



Department of  
Primary Industries

# Citrus R & D roadshow

Riverina: Monday 16 October 2017

8:45 am– 4:30 pm, Griffith Leagues Club

*Quality science for a prosperous citrus industry*





# 2017 NSW DPI citrus R&D roadshow

Riverina: Griffith Leagues Club, Monday 16 October 2017

Session 1		
8:30 am	30	Registration
9:00 am	10	Welcoming address & NSW DPI update <i>Andrew Creek</i> NSW DPI
9:10 am	30	Gall wasp: control options update <i>Jianhua Mo</i> NSW DPI
9:40 am	20	Nutrition for citrus and monitoring <i>Ryan Walker</i> Australian Precision Ag Laboratory
10:00 am	20	Anthraxnose disease management & Black core rot research <i>Nerida Donovan</i> NSW DPI
10:20 am	10	<b>Session 1 questions</b>
10:30 am	20	<b>Morning tea</b>
Session 2		
10:50 am	15	Release of new rootstocks and Valencia trial update <i>Tahir Khurshid</i> NSW DPI
11:05 am	10	Global and domestic orange juice supply and demand <i>Stefan Worsley</i> Juice Market
11:15 am	10	Plant growth regulators (fruit splitting - 2-4D, GA to increase fruit set) <i>Steven Falivene</i> NSW DPI
11:25 am	15	Afourer - Economics of overhead netting & grower experience <i>Dean Morris</i> Moricom Orchards & <i>Steven Falivene</i> NSW DPI
11:40 pm	10	<b>Session 2 questions</b>
11:50 am	20	New variety highlights <i>Graeme Sanderson &amp; Dave Monks</i> NSW DPI
12:10 pm	60	<b>Lunch</b>
Session 3		
1:10 pm	15	Pruning for improved Navel orange pack outs <i>Bill Robinson</i> MFC
1:25 pm	15	Windbreak economics: what increase in 1st grade packout is needed <i>Steven Falivene</i> NSW DPI
1:40 pm	30	Export success / FRW integrated control & secondary pests <i>Justin Lane</i> MFC, <i>Rob Wepler</i> Riverina IPM <i>Geoff Cornwell</i> DuPont
2:10 pm	15	Red scale : Lifecycle & management options <i>Jianhua Mo</i> NSW DPI
2:25 pm	15	Irrigation, economics of solar powered pumping <i>Mark Kay</i> REAQUA solar pumping
2:40 pm	10	<b>Session 3 questions</b>
2:50 pm	20	<b>Afternoon tea</b>
Session 4		
3:10 pm	20	Control options fleabane, feathertop and ryegrass <i>Scott Mathew</i> Syngenta
3:30 pm	20	Rootstock compatibility and reworking techniques <i>Graeme Sanderson</i> NSW DPI
3:50 pm	15	Fruition trap in Queensland fruit fly area wide management <i>Mark Drew</i> AgNova
4:05 pm	15	Elephant Weevil borer <i>Jianhua Mo &amp; Andrew Creek</i> NSW DPI
4:20 pm	10	<b>Session 4 questions</b>
4:30 pm	10	Closing remarks <i>Representative</i> for G&DCG inc. and LCG inc.
4:40 pm		End (Note: Nutrition workshop at 5:30 pm, see next page)



Murrumbidgee Irrigation







Riverina Biosecurity Incorporated



Department of Primary Industries

# Nutrition workshop

**Presenter:** Ryan Walker, Australian Precision Ag Laboratory

**When:** 5:30 pm – 7:00 pm, Monday 16 October 2017

**Where:** Griffith Leagues Club, 2 Bridge Road, Griffith

**Refreshment:** Supper courtesy of Super Seasons



# Field session

**What:** Pruning for 1<sup>st</sup> grade pack out: Pruning demonstration & discussion  
David Stevens (Seven Fields Nutrano)

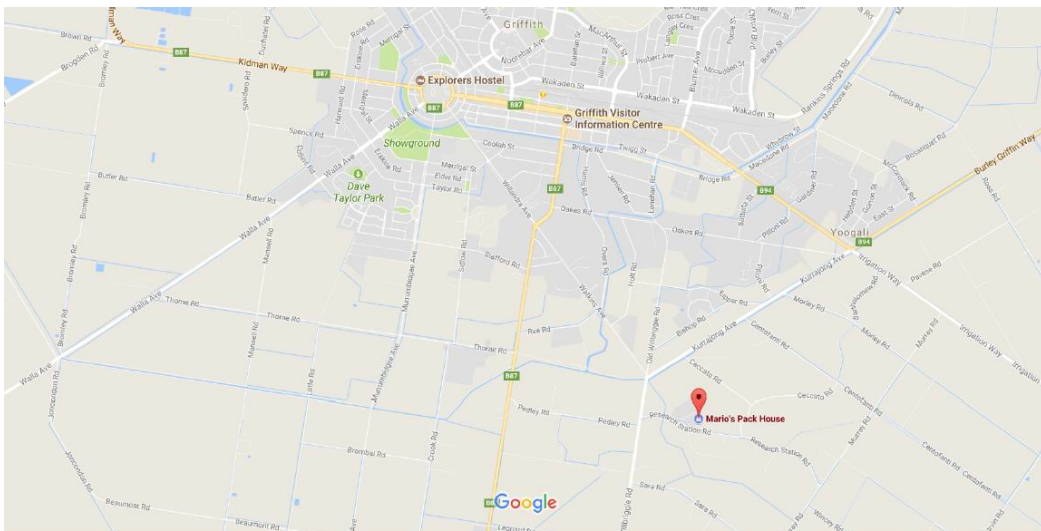
Care of pruning equipment & equipment demonstration  
Vignesh Prathik (Ryset)

**When:** 9:00 am to 11:00 am, Tuesday 17 October 2017



**Where:** Mario's Packhouse, Research Station Rd, Griffith

Google Maps Mario's Pack House  
Research Rd, Griffith (near CSIRO)



Map data ©2017 Google Australia 500 m

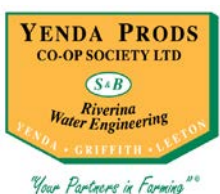


# 2017 Riverina citrus R&D roadshow

## Riverina 16 October, Griffith Leagues Club

### “Take home messages”

Session 1	
NSW DPI update	<ul style="list-style-type: none"> <li>● Harvest handbook to help train pickers on NSW DPI website</li> <li>● NSW Plant protection and management guide published. Download available by October 2017</li> <li>● Due Oct.- Dec. 2017 on NSW DPI website               <ul style="list-style-type: none"> <li>○ Mandarin manual</li> <li>○ Updated variety factsheets</li> <li>○ Citrus economics handbook and custom sheet downloads</li> <li>○ Citrus phone App</li> </ul> </li> <li>● Obtain updates from CitrusConnect e-newsletter.</li> </ul>
Citrus Gall wasp: Control options update	<ul style="list-style-type: none"> <li>● Research update: <b>Only Samurai is registered by permit to control Citrus gall wasp. Other products are registered for other pests in citrus. You must follow label recommendations.</b></li> <li>● Surround® deters CGW egg-lay. It can reduce galling next season by 90%. It is more costly than chemical insecticides and might increase red scale populations.</li> <li>● Samurai® and Confidor Guard® applied in late spring are effective for CGW control in navel trees. As much as a 95% reduction of galls has been observed. In severely infested blocks and/or large trees the reduction rate might be lower (i.e. 50%).</li> <li>● Movento® can provide good control in Valencia trees when applied during February and April. It kills the larvae and reduces the number of adult gall wasps emerging from galls next spring.</li> <li>● Parasitic wasps have established in the southern regions, however, current numbers are insufficient to offer satisfactory control of CGW. A small block with over 12 years of parasitic wasp establishment has had a significant reduction of galls, although it has not eliminated the wasp.</li> </ul>
Nutrition for citrus and monitoring	<ul style="list-style-type: none"> <li>● Regular tests build stronger profile to refine fertiliser inputs</li> <li>● Understand your soil and its variability. Build-maintain or mine nutrients?</li> <li>● Understand crop nutrient requirements and key timings for applications</li> <li>● Ensure you are getting economic responses to fertiliser applied</li> </ul>
Anthraxnose disease management	<ul style="list-style-type: none"> <li>● Disorder caused by fungi invading weakened tissue</li> <li>● Prune trees to reduce the fungal spore load in the canopy</li> <li>● Apply copper fungicide spray in autumn - apply a second spray if late harvest</li> </ul>
Black core rot research	<ul style="list-style-type: none"> <li>● Disease caused by a fungus invading the fruit at petal fall or through the navel end.</li> <li>● Hot dry conditions and strong winds at petal fall increases the chance of cracks forming in the styler tissue - creating an ideal site for core rot infection.</li> <li>● Once infection has established, it is too late to spray.</li> <li>● Incidence differs with season, typically harvest is delayed to allow infected fruit to fall</li> <li>● Growth regulators applied at full bloom have been show to reduce the size of navel end openings and consequently core rot infection in South Africa.</li> <li>● Systemic fungicide sprays at petal fall have been shown to reduce disease levels in South Africa.</li> <li>● Further work is needed to determine the optimum sprays for Australian southern citrus growing regions.</li> </ul>





2017 Citrus R&D Roadshow, Riverina 16<sup>th</sup> October

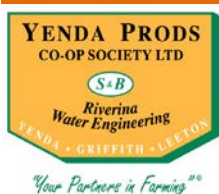
Session 1	Continued
Local & exotic diseases	<ul style="list-style-type: none"> <li>● If possible, before sending a sample to a diagnostic lab, speak to the diagnostic plant pathologist, send photos, and find out what sort of sample is best to send and how to send it.</li> <li>● It is important to realise that the isolation of an organism from your diagnostic sample, does not mean that is the primary cause of the problem. The organism could be a secondary invader.</li> <li>● It is important to know what is in your budwood. Only use budwood and rootstock seed from a tested source, such as from Auscitrus. There is no cure for graft-transmissible diseases. It's not worth the risk.</li> <li>● The biggest exotic threat to the Australian citrus industry is huanglongbing (HLB) carried by the Asian citrus psyllid. But there are other devastating diseases that we need to keep an eye out for. If you see suspicious symptoms, contact the Exotic Plant Pest Hotline on 1800 084 881 to speak to someone who can help.</li> </ul>





2017 Citrus R&D Roadshow, Riverina 16th October

Session 2	
New rootstocks	<ul style="list-style-type: none"> <li>• Six new Chinese rootstocks are available from AusCitrus.</li> <li>• Many have attributes superior to Australian rootstocks that can provide higher productivity and fruit quality in certain situations.</li> <li>• Full details of rootstock attributes are available from the rootstock section of NSW DPI citrus website.</li> </ul>
Valencia trial	<ul style="list-style-type: none"> <li>• DV Valencia is the better performing clone when grafted to Zao Yang rootstock.</li> </ul>
Global & Domestic orange juice	<ul style="list-style-type: none"> <li>● Brazil dominates orange juice market.</li> <li>● Hurricane Irma &amp; citrus greening is reducing Florida production.</li> <li>● NFC premium fresh juice market is growing globally whilst FCOJ declines.</li> <li>● Smaller Australian Valencia crop &amp; strong fresh fruit export demand will continue to create supply difficulties for processors as Australian demand for NFC juice is stable.</li> </ul>
Plant growth regulators	<ul style="list-style-type: none"> <li>● G.A. at 90% petal fall and one week later increased fruit set of smaller fruit. Next trials will target an earlier application timing to target bigger fruit.</li> <li>● Auxin at 90% petal fall               <ul style="list-style-type: none"> <li>○ Washington Navel - reduced navel end size, increased rind coarseness (naturally coarse rind), increased granulation, less juice and lower acidity. No effects on; yield, fruit size, Brix, navel end split and wind blemish.</li> <li>○ Leng navel - reduced navel end size, reduced navel end split, reduced wind blemish by ~4%. No effects on; yield fruit size, Brix, acidity and granulation.</li> </ul> </li> </ul>
Grower experience Moricom	<ul style="list-style-type: none"> <li>● Increases 1st grade packout 0-20%</li> <li>● Wetter longer/ morning dews &amp; rain</li> <li>● More insect control – regular pest monitoring essential</li> <li>● Afourer have more vigorous upright growth</li> <li>● Mature tree establishment is quicker</li> <li>● Packouts on afourers about 12 % class 1 increase with no thinning in 2017</li> <li>● 2016 was closer to 20% increase in class 1 as it was a windy spring. Blocks not covered were thinned for blemish at a cost of \$3000 per hectare. No thinning required under netting.</li> <li>● 1.5 megs less water used per hectare</li> <li>● Colour development is harder if trees are not pruned well each year</li> <li>● Seedless fruit gives a premium price most years depending on size of national crop Do your sums for your specific situation; net cost \$40-\$60K</li> </ul>
Afourer- economics of overhead netting	<ul style="list-style-type: none"> <li>● Afourer economic analysis: growing seedless Afourer in an isolated region is financially similar to growing under overhead nets in a high pollination area. The use of Drape net and seedless private varieties follows very closely behind. Growing fruit with seeds and receiving a 50% decrease in price is uneconomical.</li> </ul>
Variety highlights	<ul style="list-style-type: none"> <li>● The importance of China as an export market for Australian fruit has resulted in several local citrus selections being targeted for an increase in plantings.</li> <li>● The export demand for red fleshed citrus selections such as Cara Cara navel is continuing to expand.</li> <li>● Natural mutation of citrus leading to the development of new varieties is a common trend in Australia and is creating international interest.</li> </ul>







2017 Citrus R&D Roadshow, Riverina 16th October

Session 3	
Pruning for improved navel packouts	<ul style="list-style-type: none"> <li>● Pruning is a key and essential practice to maximise packouts of fresh market fruit.</li> <li>● Apart from reducing blemish it also gives better spray penetration, light in the tree and encourages stronger flowers and larger fruit.</li> <li>● Can make a significant impact on bin price (+\$50-\$100/bin) and yield.</li> <li>● Ideally prune every year and remove no more than 25% of total canopy in one year</li> <li>● Better to make 2-3 large cuts rather than many small cuts (cost effective)</li> <li>● "Some pruning is better than no pruning"</li> <li>● Pruning resources are available from NSW DPI Plant Protection Guide and NSW DPI Darren Minter pruning video (<a href="http://www.dpi.nsw.gov.au/citrus">www.dpi.nsw.gov.au/citrus</a>). Article also in September 2017 issue of the Australian Citrus news.</li> </ul>
Windbreak economics: when does it pay?	<ul style="list-style-type: none"> <li>● Need 5-10% increase in 1st grade pack-out for windbreaks to be economically viable</li> <li>● Anecdotal grower feedback suggest windbreaks in partially protected flat topography in Sunraysia provides about a 5% improvement in 1<sup>st</sup> grade pack-out, however in higher risk areas (exposed paddocks / hillside, windy regions) can be 10-20% or more. No studies are available to validate growers pack-out estimates.</li> <li>● Opportunity to study the effect of windbreaks and other blemish management strategies throughout farms in major regions to provide better guidelines on if/where windbreaks provide benefit and other management strategies.</li> </ul>
Export success / Fullers Rose weevil control	<ul style="list-style-type: none"> <li>● Commitment to monitoring and implementing control strategies is essential.</li> <li>● Single and dual side trunk band spray (TBS) machines; see NSW DPI videos on website.</li> <li>● TBS can cause secondary pests: mites, redscale &amp; mealybug. Monitor and probably need intervention of oil and/or chemical control.</li> <li>● Exirel® is a new foliar spray option. Block trials by Dupont indicate a potential to replace some or all TBS. Further field work is required to fully understand control and beneficial insect impact in various situations.</li> </ul>
Red scale : target lifecycles and management options	<ul style="list-style-type: none"> <li>● Biological control is the key to successful red scale management. Avoid using broad-spectrum insecticides wherever possible.</li> <li>● Red scale populations are patchy. There is usually no need to spray the whole orchard.</li> <li>● The best timing for oil/contact insecticides is to target the crawler and the white cap stage. Oils have limited effect on mature scales. Insect growth regulator (IGR) insecticides are also more effective against young scale.</li> <li>● First post-winter peak of crawlers occurs between late October and mid-November in the southern citrus regions. Later peaks are less distinct due to overlapping of different red scale stages.</li> </ul>
Solar powered pumping	<ul style="list-style-type: none"> <li>● Anything is possible with Solar Pumping.</li> <li>● Solar Pumping is ideal for the citrus industry.</li> <li>● Will Solar Pumping work for me?</li> <li>● How can Solar Pumping save me money?</li> </ul>

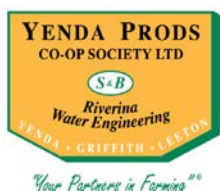




2017 Citrus R&D Roadshow, Riverina 16th October

Session 4	
Control options for fleabane, feathertop and ryegrass	<ul style="list-style-type: none"> <li>● Fleabane, feather top and ryegrass have become tolerant to some common knockdown herbicides.</li> <li>● Control of these weeds is possible but specific strategies are required. In general most are best controlled at the young growth stages, therefore monitoring weeds emergence is important.</li> <li>● Specific strategies and general weed management procedures are outlined in the weed management chapter of the NSW Citrus Plant Protection guide.</li> </ul>
Rootstock compatibility	<ul style="list-style-type: none"> <li>● Compatibility issues can be very specific to both scion varieties and rootstock types.</li> <li>● Incompatibility can be obvious as early as 3 years of age after planting or later at 8-12 years or more.</li> <li>● New rootstocks need to be assessed under Australian climatic and soil conditions as well as scion varieties before recommendations can be provided to citrus growers.</li> </ul>
Fruition trap in Queensland fruit fly management	<ul style="list-style-type: none"> <li>● Fruition Traps are the only traps which attract mature, egg-laying female fruit flies;</li> <li>● Fruition Natflav 500 must be mixed with gelatinised water via inclusion of Xanthan Gum for maximum effect.</li> <li>● As part of a comprehensive and effective IPM program, Fruition traps should be placed in the orchard from early stages of fruit set and used in combination with Fruition Natflav 500 and a registered insecticide.</li> </ul>
Elephant weevil borer	<ul style="list-style-type: none"> <li>● Life cycle &gt;= 1 year</li> <li>● Adults emerge Sep-Feb and are active, emergence peak in Dec</li> <li>● 2 egg/week, 80 eggs/lifetime</li> <li>● Avoid water logging or other stresses</li> <li>● No registered chemicals</li> <li>● Trunk sprays with a residual insecticide during Sep-Nov?</li> </ul>

Horticulture Innovation Australia is acknowledged for their investment in projects presented at the Citrus R&D Roadshow.



Murrumbidgee Irrigation

