Improved postharvest market access treatments for horticultural commodities (3097)

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The disruption to trade caused by quarantine pests and diseases is a significant issue for Australian and New Zealand (NZ) horticulture. There is an urgent need to review and improve the current disinfestation methods to develop new export protocols that are effective, economic and safe to use.

The project team consisting of researchers from across Australia and NZ has reviewed all the published and unpublished phytosanitary research conducted against these pests. The draft review document is almost complete and the team is currently preparing recommendations for future research priorities. Information has also been collated on the pests of quarantine importance, the current phytosanitary requirements, Market Access protocols currently available, economic and physical aspects of the NZ and Australian fresh fruit and vegetable industries, and quarantine security statistics.

The review will be presented at workshops with stakeholders in Brisbane and Auckland in September to develop research priorities for developing new disinfestation protocols for fruit and vegetables.

The second phase of the process will then investigate selected endpoint combination treatments most likely to deliver the required efficacy, while maintaining product quality. The ultimate aim is to develop new effective postharvest disinfestation protocols targeting both internal pests (e.g. fruit flies and codling moth) and surface pests (e.g. mealybugs and mites) to safeguard international trade for Australian and NZ horticulture.

Presenting author's biography

Pauline Wyatt is a Senior Research Scientist in the Department of Agriculture and Fisheries, where she has been working on Market Access research for over 20 years. Pauline has conducted disinfestation research against multiple fruit fly species on a range of horticultural commodities including mango, citrus, nectarines, peaches, capsicums, tomatoes and melons utilizing vapour heat, cold storage, insecticide dips and sprays and methyl bromide fumigation. Pauline has also conducted research on developing an on-farm systems approach for the control of citrus black spot in mandarins and has conducted training workshops in Vietnam in many aspects of disinfestation research as part of AusAID and ACIAR projects.

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Session One: Better management of established pests

Presentation title: Improved postharvest market access treatments for horticultural commodities

Presenter: Pauline Wyatt

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PBCRC3097 Improved postharvest market access treatments for horticultural commodities

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Problem being addressed

- The disruption to the trade of Australian and New Zealand horticulture caused by quarantine pests and diseases



Q fly

Medfly

- A review of disinfestation methods, research and protocols
- To develop new export protocols that are effective, economic and safe to use

Problem being addressed

- Need to review all the published and unpublished phytosanitary research
- Researchers across Australia and NZ who have conducted the research:

Team Member	Organisation	Speciality
Lisa Jamieson Allan Woolf	**Project Leader** PFRNZ	Entomology Physiology
Pauline Wyatt Peter Leach	DAF, QLD	Entomology
John Golding Andrew Jessup	NSW DPI	Physiology Entomology
Francis De Lima	WA Consultant	Entomology
Jack Armstrong	Quarantine Scientific	Entomology

Results so far

- A review of disinfestation options:
  - Fumigants
    - 15 major, 18 minor fumigants, methyl bromide
  - Energy treatments
    - irradiation, electrical, microwave, radio frequency, pulsed electrical field, infrared, cold plasma
  - Controlled atmosphere
    - CATTS, CA plus cold, CA plus high pressure
  - Physical
    - heat, cold, pressure, vacuum, brushing, high pressure washing
  - Systems approaches

Results so far

- A review of published and unpublished disinfestation research data in Australia and New Zealand
  - Species
  - Lifestage
  - Treatment conditions
  - Number of insects tested
  - Commodity
  - Reference
  - Protocol





Results so far

APPENDIX 14. AUSTRALIAN LARGE SCALE FRUIT FLY COLD STUDIES

Pest	Life stage tested	Temp (°C)	Exposure (days)	Large scale trial results (total number of insects treated with zero survivors	Commodity	Reference	Notes
Mediterranean fruit fly	Eggs	0.5	14	48300 (4 trials)	Apple 'Granny Smith'	Sproul 1976	Japan MAFF protocol 3 x >10 000
	Young larvae L1+L2			88700 (7 trials)	Apple 'Granny Smith'		
	Old larvae L3			59500 (5 trials)			
Mediterranean fruit fly	eggs	1.5	16	46800 (3 trials)	Apple 'Granny Smith'	Sproul 1976	Japan MAFF protocol 3 x >10 000

Species	Lifestage	Treatment	No tested	Commodity	Reference	Protocol
Medfly	First instar	1°C 16 days	84,560	Table grapes Red Globe	De Lima et al 2011	Japan MAFF
Medfly	First instar	2°C 18 days	78,859			
Qfly	First instar	1°C 12 days	66,739	Table grapes Red Globe	De Lima et al 2011	Japan MAFF
Qfly	First instar	2°C 14 days	53,136			

Queensland fruit fly							Japan MAFF protocol 3 x >10 000
	L1	3	12	124019 (3 trials)	Pear cv Packham		
	L1	1	12	134967 (3 trials)	Pear cv Williams		
	L1	3	12	57252 (3 trials)	Pear cv Williams		
	L1	1	12	91834 (3 trials)	Nashi cv Hosui		
				56294 (3 trials)	Nashi cv Hosui		
Queensland fruit fly	L3	1	12	43601 (3 trials)	Nashi cv Nijisseiki	Leach et al 2010	Japan MAFF protocol 3 x >10 000
	L3	3	12	48067 (3 trials)	Nashi cv Nijisseiki		

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Results so far

- Collated data on New Zealand and Australian fresh fruit and vegetable industries:
  - Volume and value of New Zealand and Australian fresh fruit and vegetable industries
  - Volume and value of major export markets
  - Current phytosanitary requirements
  - Existing export protocols



Results so far

Table 2. Australian export values ($million, fob) for fresh horticultural exports in 2013/2014 and their markets, market access pests, issues and approved phytosanitary treatments.

Crop	Total Export value and Volume	Value of major markets	Market access pests	Approved treatments
Citrus Orange	$140.0 million 134,448 t	Japan 34.0 Hong Kong 27.6 US 16.2 China 14.4 Malaysia 11.4 Singapore 8.8 Canada 5.1 Indonesia 3.6 UAE 2.1	**Japan**: Qfly, Medfly **China:** Fruit flies **Thailand:** Fuller's rose beetle, fruit flies **US:** Fruit flies, LBAM, CBS	Indonesia: 1. Fruit fly free areas recognised: Riverland, South Australia and Tasmania. 2. Cold treatments: onshore or in-transit at or below 2°C for 16 days; or at or below 3°C for 18 days. 3. Irradiation at 150 gray. 4. Fumigation with methyl bromide at 64g/m^3 at 21°C for 2 h. China: 1. Citrus spp, Oranges, Mandarins, Lemons, Grapefruit, Limes, Tangelo. 2.Mandatory cold disinfestation treatment is required, onshore or in- transit 1°C or below for 16 d or 2.1°C or below for 21 d.

- Lemons: 3°C for 14 d.
- All other citrus: 0°C for 13 d or 0.56°C for 14 d or 1.11°C for 18 d or 1.67°C for 20 d or

Who will directly benefit from the research?

- Horticultural industries who need to maintain or gain additional market access
- We can see:
  - WHAT the industry is exporting
  - To WHERE
  - Pests and diseases of concern
  - WHICH protocols exist
  - WHICH protocols are being used, or NOT
- BUT WHY NOT?

Challenges and issues arising from the research

- Consult with industry
- Determine priorities for new disinfestation research
- Source funding
- Develop improved market access treatments

Impact delivery plan

- Review will be presented at workshops with stakeholders in Australia and New Zealand in September 2015

- Phase 2 – Research and development of selected disinfestation treatments

The End-User Advocate's perspective

- A high quality evaluation of postharvest market access treatments
- Industry may have to rely less on true fumigants and more on alternate methods of pest control in the future
- Now a good opportunity to develop new export protocols for key pests of quarantine concern as the 2nd phase of the project
- New export protocols will need to be cost effective, safe to use and acceptable to our trading partners

Thank you

- For more information, please email

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