



What if?
***What would Xylella
mean for Australia?***

National Olive Industry Conference 2022

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Wine
Australia
for
Australian
Wine

**Hort
Innovation**

PLANT BIOSECURITY
RESEARCH INITIATIVE



Xylella should need no introduction to olive growers

Its prominence for olive growers grew when detected in olive groves in Salento, Italy in 2013 and spread quickly; the response causing civil unrest and fierce debates, accusations whilst struggling to contain the disease

Xylella 101

- A **bacterium** that creates a biofilm in xylem vessels in host plants
- Symptoms similar to water / heat stress leading to **leaf and fruit desiccation, stunted growth, dieback and, in some cases, plant death.**
- **Can be asymptomatic** in some hosts
- ***Xylella fastidiosa***, 4 accepted subspecies (*X. fastidiosa fastidiosa*, *X. fastidiosa multiplex*, *X. fastidiosa sandyii* & ***X. fastidiosa pauca***) and 2 nominated subspecies (*X. fastidiosa morus* & *X. fastidiosa tashke*), and *Xylella taiwanesis*
- Currently **no cure or treatment option** - some grape & olive species show tolerance and some early evidence indicating 'cold curing'
- Spread primarily by vectors - **xylem feeding 'sapsucking' insects** - and **infected plant material movement**
- **Over 20 crops are at threat** - avocados, cherries, citrus, grapes, nuts, olives and stone fruits
- An incursion of *Xylella fastidiosa* has been modelled as costing Australian horticultural industries between **\$1.2 billion and \$11.1 billion** in 2017-18 dollars (over 50 years), depending on the severity of the incursion and its rate of spread.
 - For olives, this has been modelled at \$191 million to \$273 million over 50 years



Source: Craig Elliott



Source: Sandy Purcell

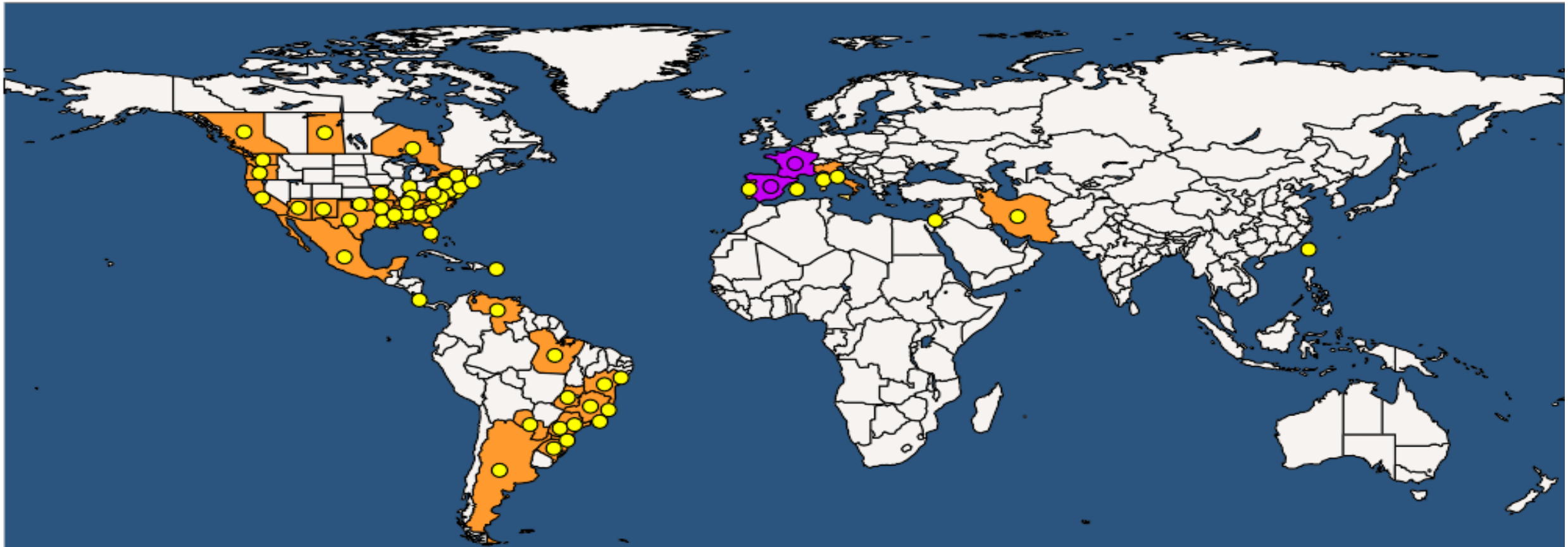


Source: Marco Scortichini



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Xylella 101



Xylella fastidiosa (XYLEFA)

● Present

● Transient

2022-10-03

(c) EPPO <https://gd.eppo.int>

Xylella 101

Most likely originated from Central America, and introduced on multiple occasions into Europe

"The overall number of *Xylella* spp. host plants determined with at least two different detection methods or positive with one method (between: sequencing, pure culture isolation) reaches now **412 plant species, 190 genera and 68 families**. Such numbers rise to **664 plant species, 299 genera and 88 families** if considered regardless of the detection methods applied."

EFSA (2022). *Scientific Report on the update of the Xylella spp. host plant database - systematic literature search up to 31 December 2021*. EFSA Journal 2022;20(6):7356, 70 pp. <https://doi.org/10.2903/j.efsa.2022.7356>

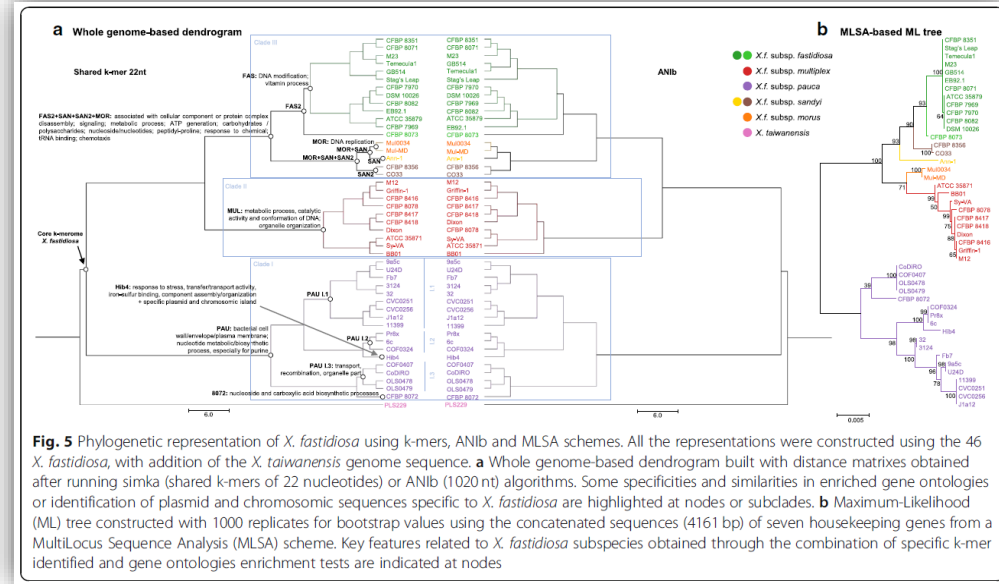
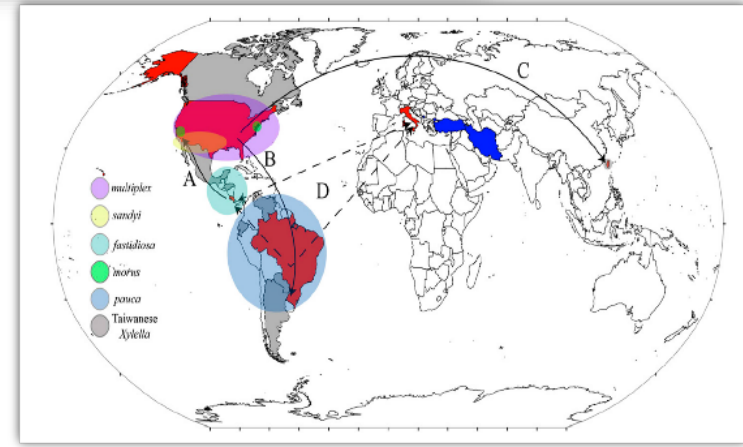


Fig. 5 Phylogenetic representation of *X. fastidiosa* using k-mers, ANiB and MLSA schemes. All the representations were constructed using the 46 *X. fastidiosa*, with addition of the *X. taiwanensis* genome sequence. **a** Whole genome-based dendrogram built with distance matrices obtained after running simka (shared k-mers of 22 nucleotides) or ANiB (1020 nt) algorithms. Some specificities and similarities in enriched gene ontologies or identification of plasmid and chromosomal sequences specific to *X. fastidiosa* are highlighted at nodes or subclades. **b** Maximum-Likelihood (ML) tree constructed with 1000 replicates for bootstrap values using the concatenated sequences (4161 bp) of seven housekeeping genes from a MultiLocus Sequence Analysis (MLSA) scheme. Key features related to *X. fastidiosa* subspecies obtained through the combination of specific k-mer identified and gene ontologies enrichment tests are indicated at nodes

Denancé et al, 2019, Identification of genetic relationships and subspecies signatures in *Xylella fastidiosa*, BMC Genomics (2019) 20:239

Almeida and Nunney (2015)
How do plant diseases caused by *Xylella fastidiosa* emerge?
Plant Disease November 2015



Ottobre 2013



Marzo 2016



LUGLIO 2021



What happened in Apulia?

What are the key issues?

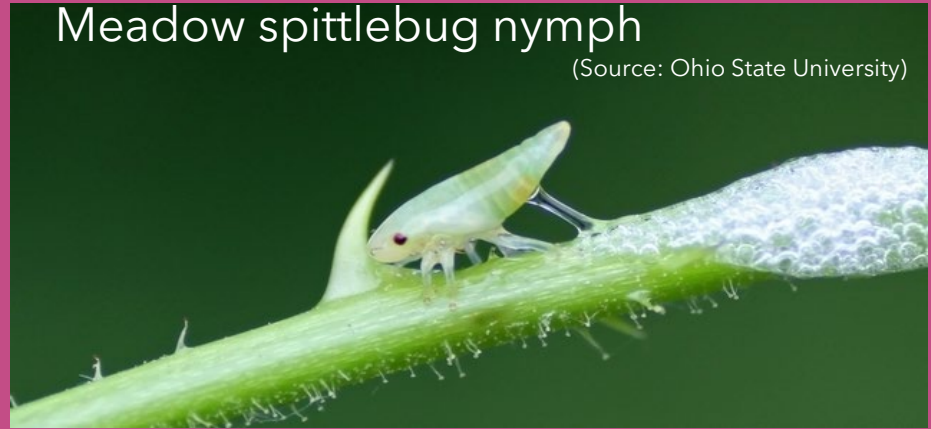
Border biosecurity is important, but **there is no 'zero risk' in biosecurity & you need to be ready**

Government Response Strategy

- How the government responds will be dependent on the situation... the extent, the presence of vectors, the feasibility of containment & eradication and the cost-benefit assessment
- The *Emergency Plant Pest Response Deed* would be activated with (affected) industry representation on the NMG & CCEPP for advice and decision-making... eradicate or transition to management?
- Affected States and Territories would have Control Centres set up - AOA would be asked to be available as 'liaison' and 'advisors'
- Movement restrictions and buffer areas would be established
- Other containment, and potentially destruction, activities would be implemented



Insect Vectors



(Source: bugguide.net)

(Source: Bugwood.org)

(Source: University of California)

Monitor for disease symptoms



Business Continuity

Start with a map....

A "clean" zone
Production areas

A "dirty" zone
Public access

What else?

- Visitor register and induction point
- Vehicle and machinery inspection point
- Vehicle and machinery washdown pad
- Incoming goods inspection point
- Incoming goods quarantine
- Packing Sheds / Outbound goods storage
- Signage
- Access points



Think about Supply Chain Management

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Social Impacts & Support



If nothing else, remember

Arrive Clean, Leave Clean

Check, Clean, Disinfect, Dry

See, Secure, Report

... and Hope is not a Plan

**IF YOU SEE ANYTHING UNUSUAL,
CALL THE EXOTIC PLANT PEST HOTLINE**



1800 084 881

Collect as much information as you can.
This includes:

- what you found
- when you found it
- where you found it
- what crop it was on
- how many you saw or how infected the crop is
- how widespread it is
- anything else that catches your attention.

If you can, take photos