

**Hort
Innovation**

An update on *Xylella* and other biosecurity matters

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Photo credit: Toni Chapman, NSW DPI

Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australia's horticulture industry

- **We advance** Australia's \$16 billion horticulture industry by investing in research and development, marketing and trade to build a prosperous and sustainable future for growers.
- **We partner** with Australian and international co-investors including government, leading science, technology, and consumer strategy experts to anticipate future challenges and opportunities.
- **Our role** is to capture value from the investments we make to benefit all levy payers.





Australian horticulture at a glance

\$16 billion

Total production value of Australian horticulture in 2021/22

17 per cent

Horticulture's share of total agriculture production value

116,900

Total number of people employed in Australia's horticulture sector in 2021/22

12,105

Approximate number of Australian horticulture businesses in 2020/21

The Biosecurity R&D team

Managing existing, and preparing for, exotic pests & diseases

The horticultural industry is at a critical juncture, facing heightened biosecurity risks and pest movements, increasing global competition, and changing consumer preferences. To thrive in this dynamic environment, we must prioritize innovation and resilience

The Biosecurity R&D team is at the forefront of this challenge. Our work aligns directly with the Hort Innovation Strategy by delivering practical solutions that enhance the sector's competitiveness and sustainability

Through our R&D efforts, we are:

- **Mitigating biosecurity threats:** We create robust biosecurity programs to protect crops from invasive threats
- **Driving productivity gains:** Delivering innovative pest & disease management solutions that increase yields and reduce costs
- **Enabling market access:** Developing surveillance systems that generate evidence to meet domestic & international market requirements
- **Fostering a culture of innovation:** Collaborating with industry partners to develop new technology and approaches

By investing in biosecurity R&D, we are safeguarding our industry, driving economic growth, and creating new opportunities for Australian horticulture. Our work is essential to ensuring the long-term success and sustainability of the sector



Biosecurity safeguards our industries and ensures supply

Protecting trade through our plant health status

- Animal, plant and human health
- Value of Australia's agricultural sector is c. \$81 billion (2021/22)
- \$51 billion (crops), \$30 billion (livestock)
- Australia's megadiverse flora and fauna (value c. \$5.7 trillion)
- Indigenous cultural heritage
- Tourism (\$50 billion) and jobs (1.6 million across supply chain)

The spectrum of pests present in Australia (native and introduced) make up our animal and plant health status

Biosecurity is all about trade

Biosecurity is all about safeguarding Australia's ability to trade fresh produce by protecting our plants from pests and diseases.



Preventing exotic plant pests from entering Australia



Reducing the impact of plant pests already present in Australia



Assuring our international trading partners that our produce is pest-free

PEST = anything that impacts animal or plant health



Key drivers – a changing biosecurity environment

Compounding challenges on multiple fronts

Chemical withdrawal and **chemical resistance** are major drivers combined with compliance and market access implications

Climate change is impacting the global environment with changing & more extreme weather, altering the habitat, range & distribution of many pests

Changing land uses are increasing interaction between people and agricultural areas

Shifting trade and travel patterns higher risks through increased movement of people, equipment & goods

Loss of genetic diversity in crops = higher risk in the event of an outbreak

Illegal activity has increased, e.g., growth and increasing complexity of trade and online shopping

Major global disruptions shock supply chains and impact the movement of goods and people, leading to changes in behaviour and pathways

New technologies such as miniaturization, biological control, IoT

Growing international competition with reduced margins

Xylella fastidiosa:

Australia's Number 1 Exotic High Priority Plant Pest



Cost to Australian producers:
\$1.2-\$11.1 billion over 50 years

Why the large investment in *Xylella*?

An outbreak would cost Australia \$1.2-\$11.1 billion over 50 years*

Xylella fastidiosa (Olive quick decline) is Australia's #1 Exotic High Priority Plant Pest

Estimated cost to the Olive Industry: \$55-\$273 million*

It is a bacterium that affects many crops and other plants

Spread by insects and grafting

**Source: DAFF, The impacts of Xylella fastidiosa on Australian horticulture and the environment*



Photo credit: Toni Chapman, NSW DPI



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Xylella in olives: a series of unfortunate events

Olives are only a recent host for *Xylella*

Unknown in Olives until it was found in Italy

- Thought to have been present in the Puglia region since 2008
- A single infected coffee plant from Costa Rica was all it took
- Spittlebugs fed on the coffee plant then moved to olives
- This is believed to be the only time X.f. has jumped to olives
- Only this strain spreading through olives
- Superspreader event: insects can infect a tree multiple times through feeding, overwhelming the immune response
- Italian growers in the infected zone are replanting with resistant cultivars

Xylella investments by Hort Innovation & Plant Biosecurity Research Initiative

Hort Innovation has invested over \$10 million in 4 projects since 2018

Coordinated projects to develop rapid diagnostic tools, technologies and protocols to support early detection and surveillance

- *Xylella* Coordinator - communication
- Diagnostics - identification
- Insect vectors - surveillance
- Gene technology - control (RNAi)



Photo credit: Toni Chapman, NSW DPI

Plant Biosecurity Research Initiative

Ensuring Australia has the latest *Xylella* knowledge by engaging with international researchers and policy makers:

- MOU with Euphresco, connecting Australian & European researchers
- FAO meeting in Bari, Puglia on transboundary pests including *Xylella* (2023)
- Field trip to olive orchards and nurseries in the Puglia region, 2023
- Xylella Conference, Ajaccio, 2019
- XFactors (Euphresco): early detection of X.f. in dormant plant material
- BeXyl (EU project): potential collaboration



Understanding Australian plants & insects

What are our local risks?

- Identify potential **local insect vectors** and if they can acquire and transmit *Xylella*
- One highly likely candidate: *Bathyllus albicinctus*
- This needs transmission experiments, which require **international collaboration**
- Identify **feeding preferences of known vectors overseas** to determine their risk to Australian and New Zealand natural environments and crops
 - New Zealand has one known vector but does not have *Xylella*
- Improve our understanding of plant-vector interactions
- Evaluate **testing protocols for *Xylella*** in potential local insect vectors
- Identify susceptibility of native plant species to the different *Xylella* species, subspecies and sequence types





Gene technology for control of *Xylella*

RNAi vaccines

Immunising citrus trees with Silvec Biologies' RNA-based tree vaccine

End game is trees with level of **resistance** against pathogen and disease = preparedness and response

Healthy, thriving trees that live with the bacterium under control

Co-investment through Hort Frontiers and leveraging existing overseas research

National *Xylella* Action Plan 2019–2029



Plant Health Committee

National *Xylella* Action Plan 2019–2029

What is next for Australian *Xylella* research?

Bringing industry and researchers together

Regulatory researchers know much of the hard science that is needed & have close ties to overseas colleagues

Social science researchers are familiar with what is required to translate research into action, create incentives, and ensure that grower's best interests are at the heart of the project

Growers & other industry stakeholders understand the practicalities of what is feasible on-farm

Bringing it all together:

- What is needed vs. nice to have?
- What is directly translatable from overseas & what needs work?
- How do we keep industry resilience and recovery at the forefront of future programs?

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Thank you!

