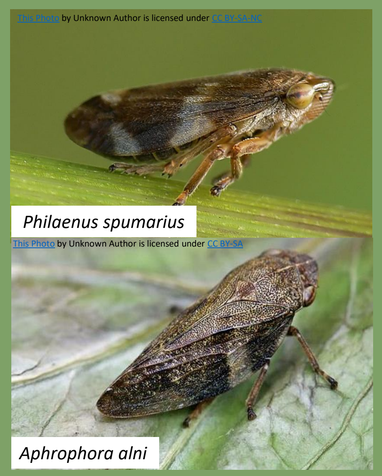

INSECT VECTORS:

Insect that are xylem feeding (*Hemiptera, Cicadellinae*) can be a XF vector. The bacterium is spread from plant to plant via insect vector that feed on the xylem sap, once the bacterium is obtained by the vector through xylem feeding the infect becomes a vector for the rest of its life. XF multiples forming biofilms to ensure firm adhesion in the insect foregut cuticular lining, so it can withstand high pressure fluid flow during feeding (Almeida and Purcell, 2006, Ionescu et al., 2014).

There are 18 species of spittlebugs that are potential vectors of XF, though *Aphrophora alni* and *Philaenus spumaruis* are the most abundant and widely distributed = most threat to spread the XF

Research question (RQ): Are trees that are naturalised or native to UK susceptible to *Xylella fastidiosa*?

Experimental design (ED):

1) Tree inoculation studies, screening for susceptibility
2) Metabolomic analysis of tree physiological state
3) RNAseq of bacterium associated genes for infection

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