Hort Innovation

Final Report

VegNET WA

Project leader:

John Shannon

Delivery partner:

Vegetables WA

Project code:

VG18003

Project:

VegNET WA VG18003 CON-001723

Disclaimer:

Horticulture Innovation Australia Limited (Hort Innovation) makes no representations and expressly disclaims all warranties (to the extent permitted by law) about the accuracy, completeness, or currency of information in this Final Report.

Users of this Final Report should take independent action to confirm any information in this Final Report before relying on that information in any way.

Reliance on any information provided by Hort Innovation is entirely at your own risk. Hort Innovation is not responsible for, and will not be liable for, any loss, damage, claim, expense, cost (including legal costs) or other liability arising in any way (including from Hort Innovation or any other person's negligence or otherwise) from your use or non-use of the Final Report or from reliance on information contained in the Final Report or that Hort Innovation provides to you by any other means.

Funding statement:

This project has been funded by Hort Innovation, using the Vegetable research and development levy and contributions from the Australian Government. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

Publishing details:

ISBN 978 0 7341 4637 3

Published and distributed by: Hort Innovation

Level 7
141 Walker Street
North Sydney NSW 2060

Telephone: (02) 8295 2300

www.horticulture.com.au

© Copyright 2020 Horticulture Innovation Australia

Content

Content 3

Summary 4

Public summary Error! Bookmark not defined.

Keywords 4

Introduction 5

Methodology 6

Outputs 7

Outcomes 8

Monitoring and evaluation 9

Recommendations 10

Refereed scientific publications 11

References 11

Intellectual property, commercialisation and confidentiality 11

Acknowledgements Error! Bookmark not defined.

Appendices 12

Summary

The primary objective of the VegNET Program is to facilitate the uptake of levy funded R&D among levy paying growers. vegetablesWA, as a Western Australian regional service provider will engage with growers according to the current methodology and workplan to facilitate the extension of levy funded research

Core objectives of the WA delivery of this program are:

- To deliver regional capacity building service to the vegetable industry in Western Australia
- To increase knowledge of vegetable R&D program and facilitate the adoption of R&D by vegetable businesses in Western Australia
- To engage with the overarching national VegNET program
- To engage with the Vegetable Industry Communications Program
- To contribute to Outcome 5 of the Vegetable Strategic Investment Plan 2017-2021

The VegNET WA program will link with current R&D Projects to assist with grower engagement. This approach has the ability to facilitate shared learning and a collaborative approach to capacity building and the adoption of R&D and continue relationships built over the last 3 years of VegNET phase 1.

The key activities within this project will be:

- Engage growers through regular contact with vegetablesWA grower base
- Extension and R&D outputs as detailed in the RFP and other information to WA vegetable growers
- A Regional Stakeholder event to assist with the VegNET 2 strategy
- A regional R&D forum to support the extension and communication of the vegetable R&D Program
  Regular updates to growers and industry through industry communications (regional and national) to increase awareness of levy funded R&D projects and outputs

Keywords

TPP; cover crop; tomatoes; water; Biosecurity; Extension Officer; Vietnamese growers; extension workshops

Introduction

The vegetable industry annually invests significantly in Research and Development (R&D) to help create and drive a sustainable and profitable industry. Core to effective R&D is effective extension; the industry has historically invested in extension through a range of different programs, most recently through VegNET Phase 1.

The purpose of the VegNET program (VG18003) is to build upon VegNET Phase 1 and increase the reach of the Vegetable R&D program including enhancing the adoption of R&D outcomes. This program will be utilising the established VegNET brand and will have delivery tailored to regional needs. The VegNET program will also promote industry training needs and approaches to highlight programs available to growers.

vegetablesWA is the peak industry body for vegetable growers in Western Australia, representing approximately 900+ levy paying growers. Western Australia has a vegetable production value of $385M. vegetablesWA have been providing relevant services to vegetable growers in Western Australia for over 70 years. Throughout that time, vegetablesWA has created well-established networks across industry, including industry bodies (state and national), state and federal government, R&D providers and individual growers.

In the past seven years, vegetablesWA has managed $12.3 million of project funds - with delivery focused both in Western Australia and nationally. vegetablesWA's core service offering to growers has been extension both in terms of businesses development and farm productivity. vegetablesWA has significant experience delivering extension, with a minimum of one full time extension role existing in the association for over 30 years. vegetablesWA currently offers extension services in both English and Vietnamese across farm productivity, business development, export and quality assurance.

VegNET Phase 1 highlighted adoption and practice changes among growers. For example, Su Tran in Carnarvon, a Vietnamese speaking grower utilised the LOTE services of vegetablesWA, Truyen Vo. Su Tran has learnt and benefited from using different soil moisture monitoring devices. Over the years, Su has learnt to understand the soil moisture dynamic and to combine different tools to assist his irrigation decisions. Although the hardware used for soil moisture monitoring is complex compared to the tensiometer, proper training and demonstration along with consultation with a specialist made it easy for the LOTE grower to understand and use.

As a further example, a Gingin grower utilised an innovative machine to change the way they spread Metham Sodium making it safer and easier for the grower and the *staff*. The remote-controlled harvester, that can cut whole head cos as well as the baby leaf, is an impressive piece of machinery. It also undertakes the massive dual job bed former/ rotary hoe hybrid. However, it was the 3-in-1smudger that really is the most innovative. As the tractor moves along at around 9km/h, a hectare can be fumigated in under 10 minutes. With the beds formed, fumigated and sealed with one machine in under 10 minutes, irrigation can be applied to activate the chemical reaction with little to no leaching. During application, spray drift by atmospheric and temperature inversion is virtually eliminated, keeping the chemical within the target area. This piece of innovation was highlighted in the vegetablesWA Grower Tour in 2017. Almost all growers who participated in a Grower Group Tour indicated gains in knowledge and skills in the areas of irrigation and processing with a number indicating their likelihood in making on-farm changes as a result.

In addition to the 2 specific examples there have been a number of broader practice change and adoption from all growers, they seek regular assistance from Industry Extension Officers on research projects. When linking with other projects such as Cover Crops for Weed Suppression or Precision Agriculture, the Industry Extension officers are able to engage the vegetable growers and have them attend workshops or organise on farm visits or tours to help progress other projects and their aims of practice change with vegetable growers.

With over 605 ES separate contacts and 324 VN contacts including telephone, email and in person and via of Facebook interactions on the closed Facebook groups; English Group www.facebook.com/groups/1641522495930877/ and Vietnamese Group www.facebook.com/groups/1837088353264524/. In line with the M&E requirements, all communications with growers have been recorded in Tall Emu (CRM).

Methodology

vegetablesWA provided the following resources to the project; Vietnamese Industry Development Officer-Truyen Vo, Industry Development Officer (English) - Samantha Grubisa and as of 16th September 2019, Project Manager-Karen Raybould. A workplan was developed and approved outlining project activities to be delivered during the project lifetime, this was implemented at the commencement of the project.

This project will:

- Assist current R&D projects to enhance regional input or engagement, vegetablesWA is currently liaising with all projects listed in the RFQ.
- Assist with the development of a VegNET2 strategy stakeholder event in regional WA.
- Conduct a Regional R&D forum to highlight R&D projects to support the extension and communication of the Vegetable R&D program.
- Promote industry training and capability building opportunities
- Have at least 1 team member attend Hort Connections, APEN conference and VegNET team teleconference.

The project will also:

- provide feedback and other information to Hort Innovation on issues and opportunities facing industry
- support Hort Innovation in achieving its objectives and strategies as required
- support Hort Innovation in achieving the industry's R&D objectives and strategies
- support Hort Innovation membership processes.

The project communicated outcomes with growers using a range of media. These included a weekly e-news, monthly podcasts, quarterly WA Grower magazine, webinars, a series of workshops across the regions and face to face discussions. vegetablesWA also facilitated grower contact with other sources of technical expertise and potential commercial partners in either the supply of inputs or then onto the value chain via webinar or podcasts.

The regional R&D forum will link with the vegetablesWA Industry Summit which has been running for 4 years and has gained significant traction with growers and stakeholders doubling in size over the years. The program is designed to allow the extension of the R&D program to assist growers and stakeholders network with those who they may not usually. There will be a grower tour to Gingin for growers of all regions to see a grower who has been established in the industry for a number of years and extend R&D and technology. The industry summit will have a panel for each section of 2 members with 150 growers and industry stakeholders to attend with a networking function.

Different growers have different communication needs and preferences for learning about and adopting ideas. Some who are relatively proactive may only need reference to information such as through the e-news. Others may need more detailed information as provided through articles in a magazine or by taking part in a webinar or listening to a podcast whilst on a tractor. Others will need discussion about the concepts as provided through workshops, facilitated learning groups and face to face. These methods, when provided in both Vietnamese and English, have proven successful in reaching the Western Australian grower audience over many years.

vegetablesWA is open to improving methodology through continuous learning and engagement with other regional service providers. This project will ensure that regional delivery projects are up to date with new R&D projects, project process, new R&D outputs and outcomes, upcoming events and national communications. The R&D projects as specified in the RFQ vegetablesWA has been liaising with in the previous VegNET project and will continue in this phase.

vegetablesWA will ensure a minimum of one team member will be available to attend Hort Connections, APEN conference and attend project meetings. Two team members will attend a face-to-face meeting at Hort Connections and further teleconferences as required. These meetings will provide an

opportunity for each project to share learning's, their approach to capacity building, successes and also to receive training in areas such as extension strategies and monitoring and evaluation.

All activities undertaken by the regional capacity building projects will comply with the conditions as set out in the RFQ. Activities will comply with Schedule 1 - Research and development activities. The regional capacity building project will not undertake association business or participate in agripolitical or marketing activities.

Outputs

The project commenced on 1st July 2019. The WA project team attended the VegNET teleconferences on 11/7/2019 & 30/7/19 and commenced finalisation of the VegNET2 strategy meeting with the consultants engaged to develop the R&D strategy. The 5th September 2019 was the launch of the strategy, 26 contacts attended as well as 15 growers and stakeholders.

The workshops undertaken during the initial period were:

Pest & Diseases with linkages to the Area Wide Management project VG16086, and

Biosecurity with the new look Plant Health Website for Farm Biosecurity.

A total of 12 English and Vietnamese speaking growers attended.

Following on from the VegNET 2 strategy consultation, a meeting took place on the 4th September 2019 in WA, a Summary Report compiled from all meetings that took place across the states outlined recommendations to improve the provision of R&D activities within the vegNET project going forward, a key criticism was the lack of communication and Hort Innovation brand awareness in relation to the funding of the vegNET project. The final report was published late 2019, at which time it was recommended that the project be solely managed by Hort Innovation delivering extension services regionally across Australia.

Further workshops undertaken for resistant and tolerant seed varieties of plants. With 21 attendees both English and Vietnamese including growers, members from the Carnarvon Growers Association, staff from the Department of Primary Industry and Regional Development and seeds sales representatives.

On the 17th October 2019 staff hosted the Export Facilitators workshop training, VG16085, supported by staff from AusVEG, the day included a trip to an air freight forwarder at Perth Airport, with a number of presentations from growers who are currently exporting sharing their knowledge and experience with the group. Tony Corlotti, Brookrise Farms, kindly hosted the Growers Tour, approximately 15 growers took the opportunity to look around Tony's farm at ; the cooling system installed by Agile 8, Matt Dear displaying some of their new machines, improving efficiency and costs and Landmark showcased the benefits of drones on the farm. Then on the 18th October 2019, vegWA hosted the regional R&D forum at the Crown Towers Ballroom in Perth. The Minister, Alannah McTernan opened the conference, which was then followed by a number of presentations including the vegWA project, VG1700 Benchmarking Bryn Edwards and Paul Omedi demonstrating the benefits that Year 2 data was now showing to those growers who had taken part in the project. Dr Kelvin Montagu presented on strip tillage (cover crop research project) which generated an active discussion with growers attending, and a request for a further workshop to take place (booked for 2020).

with over 110 people in attendance over 60 were growers. We are looking for attendance of 150 stakeholders with a minimum of 60 being growers. Included in the presentations for the day were Year 2 Benchmarking results VG1700, and a presentation from

Feedback from the events was very positive, good representation from growers, industry stakeholders and sponsors made for a very interesting 2 days.

Two further Hort. Innovation projects were featured at the event- the export (facilitators) workshop, with a presentation from the benchmarking project lead on the results of the data collated and the benefits the data can offer growers going forward.

All KPI workshops were completed this was done during Milestone 103 reporting period. IEOs continued to work on the regional management of viral and bacterial diseases and soil borne diseases; working directly with growers assisting them in the management of biosecurity procedures onsite. IEOs have found TPP growing on chili plants during the winter period preventative advice and guidance was

provided to growers.

A Notifiable Diseases and YOU tube webinar were developed having been cleared by the state pathologist for 2020, a biosecurity and Freshcare V4.1 webinar was also completed.

VegWA provided the funding for two staff to attend Hort Connections in 2019; Truyen Vo presented at the APEN conference in September 2019;

'*Overcoming language barriers to successful adoption with agricultural innovation: a multiple-case study of successful adoption knowledge-based technologies by Vietnamese Australian vegetables growers in Western Australia."*

Truyen was also invited to attend the APEN conference in Darwin in March 2020 to provide translation support to a Vietnamese grower attending.

Over the Christmas period the IEOs conducted a water assessment in North Perth and collected the last Melon samples for testing from Carnarvon.

6 Workshops had been booked in for delivery around the state from March 2020 to April 2020, all speakers had confirmed with venues booked, unfortunately these were cancelled due to the COVID19 Emergency Incident.

Outcomes

Effective linkages have been established with the other regional capacity building projects, the project team in WA has continued to reach out to projects within the vegetable R&D program and other sectors of the value chain. For example, we have been involved in setting up a Field Day with UNE from VG16086 with 42 attendees in Myalup. The discussion on using cover crops for weed suppression was significant with over 50% of growers looking at implementing this on their own properties. Other project linkages through Ausveg and the TPP and Biosecurity projects have been undertaken with visits to Geraldton and Carnarvon, this was facilitated by Truyen Vo with the agrichemical portion of the Geraldton workshop producing a table which detailed the area's issues and what chemicals could be utilised to assist. This has since been distributed to other regions within WA, specifically Wanneroo with a pest and disease workshop on 24th July 2019.

On the 14th November 2019 vegWA took part in the national vegNET teleconference. The final samples of Rock Melon were collected in Carnarvon which concludes the support given to this project at this time, during this visit from 19/11/19-22/11/19 there was an additional 5 Grower checks conducted, translation services for a TPP and Labour Scheme workshop were also provided. Tomato samples were taken in Carnarvon which showed signs of Tomato spot virus, these require a more powerful tool for testing, results were positive.

IEO articles were submitted for the Summer, Spring, Autumn and Winter editions of the WA Grower magazine including translations, coordination of information for articles in the WA Grower magazine, articles are included as an appendix (issues can be seen online here http://www.vegetableswa.com.au/wa-growers-magazine).

IEOs continue to contact growers via phone calls, face to face and emails to promote and inform regarding R&D workshops, information and enquiries. Additional activities of the IEO's have been the provision of information for the weekly e-news, monthly podcasts, webinars and the WA Growers magazine which are included in appendixes.

The spreadsheet showing the number of Regional R&D forums carried out by the IEOs, their activities and involvement in the delivery of the R&D workshops alongside other vegWA projects that were also being delivered is included as an appendix.

The IEO's have continued stakeholder engagements and contacting growers to gain an understanding of needs, disseminate R&D findings and/or assist with solving issues. This contact has been by telephone, email or in person. We have had several workshops which have taken place along with grower meetings throughout WA and in all regions with the team to cover a range of topics including TPP, Biosecurity and Benchmarking. The facility for project staff to work across different projects also enabled the team to work together to address complex and challenging issues being faced by the growers, M&E requirements have been implemented with regards to these communications and

outcomes with growers through Tall Emu (CRM) and grower feature articles in the WA Grower magazine, we also had a grower take part in the Great Australian Plate showcasing the vegetables he grew on his farm.

Monitoring and evaluation

The project successfully achieved the desired outcomes by increasing knowledge of the national R&D system and outputs amongst all levy paying growers and enhanced the adoption of improved production or business management practices. The project allowed for the extension of research and development outputs to be regularly and effectively communicated to vegetables growers, thus increasing the knowledge of the national R&D system and outputs amongst growers.

Effective management of the extension officer's performance in the project ensured driving their service toward matching it to the industry interest in general and the project objectives in particular.

The extension officers made excellent contributions by applying appropriate methods to approach the problem and to plan and to implement activities in isolation or in collaboration with other industry partners this is critical to ensure the project success. This helped to successfully develop trust and maintain relationships between targeted growers and other industry partners. Essential to the project were the delivery of workshops and the Regional Forum held over 2 days during this period. Extension services have provided access to growers and supported over 17 different R&D projects; a list of those projects is included in a table in the appendixes. The table below lists the workshops and events undertaken over the last 12months by extension services and other stakeholders.

Workshops undertaken -2019/2020

Event	Location	Date	R&D Activity
Workshop	Geraldoton	9/02/2019	Ausveg Agrichemical Meeting (see appendixes)
Workshop	Manjimup	16/04/2019	Cover Crop
Workshop	Manjimup	17/04/2019	Bio Security QA, Benchmarking VG1700
Workshop	Manjimup	8/05/2019	Bugs & Bio security
Workshop	Myalup	9/05/2019	Bugs & Bio security
UNE Field Day	Myalup	20/06/2019	Weed Field day Trial
Workshop	Wanneroo	24/07	Bugs & Bio security
Workshop x3	Canarvon	5-9/08/2019	Melon Project Bugs & Bio "Disease Resistant Seed Varieties" Benchmarking VG1700
Workshop	Manjimup	13/03/2020	Precision Ag

Workshops provide a great condition for growers to comfortably join the innovation transfer process, it is also a valuable platform for two-way flow of information to be transferred. Without the two-way flow of information, the technology transfer might have not happened or happened with low level of effect, consequently no innovation adoption.

The UNE Field day held in 2019 involved collaboration and engagement with Seed companies, growers and

agents, the event was very successful with a high turnout for the event from all stakeholders.

Truyen Vo, our Vietnamese Extension Officer was invited to present at the APEN conference in 2019 which was also attended by other extension staff and vegetavlesWA staff, Truyen also developed and gave a presentation in Vietnamese during the trip to Carnarvon, copies of all presentations are included in the appendixes.

Having extensive knowledge on the attitudes and practices of the growers along with the knowledge on the innovation system where growers and other industry partners coexist has helped the extension officers effectively facilitate interactive learning among them. The interactive learning is a precondition of information share, of better understanding, and of the changes and how they can be successfully introduced and managed by the growers, as demonstrated through the 4 case Studies completed (copies of which are included in the appendices), case studies conducted were;

- **Case Study - Adopting soil moisture monitoring innovation to fine-tune irrigation practices a Carnarvon grower experience.**
  Vo The Truyen – Vietnamese Field Extension Officer, VegetablesWA.
- **20 years of profitable bio-dynamic farming.** *Sam Grubisa – Extension Officer, VegetablesWA*
- **Agrimaster.** *Sam Grubisa – Extension Officer, VegetablesWA*
- **Using machinery to spread methan sodium.** *Sam Grubisa – Extension Officer, VegetablesWA*
- Better performance of the extension service for a better chance for the introduced innovation to be adopted.

Recommendations

Utilising the extensive experience of the Extension team the following recommendations have been identified and submitted for consideration for future service delivery.

1.vegetables WA to retain the Regional Extension Officer - vegNET project ensuring that WA levy paying growers receive representation and have a voice to advocate change and growth within the industry. The association has earnt the respect and confidence of growers over the last 70 years as we continue to promote and engage with R&D projects providing innovative solutions to improve vegetable quality to markets.

2.Longer term training and development of Extension Officers to ensure consistency of service provision.

3.Delivery of R&D workshops are clustered and sporadic, growers have to be selective in what they chose to attend to ensure they get pick the right R&D projects to support their business. R&D project participation should be equitable between the states.

4.Better use of technology to provide access by growers to R&D Project Leads to address issues – i.e. Monthly Q&A sessions.

5.Conferences should be held in cities in rotation around Australia.

6.More work to take place around sustainability

7. Development opportunity for Extension Officers to take part in an exchange program allowing them to deliver extension services in different states- build networks and grow industry knowledge through understanding the different environmental and geographical impacts and issues facing vegetable growers around Australia.

8. Feedback from growers in WA strongly supports the provision of these role as a means of obtaining ongoing support that provides them with support and a conduit to R&D engagement, especially from any commercial imperatives on which other information providers are reliant and may compromise the perceived integrity of their assistance. Growers prefer to receive information in different forms; however, the overwhelming feedback indicates that face-to-face interaction using is the most preferred method for a great portion of the grower community, especially with the Vietnamese growers.

9. As such, the Extension Officers role is seen by the Western Australian vegetable industry as well as the other entities such as governmental Research and development projects and organisations and the private services as an extremely valuable asset. This service does not only benefit this grower group but the vegetables industry as a whole.

Refereed scientific publications

Publications have been included in the WA Grower Magazine, refer to appendixes

References

Refer to appendixes

Intellectual property, commercialisation and confidentiality

if the status of the project changed in the reporting period with respect to project intellectual property (IP), commercialisation and confidentiality, provide details of any developments or issues (including royalties, patents, trademarks and domain names) that have arisen including a detailed summary of all project IP using Hort Innovation's Intellectual Property Register and the respective management of project IP and/or project outputs. Enter 'No project IP, project outputs, commercialisation or confidentiality issues to report' if there are none to report>

Appendices:

1. vegNET WA Workplan
2. Stakeholder Matrix
3. Program Logic
4. Monitoring & Evaluation
5. Regional R&D Forum
6. Regional Summary Extension Strategy
7. Autumn WA Grower Magazine article list
8. Winter WA Grower Magazine article List
9. Spring WA Grower Magazine article List
10. Summer WA Grower Magazine List
11. Autumn WA Grower Magazine
12. Spring WA Grower Magazine
13. Summer WA Grower Magazine
14. Winter WA Grower Magazine
15. E News vegetablesWA
16. E new vegetablesWA
17. Wanneroo Information Session
18. Carnarvon Travel report – TPP and Tomatoes'
19. Carnarvon information Session
20. Industry Grower Tour
21. Industry Summit booklet
22. Truyen Vo APEN presentation
23. Truyen vWA Resistant seeds Presentation August 2019 Carnarvon_
24. Case Study Using soil moisture probes to fine tune irrigation practices
25. Case Study Vegnet CS (Dugite Farm)
26. Case Study Vegnet CS (Glavocich Produce)
27. Case Study Vegnet CS (Sativa Farm)
28. Vietnmese Translated article WA Geower Hiểu biết độ pH đất và ảnh hưởng của pH đất đến canh tác rau màu
29. Vietnamese Translated article Ngành Rau quả chuẩn bị đối phó tac động của vi rut cổna
30. Bugs and Biosecurity Manji 080519
31. Grower Tour 2019
32. Grower Tour 2019
33. Truyen running Ausveg Agrichemical meeting with growers Geraldton
34. Summit 2019 1
35. Summit 2019 2

WORKPLAN 1 Jul 2019- 31 Mar 2020							
Objective	**Activity** *(Examples provided…)*	**Who**	**Where**	**When**	**How**	**KPI/Target**	**Progress**
Project delivery & governance	• Milestone reports • Verbal progress report to Hort Innovation • VegNET team meeting participation •	Sam Grubiša Rebecca Blackman Sam Grubiša	 As Required	 As Required As Required	Written submission Teleconference Video Call	Project Progress Project Progress Team engagement info transfer	102 completed 27/ 103 Milestone competed 4/10/19 VegNET teleconference 11/07/19 30/07/19 14/11/19
Project evaluation	• Event participation levels • Event feedback forms which assess impact and intent to change practice • Adoption case studies • Record of one-on one grower visit impacts/follow up •	Sam Grubiša Sam Grubiša Sam Grubiša CRM	Applicable events WA Grower / AUSVEG Mag VWA System	As Required As Required As Required	Handouts or post event emails Report / Article CRM records	M&E info Adoption of info Grower engagement info	GGT and Summit feedback forms 4 Case studies completed
Support development of Vege Extension Strategy	• Provide regional contacts to VG18003 for consultations • Regional stakeholder event/s •	Sam Grubiša Sam Grubiša	WA WA Workshops	As Required As Required	Email / Phone details Email / Phone / F2F invites	Strategy Support Strategy Support	The final list has been approved 04/09/19 VegNET Strategy meeting
Extension design	• Engage with VegNET team to share and collaborate in the development of extension resources • Engage with Hort Innovation R&D projects to access the latest R&D outputs • Engage with Hort Innovation events	Sam Grubiša Sam Grubiša Sam Grubiša	Email / Phone / Team meeting Email / Phone / F2F meeting WA	As Required As Required As Required	Email / Phone / F2F Email / Phone / F2F Event attendance	Resource Development R&D Extension Resource Development	Field Tour and Workshop Geraldton - linked with HI project VG16060 UNE Field Day 20/6/19 DPIRD WA team VG16086 R&D. 24/07/19 Pest, Disease and Freshcare workshop.

	happening in your area to look for synergies •						PHA Farm Biosecurity website run through 05-09/08/19 Assist with Melon Project information dissemination during Carnarvon tour AHR – Practical Guide to SBD Identification Precision Ag workshops Jan 2020 Gingin and Manjimup AUSVEG VLM / TPP / Biosecurity workshops Mar 2020 Carnarvon, Geraldton, Wanneroo SWICP SBD workshop Feb/Mar 2020 Manjimup Freshcare upgrade workshop 2020
Extension delivery	• Regional R&D Forum • Events (e.g. workshops, field walks, demo sites, shed meetings) • Fact Sheets • Webinars • Articles/publications • Videos/podcasts •	Sam Grubiša	WA	As Required	R&D Extension	Grower engagement and adoption	4/09/19 Regional Extension Strategy Review UNE Field Day 20/06/19 Irrigation system assessment 23/06/19 and 09+23+26/07/19 DPIRD Wanneroo Pest/Disease/ QA workshop 24/07/19 5- 9/08/19 Carnarvon Resistant seed variety/Bio security/Industry report – Benchmarking VG17000,

							Carnarvon melon diseases HORT CONNECT WA – 18/07/19 Gingin event with Citrus WA 16/08/19 1st Birthday Perth 29/08/19 Donnybrook event 18/10/19 HCWA Brunch Burswood VWA Grower Group Tour Field Walk in Gingin with new technology on display. Industry Summit 17-18/10/19, 3 speakers to cover projects which are currently needing extension. In addition, Export workshop is being held to link with Ausveg & Export Facilitators project. R&D Hort Innovation project VG17000 Benchmarking will be featured. With 150 guests for 2pm to 5.30pm and followed by a networking event. Vietnamese & English versions on: Biosecurity Fact Sheet, Pest Monitoring Fact Sheet, Water Testing PH, Melon Bio Security; crop water use, Irrigation and water

							efficiency, Regional management of viral and bacterial diseases and soil borne disease, TPP management WA Grower Article: VegNET (VG18003) IEO Industry update Notifiable Diseases and You Webinar (clearance from CEO and State Pathologist pending), Biosecurity Webinar (AUSVEG inclusion possible), Freshcare V4.1 Webinar
Communication & stakeholder engagement	• Attend Hort Connections 2019 • Attend 2019 APEN conference • Linkages to national communications services (VG15027) • Linkages to Hort Innovation communications services • Linkages to Hort Innovation R&D projects • One-on-one grower visits • eNewsletter • Social media & websites • Build upon contact database •	Sam Grubiša Sam Grubiša Rebecca Blackman Sam Grubiša Rebecca Blackman Sam Grubiša Sam Grubiša VWA Team VWA Team VWA Team	 As required As required As required WA VWA CRM	 As required As required As required Weekly As required	***PRIVATELY FUNDED*** R&D Extension and Grower adoption R&D Extension and Grower Adoption R&D Extension and Grower Adoption Engagement Up to date Grower information	 Information Transfer Information Transfer Information Transfer Information Transfer Grower engagement	TV:Attended APEN conference 10-15/07/19 Presented Innovation adoption by Vietnamese growers in WA TV attended APEN March 2020 Grower visits Gingin, Wanneroo (Planned for early 2020 – Carnarvon, Geraldton, Manjimup awaiting confirmation from project links) - **Workshops cancelled due to COVID19 Pandemic** Precision Ag Workshop Manjimup 13/03/2020

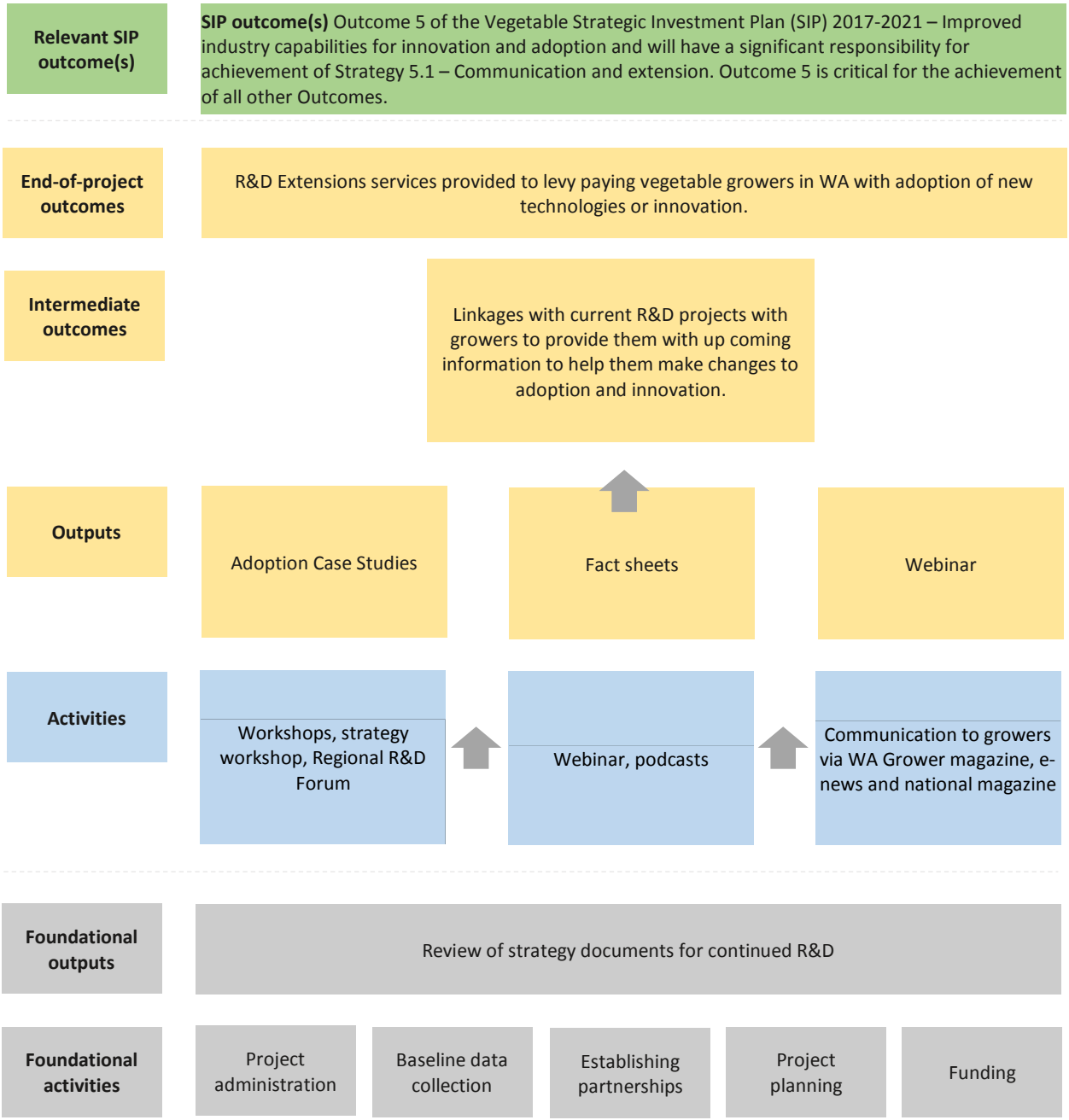
							Grower visits conducted and updated into CRM Access to articles and SM sites via server copies in MS reports

NB – Due to COVID19 Pandemic Workshops due for delivery in March/April 2020 were cancelled, discussions with project leads to arrange Workshop webinars is currently being delveloped.

Stakeholder Matrix

Stakeholders	Relationship					
vegetablesWA						
WA Veg Growers						
APC-VPC						
DAFWA						
Ausveg						
Hort Innovation						
	vegetablesWA	WA Veg Growers	APC-VPC	DPIRD	Ausveg	Hort Innovation

Weight	1	Least
Weight	2	
Weight	3	
Weight	4	
Weight	5	Most


Relevant SIP outcome(s)
SIP outcome(s) Outcome 5 of the Vegetable Strategic Investment Plan (SIP) 2017-2021 – Improved industry capabilities for innovation and adoption and will have a significant responsibility for achievement of Strategy 5.1 – Communication and extension. Outcome 5 is critical for the achievement of all other Outcomes.
End-of-project outcomes
R&D Extensions services provided to levy paying vegetable growers in WA with adoption of new technologies or innovation.
Intermediate outcomes
Linkages with current R&D projects with growers to provide them with up coming information to help them make changes to adoption and innovation.
Outputs
Adoption Case Studies
Fact sheets
Webinar
Activities
Workshops, strategy workshop, Regional R&D Forum
Webinar, podcasts
Communication to growers via WA Grower magazine, e-news and national magazine
Foundational outputs
Review of strategy documents for continued R&D
Foundational activities
Project administration
Baseline data collection
Establishing partnerships
Project planning
Funding

Monitoring & Evaluation – VG18003 VegNET WA

1 Program logic

Figure 1 Logic model for project

- *the **'end-of-project' outcomes** your project expects to achieve enhanced regional engagement with other Hort Innovation R&D projects*
- *the **Strategic Investment Plan (SIP)[1] outcome(s)** your project expects to contribute towards increasing awareness and adoption of existing R&D project outputs and regional engagement*
- *the **activities** and **outputs** the project will deliver a regional R&D forum, VegNET2 Strategy meeting, communications provided to national project, 5 project workshops.*
- *how those activities and outputs are expected to cause the end-of-project outcomes provide growers with engagement and access to R&D project outputs.*

2 Project M&E scope

2.1 Audience

Table 1: M&E audience and their information needs

Audience	Information need
Primary	
Project team	Weekly staff meetings, Fortnightly project meetings, attendance on VegNET team phone calls at 80% attendance
Hort Innovation	Number of workshops undertaken, number of communications provided to WA state industry and National body, Number of content pieces shared with VegNET team.
Secondary	
Agriculture Produce Commission – Vegetable Producers Committee	Fund half of the project in WA – this provides the scope to work on melons, onions, asparagus, tomatoes, garlic.

[1] Strategic Investment Plans (SIPs) are available at http://horticulture.com.au/grower-focus/

2.2 Key evaluation questions

Table 2: Project key evaluation questions

Key evaluation questions	Relevant?	Project-specific questions
Effectiveness		
1. To what extent has the project achieved its expected outcomes?	Yes	To what extent has the project increased the adoption of the industry Best Practice Guidelines? To what extent has the project improved knowledge and awareness of R&D project outputs?
Relevance		
2. How relevant was the project to the needs of intended beneficiaries?	Yes	To what extent has the project met the needs of industry levy payers?
Process appropriateness		
3. How well have intended beneficiaries been engaged in the project?	Yes	To what extent were the target engagement levels of industry levy payers achieved? Have regular project updates been provided through linkage with the industry communication project?

3 Performance expectations, data collection and analysis

Table 3: Project monitoring plan

Logic level	What to monitor	Performance expectation (KPIs) and/or monitoring questions	Data collection – method (e.g. survey) and source (e.g. growers)	Timing of, and responsibility for, data collection
Activities and outputs	Workshops; Publications; Number of growers accessed training/attendance at extension events; Industry development services	Extension participation (number of growers and other stakeholders)	Record keeping & Feedback Surveys (Industry Development Officer)	Ongoing (Industry Development Officer)
Intermediate outcomes	Changes in knowledge, attitudes and skills of growers on a specific R&D project.	Number of growers indicating an increase in knowledge of how and why a best practice should be implemented	Event questionnaire (Growers)	Intermittent Reports (Project Team member)
End-of-project	Uptake and adoption of a specific best practice by	Practice change by a target percentage of	Surveys and case	e.g. At end of project for

outcomes	growers;	production base (and result of that practice change)	studies (Growers)	Final Report (Project Leader)

4 Evaluation

Table 4: Additional evaluation data requirements

KEQ	Data collection requirement	Source and method
To what extent has the project increased the adoption of the industry Best Practice Guidelines? To what extent has the project improved knowledge and awareness of R&D project outputs?	NA	
To what extent has the project met the needs of industry levy payers?	NA	
To what extent were the target engagement levels of industry levy payers achieved? Have regular project updates been provided through linkage with the industry communication project?	NA Milestone reports, weekly project meetings	*vegWA to produce weekly and quarterly reports as outlined in project contract.* *Milestone reports in line with project contract.* *Weekly meetings, 10am every Friday Project Lead, Operations Manager and 2 IEO Officers*

5 Reporting and continuous improvement

Table 5: Project progress reporting

Report type	To whom	Timing
Milestone Reports	Hort Innovation	Quarterly
Final Reports	Hort Innovation	At end of project
Articles	Industry magazine	Quarterly
Case Study	Growers and Hort Innovation	Six months

Project code	Project Title	Project leader	Leader email	Leader Phone	Assistance needed	vWA VegNET involvement
VG15028	Vegetable industry education and training initiative (VegPRO)	Doris Blaesing RMCG	dorisb@rmcg.com.au	0438 546 487	Promoting the use of VegPRO resources- VegWHS and the carrot USB VegInductions course Career Pathways Guide	✓
VG15027 (and VG18000)	National Vegetable Industry Communications Program	Shaun Lindhe AUSVEG	Shaun.lindhe@ausveg.com.au	0405 977 789	Sourcing infoveg/article ideas from you and providing you with a heads up on what the upcoming Infoveg/Magazine content will contain.	✓
VG15070	A strategic approach to weed management for the Australian Vegetable Industry	Paul Kristiansen UNE	Pkristi2@une.edu.au	02 6773 2962		✓
VG16009	Adoption of Precision Systems Technology in Vegetable Production	Ian Layden QDAF	Ian.layden@daf.qld.gov.au	0409 495 737	Project wraps up and there is a strong needs to extend results to industry.	✓
VG16060	Vegetable agrichemical pest management needs and priorities	Patrick Arratia AUSVEG	Patrick.arratia@ausveg.com.au	0418 982 572	17 workshops to get completed by December- will require assistance with regards to best locations and bums on seats VG16060. Plus getting growers to complete the on-line surveys for pest priorities.	✓
VG16061	Vegetable Industry Export Program	Michael Coote AUSVEG	Michael.coote@ausveg.com.au	0416 016 202		✓
VG16062	Field and landscape management to support beneficial arthropods for IPM on vegetable farms	Geoff Gurr Charles Sturt University	ggurr@csu.edu.au	0417 480 375	Article in the upcoming Veg Australia magazine. About to start doing field trials based on their learnings, so if there are growers who are interested in trying to promote beneficials on their land (and grow corn or brassica's) they can get involved.	✓
VG16068	Optimising cover cropping for the Australian vegetable industry	Kelvin Montagu AHR	Kelvin.montagu@gmail.com	0421 138 019		✓

VG16078	Soil Wealth and Integrated Crop Protection- Phase 2	Gordon rogers AHR	gordon@ahr.com.au	0418 517 777	Assistance in promoting the local case and core study sites and VG16078 resources- factsheets, webinars, masterclasses, reviews etc	✓
VG16085	Vegetable Export Facilitators	John Shannon VWA	John.shannon@vegetableswa.com.au	0488 111 526		✓
VG16086	Area wide management of vegetable diseases: Virus and Bacteria	Cherie Gambley QDAF	Cherie.gambley@daf.qld.gov.au	0423 200 211		✓
MT17017	Vegetable Cluster Consumer Insights Program (Nielsen Data)	Chanel Day The Nielsen Company Australia	Chanel.day@nielsen.com	0414 837 119		✓
VG15077	Vegetable industry farm financial survey	José ten Have	johanna.TenHave@agriculture.gov.au	0438 634 516		⊘
LP15006	Attracting new entrants into Australian Horticulture	Gemma Burger Rimfire Resources	GBurger@rimfireresources.com.au	1300 380 701	Encouraging suitable vege businesses to take on an intern	⊘
ST16010	iMapPESTS: Sentinel Surveillance for Agriculture	Shakira Johnson AUSVEG	shakira.johnson@ausveg.com.au	0433 937 564	Soon be deploying newly-designed airborne sampling unit in the field to begin a trial phase	✓
VG16063	The Enviroveg Program	Danielle Park AUSVEG	Danielle.park@ausveg.com.au		Understand what the program is and its benefits to a grower	✓
Advance Production systems, Pollination and Health Nutrition & Food safety Frontiers funds		Alok Kumar Hort Innovation			Key investments and what is in the pipeline. Some of the pollination work is especially relevant – especially for some of the vegetable seed crops	✓
Leadership Frontiers Fund investments		Jane Wightman Hort Innovation				✓

MT16018	National TPP Program Coordinator	Alan Nankivell			To help implement TPP management in WA and to prepare eastern-states Growers	✓
VG17015	Alternative disinfestation for market Access for crops affected by TPP	DPIRD			Exploring disinfestation treatments to support the trade of fresh produce from WA	✓
Melons Aus	CGMMV	Dianne Fullelove			Assisting industry to combat the spread and severity of CGMMV within WA	✓

✓ VG15028 – YES

✓ VG15027 – YES

✓ VG15070 – YES

✓ VG16009 – YES

✓ VG16060 – YES

✓ VG16061 – YES

✓ VG16062 – YES

✓ VG16068 – YES

✓ VG16078 – YES

✓ VG16085 – YES

✓ VG16086 – YES

✓ MT17017 – YES (WA Grower)

⃠ VG15077 – ASK BRYN

⃠ LP15006 – Primary Produce Traineeship

✓ ST16010 – YES (when available)

✓ VG16063 – YES (previous assistance including QAC)

✓ Alok Kumar - YES (when available)

✓ Jane Wightman - YES (when available)

✓ MT16018 – YES (when requested)

✓ VG17015 – YES (when requested)

✓ CGMMV – assisted Melons Aus with contacts in WA, assisted with VM19000 and SP Singh workshops

Extension Strategy for Australian Vegetable Industry
Summary of Regional Meetings

Purpose

The purpose of the meetings was to gain regional input into the development of a national Hort Innovation Strategy for extension into the vegetable industry going forward.

Meetings held

Twelve regional workshops were held in all states:

- Northern Territory (Darwin)
- Queensland (Bowen/Gumlu Bundaberg; SE Qld/Lockyer)
- Victoria (Gippsland; SE Melbourne; SW Melbourne)
- NSW (Sydney; North Coast)
- South Australia (Adelaide)
- WA (Perth)
- Tasmania.

There were approximately 140 participants across these workshops, with about half being growers and the rest comprising of industry representatives including re-sellers; government; grower group members; and the IDOs.

The meetings were facilitated by the consultants undertaking the review – Jeff Coutts (Qld/NT); Sean Kenny (Vic/Tas); and Neels Botha (NSW, SA & WA).

Industry Context

Regions were asked about the current context around the vegetable industry in their region. While there were a range of distinctive regional factors that impacted on extension support, many of the issues were common across most regions.

Regions differed in industry size and type of crops as well as the geographical area that VegNET staff were expected to cover (for example, in North Queensland, the region stretched from Mackay to Mareeba – approx. 800km). Farm sizes ranged from smaller enterprises (5-25 ha) to larger family or corporate farms (1-2000 ha) – a number of larger enterprises having farms in more than one region. Protected cropping and the use of hydroponics are also common in a number of regions. Climate, soils, use of protected facilities and access to markets impact on the type and timing of crops grown.

There is a relatively large percentage of growers with language other than English (e.g. with Vietnamese, Cambodian and other national heritage) in most regions – with many having poor English literacy skills.

Most of the produce is sold in the local and national markets. Fresh Market Australia is the national organisational representing each of the six market chambers which represent the fruit and vegetable wholesalers located in Brisbane, Sydney, Melbourne, Adelaide and Perth. Woolworths and Coles have a big impact on prices and markets.

Irrigation is critical to vegetable growing in most regions – and water shortage a major issue for production.

Available Information sources

(outside of VegNET)

An over-riding message across the regions was that there was no shortage of information – if someone was looking for it. Many mentioned their use of the internet – 'googling' information they needed. Little mention was made of specific websites such as Hort Innovation or AusVeg – rather it was wherever information was available based on their search criteria (although mention was made of the value of Apps such as that used for insect identification). Some growers were frustrated, however, at the lack of locally relevant information – and/or understanding the problem they had and so better know what to search/ask for.

While other growers were nominated by some as sources of information, a number referred to the reluctance of many growers to share their 'IP' (a combination of not wanting to give away commercial advantage – or not sure enough of their approach to risk telling others to use it). A number of growers referred to travelling within Australia and overseas to learn more about management practices. Mention was made of a Bayer supported group that helped growers share information and visit other places. Others referred to specific relationships they had with other enterprises with respect to learning from each other.

Other information sources that were mentioned across the regions included: local grower groups/organisations; re-sellers (most regions - with recognition of potential bias towards their products); industry magazines; private agronomists (mainly larger enterprises – paying consultants was seen as too expensive for most farms); GrowCom; and other industry organisations and government (especially in relation to labour awards). The loss of state government extension (and research) was raised in some cases as a gap.

Contribution of VegNET to date

It was clear that most of those who participated in the regional meetings were positive about the VegNET program and staff and their contributions. Their contributions were described as ranging from: being an 'enabler' and providing a linking/brokering function for information and expertise across the industry; providing networking opportunities and connection to researchers; leveraging existing information and advisory sources; and being a conduit for information. Regular local information updates were mentioned by some as very useful and assistance with Freshcare certification (initially funded by Hort Innovation – as HAL – in 1995) was appreciated where it was done. Some growers did not relate to the term 'VegNET' but did know of the IDO and their work. Growers with English as a second

language were appreciative of having information and activities undertaken in their first language.

Field days and workshops were run in most regions by – or supported by – the IDOs. There was some concern about the workshops related to national research projects where the IDO is expected by the researchers to organise workshops which may not be relevant or not delivered in an appropriate way for local growers to gain from them.

There were some comments that the contracted activities of the IDOs did not always line up with what the regional needs were and limited the value of the program (it has been noted that workplans were intended to be based on defined regional needs). Some examples were given where IDOs took on a role of working with different organisations to address a regional priority. For example, in the NT, the IDO successfully worked with the government agency researchers and industry to progress the understanding and use of IPM approaches.

Delivery Model

In relation to the delivery 'models' discussed (Pipeline; Social learning; and Design), a number of regions saw that the IDO was mainly operating on the 'Pipeline' model – being a conduit of information from Hort Innovation and other sources and disseminating it in different ways to growers. One region saw this as broken because of fragmentation and other regions saw elements of the social learning model being in use (although recognised the limitations of many growers being reluctant to share). There was interest in the design model (and some regions saw aspects of this in practice) but difficulty in seeing how this would work effectively in practice. A couple of regions considered that their IDO worked across all 3 models and needed to have the flexibility to choose what was best at the time.

Issues confronting industries

Challenges facing the industry were varied across regions but there were many issues that were raised in common across all of the regions. **The most common mentioned challenges were in relation to water (availability, quality and cost – not a problem in Tasmania); labour (availability, awards, HR and skills) and input costs.** These were not raised in relation to whether or not they were directly related to extension needs – just issues in general. Other key generic issues mentioned included: biosecurity; pest management; market access (including export); post-harvest and marketing; urban encroachment; social licence (environmental impact and chemical (mis)usage); and business management.

The lack of information (including on labels) directly relevant to growing and managing certain crops in regional specific locations (e.g. Asian crops in NT) was also raised – as well as the **lack of local trials to test approaches**. One region highlighted the need to have better information in chemical usage and application.

Opportunities

Dealing with the issues identified was seen by many as the major opportunities that could be addressed. Questions were asked about how VegNET could best flexibly deal with the broader issues facing the industry in the regions beyond technical 'R&D'. Longer term funding for VegNET positions was seen by many as one key element if real understanding, trust and progress was to be made – as well as having a more flexible

mandate. This would allow projects to be followed up effectively and support provided for effective adoption. One region highlighted the added value to the VegPro project (now finished but with many training resources available) and for growers if VegNET also organised on-going VegPro training (including involving the private sector with 'train the trainer').

Market development (including export opportunities) and biosecurity were raised across a number of regions where VegNET could have a real impact. Progressing the use of robotics, drones and other electronic approaches were also raised. One region referred to the imminent threats from pests in other regions/states and the opportunity to proactively address this. Others referred to further developing IPM approaches, water use efficiency strategies and value adding. Having good economic data and case studies were seen as ways to assist decision-making in some regions.

Future Model

There was a broad view across regions that the extension role needed to be flexible and driven by regional needs and priorities. Most saw the VegNET role as needing to go beyond technical R&D and the pipeline model to encompass aspects of the other models. As one region put it 'there needs to be a mandate beyond agronomy only and have a focus on building better vegetable businesses'. This was seen to be addressing issues related to viability of industries and farms and engaging where necessary to achieve this. Although many saw value in a more design-centred approach, there was some concern about how this might be implemented from a practical viewpoint.

There was also a strong call across a number of regions for Hort Innovation/VegNET to have a stronger role in regionally relevant research, demonstrations, local field trials and/or 'model farms' – potentially with commercial partners. This need for locally relevant evidence-based information from a neutral location and source was seen as important to providing key information and confidence in adoption.

Association of the VegNET/IDO with local organisations was seen as important by most regions to ensure ease of connection with growers and being able to leverage resources and activities. This association also assisted in ensuring that the position was not over-loaded. It was emphasised by some that there was a need for less restrictions on regional extension roles and activities, more appropriate performance measures, streamlined reporting and more scope for flexibility and 'doing what it took' to address key industry issues.

There was recognition that there were different industries and types of farms and so a one-size fits all was not always possible. It was also raised that sometimes vegetables were grown alongside tree crops (for example) on the same farm – and there was a need for the IDO/extension to take a farming system approach and not just deal with the vegetable component.

Other observations

Other comments related to the lack of legacy and connection with Hort Innovation projects and links between different arms of the industry (e.g. VegNET, AusVeg and SIAP).

Standardisation of VegNET staff salaries, proformas (e.g. for the newsletters) and training and mentoring support was also raised. Better linking the level of VegNET support to regional industry size and levy funds was also mentioned in one region. There were mixed comments related to whether Hort Innovation should directly manage/coordinate VegNET staff rather than through a third party. Branding and co-branding was also raised in some meetings in relation to attribution of activities to levies.

Main Messages and Next Steps

It is clear from the meetings that vegetable growing is very diverse in terms of crops, farm size, markets, soil and climatic conditions. There also seems to be a good mix of agronomic information from a range of sources for vegetable growers who are seeking information – including the internet, resellers and industry and grower organisations and their publications. Special attention was needed for those with English as a second language. A number of growers in the meetings referred to travelling to other regions as well as internationally to gain information and insights into their crops.

Despite this ready access to information by most growers, the role of VegNet staff were seen as playing an important role in passing on information, engaging growers and brokering linkages. While many regions indicated they were largely information disseminators, others described roles that were more about facilitating learning and working with other organisations on regional priorities.

There appears to be a gap in locally relevant agronomic and management information for some crops in some regions - reflected in a call for more locally relevant research and field trials/demonstrations. The reluctance by some growers to share information because of commercial advantage underlines the need for other mechanisms to gain locally relevant information and facilitate shared learning.

Many of the issues raised across regions as limiting vegetable business productivity and sustainability related to non-agronomic matters – including post-harvest and market development, water, biosecurity and labour. These were not areas that VegNet generally had a large presence or mandate – and there was general support for VegNet staff to have the flexibility and mandate to be able to better direct efforts at identifying and addressing regional industry priorities. This was also linked to comments around needing a longer contract (5 years rather than 3) and maintaining close links to local organisations.

Key areas then to explore in developing a vegetable extension strategy based on the regional feedback would therefore include:

- How vegetable extension can best address the high priority issues and opportunities identified in the region – and how common cross-regional issues be most effectively supported from a national/cross-regional perspective.
- Clarifying the regional extension role to enable the flexibility needed while ensuring that it retains its focus and people do not get stretched too far – and considering the related personnel and salary levels reasonable for the role.
- Exploring how vegetable extension – or Hort Innovation more generally – can best address the call for more regionally relevant local research.
- Identifying the skills, training and support needed to ensure that extension staff are equipped to effectively undertake their roles.
- Progressing the call for longer contracts for extension staff to allow for better long-term relationships, understanding, approaches and outcomes.

- Considering how best to provide on-going close-relationships with local organisations while ensuring effective national coordination, mentoring, support and guidance.

Autumn 2019 Article list

Deadline 20th February, translation deadline 15th February

Cover

Your industry association

- Chief Executive Officer Report - John
- Presidents Report – Dan Kuzmicich – been advised it will be today
- APC-VPC Grant round open – Bec

Your Production

- Stable Fly Update – David Cook
- Permit – APVMA Search – Sam/Joel
- Brown Marmorated Stink Bug – DPIRD
- Strip Tilling – RMCG
- Area Wide Management Project – DPIRD
- Biosecurity Q&A - – been advised it will be today

Tool Time-

- Rural Intelligence Platform, CSIRO & Digital Agriculture Services – Sam to contact
- Computer pathogens & listeria

Your industry

- VegNET Update Article – Sam & Truyen
- SFFC Membership Drive
- Grants for agrifood businesses to pursue Asian markets – DPIRD – WA Corn Growers, Capogreco etc
- Avocado Researcher - DPIRD

Your business

- Quality Assurance - Joel
- Single Touch Payroll deadline approaching – it will be end of day
- Rural Financial Counsellor WA – Chris
- Employing the right people Small Bus Development Corp – Wendy Burgner
-

Your market

- Export Facilitators Project –Manus
- Consumer veg - Neilson article

Vietnamese translated – all emailed to Truyen by 15th February

- Biosecurity Q&A - – been advised it will be today

Your Production (Back of Mag)

- Permits Bec

WA Potatoes

- Simons update (will include photos) - suggest 1 page - – been advised it will be today
- Marketing update 1-2 pages with images (see link below)
- Colin Ayres new optical sorter - suggest 2 pages - launch is on Friday (possibly with Min) so will send all the info then (we have a draft just need to finalise)
- Export Development Plan project - suggest 1-2 pages also - photos to be supplied on Saturday when our consultants get back to Perth (article attached below).
- ~~Seed for Schools - photos and small update about last years Bunnings prize winners - visit on Monday so will get files to you then - 1 page will be good - – been advised it will be today~~

Pome West

- 8 pages
  -
  -

Cover page – include Pomewest & APC logo

WA Citrus

- 14 pages
  -

WA StoneFruit

- 4 pages
  -

Advertorial

- Centerwest insurance

Events

- Industry summit 17-18 October
- Biosecurity & Food safety workshop 5-8 May Wanneroo, Donnybrook, Manjimup & Albany
- UNE Weed Trial Field Day July 2019

Winter 2019 Article list

Deadline 17th May, translation deadline 10th May

Cover

Your industry association

- Chief Executive Officer Report - John
- Presidents Report – Dan Kuzmicich
- APC-VPC FFS Grower Tour Report – Bec

Your Production

- Chemical Selection – Part 2 – Sam/Joel
- Area Wide Management Project – DPIRD
- TPP update – workshops Callum Ausveg
- UNE Weed factsheets – Fat hen – Michael
- UNE Save the Date Field Day Weeds – Michael
- Phosphate in veggie gardens – Truyen
- Area Wide Surveillance – Hitachi
- VeggieNotes – Ausveg
- Ripper mulcher Tasmania - RMCG

Tool Time-

- Robotic apple harvester – T&G
- HAIFIA App info

Your industry

- VegNET Final Article – Sam & Truyen
- Horticulture Biosecurity Advisory Committee – DPIRD
- Benchmarking project update – Bryn
- Gascoyne Food Festival Launch – need images
- Hort Connections Award Nominations
- Drones – Eyes turned skyward
- BWEB – Farmer on a plate
- HortConnectWA Article & membership info - BEC

Your business

- Freshcare Online Portal - Joel
- Freshcare V4.1 – Freshcare due 3rd June leave 2 pages please
- IAuditor – loose leaf lettuce Bec to write
- Record Keeping - Small Bus Development Corp – Craig Francis
- Labour article – MADEC

Your market

- Export Facilitators Project –Manus
- Consumer veg Leeks- Neilson article
- Foodex Article – Manus

- Japan market insights – Claire

Vietnamese translated – all emailed to Truyen by 10th May

- Phosphate in veggie gardens – Truyen

Your Production (Back of Mag)

- Permits Bec

WA Potatoes

- Simons update (will include photos) - suggest 1 page - –
- Marketing update 1-2 pages with images
- Seed for Schools

Pome West

- 8 pages
  - Antioxidants more powerful in name than fact
  - Donnybrook apple festival
  - Future Orchard Walk
  - Orchard clean up time
  - Apples go to town farmer on a plate
  -

Cover page – include Pomewest & APC logo

WA Citrus

- 4 pages
  -

WA StoneFruit

- 4 pages
  -

Advertorial

-

Events

- UNE Weed Trial Field Day 20 June 2019 - Myalup
- Hort connections 24-26 June - Melbourne
- 2019 APEN Conference – Darwin NT 12-13 September
- Industry summit 17-18 October

Winter 2019 Article list

Deadline 17th May, translation deadline 10th May

Cover

Your industry association

- Chief Executive Officer Report - John
- Presidents Report – Dan Kuzmicich
- APC-VPC FFS Grower Tour Report – Bec

Your Production

- Chemical Selection – Part 2 – Sam/Joel
- Area Wide Management Project – DPIRD
- TPP update – workshops Callum Ausveg
- UNE Weed factsheets – Fat hen – Michael
- UNE Save the Date Field Day Weeds – Michael
- Phosphate in veggie gardens – Truyen
- Area Wide Surveillance – Hitachi
- VeggieNotes – Ausveg
- Ripper mulcher Tasmania - RMCG

Tool Time-

- Robotic apple harvester – T&G
- HAIFIA App info

Your industry

- VegNET Final Article – Sam & Truyen
- Horticulture Biosecurity Advisory Committee – DPIRD
- Benchmarking project update – Bryn
- Gascoyne Food Festival Launch – need images
- Hort Connections Award Nominations
- Drones – Eyes turned skyward
- BWEB – Farmer on a plate
- HortConnectWA Article & membership info - BEC

Your business

- Freshcare Online Portal - Joel
- Freshcare V4.1 – Freshcare due 3rd June leave 2 pages please
- IAuditor – loose leaf lettuce Bec to write
- Record Keeping - Small Bus Development Corp – Craig Francis
- Labour article – MADEC

Your market

- Export Facilitators Project –Manus
- Consumer veg Leeks- Neilson article
- Foodex Article – Manus

- Japan market insights – Claire

Vietnamese translated – all emailed to Truyen by 10th May

- Phosphate in veggie gardens – Truyen

Your Production (Back of Mag)

- Permits Bec

WA Potatoes

- Simons update (will include photos) - suggest 1 page - –
- Marketing update 1-2 pages with images
- Seed for Schools

Pome West

- 8 pages
  - Antioxidants more powerful in name than fact
  - Donnybrook apple festival
  - Future Orchard Walk
  - Orchard clean up time
  - Apples go to town farmer on a plate
  -

Cover page – include Pomewest & APC logo

WA Citrus

- 4 pages
  -

WA StoneFruit

- 4 pages
  -

Advertorial

-

Events

- UNE Weed Trial Field Day 20 June 2019 - Myalup
- Hort connections 24-26 June - Melbourne
- 2019 APEN Conference – Darwin NT 12-13 September
- Industry summit 17-18 October

CEO's report
APC-VPC Update
President's Report
Introducing Karen Raybould

Your Production

- Guide provides new weapon for all growers in ongoing battle against soil-borne diseases
- Protected cropping to boost north's high-value produce
- How has your strip-till New Year's resolution progressed? (Also in AusVEG Spring edition)
- Mobile pest surveillance units to give plant industries vital pest and disease information
- Department recruiting for a TPP spring offensive
- Gauging Crop Water Use DPIRD
- Stable fly on leaf DPIRD
- Pollination Research DPIRD
- Protecting deciduous fruit tree crops from mites DPIRD

Tool Time

- APVMA App (Truyen Vo)

Your Industry

- Healthy convenience: demand for pre-packed salads continues to grow
- Sustainable Farmer Community Innovation project (email)
- Take time to get piece rate right (MADEC)
- Toilet & Facilities Regulations (Work Safe sent through Code of Conduct)

WA Potatoes

- President's Report
- Executive Officer's Report
- World Potato Congress
- Potato export plan developing through industry consultation
- WA Potatoes Magazine
- Summer Recipe

Pomewest (8-10 pages, Each page is 500-750 words plus images)
Waiting for content

WA Citrus
Waiting for content

Stonefruit WA
Waiting for content

Your Business

- Meeting Retail Requirements (Joel Dinsdale)
- Ant Lieu's successful 4.1 audit (Joel Dinsdale)
- Fair Work Ombudsman Horticulture Showcase
- Primary Production Legislation Letter
- Indonesia market opportunities DPIRD
- Do you need to look at how your business is financed?
- Focusing on driving income and profitability from your land

Your Market

- Export trade shows fact sheet text (Manus Stockdale)
- Export update (Manus Stockdale)
- (?) Maximum Residue Level Testing (Manus Stockdale)

Vietnamese Translations

vegetablesWA

Pests, Disease and Quality Assurance!

Are you aware that the above 3 topics are linked?

No? Well you should come along to the vegetablesWA Wanneroo Information Session to find out how!

Date: Wednesday 24th July 2019

Time: 6:00pm – 8:00pm

Where: Wanneroo Tavern

(Light refreshments provided)

RSVP 22nd July to Sam 0427 373 037

Speakers

Sam Grubiša - Biosecurity tips

Truyen Vo - Pest and Disease presentation

Joel Dinsdale - Freshcare and the importance of correct protocols and procedure

Vietnamese translation provided

apc
AGRICULTURAL PRODUCE COMMISSION
Supporting Producers' Initiative

National Vegetable **Extension Network**
Western Australia

Carnarvon Travel Report 19-22 Nov 2019 – Truyen Vo

Summary

The visit to Carnarvon was worthwhile for implementing extension activities including providing language assistance and experiences in the grower meeting on Nov 21 that covered: TPP talk, Labour Scheme info, Tomato quality issues and, growers' comments on CGA services.

Grower 5 visits were also carried out to check on suspected new melon disease and the importance of farm biosecurity.

Some of the key learnings were:

- Observation during the trip recorded tomato crop is finished earlier this year than usual. Fewer tomato crop remains on the paddock. The field is now either bare land or water melon. It was explained by visited growers that the earlier clean up of tomato crop is due to unprofitable price and very low demand of Carnarvon tomato in Perth market. Price of cherry tomato which has been staying high since earlier this year also dramatically drops to below $2/kg which become unprofitable to grower too. Thus water melon have been employed as the last hope of the year to bring some cash to growers.
- The grower visits recorded water melon issues like last year with rind rot necrosis symptoms. One grower has sent sample to Carnarvon Research station for testing.
  I have reported the observation in the grower meeting and encourage growers to contact Carnarvon research station for sampling and testing.
- TPP talk by Annie (DPIRD) was included at the end of a multiple topics grower meeting (Labour Scheme info, Tomato quality issues and, growers' comments on CGA services) which was about 10-15 minutes long. There was little sign of grower's appreciation having a better understanding on TPP pests its relation to produce quality compliance. Except 2 growers remained seated to listen toward the end, other growers stand up and showed hurry to go to 2 BD parties in the area that night.
- Labour scheme info was very quickly and briefly introduced to growers at the end most of the meeting when growers showed hurry to go to the parties.

Key Meetings

1. **Carnarvon Workshop (Vietnamese growers)**
   There were 9 grower participants and representatives from CGA, DPIRD and VegetablesWA. Meeting on Nov 21 that covered: TPP talk, Labour Scheme info, Tomato quality issues and, growers' comments on CGA services.
   Table 1. The list of attendees

No.	Names	Locations	Crops grown	Notes
1	Giay Nguyen	South River Rd	Tomatoes, watermelon, zucchini, cucumber, egg plants	Rent
2	Duc Nguyen	Mc Glade Rd	Tomatoes, Melons	Owner
3 & 4	Kiem Thi and his worker	North River Rd	Tomatoes, Capsicum, Beans, Avocadoes, Mangoes, Papaya	Owner
5	Tanh Nguyen	South River Rd	Tomatoes, Melons	Rent
6	Su Tran	Robinson St	Tomatoes, mangoes, Avocados	Owner and Rent
7	Phuong Trinh	Mc Glade Rd	Tomatoes, Melons	Owner
8	Binh	South River Rd	Tomatoes, chilies	Ownwer

9	**Mr. Hoang**	**North River Rd**	**Tomatoes, Melons**	**Share farmer**
10	**Bobo**	**CGA**		**Sale man**
11	**Annie**	**CGA & DPIRD**		**Agronomist**
12	**Valerie**	**GDC**		**Carnarvon**
13	**Dan Kuzmicich**	**North River Rd**	**Capsicum, eggplant**	**Owner**
14	**Truyen Vo**			**VegetablesWA**
15	**Melissa**			**VegetablesWA**

2. Individual grower visits

Discussed topic:

(i) Visited growers are provided with Melon fact sheets (and Farm biosecurity sign on request). Water melon rind rot necrosis was discussed.
The symptom has been observed in few farm (see photos). More number of cases has been recorded 2019.
The problem occurred only with Royal Armada variety

Follow up: waiting for the test results come out from Carnarvon research station and to contact with the growers and the Coordinator of Area Wide management of bacterial and virus diseases project at DPIRD has been informed and agreed to cooperate.

(ii) Labour Scheme introduction

The list of visited growers and discussed topics

No.	Names	Locations	Crops grown	Notes
1	**Kim Nguyen**	**North River**	**Capsicum, water melons, Papaya**	**This grower reduced farming activities while paying more effort to her Gascoyne bakery shop. No serious crop issue reported.**
2	**Mr Dung Nguyen - Andrew**	**South River Rd**	**Cherry tomatoes**	**Picking cherry tomatoes. Observed bacterial spot and speck disease symptoms. Spray recommend was given to grower using Coppox mixed with Dithane powder. Grower apply the spray the day after and give a call to Truyen on 25 Nov reported a good sign of effectiveness. Disease symptom seems stop moving up new leaves.**
3	**Mr Cuoi**	**Robinson St**	**Tomatoes, Melons**	**Lease farmer, contracting to market agent in Perth. Melon disease was reported, photos of the symptom were taken. Melons fact sheets was given to grower.**
4	**My Kiem Thi**	**North River Rd**	**Capsicum, tomatoes, mangoes, Avocado**	**Owner. A range of topics were discussed including tomato quality and price, labour issue, hay fever!, TPP …**
5	**Duc Nguyen**	**Mc Glade Rd**	**Tomatoes, Melons**	**Owner. Labour scheme was discussed.**
6	**Su Tran**	**Robinson St**	**Tomatoes, mangoes, Avocados**	**Owner and Rent. Owner. Labour scheme, low tomatoes quality and low price, water melon disease issues were discussed.**

Actions/follow up: waiting for the test results come out from Carnarvon research station and to contact with the growers and the Coordinator of Area Wide management of bacterial and virus diseases project at DPIRD has been informed and agreed to cooperate.

For further details contact Truyen Vo at Truyen.vo@vegetableswa.com.au

vegetablesWA

The vegetablesWA team is heading to Carnarvon in August and we will be holding an information session on…

"Disease Resistant Seed Varieties"

Date: Tuesday 6th August 2019

Time: 5:30pm – 7:30pm

Where: The Bomb Shelter

(Drinks & Vietnamese Translation provided)

SPEAKERS

Truyen Vo – Resistant varieties and translation

Sam Grubiša – Carnarvon Variety Trial info / update

Bryn Edwards – Benchmarking Industry Results Year 2

For further information on what services are available through vegetablesWA, have a look at our website

www.vegetableswa.com.au

To get involved in this year's Financial Review and Industry Benchmarking initiative click on the link below

https://bit.ly/2Qi8BR1

apc
AGRICULTURAL PRODUCE COMMISSION
Supporting Producers' Initiative

National Vegetable **Extension Network**
Western Australia

Vegetable Industry Summit & Grower Tour

17–18 OCTOBER 2019

Grower Group Tour

Thursday 17 October

8.30am-4.00pm

Brookrise Farm, Gingin

Grower Group Tour

Program

TOUR	
8:30am	Pick up from Aloft
10:00am	Arrive at Brookrise Farm — *morning tea on bus*
10:00am–12:00pm	Drones *Landmark*
12:00pm–1:00pm	*Lunch — Burger Bar*
1.00pm-1.30pm	Coolnomix, Energy Efficient Coolrooms *Green Choice Electrical*
1:30pm–2:00pm	Machinery Display *AFGRI Moora*
2:00pm	Depart Brookrise Farm
4:00pm	Arrive back at Aloft

Brookrise Farm

Understanding local business.

Whether you require day-to-day banking support, or a customised banking solution - we're here to help.

Our Bankwest Business Relationship Managers have an in-depth understanding of the local areas and industries they work in.

Working closely with you, they are committed to delivering innovative banking solutions to help you reach your business goals.

Speak to your local Business Relationship Managers today

Ben Coman
Senior Relationship Manager
Rural and Regional WA
(08) 9369 9318 | 0477 710 529
ben.coman@bankwest.com.au

Tom Antonio
Relationship Manager
Rural and Regional WA
(08) 9369 9319 | 0419 902 196
tom.antonio@bankwest.com.au

bankwest FOR BUSINESS

Bankwest, a division of Commonwealth Bank of Australia ABN 48 123 123 124 AFSL/Australian credit licence 234945.

BWA-Ad190 091019 V2

Speakers

Jonathan Smith
Stratus Imaging

Jon has an extensive sales background that has provided him a good basis for engaging with people on all levels. This has allowed Stratus Imaging to help address growers restraints and provide tailored solutions to the agricultural sector, whilst maintaining the growers best interests.

Andrew Dedman
Stratus Imaging

Andrew has a broad knowledge of risk management that has covered viticulture and oil and gas. He is recognised as one of only a handful of drone pilots in Australia that are able to operate up to five drones for aerial application.

Abstract Drones

Landmark and Stratus introduce Aero Shield survey drones that represent the very latest in geospatial technology and now provide a viable alternative to ground driven and aerial sprayers. Our Aero Shield spray drones feature a range of sensors that produce real-time data which delivers its payload to target areas with pinpoint accuracy. What this means for your farm is a substantial reduction in labour costs and chemical volumes — giving you the potential to significantly improve your profitability.

Stratus Imaging service portfolio:

- *UAV Remote sensing acquisition (RGB & Multispectral)*
- *Spatial data processing (UAV & Satellite)*
- *Spatial analytics (inc NOVI, canopy cover, plant flowering %, crop damage,% nitrogen)*
- *Sophisticated soil moisture probes*
- *Electromagnetic induction-based soil sensing (EM38)*
- *Prescription maps for VR enabled equipment*
- *Aerial surveys & inspections*
- *Crop and forestry spraying services*
- *Authorised DJI reseller*

Speaker

Kevin Moore

Chief Executive, Agile8 Consulting Limited

With a degree in electronics Kevin founded Agile8 in 2005 following an earlier career in the oil industry with BP and then as a management consultant specialising in delivering large business transformation programmes in Europe, the USA and across Asia Pacific. He is a Chartered Electrical Engineer. Kevin's professional career has included service in Europe, the USA, the Middle East and Asia.

As cooling systems rapidly become one of the largest contributors to global warming Agile8's focus is on the delivery of COOLNOMIX® and related technologies that alleviate the impact of air conditioning and refrigeration systems. New Internet of Things (IoT) based products are planned for building and district cooling and for home/ residential environments.

Abstract Energy Efficient Coolrooms

The environment and climate change are frequently in the spotlight these days. We have the core belief that there is no Planet B therefore we are focussing on products that support the concept of sustainable energy and reducing the carbon footprint. COOLNOMIX® ORS™ is the brainchild of Agile8 Consulting Limited whose goal is to simultaneously limit environmental toxins and lower the costs associated with air conditioning and refrigeration.

The COOLNOMIX® ORS™ works to accomplish this goal by relying on the Optimised Refrigerant Supply.

Two temperature sensors allow the ORS™ to monitor the space temperature as well as the refrigerant supply, and by applying an algorithmic energy trading approach COOLNOMIX® starts and stops the unit's compressor at the exact time required to optimise operating costs. Use of this product provides numerous benefits including exceptional energy saving performance, temperature stability, and smaller carbon footprint because of enhanced air quality and a reduction in expended energy.

Speaker

Josh Scruers

AFGRI Moora

AFGRI Equipment is your reliable source for premium new and used equipment, service and solutions.

Abstract Drones

AFGRI Moora is your local John Deere machinery dealer. We are your partner for life. At AFGRI Equipment, we continuously aim to maintain a high level of excellence when supplying equipment to our customers. We do this by listening to our customers and going the extra mile to deliver the best possible solutions to meet their needs. From pre-sales advice to parts, servicing and repairs, we are with you every step of the way.

Notes

vegetablesWA

Vegetable Industry Summit & Grower Tour

apc
AGRICULTURAL PRODUCE COMMISSION
Supporting Producers' Initiative

Hort Innovation

National Vegetable Extension Network

Vegetable Industry Summit & Grower Tour

17–18 OCTOBER 2019

Industry Summit

Friday 18 October

1.30pm-5.30pm

Crown Towers Ballroom,
Crown Perth

SPONSORED BY

bankwest

Industry Summit

Program

SUMMIT MC: DI DARMODY	
1:30pm–2:00pm	*Arrival tea & coffee*
2:05pm–2:10pm	Welcome to event — Di Darmody *MC*
2:10pm–2:20pm	Event opening — Hon. Alannah MacTiernan *Minister for Agriculture*
2:20pm–2:25pm	Opening speech — John Shannon *CEO, vegetablesWA*
2:25pm–2:55pm	Krista Watkins *Rural Women of the Year, Natural Evolution*
2:55pm–3:10pm	Panel — Marketing
3:10pm–3:25pm	Drivers for compliance and certification: commercial, regulatory and beyond — Joel Dinsdale *vegetablesWA*
3:25pm–3:35pm	Panel — Freshcare
3:35pm–4:00pm	*Tea break*
4:00pm–4:10pm	Area wide management — Craig Webster *DPIRD*
4:10pm–4:20pm	Panel — DPIRD
4:20pm–4:40pm	Benchmarking — Bryn Edwards *vegetablesWA* & Paul Omodei *Planfarm*
4:40pm–4:55pm	Panel — Benchmarking
4:55pm–5:00pm	Ben Coman *Bankwest*
5:00pm–5:10pm	Strip tillage — Kelvin Montague *AHR*
5:10pm–5:20pm	Panel — Strip tillage
5:20pm–5:25pm	*Telstra prize draw*
5:25pm–5:30pm	Closing
SUNDOWNER RECEPTION	
5:30pm–8:30pm	Networking Sundowner

Master of ceremonies

Di Darmody

With over 17 years of experience as a journalist and presenter with ABC Radio, Di Darmody is a well known — and popular — voice for listeners in Perth and throughout Western Australia.

Di has presented ABC Perth Breakfast, Focus, Afternoons, Drive, Saturday Breakfast, The Country Hour as well as National Nightlife, has also worked on National Grandstand, AFL and WAFL coverage and has hosted a variety of regional and state-wide programs across WA.

Speaker

Krista Watkins

Rural Women of the Year, Natural Evolution

Krista Watkins is a leader in agricultural innovation and the co-founder and Managing Director of Natural Evolution, a company specialising in green banana and other waste produce products. She is an advocate for innovation and disruption, and passionate about reinvigorating the Australian Food manufacturing industry.

Abstract Marketing

Krista's interest in reducing waste and finding uses for unsaleable produce led to the development of Natural Evolution in 2015. Following tireless work and research, she and husband Rob built the world's first pharmaceutical grade green banana processing facility and pioneered the process of turning produce into functional foods and cosmetics.

Notes

vegetablesWA

Speaker

Joel Dinsdale

Quality Assurance Coordinator, vegetablesWA

Joel Dinsdale is currently the quality assurance coordinator at vegetablesWA, a Freshcare registered trainer and a registered GlobalG.A.P. Farm Assurer that supports growers across horticulture nationally.

Abstract Drivers for compliance and certification: commercial, regulatory and beyond

Like so many of Australia's fresh produce industry success stories, the Freshcare Program had humble beginnings.

Freshcare is the name for the horticultural industry owned, not-for-profit, on-farm assurance program, established in the year 2000 to service the needs of the Australian industry.

Freshcare's practical approach to helping growers and packers assure customers that their produce is fresh and safe has seen over 7,500 horticultural businesses adopt the program since its beginning.

Notes

vegetablesWA

Speaker

Craig Webster

Project Officer, Department of Primary Industries and Regional Development

Craig Webster is a researcher at the Department of Primary Industries and Regional Development working on understanding and controlling epidemics of diseases in horticultural crops.

Abstract Area wide management

Viruses and bacterial diseases continue to be an important factor reducing yields in horticultural crops. We are looking at better understanding the different diseases causing issues in regions across WA, and how management plans can be tailored to different farming systems. Understanding when and how diseases survive and spread can be used to reduce the impact of outbreaks, and through field experiments we are working towards demonstrating which options are most effective against different diseases and in different systems. Results of the project and the key issues observed will be discussed.

Notes

vegetablesWA

Speakers

Bryn Edwards

Benchmark Lead, vegetablesWA

As Benchmark Lead, Bryn has been responsible for winning the funding and launching Australia's first vegetable Production and Financial benchmarking initiative in WA. With an 16-year background in management consultancy across a variety of business sectors and countries, Bryn specialises in bringing simplicity into complex and uncharted business environments in order to 'get stuff done' in a straightforward and focused manner and most importantly deliver maximum value on many levels.

Paul Omodei

Farm Management Consultant, Planfarm

Paul is based in Manjimup in South Western WA and has been consulting since 2004, after working with CSBP Ltd for nine years in various management roles including sales and market development. Paul has over 12 years' experience in business planning, budgeting and margin analysis covering agronomy and farm systems predominantly. He also has dairy and beef experience extending from the south west through to the Great Southern and Esperance regions.

Abstract Benchmarking

In this presentation, Paul and Bryn will go beyond the published Industry Findings and provide greater insight into the grower report and the feedback that all participants receive. Briefly working through an example report, you will be given firsthand insight into the key metrics and measures that drive profitability and how they are interpreted in a benchmarking report to provide tangible actions to improve profitability. Also, for the first time, Paul and Bryn will share the more detailed averages that have been collected by the project and have only previously been shared with participants.

Notes

Speaker

Dr Kelvin Montague

Principal Consultant, Colo Consulting

Dr Kelvin Montagu currently leads the vegetable industries cover crop research project has been promoting the use of cover crops and other soil management practices through **www.SoilWealth.com** for several years.

Abstract Strip tillage

Cover crops are being rediscovered as important tools for improving soil structure and health, controlling soilborne disease and weeds, reducing erosion and nutrient loss, and adding nitrogen.

The presentation will show how cover crops can be used in today's intensive vegetable production systems, by combining the new understanding how cover crops work, together with machinery and management practices to make them work on today's farms.

Notes

Notes

Understanding local business.

Whether you require day-to-day banking support, or a customised banking solution - we're here to help.

Our Bankwest Business Relationship Managers have an in-depth understanding of the local areas and industries they work in.

Working closely with you, they are committed to delivering innovative banking solutions to help you reach your business goals.

Speak to your local Business Relationship Managers today

Ben Coman
Senior Relationship Manager
Rural and Regional WA
(08) 9369 9318 | 0477 710 529
ben.coman@bankwest.com.au

Tom Antonio
Relationship Manager
Rural and Regional WA
(08) 9369 9319 | 0419 902 196
tom.antonio@bankwest.com.au

bankwest FOR BUSINESS

Bankwest, a division of Commonwealth Bank of Australia ABN 48 123 123 124 AFSL/Australian credit licence 234945.

BWA-Ad190 091019 V2

vegetablesWA

Vegetable Industry Summit & Grower Tour

apc
AGRICULTURAL PRODUCE COMMISSION
Supporting Producers' Initiative

Hort Innovation

National Vegetable Extension Network

 © Copyright APEN

Abstract Title

Title of presentation/poster

Overcoming language barriers to successful adoption with agricultural innovation: a multiple-case study of successful adoption knowledge-based technologies by Vietnamese Australian vegetables growers in Western Australia.

Abstract Author/s

Vo The Truyen
Western Australia Vegetables Growers Association - vegetablesWA

Presenting Author Biography

Vo The Truyen is a Industry Extension Officer Vietnamese with Western Australia Vegetable Growers Association (vegetablesWA), a peak industry body representing and assisting vegetable growers, industry and government to maintain a profitable and sustainable vegetable industry in Western Australia. Truyen looks after about 220 Vietnamese Australian among 900+ WA vegetable growers in terms of: Establish and maintain linkages with growers and other stakeholders and organisations within R&D community and commercial suppliers; Engage into the Language other than English Community to contribute and share information and experiences; Maintain regular, relevant communications with Vietnamese vegetable growers in WA, ensure grower base is well understood and well represented on all issues; Extension of relevant research into practicable materials for Vietnamese growers/Uptake of advanced growers' practices to spread out to another grower community as appropriate; Provide spoken and written translation services; Facilitate two- way communication between Vietnamese Australian growers and English-speaking growers and the industry figures.

During his employment at vegetablesWA, Truyen has been involved in Hort Innovations Vegetables Extension network (VegNET) project and being an Australian Vegetable Extension Network member.

Before devoting his work full time with vegetablesWA Truyen served for 15 years as a research scientist and the head of Extension Service of Southern Fruit Research Institute (SOFRI) in Vietnam whose main mandates are to develop and extend production and marketing technologies to support fruits growers in Southern Viet Nam. During serving at SOFRI Truyen has been recognized and a key person contributing to the successful establishment of the first ever mango grower cooperative in Viet Nam in 2002 following by the development of other fruit grower cooperatives in the region.

Truyen has also worked as a lab technician for two short-term contracts with Land Care Research New Zealand during 2006-2007

Truyen has written several research and extension articles in both English and Vietnamese for vegetablesWA quarterly magazine as well as for SOFRI's and FAO's proceedings previously.

Truyen is an accredited Agricultural consultant holding a B.Sc degree Agronomy and M.Sc degree Horticulture, as well as having a 5-years study in community development.

 © Copyright APEN

Presenters Phone: **T** 08 9486 7515 **M** 0457 457 559

Presenters Email: ***truyen.vo@vegetableswa.com.au***

Presenters Address:

West Australian Vegetable Growers Association Inc.
702-704 Murray Street, West Perth WA 6005

Abstract Topic

Please select the topic/s which your presentation or poster will address.

☐ Climate Resilience	☐ Environment and Resources
☒ Rural Community Challenges	☐ Rural Health
☒ Sustainable Agriculture	☐ Technology and Innovation
☒ International Extension	☐ Indigenous Engagement

Type of presentation

Please select an oral presentation, or poster display. Please note that Posters will be displayed throughout the conference and the conference programme will include poster presentations.

☒ 15 Minute Oral Presentation

☐ Poster Display

Type of paper

Please indicate whether you wish to publish a paper in the *REIS Journal*, either in the *Research* section, the *Practice* section, or if you only wish to only present and not publish a paper.

☒ Research ☐ Practice ☐ No paper (Conference proceedings abstract only)

Images

Abstracts should be accompanied by a high resolution JPEG of the author.

Abstract Summary

On-the-go knowledge-based innovation such as the digital soil moisture monitors, fertigation automation and integrated pest management have all been introduced into mainstream agriculture practice in Australia for several years. While these innovations have been shown to provide production and environmental benefits, widespread adoption has been slow among Vietnamese Australian vegetables growers.
Agricultural technology in Australia has been introduced with the default English language. Insufficient attention is paid to paradigms of technology adoption by language other than English users. Therefore, the adoption of the agriculture technologies among language other than English community is not as great as it could and should be. By paying attention to overcoming language barriers to successful adoption with complex innovation and adoption drivers of Vietnamese Australian vegetables growers, this paper sheds light to the multifaced innovation adoption in agriculture.

 © Copyright APEN

Abstract Submission

On-the-go knowledge-based innovations such as the digital soil moisture monitors, fertigation automation and integrated pest management have all been introduced into mainstream agriculture practice in Australia for several years. While these innovations have been shown to provide production and environmental benefits, widespread adoption has been slow among Vietnamese Australian vegetables growers. These agricultural technologies in Australia have been introduced with the default English language. Insufficient attention is paid to paradigms of technology adoption by language other than English grower users. Therefore, the adoption of these agriculture technologies among language other than English grower community is not as great as it could and should be.

The aim of this research is to describe how and why language other than English growers overcome language barrier to successfully adopted and assimilated complex agricultural innovation in order to shed light to the multifaced innovation adoption in agriculture.

A multiple case study methodology was employed to this research. This choice of research strategy enables the researcher to explore the differences within and between cases. The goal is to replicate findings across cases. Three cases in this study involved Vietnamese Australian vegetable growers in Carnarvon, Geraldton and Gingin of Western Australia. The adopted technologies included the digital soil moistrure monitoring technique, automated fertigation system, and integrated stable fly control technique.

Drivers of adopion were identified within each case in this study which included (i) competitive and contingent factors – geography, business scale, water availability and soil type; (ii) the socio-demographic factors – age, education, duration of settlement in Australia, English proficiency, market and social reputation, networking; regulations and; (iii) Financial resources – income, ownership, immediate and long-term benefits. Common leaning strategy towards successful technology adption among cases was described which is constantly improving English while securing reliable sources of language assistance and technical assistance. The language assistance via the bilinguage industry extension officer at the industry body is of vital factors.

Understanding the role that language plays in creating barriers to learning and adopting technology is critical for agricultural extension. They are experiencing an increasing range of culturally and linguistically diverse populations amongst growers. The data resulting from this study will inform policy and practical solutions for communication in agricultural extension.

Abstract submission dates and information

Authors who are not able to submit their abstract online or have questions about the abstract submission process can contact contact abstracts@apen.org.au or by phoning the APEN Secretariat on (02) 6024 5349. Submission dates are as follows:

- Call for abstracts: OPEN
- Abstracts submitted: 5th July 2019
- Author informed: 19th July 2019

Resistant Seeds
SỬ DỤNG GIỐNG KHÁNG TRONG NGHÀNH RAU CẢI

Cucumber green mottle mosaic virus
Bệnh khảm vi-rút trên dưa leo

Melon necrotic spot virus
Siêu vi khuẩn gây bệnh thối nâu trên dưa

Võ Thế Truyền – Chuyên viên khuyến nông

This project has been part funded by Agriculture Produce Commission and by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

Introduction / Giới thiệu

Growing resistant varieties is strongly recommended / Sử dụng giống kháng là biện pháp được ưu tiên khuyến cáo trong quản lý sâu bệnh :

1. Minimise chemical use and its side effects / Giảm thiểu sử dụng nông dược và tác hại của sử dụng nông dược:

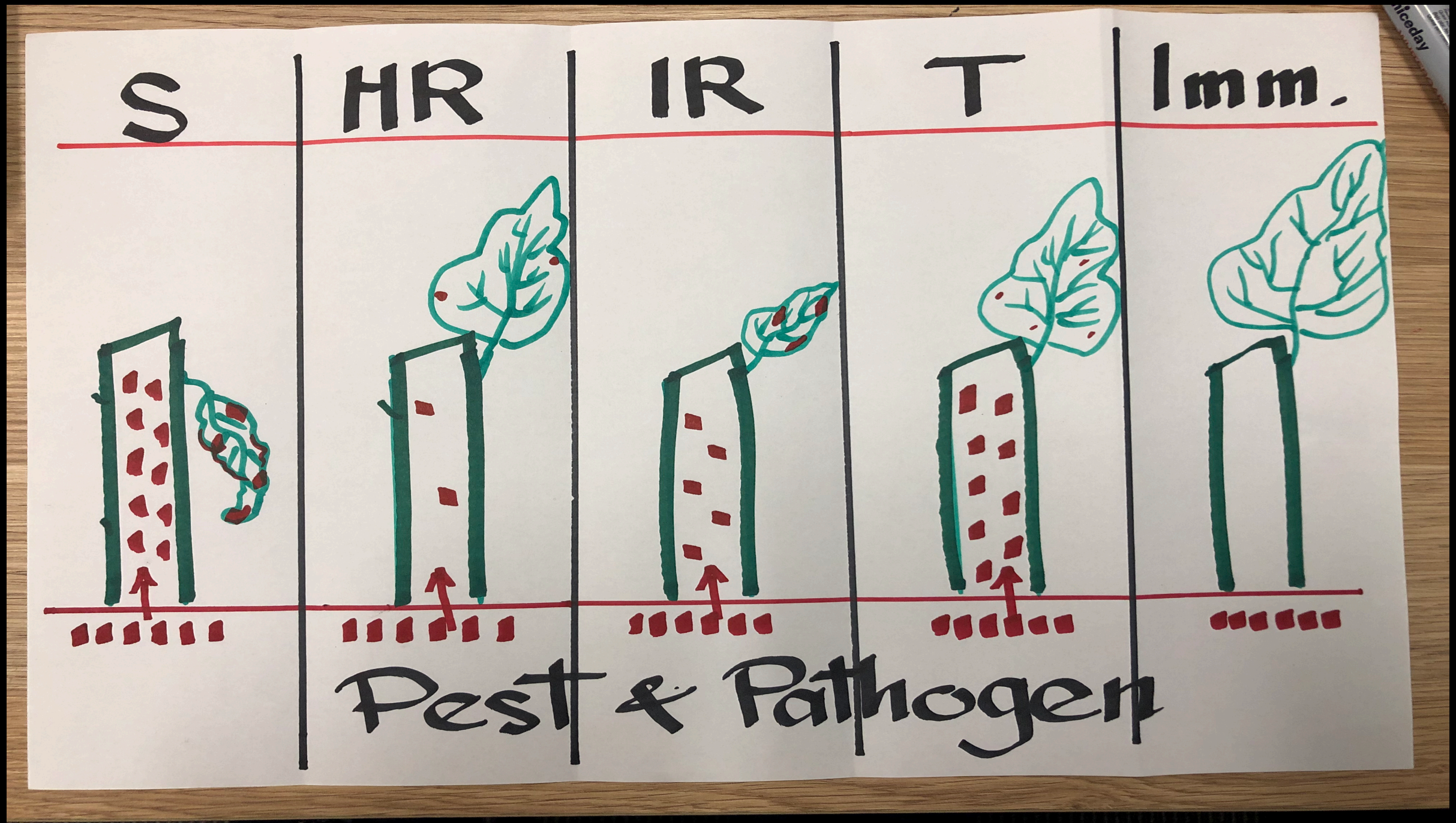
- **Cost / Chi phí**
- **Environment / Môi trường**
- **Pests and diseases resistance build up / Hiện tượng lờn thuốc**
- **MRL / Rủi ro dư lượng thuốc trên sản phẩm**

2. Target specific pets of disease / Đối phó với 1 loại sâu bệnh hại chuyên biệt

3. Compatible to IPM / Phối hợp tốt với IPM

Definition

- + Immunity: not subject to attack or infection by a specified pest or pathogen.
- + Resistance is the ability of a plant variety to restrict the growth and development of a specified pest or pathogen and/or the damage they cause when compared to susceptible plant varieties under similar environmental conditions and pest or pathogen pressure.
- High/standard resistance (HR): plant varieties that highly restrict the growth and development of the specified pest or pathogen under normal pest or pathogen pressure when compared to susceptible varieties.
- Moderate/intermediate resistance (IR): plant varieties that restrict the growth and development of the specified pest or pathogen, but may exhibit a greater range of symptoms or damage compared to high/standard resistant varieties.
- + Susceptibility is the inability of a plant variety to restrict the growth and development of a specified pest or pathogen.


S
HR
IR
T
Imm.
Pest & Pathogen

Commonly grown varieties in Carnarvon
Giống thường trồng tại Carnarvon

Tomatoes:

Round: Nemex, Ducan, Pinnacle, Rifle

Cherries: Astuto, Genio, Moscatel, Cherelino

Grapes: Sundance, Ornela, Pumpa

Watermelon: Javelin, Royal Amada, Talca

Capsicum and Peppers: Quattro, Cayman, Hercules, Warlock, Chevi

vegetablesWA

Commonly grown varieties in Carnarvon
Giống thường trồng tại Carnarvon

Tomatoes:

Round: Nemex, Ducan, Pinnacle, Rifle

Cheries: Astuto, Genio, Moscatel, Cherelino

Grapes: Sundance, Ornela, Pumpa

Watermelon: Javelin, Royal Amada, Talca

Capsicum and Peppers: Quattro, Cayman, Hercules, Warlock, Chevi

Growers confuse with Resistant codes

The pests and diseases identified on each tomato property participating in the project in Carnarvon 2017

vegetablesWA

Grower	Nematodes	Fungi	Bacteria
1	Root knot nematodes (Meloidogyne sp.) Root lesion nematodes (Pratylenchus sp.)	Fusarium root rot (Fusarium sp.)	Bacterial canker (Clavibacter michiganensis subsp. michiganensis)
2	Root knot nematodes (Meloidogyne sp.) Root lesion nematodes (Pratylenchus sp.)	Fusarium root rot (Fusarium sp.)	Bacterial canker (Clavibacter michiganensis subsp. michiganensis)
3	Root knot nematodes (Meloidogyne sp.)	Fusarium wilt (Fusarium oxysporum)	Bacterial canker (Clavibacter michiganensis subsp. michiganensis)
4	Root knot nematodes (Meloidogyne sp.)	Fusarium root rot (Fusarium sp.)	Bacterial speck (Pseudomonas syringae)
5	Root knot nematodes (Meloidogyne sp.) Root lesion nematodes (Pratylenchus neglectus and Pratylenchus sp.)		Bacterial speck (Pseudomonas syringae)
6	Root knot nematodes (Meloidogyne sp.) Root lesion nematodes (Pratylenchus neglectus)		Bacterial canker (Clavibacter michiganensis subsp. michiganensis) Bacterial speck (Pseudomonas syringae)
7		Fusarium wilt (Fusarium oxysporum)	Bacterial canker (Clavibacter michiganensis subsp. michiganensis)
8		Rhizoctonia and Fuarium root rot (Rhizoctonia sp. and Fusarium sp.)	Bacterial canker (Clavibacter michiganensis subsp. michiganensis)
9		Fusarium wilt (Fusarium oxysporum)	Bacterial canker (Clavibacter michiganensis subsp. michiganensis)
10	Root knot nematodes (Meloidogyne sp.) Root lesion nematodes (Pratylenchus sp.)	Rhizoctonia and Fuarium root rot (Rhizoctonia sp. and Fusarium sp.)	Bacterial canker (Clavibacter michiganensis subsp. michiganensis)

vegetablesWA

Product Information Sheet

Syngenta Hybrid Indeterminate Gourmet Tomato

NEMEX F1

SPECIFICATIONS

- Nemex is an indeterminate gourmet tomato for passive greenhouse
- High quality fruit are flat-round with a strong red colour and high gloss
- High productivity with easy hot and cold setting, good uniformity and pack out
- Plant habit is semi-open with high vigour
- Average fruit size is 150-180g

TECHNICAL DATA	
Disease resistance	HR: Fol0-1(US1-2), V0(US1), Va0(US1), Vd0(US1), TMV0, ToMV0,1,1.2,2, , Ma,Mi,Mj
Notable trait	High yielding variety

TECHNICAL DATA	
Fruit Size	Approx. 150-180g
Fruit Shape	Flat-round

Australia P: 03 8401 3346 F: 03 8401 3347 info@fairbanks.com.au www.fairbanks.com.au

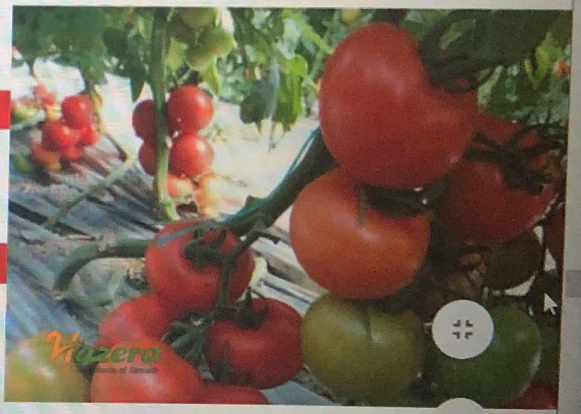
New Zealand P: 09 2390893 F: 09 2390896 info@fairbanks.co.nz www.fairbanks.co.nz

vegetablesWA

VARIETY	COMMENTS	SHELF LIFE	SUITABLE FOR	AVERAGE WEIGHT	RESISTANCES
INDETERMINATE HYBRID - ROUND/GOURMET					
DUNCAN F1	+ Suited to Southern & Western Australia + Short internodes with consistent 5-6 fruit per truss + Extremely uniform shape & size provides for high pack-out, high yields + High quality, firm fruit with good colour, exceptional gloss & outstanding shelf life	Excellent LSL	Open field Greenhouse	180 - 200g	HR: ToMV / Va:[illegible] / Vd:1 / Fol: 1,2,3 / For IR: Ss / TSWV:T0
ROYALTY F1	+ TYLCV / F3 with Firmness + Robust plant with compact internodes + Consistent fruit size with oustanding firmness, strong against weather-marking + Great shape - flat round - demanded by markets + Fantastic fruit set of 5-6 large fruit per truss	Excellent	Open field	180 - 200 g	HR: Va:1 / Vd:1 / Fol:1,2,3 IR: Ss / TYLCV
TAGLIS F1 (H) NEW	+ Excellent Fruit Quality + Strong, versatile, vigorous plant with dense cover & strong weather tolerance + Good cracking resistance, high yield potential + Great quality, uniformity & colour	Excellent	Open field Greenhouse	150 - 190 g	HR: ToMV / Vd:1 / Fol:1,2 / Ff / For IR: TYLCV / Mi / Mj
DETERMINATE HYBRID - ROUND/GOURMET					
BREAKER F1 (H) NEW	+ Great Quality, Firmness & Shelf Life + Vigorous plant, high yielding with excellent weather resistance + High quality & uniform colour with good gloss + Attractive, flatter, round shaped fruit	Excellent	Open field	150 - 180g	HR: ToMV / Va:1 / Vd:1 / Fol: 1,2 IR: TYLCV / Ma / Mi / Mj / Ss
INDETERMINATE HYBRID - ROMA					
BLAZER F1	+ Bright Red Colour & Good Firmness + Excellent plant vigour for fruit production, high yield potential + Slightly longer style fruit with good size + Fruit setting under hot conditions is strong	Very good	Open field Greenhouse	120 - 145g	HR: ToMV / Va:1 / Vd:1 / Fol:1,2,3, / Lt IR: TSWV:T0 / Ma / Mi / Mj
COLIBRI F1	+ Standard for Egg Roma Production in Greenhouses + Mid shelf life + Vigorous plant, producing large Roma tomatoes in the European style with a slight nipple + Very grower friendly	Mid-life	Open field Greenhouse	130 - 150g	HR: ToMV / Va:1 / Vd:1 / Fol:1,2 / For IR: Ss, Ma / Mi / Mj
COLT F1	+ A Future Market Leader + Produces high quality, true egg shape fruit, without nippling, best new indeterminate Roma tomato available for fresh market + Very uniform, large size, very good against weather marking & exceptional shelf life	Excellent	Open field	130 - 150g	HR: Va:1 / Vd:1 / Fol:1,2,3 / Pst

DUNCAN F1

F3, TSWV & CLEAN LARGE FRUIT



TAGLIS F1 (H)

EXCELLENT FRUIT QUALITY

vegetablesWA

Products » Tomato » Cherry » Oval » Ornela F1

Ornela F1

First mini san-marzano with multi virus resistance.Excellent yield and leaf disease resistance.

- Mini San Marzano with very high leaf and virus resistance.
- Very high yield potential.
- Good set in cool and hot times.
- High fruit brix with very good taste.
- For production open field or under protection.
- Resistances : Vd,F1,ToMV,Mi,Mj,PTO,TYLC,TSWV

HR/IR >
Resistance Legend >

We would be happy to assist you just click here >

Terms and Conditions

vegetablesWA

Pumba

Hybrid Grape Tomato

- Indeterminate. Very productive plant
- Fruit holds its size to the top of the plant
- Grape shaped fruit weight 15 - 20g
- Strong plant with good vigour
- Good fruit cover
- Very good shelf life

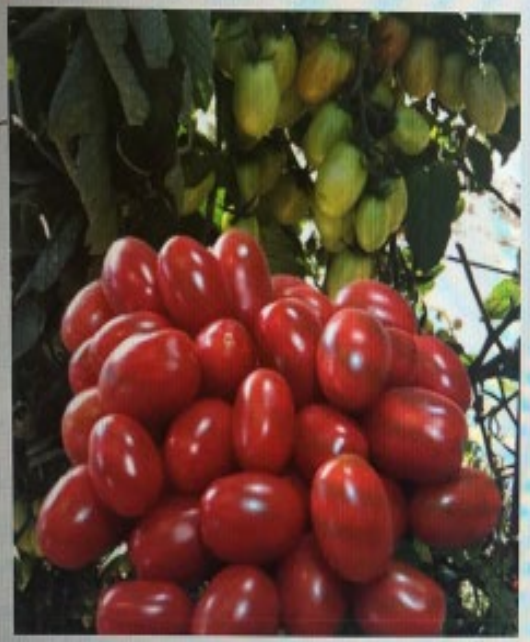
Additional comments and cultural notes

vegetablesWA

SEEDS

CONTACT US AUSTRALIAN ONIONS

PUMBA



US Agriseeds

Very productive plant. Fruit holds its size to the top of the plant. Strong plant wit
life.

BRAND:

US Agriseeds

TYPE:

Hybrid

MATURITY FROM TRANSPLANT:

10 weeks

PLANT HABIT:

Indeterminate

FRUIT TYPE:

Grape shaped, red. 15 - 20g

PACK SIZE:

500 / 2,000 seeds

DISEASE RESISTANCE:

Good tolerance to TYLC and TSWV observed

TECHNICAL SHEET:

vegetablesWA

Disease Terminology (Internationally)

23. *Solanum lycopersicum* (ex *Lycoperscicon esculentum*) (Tomato)

Scientific name	English common name	Code
Viruses		
Beet curly top virus	Curly top	BCTV
Cucumber mosaic virus	Cucumber mosaic	CMV
Pepino mosaic visus	Pepino mosaic	PepMV
Tobacco mosaic virus	Tobacco mosaic	TMV
Tomato apex necrosis virus	Tomato apex necrosis	ToANV
Tomato mosaic virus	Tomato mosaic	ToMV
Tomato torrado virus	Tomato torrado	ToTV
Tomato spotted wilt virus	Tomato spotted wilt	TSWV
Tomato yellow leaf curl virus	Tomato yellow leaf curl	TYLCV
Bacteria		
Clavibacter michiganensis subsp. *michiganensis*	Bacterial canker	Cmm
Pseudomonas corrugata	Pith necrosis	Pc
Pseudomonas syringae pv. *tomato*	Bacterial speck	Pst
Ralstonia solanacearum	Bacterial wilt	Rs
[4] *Xanthomonas campestris* pv. *vesicatoria*	Bacterial spot	Xcv
Fungi		
Alternaria alternata f. sp. *lycopersici*	Alternaria stem canker	Aal
Alternaria solani	Early blight	As
Corynespora cassiicola	Target spot	Cc
[5] *Fulvia fulva* (now *Passalora fulva*)	Leaf mold	Ff (now Pf)
Fusarium oxysporum f. sp. *lycopersici*	Fusarium wilt	Fol
Fusarium oxysporum f. sp. *radicis-lycopersici*	Fusarium crown and root rot	For
Leveillula taurica (anamorph: *Oidiopsis sicula*)	Powdery mildew	Lt
Oidium neolycopersici	Powdery mildew	On
Phytophthora infestans	Late blight	Pi
Phytophthora parasitica	Buckeye fruit and root rot	Pp
Pyrenochaeta lycopersici	Corky root rot	Pl
Stemphylium botryosum f. sp. *lycopersici*	Gray leaf spot	Sbl
Stemphylium lycopersici	Gray leaf spot	Sl
Stemphylium solani	Gray leaf spot	Ss
Verticillium albo-atrum	Verticillium wilt	Va
Verticillium dahliae	Verticillium wilt	Vd
Nematodes		
Meloidogyne arenaria	Root-knot	Ma
Meloidogyne incognita	Root-knot	Mi
Meloidogyne javanica	Root-knot	Mj

SEEDS FOR LIFE
International Seed Federation

7. *Capsicum annuum* (Pepper)

Scientific name	English common name	Code
Viruses		
Chilli veinal mosaic virus	Chilli veinal mosaic	ChiVMV
Cucumber mosaic virus	Cucumber mosaic	CMV
Paprika mild mottle virus	Paprika mild mottle	PaMMV
Pepper mild mottle virus	Pepper mild mottle	PMMoV
Pepper mottle virus	Pepper mottle	PepMoV
Pepper yellow mosaic virus	Pepper yellow mosaic	PepYMV
Potato Y virus	Potato Y	PVY
Tobacco etch virus	Tobacco etch	TEV
Tobacco mild green mosaic virus	Tobacco mild green mosaic	TMGMV
Tobacco mosaic virus	Tobacco mosaic	TMV
Tomato mosaic virus	Tomato mosaic	ToMV
Tomato spotted wilt virus	Tomato spotted wilt	TSWV
Bacteria		
Ralstonia solanacearum	Bacterial wilt	Rs
Xanthomonas campestris pv. *vesicatoria*	Bacterial spot	Xcv
Fungi		
Colletotrichum acutatum	Anthracnose	Ca
Colletotrichum capsici	Anthracnose	Cc
Colletotrichum gloeosporioides	Anthracnose	Cg
Fusarium oxysporum f. sp. *capsici*	Fusarium wilt	Foc
Leveillula taurica (anamorph: *Oidiopsis sicula)*	Powdery mildew	Lt
Phytophthora capsici	Buckeye fruit and root rot	Pc
Nematodes		
Meloidogyne arenaria	Root-knot	Ma
Meloidogyne incognita	Root-knot	Mi
Meloidogyne javanica	Root-knot	Mj

8. *Citrullus lanatus* (Watermelon)

Scientific name	English common name	Code
Viruses		
Cucumber vein yellowing virus	Cucumber vein yellowing	CVYV
Cucumber mosaic virus	Cucumber mosaic	CMV
Papaya ringspot virus	Papaya ringspot	PRSV
Squash leaf curl virus	Squash leaf curl	SLCV
Watermelon mosaic virus	Watermelon mosaic	WMV
Zucchini yellow mosaic virus	Zucchini yellow mosaic	ZYMV
Fungi		
Colletotrichum orbiculare	Anthracnose	Co
Fusarium oxysporum f. sp. *niveum*	Fusarium wilt	Fon
Podosphaera xanthii	Powdery mildew	Px

11. *Cucurbita pepo, C. maxima, C. moschata* (Squash and pumpkin)

Scientific name	English common name	Code
Viruses		
Cucumber mosaic virus	Cucumber mosaic	CMV
Luffa yellow mosaic virus	Luffa yellow mosaic	LYMV
Papaya ringspot virus	Papaya ringspot	PRSV
Squash leaf curl virus	Squash leaf curl	SLCV
Squash mosaic virus	Squash mosaic	SqMV
Watermelon mosaic virus	Watermelon mosaic	WMV
Moroccan watermelon mosaic virus	Moroccan watermelon mosaic	MWMV
Zucchini yellow mosaic virus	Zucchini yellows	ZYMV
Fungi		
Golovinomyces cichoracearum	Powdery mildew	Gc
Fusarium oxysporum f. sp. *cucumerinum*	Fusarium wilt	Foc
Fusarium oxysporum f. sp. *lagenariae*	Fusarium wilt	Fol
Fusarium oxysporum f. sp. *melonis*	Fusarium wilt	Fom
Fusarium oxysporum f. sp. *niveum*	Fusarium wilt	Fon
Fusarium oxysporum f. sp. *radicis-cucumerinum*	Root and stem rot	For
Fusarium solani f. sp. *cucurbitae*	Crown and root rot	Fsc
Phomopsis sclerotioides	Black root rot	Ps
Pythium aphanidermatum	Damping off , Pythium fruit rot (cottony leak)	Pa
Phytophthora capsici	Phytopthora crown and root rot	Pc
Pseudoperonospora cubensis	Downy mildew	Pcu
Podosphaera xanthii	Powdery mildew	Px

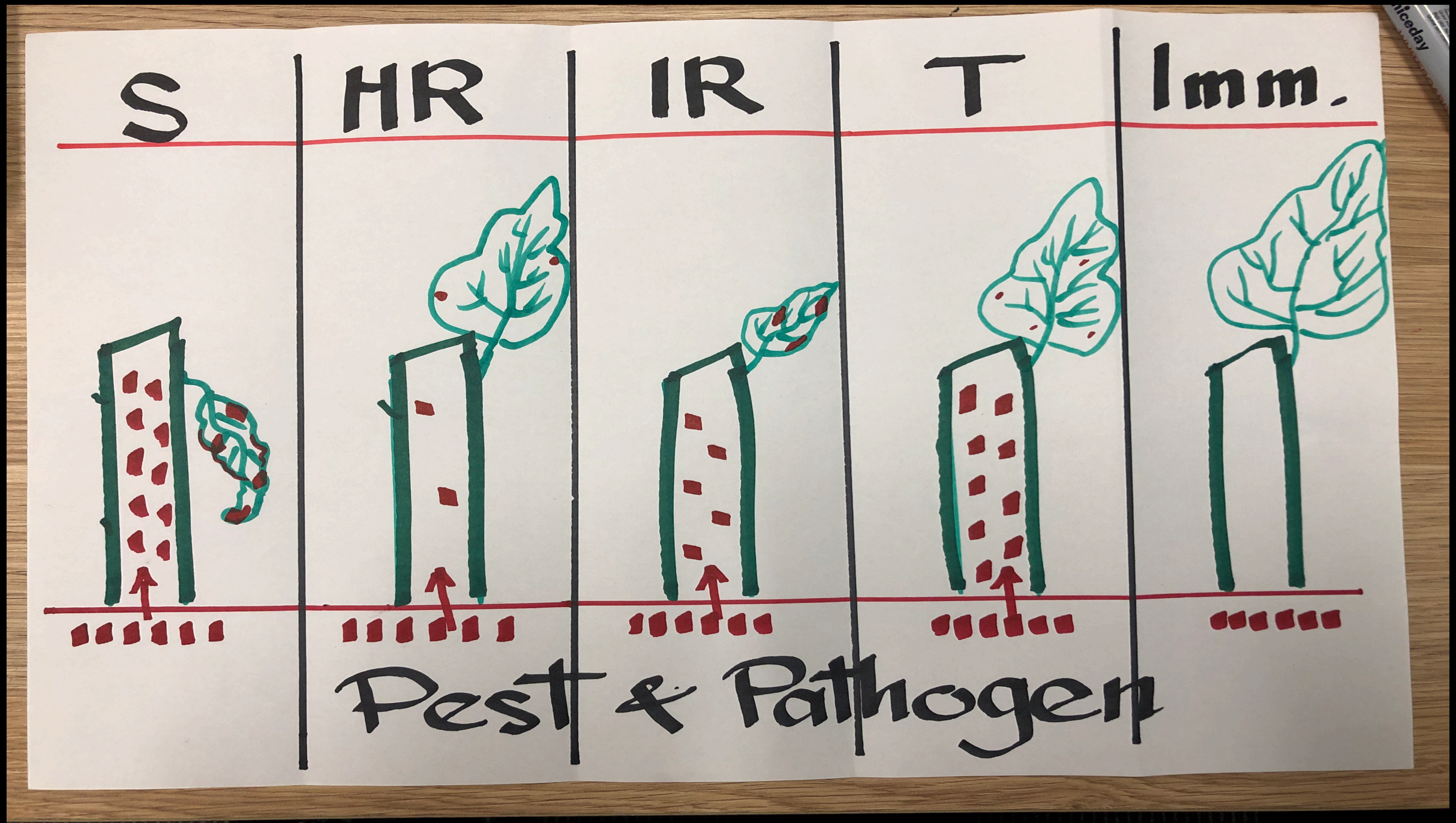
9. *Cucumis melo* (Melon)

Scientific name	English common name	Code
Viruses		
Cucumber green mottle mosaic virus	Cucumber green mottle	CGMMV
Cucumber mosaic virus	Cucumber mosaic	CMV
Cucumber vein yellowing virus	Cucumber vein yellowing	CVYV
Cucurbit yellow stunting disorder virus	Cucurbit yellow stunting disorder	CYSDV
Melon necrotic spot virus	Melon necrotic spot	MNSV
Moroccan watermelon mosaic virus	Moroccan watermelon mosaic	MWMV
Papaya ringspot virus	Papaya ringspot	PRSV
Squash leaf curl virus	Squash leaf curl	SLCV
Squash mosaic virus	Squash mosaic	SqMV
Watermelon mosaic virus	Watermelon mosaic	WMV
Zucchini yellow mosaic virus	Zucchini yellows	ZYMV
Fungi		
Golovinomyces cichoracearum	Powdery mildew	Gc
Fusarium oxysporum f. sp. *melonis*	Fusarium wilt	Fom
Pseudoperonospora cubensis	Downy mildew	Pcu
Podosphaera xanthii	Powdery mildew	Px
Insects		
Aphis gossypii	Cotton aphid	Ag

10. *Cucumis sativus* (Cucumber)

Scientific name	English common name	Code
Viruses		
Beet pseudo yellowing virus	Beet pseudo yellows virus	BPYV
Cucumber green mottle mosaic virus	Cucumber green mottle	CGMMV
Cucumber mosaic virus	Cucumber mosaic	CMV
Cucumber vein yellowing virus	Cucumber vein yellowing	CVYV
Cucurbit yellow stunting disorder virus	Cucurbit yellow stunting disorder	CYSDV
Kyuri green mottle mosaic virus	Cucumber green mottle	KGMMV
Papaya ringspot virus	Papaya ringspot	PRSV
Squash leaf curl virus	Squash leaf curl	SLCV
Watermelon mosaic virus	Watermelon mosaic	WMV
Zucchini yellow mosaic virus	Zucchini yellows	ZYMV
Bacteria		
Erwinia tracheiphila	Bacterial wilt	Et
Pseudomonas syringae pv. *lachrymans*	Angular leaf spot	Psl
Fungi		
Cladosporium cucumerinum	Scab and gummosis	Ccu
Colletotrichum orbiculare	Anthracnose	Co
Corynespora cassiicola	Corynespora blight and target spot	Cca

International Seed Federation


S
HR
IR
T
Imm.
Pest & Pathogen

vegetablesWA

Commonly grown varieties in Carnarvon
Giống thường trồng tại Carnarvon

Tomatoes:

Round: Nemex, Ducan, Pinnacle, Rifle

Cherries: Astuto, Genio, Moscatel, Cherelino

Grapes: Sundance, Ornela, Pumpa

Watermelon: Javelin, Royal Amada, Talca

Capsicum and Peppers: Quattro, Cayman, Hercules, Warlock, Chevi

No currently used variety is immunity to the abovementioned problems

Practicing Farm biosecurity is very important

vegetablesWA

WARNING

FARM BIOSECURITY IN PLACE

Please contact the office before entering.

_____ _____

Do not enter property without prior approval.
Keep to roadways and laneways.
Do not enter growing areas.

AUSVEG Plant Health AUSTRALIA EnviroVeg Horticulture Innovation Australia

LƯU Ý

An toàn sinh học được áp dụng tại trang trại

Vui lòng liên hệ văn phòng trước khi vào.

_____ _____

Không vào trang trại khi chưa có sự đồng ý của chủ trang trại.
Đi theo đúng tuyến đường quy định.
Không đi vào khu vực trồng trọt.

AUSVEG Plant Health AUSTRALIA EnviroVeg Horticulture Innovation Australia

Vegetable & Potato Biosecurity Program

Cucumber green mottle mosaic virus
Bệnh khảm vi-rút trên dưa leo

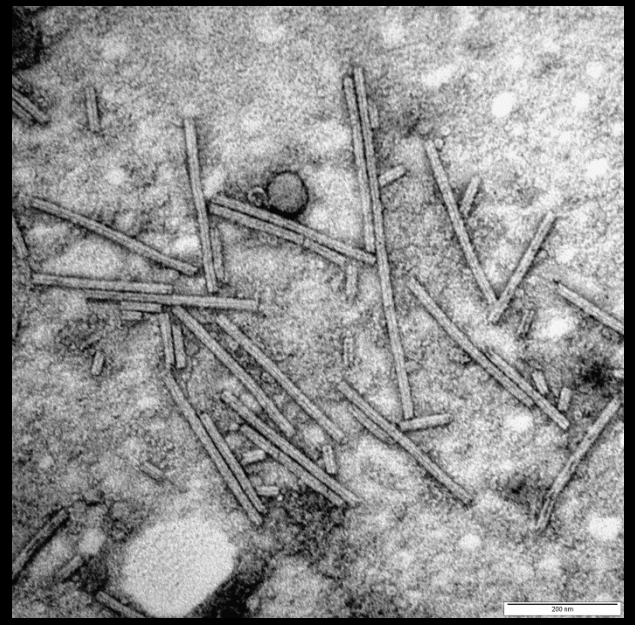
Melon necrotic spot virus
Siêu vi khuẩn gây bệnh thối nâu trên dưa

Võ Thế Truyền – Chuyên viên khuyến nông

vegetablesWA

CGMMV – Background / Bối cảnh

- Tobamovirus
- No insect vector known to transmit / Chưa phát hiện côn trùng lây truyền bệnh
- Very stable / Sống dai
- Highly contagious / Rất dể lây nhiễm
- Seed transmission / Lây được qua hột giống



CGMMV particles from cucumber

- Yield losses – up to 100% / Thiệt hại năng suất đến 100%
- Example – in Israel in 2013, 40% watermelon production lost / Dẫn chứng năm 2013 Israel thiệt hại 40% sản lượng dưa hấu

Symptoms

Symptoms CGMMV vary with species and variety / Các triệu chứng

Infected cucumber

Dr A. Dombrovsky (fruit), Monstano (leaves)

Infected watermelon

B. Conde

- **Leaf mottle / lốm đốm mất màu xanh không đồng đều**
- **Leaf distortion / Lá co rút dị dạng**
- **Stunted plant / Cây không lớn**
- **Plant death / chết cây**
- **Fruit abortion / Thui trái**
- **Fruit malformation / trái dị dạng**
- **Flesh breakdown / trái hỏng ruột**

Hosts

Mainly restricted to Cucurbitaceae ?chủ yếu trong phạm vi họ bầu bí dưa

<u>Crops / Các loại hoa màu</u>

- **Cucumber (*Cucumis sativus*) /dưa leo**
- **Watermelon (*Citrullus lanatus*) / dưa hấu**
- **Rockmelon and honeydew melon (*Cucumis melo*) / Dưa lưới và hoàng kim**
- **Bottle gourd (*Lagenaria siceraria*) / bầu**
- **Zucchini and squash (*Cucurbita pepo*) / Bí ngồi và squash**
- **Pumpkin – butternut and jarrahdale (*Cucurbita maxima, C. moscata*) / Các loại bí rợ**

<u>Weeds / có dại</u>

Afghan/paddy melon (*Citrullus lanatus*) / dưa hấu hoang

Blackberry nightshade (*Solanum nigrum*) / (cà dại)

Fat hen (*Chenopodium album*) / cỏ nhám

Amaranth (*Amaranthus sp.*) / cây dền

Spread within crop/Lây nhiễm trong cùng mùa vụ

vegetablesWA

Mechanical (sap) – pruning, staking, handling plants (hands, tools, clothing, equipment)
Lây nhiễm cơ học (qua nhựa cây) : bấm lá, lặt chèo, quấn ngọn (tay, dụng cụ…)

Machinery/vehicles – moving soil or damaging plants
Máy móc : mang đất nhiễm bệnh đến

Contaminated soil (infected plant debris) – infects new plants through roots
Từ đất có mầm bệnh trong xác bả cây nhiễm bệnh

Root to root contact – infected plant roots growing into healthy plant roots
Rể cây tiếp xúc nhau - rể cây bệnh chạm vào rể cây khác

Contaminated water – virus infects roots
Nguồn nước có mầm bệnh do tiếp xúc rể cây bệnh

Intensive cultivation and frequent crop handling will increase spread / Thâm canh liên tục gia tang khả năng Xâm nhiễm bệnh

vegetablesWA

CGMMV and MNSV (Melon necrotic spot virus)
Siêu vi khuẩn gây bệnh thối nâu trên dưa

vegetablesWA

What is Melon necrotic spot virus
Siêu vi khuẩn gây bệnh đốm nâu trên dưa là gì?

Melon necrotic spot virus (MNSV) is a member of the *Carmovirus* genus, which can result in severe yield losses in melon and cucumber crops.

Siêu vi khuẩn gây bệnh đốm nâu trên dưa (Melon necrotic spot virus - MNSV) là một loại thuộc chi *Carmovirus* – là nhóm siêu vi khuẩn có thể gây thiệt hại nghiêm trọng về năng suất trên các loại dưa

vegetablesWA

Where is it now?

MNSV has been reported in the Americas, Europe, Asia and parts of Africa and the Caribbean. Melon necrotic spot virus (MNSV) is considered exotic to Australia yet symptoms detected during 2012 within NSW were consistent with that of MNSV. Diagnostic work is ongoing to determine the status of MNSV in Australia.

Bệnh MNSV đã xuất hiện ở đâu?

Bệnh MNSV đã được ghi nhận ở các nước châu Mỹ, châu Âu, châu Á và một phần châu Phi và Địa Trung Hải. Bệnh này được xếp vào loại bệnh ngoại lai trên nước Úc, tuy nhiên triệu chứng bệnh quan sát được vào năm 2012 ở NSW rất tương đồng với triệu chứng bệnh MNSV. Công tác chẩn đoán bệnh vẫn đang được tiến hành để xác định tình trạng bệnh MNSV trên nước Úc

vegetablesWA

Symptom in Carnarvon watermelon

It’s better to have the sample test

Nên được xét nghiệm bệnh

vegetablesWA

Melon necrotic spot virus (MNSV) is considered exotic to Australia.

Symptoms detected during 2012 within NSW were consistent with that of MNSV. Diagnostic work is ongoing to determine the status of MNSV in Australia.

Bệnh này được xếp vào loại bệnh ngoại lai trên nước Úc.

Triệu chứng bệnh quan sát được vào năm 2012 ở NSW rất tương đồng với triệu chứng bệnh MNSV. Công tác chẩn đoán bệnh vẫn đang được tiến hành để xác định tình trạng bệnh MNSV trên nước Úc

vegetablesWA

Commonly grown varieties in Carnarvon
Giống thường trồng tại Carnarvon

Tomatoes:

Round: Nemex, Ducan, Pinnacle, Rifle

Cheries: Astuto, Genio, Moscatel, Cherelino

Grapes: Sundance, Ornela, Pumpa

Watermelon: Javelin, Royal Amada, Talca

Capsicum and Peppers: Quattro, Cayman, Hercules, Warlock, Chevi

No currently used variety is immunity to the abovementioned problems

Practicing Farm biosecurity is very important

vegetablesWA

WARNING

FARM BIOSECURITY IN PLACE

Please contact the office before entering.

_____ _____

Do not enter property without prior approval.
Keep to roadways and laneways.
Do not enter growing areas.

AUSVEG Plant Health AUSTRALIA EnviroVeg Horticulture Innovation Australia

LƯU Ý

An toàn sinh học được áp dụng tại trang trại

Vui lòng liên hệ văn phòng trước khi vào.

_____ _____

Không vào trang trại khi chưa có sự đồng ý của chủ trang trại.
Đi theo đúng tuyến đường quy định.
Không đi vào khu vực trồng trọt.

AUSVEG Plant Health AUSTRALIA EnviroVeg Horticulture Innovation Australia

Vegetable & Potato Biosecurity Program

Primary infection / introduction

- Sowing infected seed – primary introduction into new areas

Virus remains dormant within seed coat until germination

Seed transmission levels up to 20%

- Planting infected seedlings/rootstock

- Contaminated soil (contains infected plant debris) moved between properties – machinery, pallets, vehicles, footwear

- Sharing of equipment/personnel between properties – tools, clothing, footwear

vegetablesWA

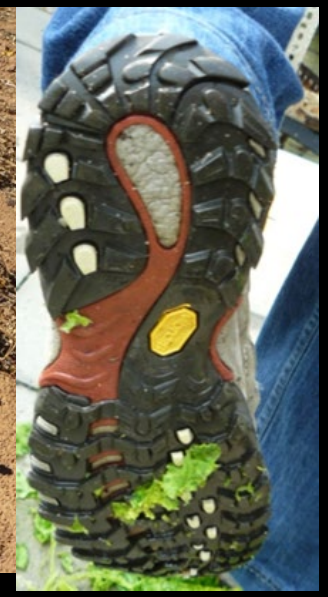
Mechanical (sap) – pruning, staking, handling plants (hands, tools, clothing, equipment)

Machinery/vehicles – moving soil or damaging plants

Contaminated soil (infected plant debris) – infects new plants through roots

Root to root contact – infected plant roots growing into healthy plant roots

Contaminated water – virus infects roots



- **No insect vector known**
- **Chewing insects – may spread by moving infected sap**
- **Bees – hives have been shown to contain virus**

Management/control

Need to use multiple approaches:

- Testing seed/seedlings – phytosanitary certificate
- Monitor plants and test suspect plants early – DAFWA diagnostic testing
- Remove and destroy infected and surrounding plants and fruit (bag, burn)
- Infected crops – spray out with herbicide (Glyphosphate or Glufosinate)
- Plant and fruit debris – destroy (burn, deep burial)
- Soil – prevent movement on machinery
- Avoid planting cucurbit crops into infected soil for 12 months (?)

- Clean and disinfect – use 1% bleach or Virkon S
- Restrict movement of personnel, equipment and vehicles
- Clean pallets

Resistance varieties – none currently available

Diagnostics/testing

- **Seed test for phytosanitary certification (Australia)**
- **9,400 seeds tested from batches over 20,000 seeds**
- **Or 20% of seeds from smaller lots**

- **Suspect plants – submit leaves for testing (DAFWA)**

- **Free testing available**

vegetablesWA

Implement biosecurity practices

DPIRD does not intend to take any regulatory action or quarantine properties

Test suspect plants

Restrict vehicle, equipment, personnel movement onto and within properties

Hygiene practices

Work together

vegetablesWA

Implement biosecurity practices

Participate in currently running projects

What next /các bước tiếp theo

Implement biosecurity practices
Áp dụng các biện pháp an ninh sinh học

DPIRD does not intend to take any regulatory action or quarantine properties
Bộ Nông nghiệp KHÔNG có ý định cô lập hay cấm đoán trang trại sản xuất

Test suspect plants
Giám đinh mẩu cây nghi ngờ

Restrict vehicle, equipment, personnel movement onto and within properties
Hạn chế di chuyển trong phạm vi trang trại và giửa các trang trại

Hygiene practices / Thựa hành vệ sinh trang trại

Work together / Hợp tác phòng trừ bệnh

CGMMV Biosecurity Update

Supported by
Royalties for Regions, DPIRD, ORDCO,
ORIA cucurbit growers

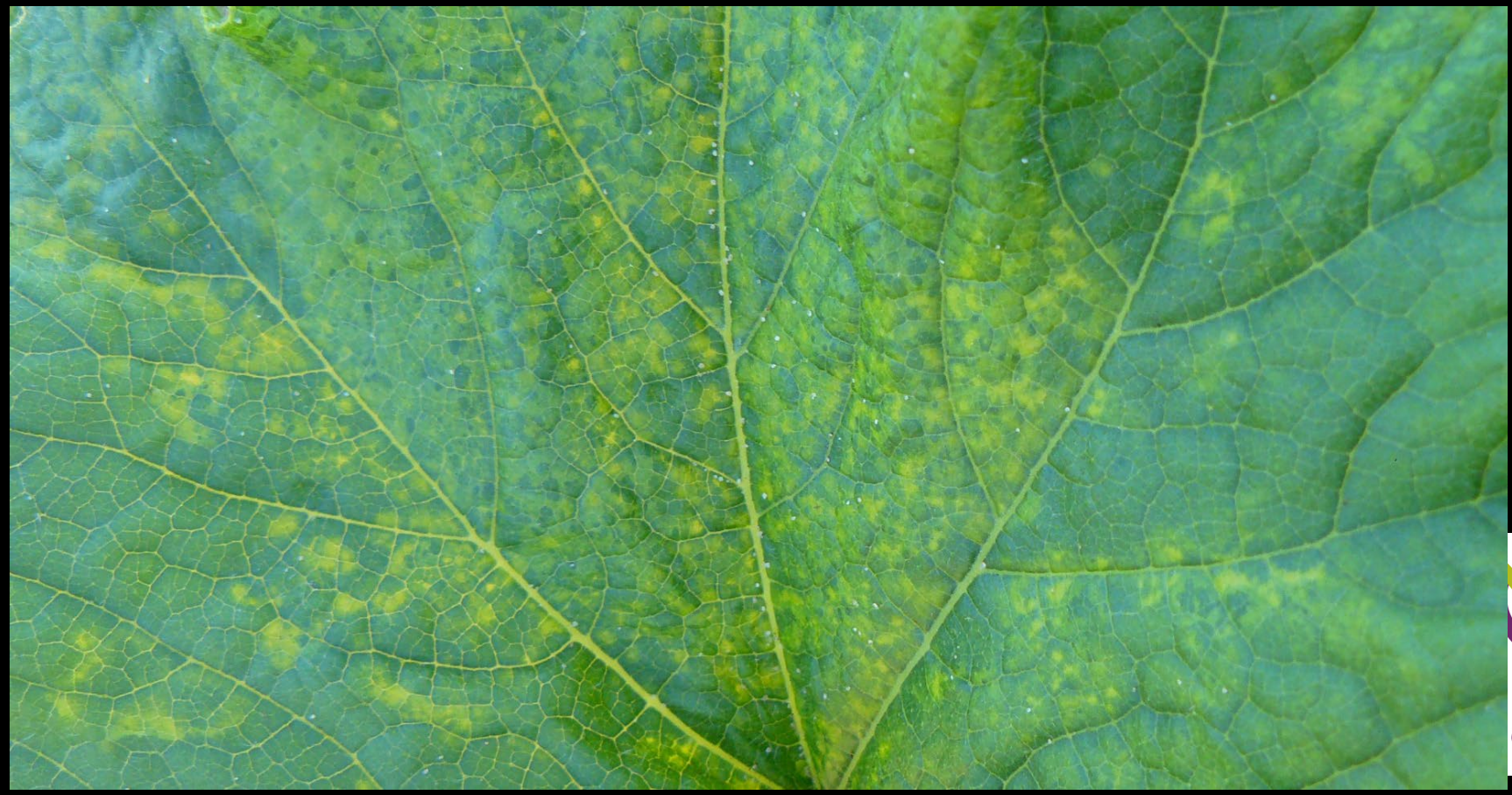
VG15013 Improved management options *for Cucumber green mottle mosaic virus*

Craig Webster, Development Officer
DPIRD Diagnostic and Laboratory Services

Supporting your success

VG16086 : Area Wide Management of Vegetable Diseases

Viruses and Bacteria



vegetablesWA

Project scope

- Industry outcomes
  - Informed decision making for disease management
  - Education on the benefits for area wide approaches
  - Enhanced preparedness to key exotic threats
- Project team:
  - Government Agriculture Agencies

  from QLD, Vic, WA, NT and TAS
  - Private research providers

  (QLD, NSW, WA & Vic)

Western Australia

- Aims:
  - Monitor the distribution and diversity of viruses, vectors and bacteria in vegetable crops
  - Identify any new disease issues.

- Surveys:
  - Geraldton (October/November)
  - Carnarvon (August/September)
  - South-west
  - Kununurra
  - Viruses, vectors and bacteria
  - Capsicum, beans, vegetable brassicas, cucurbits
  - Alternative hosts (viruses and bacteria)

Thank you

Visit dpird.wa.gov.au

Important disclaimer
The Chief Executive Officer of the Department of Primary Industries and Regional Development and the State of Western Australia accept no liability whatsoever by reason of negligence or otherwise arising from the use or release of this information or any part of it.

Copyright © Department of Primary Industries and Regional Development, 2018

Acknowledgements

vegetablesWA

Practicing Farm biosecurity is very important

Vegetable & Potato Biosecurity Program

vegetablesWA

National Vegetable Extension Network
WESTERN AUSTRALIA

apc
AGRICULTURAL PRODUCE COMMISSION
Supporting Producers' Initiative

Thank You
Cám ơn

This project has been part funded by Agriculture Produce Commission and by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

Adopting soil moisture monitoring innovation to fine-tune irrigation practices – a Carnarvon grower experience.

Vo The Truyen – Vietnamese Field Extension Officer, VegetablesWA.

Declining underground water resources is a serious issue to Western Australia horticulture.

Several projects such as Water for food (Carvarvon), More dollar per drop (WA), and Assessment grower practices on irrigation, fertilizer, and pest and disease management (Perth and Carnarvon) have been implementing by governmental and industry bodies to explore more water and to improve the water use efficiency.

In line with that effort WA vegetable growers are also fine-tuning the conventional irrigation practices toward making the most use of limited water allocation to increase profit.

This article is to share experience from a Carnarvon tomato grower, Su Tran, on how he has learned and benefited from using different soil moisture monitoring devices. Su's learning curve over years trying to understand the soil moisture dynamic and to combine different tools to irrigation decision is amazing.

1. The tensiometer (Manually reading a vacuum gauge)

Su first try was in 2011 to understand the soil moisture status by using the tensiometers, which measurements can be done by manually reading a vacuum gauge.

Photo 1. Tensiometers (http://www.soilmoisture.com/SOILMOISTURE-TENSIOMETER-60-SIZE/, retrieved by 09/02/2018)

Expectation: Su Tran bought these devices with different sizes from a local supplier expecting he could "read the soil water status at different depths" which might help to irrigation decision.

Trying: It was easy for Su to plant the tensiometers at different soil depths in a tomato bed and read numbers on their gauges. In contract, it is very difficult to establish the correlation between the readings and the soil water status to establish irrigation schedule and the shift time.

Learning: Advices on how to install, management and how the tensiometer work were given by the local supplier when Su buy the tools. He thought he could learn while adopting this innovation regardless the fact that he could not up take technical advices in full with his limit English.

He has struggled to figure out what a reading mean, how they tell the soil water status, and why the gauge reading remaining on zero. In reality it was hard to for Su figure out why the reading variation did not match with his hand observation on the soil moisture and with observation of the crop appearances. Su could not obtain clear benefit from trying this.

Moreover, manually readings after every irrigation shift is disruptive to Su's routine tasks.

Adoption: after a season playing with tensiometers Su decided to dis-adopt these tools.

Discussion: Tensiometer is a knowledge-based innovation in soil moisture monitoring. It requires a certain level of basic knowledge on physic and soil science to successfully adopt this additional tool to irrigation decision.

In principle, the tensiometer measures how hard it is to remove water from the soil (at different depths) which is said providing "the best indication of available water for plants". Fluid drawn in and out of the tensiometers porous tip, depending on water availability, creates a suction pressure representing the suction force required for a plant to obtain water from the soil.

Tensiometers need skills to manage and to interpret of readings. The most common problems in their use are the tensiometer not positioned within the crop's root zone and the irrigation wetting pattern and the gauge reading remaining on zero. Tensiometers need regular attention too. Some air does enter through the ceramic tip and sometimes through joins, particularly at high tension which influences the gauge reading. Grower adopters do not always understand these, thus hard to achieve success.

Growers with limit science knowledge need a proper training, especially with those who speak language other than English, to successfully adopt this knowledge-based innovation to irrigation decision.

2. Soil moisture monitoring on the web

Su Tran was then introduced to a "smart" soil moisture monitoring on the web – Outpost central early 2017 with a year free trial when he participated in an irrigation, fertilizer, pest and disease management project (this project was funded by Gascoyne Development Commission, the Department of Agriculture and Food with assistance from vegetablesWA). Through this trial Su has learned and quickly picked up the benefits having this soil moisture monitoring device in irrigation decision and invested 2 more sets for other plots in his tomato farm.

Expectation: Su expected to learn something useful assisting irrigation decision while enjoying a year free trial and technical services having a set of "smart" soil moisture monitoring on the web – Outpost Central on his farm.

Trying: The hardware of this soil moisture monitoring on the web – Outpost Central is a combination of soil moisture probes connecting to a compact digital data logger.
Interestingly, the soil moisture probes are tensiometers that are similar to those that Su has tried years ago except the readings are automatically transferred to the datalogger.

The data logger comprises of a powerful data recorder and modem. This device collect data from attached tensiometers. Once activated the unit is pre-programmed to send data to the service provider web site as often as the project demands for charting, storage and backup. In a free one-year trial, a soil moisture specialist – Scott Brain, from Carnarvon-based agronomy service provider Field Capacity - has worked with Su to install and to set up the best monitoring system for his situation. Refill and stress points are set up within the range of soil moisture levels that is believed

best for tomato crop performance. Low and high alarm in forms of SMS is sent to Su's smart phone when the soil moisture comes near to or beyond the stress point.

Service provider sets up the charts (see photos) to display the most complex of information clearly and concisely. Remote unattended monitoring allows Su to know what is going on by reading his cell phone. More importantly the service alerts Su via SMS and email on his smart phone when an alarm event occurs.

Learning: Su Tran reveals that this innovation adoption helps him to gain knowledge on exactly what is happening to moisture levels below the surface allows for detailed analysis of the soil moisture levels for making decisions in irrigation scheduling.

Although the hardware is complex (as compared to the tensiometer that Su has tried before) the information he obtains from it is concise and clear.

The low and high alarm in forms of SMS (see photo) are very helpful assisting irrigation shifting and scheduling. However, Su observed that there is lag between water application, data collection and SMS alert message. Therefore, Su does not totally rely on these advices but using them as additional factor to combine with his observations and experiences to irrigation decision making.

The charts with refill and stress lines creates pictorial imagination on the dynamic of soil moisture below the surface. This facilitate the learning easier and faster. The stable reading at 60cm depth makes Su happy that he could avoid leaching losses from overfull profiles, eliminating fertiliser wastage and environmental concerns.
Maintain close contact to the moisture specialist of the service provider is very important during the learning phase. Beside setting up the system at the beginning the specialist help answer questions and address issues occur during implementing the trial.
Adopting: Su confidence built up over the learning phase during one-year demonstration of this soil moisture monitoring on the web. Su's irrigation practices changed from two-day schedule with long shift time to daily schedule with shorter shift. Although water saving is not achieved but Su is confident that the water use efficiency has improve through better crop performance.
The demonstration tool set is still sitting in his farm, Su has invested 2 more sets for other plots of his farm given that their soil conditions are different.

Discussion:

- Although the hardware this soil moisture monitoring on the web is complex (as compared to the tensiometer that Su has tried before), proper training and demonstration and then closely consultation provided by the soil moisture specialist made it not too difficult for a "language other than English grower" to understand and use.
- Management these new devices are not disruptive Su's routine tasks as he can access data and charts over the cell phone as his convenience.
- As it was shown in the More dollar per drop project report that the alternate irrigation days of existing irrigation practice make crops drought stressed every second day which is significantly limited yields, the change to every day watering Su has made (resulted from of this innovation adoption) is a right move. Su benefited better crop performance as an relative advantage.
- Su has had chance to get a free trial and services to learn and to observe the relative advantage of this soil moisture monitoring tool (better crop performance). This is a contributing factor to adoption.

vegetablesWA
Agricultural Produce Commission
National Vegetable Extension Network WESTERN AUSTRALIA
Hort Innovation Strategic levy investment | VEGETABLE FUND
This project has been funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

Case study

20 years of profitable biodynamic farming

Dugite Farm

Growers	Brett Kirkpatrick and Leonie Inger
Location	Donnybrook, WA
Size	80 hectares
Enterprises	Cabbage, cauliflower, pumpkin & potatoes

Donnybrook farmer Brett Kirkpatrick has been growing vegetables and pastures using compost and biodynamic preparations for over 20 years. His experience is a valuable insight for growers considering a partial or complete adoption of biological farming principles.

Brett Kirkpatrick and Leonie Inger are fourth generation Donnybrook farmers and pioneers in the organic industry. They started growing biodynamic-certified potatoes in 1994 and four years later added cabbage, cauliflower and pumpkin to the rotation.

Their small operation is in hilly country where large scale growing is difficult. Nevertheless, prices received for organic produce means that their small holding is viable. To supplement vegetable production, 80 hectares of pasture is also utilised for rotational grazing of cattle.

While being a certified biodynamic grower, Brett is open to any form of sustainable farming. "I used to be really passionate about biodynamics, but what's happening now is that there's so many different paradigms under 'sustainable farming'. A lot of today's biological products are based on biodynamic preparations that we use to activate soil biology. Biodynamic farming is now just one tool in the toolbox."

Brett agrees that it's certainly a challenge to get the growth that a lot of farmers are used to. But for him, yield comes in behind profitability, sustainability and health.

His system relies heavily on soil biology, but that requires a good understanding of how biological activity is reduced by low temperatures and waterlogging.

Continued >>>

"Each planting of brassicas (on 1,000m^2 plots) gets about four tonnes of compost during the warmer months (40t/ha), but as it gets colder we've found you've got to ramp that up to 12 tonnes (120t/ha). In winter you are literally supplying all the nutrients, whereas in the warmer months the biology is more active and able to make more available per tonne. So I think biodynamics works better with irrigation. When you have soil moisture and warmth you will get more development of the biology. But if we have a leak in summer irrigation we get a yellowness where there is excess water because it has upset the nitrogen cycling.

"We use clover and lupins or peas in green manure mixes that we pre-plant, but the main focus is feeding the soil with compost and getting nitrogen out of the atmosphere."

Nitrogen content in dry compost is typically around 1–3%, and that is slowly released over several years. To speed up the release, Brett adds biodynamic preparations into his compost to increase biological activity and the rate of nitrogen mineralisation. Rock dusts required to supply other nutrients are also put through the compost to make them plant-available more quickly. And Brett likes to give his compost plenty of time to mineralise.

"A lot of people put compost out too soon when it hasn't broken down sufficiently. You want to put a compost out that doesn't smell like ammonia anymore, but smells like earth."

Patience is indeed a key to biological farming, especially in the transition phase, and making drastic changes may lead to failure.

"I have to say that with biodynamics it takes time. So in the early stages of transitioning you may need to buffer your activities. But if you are going to put out nitrogen, put sugar or molasses with it to support the biology."

Brett believes that balancing the soil carbon to nitrogen ratio will help to achieve a more functional soil biology.

"I think the main opportunity for conventional farmers is that compost can help buffer their nitrogen use. When they put out nitrogen they are consuming their carbon, which is going to be slowly eaten away. Compost or other carbon-based inputs can be applied with nitrogen to support the biology."

In terms of pasture and hay paddocks, Brett's rates are much more conservative, and he has learnt the importance of long-term monitoring for deficiencies in soil fertility.

"I'm putting out about a tonne to the acre of compost (2.5t/ha) once a year when there's still a bit of rain to wash it in. This is combined with rotational grazing of 100 Angus and Murray Greys in 38 paddocks over 80ha.

"When we first changed over to biodynamics one of the first things my father noticed was that the calves on average were 50–60kg heavier than on his farm. But that doesn't seem to be the case now. Its almost like the biodynamics complemented the nutrients that my father had been putting on for years, for a period, and then it started to decline."

In 2014 Brett took part in a whole farm nutrient mapping project funded by South West Catchments Council. "That was a real insight and the first time we did tissue testing." Results showed that potassium levels were pretty good in most places, sulphur was needed, and that the huge buffer

of phosphorus from the days of conventional farming was starting to get low.

"We hadn't put any phosphorus on for probably 15–20 years. Trace element deficiencies were also starting to show up."

It is an incredible example of the time it can take before deficiencies start to appear. While realising that he could have started a nutrient monitoring and maintenance programme earlier, it seems he didn't leave it too late, and it turned out to be a useful learning experience.

"A lot of the farms around me have stopped using any inputs. It was interesting to see how their farms declined much faster than mine did. Other than a few lime and dolomite amendments I was using biodynamics solely. Since I started putting other inputs in, trying to get the mineral balance right, my farm is starting to stand out again."

MORE INFORMATION ▸

For further information contact Sam Grubisa on 0427 373 037 or email Sam at sam.grubisa@vegetableswa.com.au.

The South West Catchments Council nutrient mapping project was supported through funding from the Australian Government.

vegetablesWA
Agricultural Produce Commission
National Vegetable Extension Network WESTERN AUSTRALIA
Hort Innovation Strategic levy investment
VEGETABLE FUND

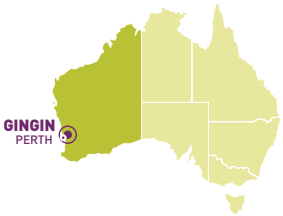
This project has been funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

vegetablesWA
Agricultural Produce Commission
National Vegetable Extension Network WESTERN AUSTRALIA
Hort Innovation Strategic levy investment | VEGETABLE FUND
This project has been funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

Case study

Agrimaster

Glavocich Produce



Growers	Paul & Crystal Glavocich
Location	Gingin, WA
Size	70 acres
Enterprises	Garlic, parsnips, sweet potatoes, zucchini, eggplant, silverbeet and kale

Paul and Crystal have been in Gingin growing vegetables for the past few years however have only been out on their own since July 2016.

When they went out on their own it came with its own set of challenges, they had previously grown vegetables South of Perth and knew the challenges they would face with new soil conditions were only the start.

As they were starting from scratch they looked at setting up new systems, one of which was their finance system with Agrimaster. They were using a consultant BJW Agribusiness who was helping to keep them focused so every three months they were looking at their finances.

By setting up Agrimaster it has allowed Crystal to be able to stop manually working out the profit on each of their lines which was taking up way too much time with a new baby.

Crystal can now spend two hours per week getting their finances up-to-date and have a full understanding on each produce line. This helps Paul manage the growing side of their business.

Crystal says knowing the average price for the products you are sending to the market and exactly the number of crates has made a significant improvement to the business. She said "If we don't track everything we will go broke! It isn't about how much money you have in the bank you have to understand the details in order to be able to ensure the bills don't creep up on you and you know your costs."

The Agrimaster support team has been a huge help as they are available on the phone or use their website to find FAQ's or a better understanding from other people's questions. Juggling a new baby, a business and a home can be hard work however Crystal is making sure she is using the tools so she has extra time to spend with Paul and baby Benjamin. The discipline on ensuring that you enter the data regularly has helped their business to know what each line is doing. They can now look at when they are selling and what season they should be growing in to make the most money.

MORE INFORMATION ▸

For more information on business management contact Sam Grubisa at sam.grubisa@vegetableswa.com.au or on 0427 373 037.

You can also find out more on their website agrimaster.com.au

This project has been funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

Case study

Using machinery to spread metham sodium

Sativa Farm

Growers	Dobra Family
Location	Cullalla, WA
Size	800 acres
Enterprises	Cos, spinach, rocket, tatsoi, mizuna, kale and baby leaf lettuce

Sativa Farms is one of the production farms for Loose Leaf Lettuce Company, owned by Maureen, Barry and their son Kevan Dobra.

Kevan has been working the property for 12 years with his Farm Manager son Jase, the fifth-generation in the Dobra family. While livestock and broadacre farming cover a majority of the land, the "loose leaf" operation is what I came to see.

Kevan and Jase have their work cut out for them, cropping 110 acres of cos, spinach, rocket, tatsoi, mizuna, kale and baby leaf lettuce in rotation.

Being on a property that's out of reach of the sea breeze with temperatures reaching a scorching 50°C, two of the growing sites have a specially adapted overhead irrigation system that can help combat the searing heat of summer.

Seeing a huge open ground cropping area that appears to have its own rain clouds hovering above is as innovative as it is big.

Unsurprisingly, the irrigation system is not the only forward thinking this family is undertaking.

The 'made to spec' machinery is a trio of innovation. First off, the remote-controlled harvester, that can cut whole head cos as well as the baby leaf, is an impressive piece of machinery. Then you have the massive dual job bed former/ rotary hoe hybrid. But it was the 3-in-1 smudger that really is the most innovative.

Long hours, inclement weather conditions and the physical nature of the farm inspire all growers to design pieces of machinery that will make their day just that bit easier; and this is exactly what Kevan and Jase have done.

Continued >>>

What started as a self-welded, single run smudger has become a three job behemoth. With just a single pass this machine forms three 'ready for planting' beds; with tire tracks and tops so flat they look like tables... job one. It seals the top of the beds so there is no need for rolling... job two. Its third and final job is the most impressive of all... it methams.

Yes, one of the most unpleasant jobs on a Western Australian farm is made almost easy with this innovation.

Ensuring the tractor has the appropriate door/window seals and air filters, a 1,000L metham sodium tank is securely mounted on top of the smudger, eliminating the need for decanting the product which may result in possible hazardous exposure. There is a separate metered pump for each bed former, so each bed receives the correct rate of chemical application. PVC pipes (non-corrosive, easily replaced and relatively inexpensive) with evenly spaced, pre-drilled holes are connected to the pumps and mounted behind a cutting blade that slices 60mm beneath the top of the formed bed.

This method injects the metham deep enough for the chemical to be effective, without the fumes being released to the immediate atmosphere.

As the tractor moves along at around 9km/h, a hectare can be fumigated in under 10 minutes. With the beds formed, fumigated and sealed with one machine in under 10 minutes, irrigation can be applied to activate the chemical reaction with little to no leaching. During application, spray drift by atmospheric and temperature inversion is virtually eliminated, keeping the chemical within the target area.

By keeping the chemical within the target area its effectiveness as a soil fumigant, with the added benefit of a preemergence herbicide, is significant; 8–10 weeks in Winter and 5+ weeks in Summer.

Seeing the machine in action had me applauding the family. Seeing machinery that is not only innovative but ticks all the boxes for on farm best practice has enormous benefits for the family. This provides safety, reduced costs and a piece of innovative farm equipment.

MORE INFORMATION ▸

If you would like further information contact Sam at **sam.grubisa@vegetableswa.com.au**

vegetablesWA
Agricultural Produce Commission
National Vegetable Extension Network WESTERN AUSTRALIA
Hort Innovation Strategic levy investment
VEGETABLE FUND

This project has been funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

Hiểu biết độ pH đất trong canh tác rau màu

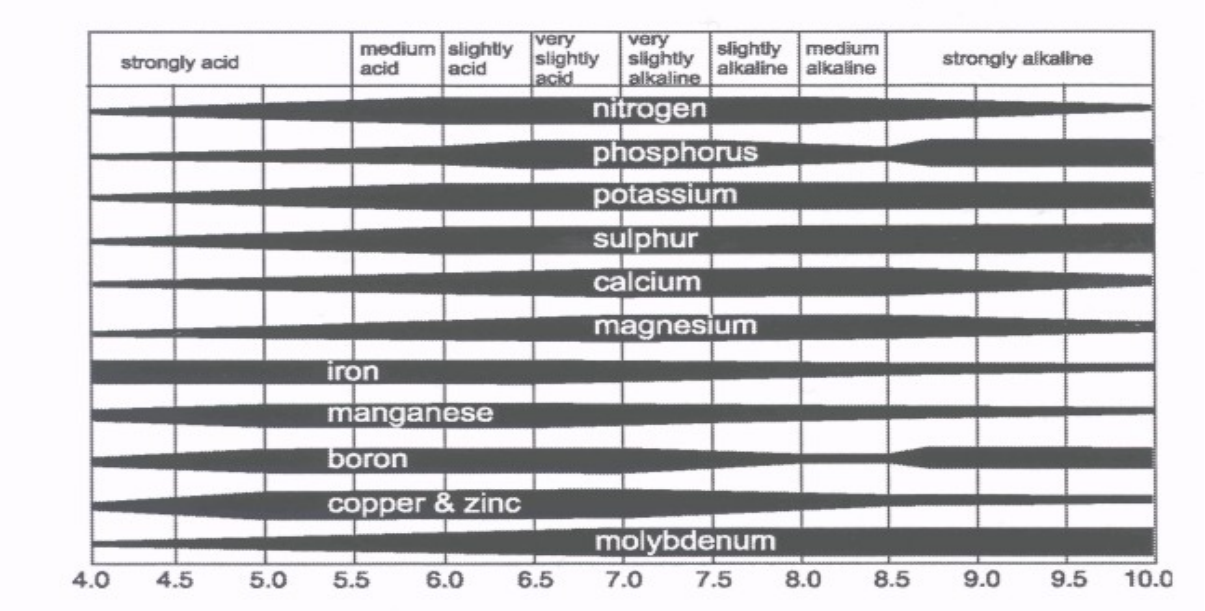
Võ Thế Truyền, chuyên viên khuyến nông, Hiệp hội Rau cải Tây Úc.

Một tài liệu về độ pH đất và ảnh hưởng của độ pH đối với dinh dưỡng cây trồng đã được đăng trong ấn bản mùa hè 2015 của tạp chí chuyên ngành của Hiệp hội rau cải. Tài liệu này trình bày các kiến thức căn bản về độ pH đất và tác động của độ pH lên dinh dưỡng cây trồng chũng như các biện pháp canh tác làm thay đổi độ pH trong đất canh tác.
Gần đây nông dân trồng rau màu ở khu vực phía bắc Perth phản ánh một số trường hợp ghi nhận ph đất xuống thấp gây ảnh hưởng đến sinh trưởng, chất lượng sản phẩn rau màu và dường như gia tăng thêm bệnh trên cây trồng.
Bài viết này một lần nữa giúp ôn lại kiến thức căn bản về độ pH đất và tác động của pH đất đến sự phát triển của hoa màu trên trang trại thương mại.

Kiến thức căn bản về độ pH đất
Trong thuật ngữ chuyên môn độ pH đất là giá trị đo đếm độ a-xít hay độ kiềm của đất mà trong dân gian hay gọi là độ chua. Độ pH có giá trị trong khoảng từ 0-14. Giá trị 7 là trung tính (không chua không kiềm). Giá trị càng giảm về 0 thì độ chua càng cao.
Điều quan trọng cần nên biết là giá trị độ pH tăng giảm 1 số thì độ chua tăng giảm 10 lần.

Ảnh hưởng của độ pH đất đến dạng tồn tại của các chất dinh dưỡng mà cây trồng hấp thu được
Ý nghĩa của độ pH đất trong nông nghiệp chính ở chổ yếu tố này ảnh hưởng đến độ hửu dụng của các chất dinh dưỡng trong đất mà cây trồng hấp thu được.
Chất dinh dưỡng trong đất nếu hiện diện dưới dạng cây trồng không hấp thu được thì cho dù phân bón vẫn được cung cấp bình thường vẫn có thể xảy ra hiện tượng thiếu dinh dưỡng hoặc vấn đề ngộ độc do dư thừa dinh dưỡng khi độ pH đất thay đổi đột ngột.
Biểu đồ dưới đây là dạng trình bày kinh điển trong rất nhiều tài liệu về mối liên quan giửa độ ph đất và mức độ hửu dụng các nguyên tố dinh dưỡng trong đất cho cây trồng.

Hình 1: Biểu đồ tương quan giửa pH đất và độ hửu dụng của các nguyên tố dinh dưỡng cho cây



Như trình bày trong biểu đồ, ở điều kiện pH đất trong khoảng a-xít rất nhẹ 6,5-7,0 thì hầu hết các nguyên tố dinh dưỡng đều đạt ngưỡng hửu dụng cao cho cây trồng.
Nếu xem xét từng nguyên tố, chẳng hạn chất lân (phosphorous – ký hiệu là P), độ hửu dụng của P cho cây trồng cao nhất khi độ pH đất trong khoảng 5,5-7,5 và suy giảm khi Ph thấp dưới 5,5. Điều này có nghĩa rằng nếu bón cùng một lượng P trên 2 loại đất có độ pH khác nhau thì lượng P cây có thể hất thu được trong đất có độ pH 6,0 sẽ cao hơn lượng P cây có thể hấp thu được trên đất có độ pH dưới 5,5. Tương tự như vậy, bởi vì độ hửu dụng của chất Molipdate (ký hiệu la Mo) cao khi pH đất hơn 6,5 cho nên hiện tượng cây trồng thiếu Mo chỉ thường xảy ra trên đất có pH thấp và bón vôi để gia tăng pH đất củng giúp điều chỉnh độ hửu dụng của Mo.

Độ pH của đất nông nghiệp tiểu bang Tây Úc
Tài liệu Độ pH đất và sức khỏe cây trồng do Bộ Nông nghiệp và Lương thực Tây Úc báo cáo rằng các dạng đất đặc trưng trên tiểu bang có độ pH dao động từ 4 đến 8,5. Trong khu vực dân cư các loại đất có pH kiềm ở nơi gần bờ biển đá vôi. Đất những vùng sâu vào nội địa và hầu hết các vùng đất nông nghiệp đất chua hơn (pH dưới 7).
Các vùng đất nông nghiệp đất nguyên thủy không chua khi phát hoang trở thành đất chua do quả trình áp dụng phân bón liên tục.
Đo đạt pH trong hàng cà ở các trang trại phía Bắc Perth cho giá trị 5,0-6,5, thường thấp hơn pH đất giua các hàng cà. Hiện tượng trên củng dược quan sát trên các trang trại trồng zucchini, cà tím, đậu, dưa leo.
Trong các trang trại trồng cây trên mùn cưa như dưa leo trong bịt và rau muống trong nhà nóng, dộ pH có thể thấp hơn 4,5 do sự sản sinh a-xít hửu cơ của mùn cưa mục và rể cây chết.
Trong tài liệu Hướng dẫn thực hành nông nghiệp tốt cho nông dân Carnarvon thì đất khu vực này có pH trong khoảng 6,8 -7,8 và được xếp vào hạng đất trung tính hoặc kiềm nhẹ. Dưới điều kiện như vậy, độ hửu dụng của các nguyên tố phân bón vi lượng như mangan (manganese – ký hiệu Mn), kẽm (zinc - Zn) and đồng (copper - Cu) suy giảm nhanh chóng.
Khi pH bắt đầu tăng đến hơn 8,5, độ hửu dụng của lân, sắt, đồng, kẽm vad mangan giảm nhanh chóng, có thể phải phân tích mẩu cây trồng thường xuyên để xác định nguy cơ thiếu dinh dưỡng các nguyên tố này.

Tác động của pH đất đến sự phát triển của hoa màu trên trang trại thương mại

Ảnh hưởng của độ pH đất đến hình thức hiện diện của các loại dinh dưỡng trong đất: độ pH đất quyết định mức độ hòa tan và và độ khả dụng của các nguyen tố dinh dưỡng trong đất.
14 loại dinh dưỡng cho cây trồng trong đất gồm có đạm (N), lân (P), kali (K), Can-xi (ca), Ma-nhê (Mg), lưu huỳnh (S), sắt (Fe), kẽm (Zn), đồng (Cu), Mang-gan (Mn), Bo (B), Chlorine (Cl), Mo-lip-đen (Mo) và Ni-ken (Ni). Các chất này thương hiện diện dưới dạng kết hợp với các chất khác thành các hợp chất và hòa tan trong nước thanh các phần tử mang điện tích (ion) thì cây trồng mới hấp thu được. Chính độ pH đất tác động đến sự hình thanh hay phân giải cũng như hình thức tồn tại của các hợp chất này trong đát và trong vùng rể cây. Khi pH đất dưới 5.0 thì hàm lượng sắt, đồng, kẽm, măng-gan hòa tan cao. Ngược lại khi pHcao hơn 7.0 thì nhôm, ma-nhê hòa tan nhiều hơn, vì vậy chúng kiềm giử lân dưới dạng không tan làm cây trồng không hấp thu được. Nói chung thì pH đất trong pham vi từ 5.5 đến 7.0 là điều kiện tốt cho sự hòa tan của hầu hết các nguyen tố dinh dưỡng cho cây trồng.

Ảnh hưởng đến sự hấp thu dinh dưỡng trong vùng rể: PH đất ảnh hưởng đến sự hấp thu dinh dưỡng trong vùng rể vì nó làm thay đổi đặc tính của cấu tử đất (các hạt trong đất). Khi pH đất quá thấp các cấu tử đất mang điện tích dương sẽ hút chặt các nguyen tố dinh dưỡng như lân gay tình trạng thiếu hụt cho cây trồng (mặc dù hàm lượng lân trong đất cao). Tuy nhiên, khi pH đất cao thì gây ra tình trạng thiếu sắt, kẽm, măng-gan trên rau màu.

Ảnh hưởng đến sự ngộ độc kim loại trên hoa màu: về căn bản ngộ độc kim loại xảy ra khi độ pH đất thấp hơn 5.0 các kim loại như nhôm, sắt, đồng, măng-gan hòa tan rất mạnh gây ngộ đọc cho cây. Trường hợp dễ thấy nhất là trên đất phèn. Thường đề tránh tình trạng này thì nông dân bón thêm vôi để tăng đô pH.

Ảnh hưởng đến bệnh cây có nguồn gốc từ trong đất: Một số mầm bệnh hại trong đất có tuuwowng quan chặt chẽ đến pH đất. thí dụ như bệnh rể chum/chùn rể trên các loại hoa màu họ thập tự (các loại cải) gây ra do nấm *Plasmodiophora brassicae.* Khi pH đất thấp dưới 5.7 thì bệnh này có nguy cơ phát triển mạnh. Nhưng bệnh suy giảm khi pH đất tăng lên khoàng 5.7-6.2 và biến mất khi pH đất tăng lên 7.3

Kiểm tra và điều chỉnh độ pH đất.

Nông dân có thể tự kiểm tra độ pH đất trong đất bằng cách sử dụng các công cụ đo pH có bán tại các điwwrm cung cấp vật tư nông nghiệp. Ngày nay các loại máy đo pH kỹ thuật số rất phổ biến và dể áp dụng. Tuy nhiên điều chỉnh độ pH đất là việc làm đòi hỏi có trình độ hểu biết nhất định về các chất cải thiện độ pH, trường hợp nào nên áp dụng và cách tính toán liều lượng áp dụng. Nên tham vấn các nhà nông học để có được các khuyến cáo phù hợp.

Ngành rau quả chuẩn bị đối phó tác động của vi-rút Corona

Khi mà thông tin về vi-rút Corona (hay còn gọi là COVID-19) chiếm lĩnh các trang thông tin và gây ra hạn chế đi lại nặng nề, điều hết sức quan trọng nà nông gia nên được chuẩn bị, được thông tin, và hạn chế rủi ro đến mức tối thiểu.

Chủ tịch liên đoàn nông gia quốc gia Tony Mahar đã cảnh báo rằng tình thế càng xấu và càng nhiều quốc gia bị ảnh hưởng thì thách thức càng nghiêm trọng đối với ngành nông nghiệp Úc trong việc cung cấp thục phẩm cho người tiêu dùng.

Theo ông Tony Mahar một trong các quan ngại lớn hơn nữa cho ngành nông nghiệp là khả năng đảm bảo lực lượng nhân công khi đối mặt với hạn chế di chuyển ngày càng gia tăng do sự lây lan của vi-rút Corona. Ông nói: "Một tỉ lệ lớn trong ngành nông nghiệp bao gồm các ngành rau quả, thịt heo và ngủ cốc sử dụng lao động thời vụ hoặc lao động du lịch để thu hoạch sản phẩm".

Ông cũng phát biểu rằng hạn chế di chuyển và vận chuyển tại các nước bị ảnh hưởng đã làm suy giảm nhu cầu tiêu dùng, đặc biệt là các loại đặc sản chất lượng cao của Úc. "Hạn chế di chuyển còn ảnh hưởng đến chuỗi cung ứng khi cảng biển và sân bay được thắt chặt".

Bộ trưởng Bộ Nông nghiệp và Lương thực , bà Alannah MacTiernan MLC, đã phát biểu rằng ngành (nông nghiệp) phải chuẩn bị cho tác động của COVID-19. "Trung Quốc là bạn hàng lớn nhất chiếm 28% trong tổng xuất khẩu sản phẩm nông lâm nghiệp 2,35 tỉ đô la mỗi năm". "Tuy vậy, ảnh hưởng của sự lây lan vi-rút Corona vượt ra khỏi Trung Quốc – chúng ta lường trước nhu cầu thực phẩm ở các nước châu Á giảm do cư dân và khách du lịch tránh đi lại". "Chúng ta cũng lường trước ảng hưởng đối với xuất khẩu đến các quốc gia đang bị ảnh hưởng đó, đặc biệt là các ngành co sản phẩm mau hỏng và lệ thuộc sâu vào thị trường Trung Quốc".

Trung tâm tập huấn ARC về An toàn thực phẩm trong ngành thực phẩm tươi đã phát hành tờ thông tin về vi-rút Corona trong đó nhấn mạnh rằng vi-rút hầu như không lây lan qua đường sản phẩm tươi cũng như nhấn mạnh rằng các biện pháp đơn giản có thể được áp dụng để hạn chế rủi ro.

Tác giả của tờ thông tin, tiến sỹ Hayriye Bozkurt, cảnh báo rằng vi-rút có thể tồn tại đến 3 giờ trên các bề mặt phi sinh vật và nhiều giờ trên bàn tay, các mô, và các bề mặt khác. Bà khuyến cáo rằng để giảm thiểu rủi ro ngành nên áp dụng các biện pháp vệ sinh các nhân cùng với các biện pháp thực hành canh tác tốt.
Sau đây là một sơ ý chính trong tờ thông tin của tiến sỹ Hayriye Bozkurt " Vi-rút corona gần như không lây qua sản phẩm tươi".

Vi-rút corona là gì?

Vi-rút corona là mộjt họ sieu vi khuẩn thường là gây ra bệnh về hô hấp. Chúng bao gồm các loại vi-rút gây ra bệnh cảm thông thường và bệnh cúm theo mùa cũng như các loại bệnh nghiêm trọng hơn như Hội chứng hô hấp cấp (Severe Acute Respiratory Syndrome - SARS) và Hội chứng hô hấp Trung Đông (Middle East Respiratory Syndrome - MERS).

Vi-rút corona có sống ngoài cơ thể, trên thức ăn hay các bề mặt khác không?
Hầu hết các chủng vi-rút trong các bệnh phẩm hô hấp (như corona, corona, coxsackie, influenza, SARS or rhino virus) có thể tồn tại trên các bề mặt một vài ngày. Mặt dù cần them nhiều dữ liệu để xác đinh vi-rút corona có thể sống bao lâu trên các bề mặt, chúng tôi biết rằng vi-rút có thể tồn tại đến 3 giờ trên các bề

mặt phi sinh vật và nhiều giờ trên bàn tay, các mô, và các bề mặt khác. Tuy nhiên thời gian tồn tại thay đổi tùy theo loại bề mặt, nhiệt độ và ẩm độ tương đối.

Vi-rút có lây qua các sản phẩm tươi không?
Vi-rút corona được cho là lây lan qua các hạt lỏng li ti thoát ra trừ hệ hô hấp, tiếp xúc với dịch phẩm bệnh, truyền qua các dịch từ mủi miệng. Chúng ta đã có kinh nghiệm từ các trường hợp Hội chứng hô hấp cấp (Severe Acute Respiratory Syndrome - SARS) và Hội chứng hô hấp Trung Đông (Middle East Respiratory Syndrome - MERS) rằng người ta không bị lây bệnh các loại vi-rút này qua các sản phẩm tươi và vi-rút 2019-nCoV gần như không lây qua sản phẩm rau quả tươi. Cũng như các chủng vi-rút khác, vi-rút corona cần phải có sinh vật ký chủ (là động vjật hay con người) đề sinh trưởng, vì thế chúng không thể sinh sản trong rau quả tươi. Hiện vẫn chưa rỏ liệu người ta có bị nhiễm bệnh khi tiếp xúc bề mặt rau quả tượi có vi-rút COVID 19 trên đó rồi đưa tay lên mặt mủi mắt hay không. Giử vệ sinh và thực hành nông nghiệp tốt luôn luôn là khuyến cáo thực tế cần được áp dụng nghiêm túc.

Khả năng chịu đưng của vi-rút corona khi bị bất hoạt trong điều kiện nhiệt độ nóng, lạnh thế nào?
Mặc dù chưa có số liệu khẳng định vi-rút corona sẽ bất hoạt trong điều kiện kết hợp thời gian và nhiệt độ nào, nấu kỹ có lẻ đủ để đạt mục đích giảm thiểu vi-rút. Đối với biện pháp xử lý lạnh, như nhiều loại vi-rút, chúng có thể sống nhiều tháng, nhiều năm trong nhiệt độ dưới điểm đông đá. Chúng ta biết rằng các biện pháp đông lạnh sản phẩm hình thức công nghiệp hiện nay ít có hiệu lực làm giảm thiểu vi-rút. Người tiêu dùng nên nấu chín thức ăn đông lạnh trước khi dùng.

Cách giảm thiểu rủi ro?
Người bốc xếp sản phẩm rau quả tươi có thể làm nhiễm vi-rút lên sản phẩm khi ho, hắt hơi hay tiếp xúc trực tiếp sản phẩm, trừ khi họ tuân thủ nghiêm ngặt qui định vệ sinh cá nhân cùng với qui định thực hành nông nghiệp tốt.
Tổ chức Y tế thế giới WHO khuyên rằng các khuyến cáo tiêu chuẩn dể giảm thiểu tiếp xúc hay lây truyền một loạt các loại bệnh nên được duy trì. Các biện pháp này bao gồm:

- Rửa tay đúng cách
- Thực hang các biện pháp che chắn đúng cách khi ho, sổ mủi.
- Thực hành các biện pháp nông nghiệp tốt.
- Tránh tiếp xúc gần (khi có thể) với bất kỳ ai có triệu chứng bệnh hô hấp như ho, sổ mủi.

Để cập nhật thông tin về hiện trang vi-rút corona, vui lòng vào trang thông tin của Tổ chức Y tế thế giới WHO https://www.who.int/health-topics/coronavirus

EXIT

OFFICE

XAIRCRAFT

Geraldton
Grower Meeting TPP Update
9th April 2019
Alan Nankivell (NTFFC)