

# BerryQuest International 2022

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**25–28 July**  
Sea World Resort  
& Conference Centre

**BQI  
22**

# BerryQuest International 2022

## WEDNESDAY 27 JULY 2022

**Berry Breeding: Supporting Strawberry Production  
through High Health Runners**

**Fiona Constable, Agriculture Victoria**



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# Supporting Strawberry Production through High Health Runners

Fiona Constable

# Plant Biosecurity

## Plant Health Australia:

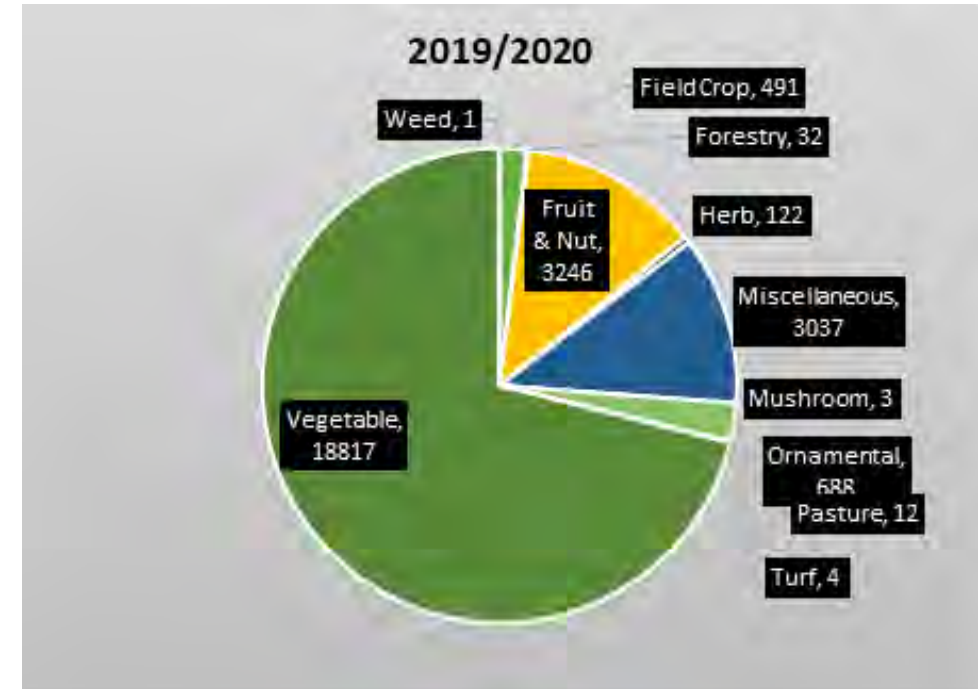
- “a set of measures designed to protect crops from *emergency* plant pests at national, regional and individual farm level”

- Economy
  - Production
  - Export markets
- Environment
  - Local ecosystems
  - Amenities
- Community
  - Way of life
  - Food security



# Agriculture Victoria: biosecurity services

- Crop Health Services (CHS; AgriBio, Melbourne)
  - Test ~26,000 suspected samples each year (~75,000 tests)
  - Low and high throughput testing: visual to molecular
    - **296 tests/analytes available**
  - Emergency response
  - Expert advice to state and commonwealth biosecurity agencies
  - NATA (ISO17025) accreditation (CHS)



- **Crop Hygiene – Biosecurity Services**

# Crop Hygiene – Biosecurity Services

An independent provider of biosecurity services to the horticultural industry

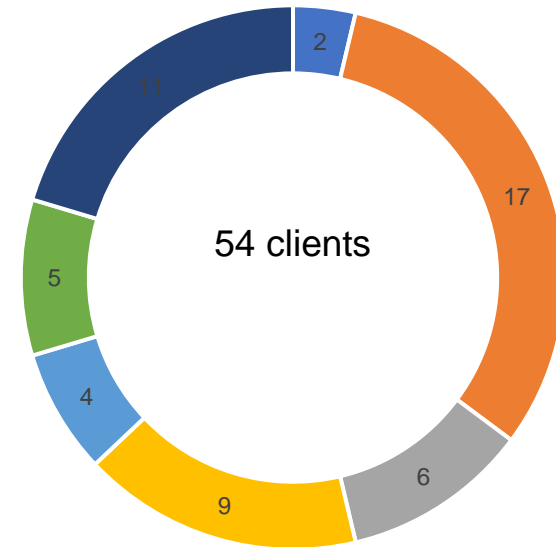
Genetic Resource Centre: High health /nucleus plants maintenance

- Germplasm maintenance
- Tissue culture and propagation
- Support for certification
- Virus elimination

Crop inspections/forecasting

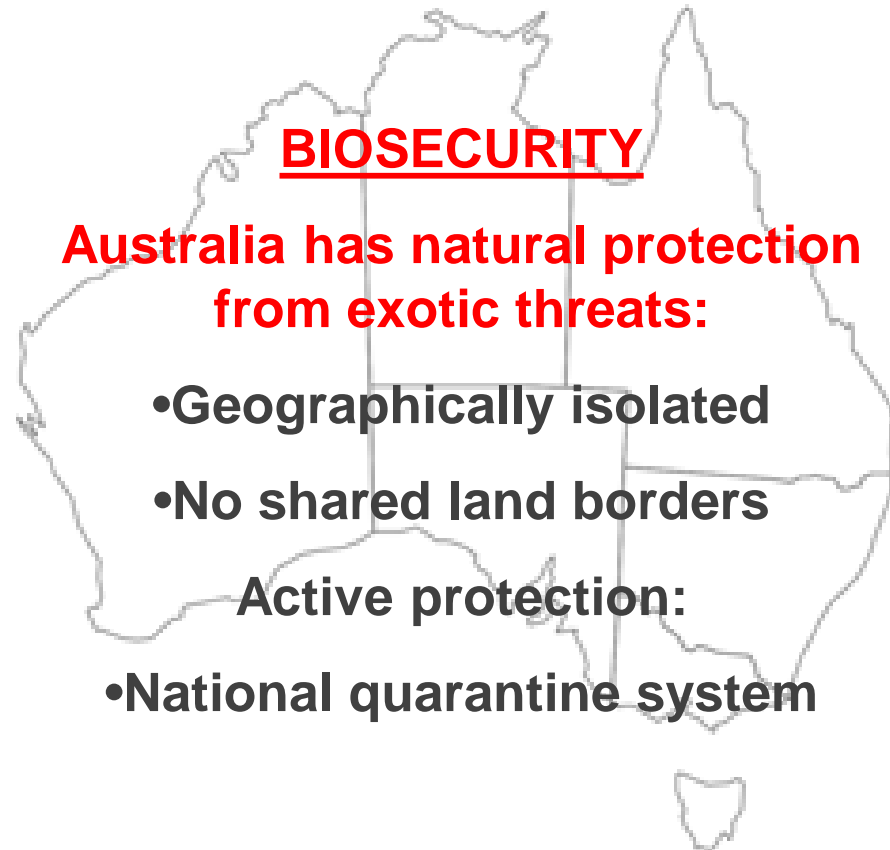
Small R&D projects

- Approved Arrangements (Quarantine)
- NIASA & Biosecure HACCP (in process)
- Seeking MPI accreditation as an approved supplier of materials for NZ



■ Almond ■ Berry ■ Grape ■ Potato ■ Tree Fruits ■ Various ■ Other

# Biosecurity and the Australian Strawberry Industry



## Biosecurity continuum:

Offshore:

- Approved suppliers

Border:

- Importation

Onshore:

- Incursion management
- Interstate biosecurity
- Intrastate – region/farm
- **Certification**

# Importing strawberry propagation material

- Entry as tissue cultures only
- Screened in post-entry quarantine (PEQ) for a minimum of months 6 months or 12 for disease or pathogens of quarantine concern
- AVR has approval to introduce newly imported varieties into tissue culture at AgriBio prior to release from PEQ
  - Increase numbers
  - Establish material for testing prior introduction to certification programs



# Australian strawberry certification schemes

**Supporting onshore biosecurity**

**Operational 60 + years**

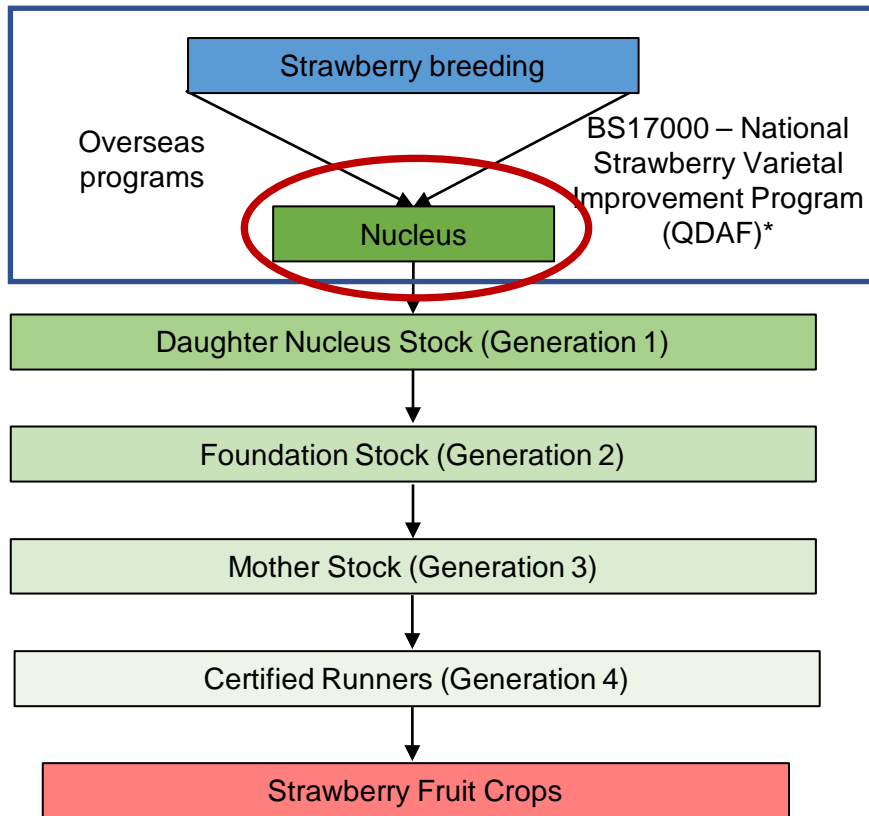
**Certified strawberry runners are supplied through Victorian (≈70%) and Queensland (≈30%) high health runner production schemes (2019)**

- Certified on the basis of their high health status
- Reduce the threat of spread pathogens and pests
- Provide traceability
- Provision of high quality planting material that is true to type.

**Victorian Strawberry Runner Certification Scheme**  
**Australian Strawberry Propagators Accreditation Authority**



# Australian certified strawberry runners



AVR maintain strawberry nucleus plants and undertake annual testing

\*BS19000 High health pre-commercial propagation material for Australian strawberry growers (AVR)

Pathogen	Detection method			
	Visual inspection <sup>1</sup>	Culturing	Biological <sup>2</sup>	Molecular
<b>Virus</b>				
Beet pseudo-yellows crinivirus (BPYV)			GI	RT-PCR
Strawberry crinkle cytorhabdovirus (SCV)			GI	RT-PCR
Strawberry mild yellow edge potexvirus (SMYEV)			GI	RT-PCR
Strawberry mottle sadwavirus (SMoV)			GI	RT-PCR
Strawberry necrotic shock ilarvirus (SNSV)			HI, GI	RT-PCR
Strawberry pallidosis associated crinivirus (SPaV)			GI	RT-PCR
Strawberry vein banding caulimovirus (SVBV)			GI	PCR
Tobacco streak ilarvirus (TSV)			HI	RT-PCR
<b>Bacteria</b>				
<i>Xanthomonas fragariae</i> <sup>3</sup>	Yes	Yes		PCR
Rickettsia-like-organism	Yes			PCR
Phytoplasmas	Yes			PCR
<b>Fungi</b>				
<i>Colletotrichum</i> species	Yes	Yes		
<i>Gnomonia comari</i>	Yes	Yes		
<i>Phytophthora</i> sp. including <i>P. fragariae</i> f.sp. <i>fragariae</i> <sup>3</sup>	Yes	Yes	Bait	PCR
<i>Verticillium dahliae</i>	Yes	Yes		

<sup>1</sup>Follow-up testing as required

<sup>2</sup>GI – graft indexing; HI – Herbaceous indexing

<sup>3</sup>Not present in Australia

# Nucleus introductions and testing

**Recommended procedure for pathogen testing of strawberry pre-nucleus and nucleus plants**

Stage	Test requirement
Pre-nucleus stock under quarantine or locally sourced*	Two seasons of testing (Visual, culturing, biological and/or molecular)
Indexing by 3-4 rounds negative tests.	
Annual indexing of the nucleus mother plants	Every year (Visual, culturing, biological and/or molecular)

\* Heat therapy for pathogen eradication as required

# AVR current research activities

**MT17006** Improving preparedness of the Australian horticultural sector to the threat potentially posed by *Xylella fastidiosa* (a severe biosecurity risk) (Hort Innov.)

**WA2001** *Xylella* insect vectors (Wine Aus)

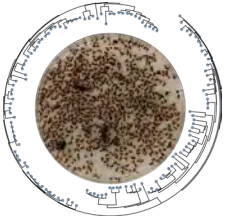
**MT18005** – Improving plant industry access to new genetics through faster and more accurate diagnostics using Next Generation Sequencing (NGS) (Hort Innov.)

- Led by QUT, AVR lead bacteriology
- Adoption of high throughput sequencing for viruses of *Prunus*, *Rubus* and *Fragaria* by December 2022

**RRD4P** – Boosting Diagnostics (GRDC)

- Spotted wing drosophila surveillance - metabarcoding
- Diagnostics surge capacity for grapevine red blotch virus and *Xanthomonas fragariae*
- *Fusarium*, nematodes diagnostics capability

**Food safety traceability in horticulture (AgVic)**



# Future research needs to support biosecurity

- Adoption of high throughput sequencing as a diagnostic tool to support certification
- Baseline the presence of pathogens to support diagnostic outcomes for PEQ and certification testing and disease management
- In-field pathogen surveillance tools to support certification and disease management
- Improved understanding of vectors and vector ecology (viruses, phytoplasmas, rickettsias) for management

# Acknowledgements

- Agriculture Victoria
  - Microbiology team, Crop Hygiene, Crop Health Services
- QDAF
- Hort Innovation
- Strawberry Industry