



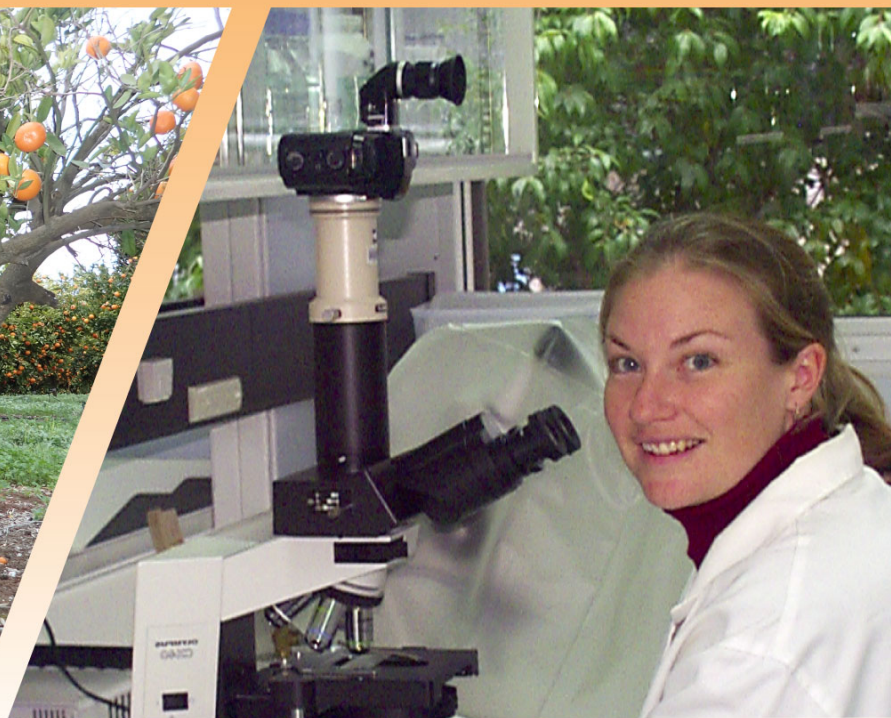
Department of
Primary Industries

Citrus R & D roadshow

Riverland: Thursday 19 October 2017

8:45 am – 5 pm, Loxton Research Centre

Quality science for a prosperous citrus industry



2017 citrus R&D roadshow

Riverland: Loxton Research Centre, Thursday 19 October 2017

Program Version 10/10/17

Session	1	Redevelopment & planting	
8:30 am	30	Registration	
9:00 am	10	Welcoming address & NSW DPI update	Myles Parker NSW DPI
9:10 am	25	Reworking challenges & rootstock compatibility: known issues	Mark Skewes SARDI & Graeme Sanderson NSW DPI
9:35 am	15	New Chinese rootstocks for improved productivity & fruit quality	Tahir Khurshid NSW DPI
9:50 am	25	Riverina, Riverland & Sunraysia overhead netting experiences summary & economics	Steven Falivene NSW DPI
10:15 am	15	New variety highlights	Graeme Sanderson & Dave Monks NSW DPI
10:30 am	10	Session 1 questions	
10:40 am	20	Tea break & variety tasting	
Session	2	Fruit Quality	
11:00 am	15	Plant growth regulators (navel end reduction & increase fruit set)	Steven Falivene NSW DPI
11:15 am	15	Rind texture project: factors and results	Andrew Creek NSW DPI
11:30 am	20	Windbreak & pruning economics: when does it pay?	Steven Falivene NSW DPI
12:50 pm	10	Session 2 questions	
12:00 pm	45	Lunch	
Session	3	Pest & disease	
12:45 pm	45	Loxton Research Station rootstock trial farm walk	Mark Skewes SARDI
1:30 pm	30	Challenges of integrated FRW management; overview & new Dupont foliar FRW spray (Exirel®)	NSW DPI, Dupont, pest scouts and others
2:00 pm	30	Control options for fleabane, feathertop and ryegrass, new Sumitomo residual herbicide (Chateau®) & discussion	Scott Mathew Syngenta & Sumitomo
2:30 pm	20	Red scale : targeting lifecycle and management options (10 min group discussion)	Jianhua Mo NSW DPI & industry discussion
2:50 pm	10	Session 3 questions	
3:00 pm	20	Afternoon tea	
Session	4	Pest cont. & production	
3:20 pm	30	Citrus Gall wasp: update on control options & Sumitomo Samurai® update	Jianhua Mo NSW DPI & Sumitomo
3:50 pm	10	Regrowth control on reworked trees: chemical trial results	Andrew Creek NSW DPI
4:00 pm	15	Black core rot overview and trial results: new citrus biosecurity booklet	Nerida Donovan NSW DPI
4:15 pm	20	Matching fertiliser to soil pH	Bruce Scott Campbells Fertilisers
4:35 pm	15	Session 4 questions, other questions & survey	
4:50 pm	10	Closing remarks	CASAR
5:00 pm		End	

Program might be subject to change



Department of
Primary Industries



Registration

Cost: The event is **free** thanks to funding support from:

NSW DPI, SARDI, Campbell chemicals, Sumitomo chemicals, AgNova, Ryset-Electrocoup and Dupont

Thanks is given to Citrus Australia and the Citrus Australia South Australian Regional Committee (CASAR) for their support and consultation. Horticulture Innovation Australia is acknowledged for their investment in projects presented at the roadshow.

Registration is essential by Monday 16 October for catering and event organising purposes. Registrations will be limited. Registering early is appreciated and ensures your place at the roadshow.

Please email dareton.office@dpi.nsw.gov.au or phone (03 5019 8400) with the following details:

- **Roadshow event and date** (e.g. Loxton Thu 19 Oct)
- **Name**
- **Region** (i.e. Waikerie, Loxton, Pyap etc.)
- **Email** (if phone in registration)
- **Mobile phone**

On registration you will receive a confirmation email.
If you do not receive an email please contact us.



2017 Riverland citrus R&D roadshow

Riverland 19 October, Loxton Research Centre

“Take home messages”

Session 1	Redevelopment & planting
NSW DPI update	- Harvest handbook to help train pickers on NSW DPI website - NSW Plant protection and management guide published. Download available by October 2017 - Due Oct.- Dec. 2017 on NSW DPI website - Mandarin manual - Updated variety factsheets - Citrus economics handbook and custom sheet downloads - Citrus phone App - Obtain updates from CitrusConnect e-newsletter. Email steven.falivene@dpi.nsw.gov.au to subscribe.
Challenges of reworking (G.Sanderson - NSW DPI)	- Prior to reworking a full site assessment should be done to determine previous, herbicide use, age of trees, rootstock and general health status of the trees. - Reworking factsheet available from NSW DPI website - Reworking video upon request (loaded NSW DPI website by Dec 2017)
Rootstock compatibility (G.Sanderson - NSW DPI)	- Compatibility issues can be very specific to both scion varieties and rootstock types. - Incompatibility can be obvious as early as 3 years of age after planting or later at 8-12 years or more. - 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.
Rootstock compatibility (M.Skewes - SARDI)	- Navelina has displayed an incompatibility response on C35 citrange and some citrumelo's, resulting in tree death from about 12 years of age. Bud-union creasing appears to be the cause of decline and death. - Afourer and Murcott mandarin types have displayed die-back on Swingle citrumelo, resultant poor tree growth and reduced yields at age 13-14 years. Some evidence of bud-union creasing. - Afourer mandarins have depressed yields on C35 citrange at 13-14 years of age, and evidence of bud-union creasing. Longevity of this combination is suspect.
New Chinese rootstocks; better productivity & fruit quality (T.Khurshid - NSW DPI)	- Six new Chinese rootstocks are available from AusCitrus. - Many have attributes superior to Australian rootstocks that can provide higher productivity and fruit quality in certain situations. - Full details of new Chinese rootstock attributes is available from the rootstock section of NSW DPI citrus website.
Summary of Grower experience with overhead nets (D.Stevens – Seven Fields, Payap Produce & Moricom- D.Morris)	- Common comments - Increases 1st grade packout 0-20% - Wetter longer/ morning dews & rain - More insect control – regular pest monitoring essential - Delayed or mixed colour development – more pruning for light into the tree - Afourer more vigorous upright growth - Good/faster early tree growth - Afourer mandarins have economic benefit under nets from seedless fruit (seeded fruit still have a reasonable price, but are becoming lesser in value). - Do your sums for your specific situation; net cost \$40-\$60K - Seven fields(Sunraysia) Afourer (flat topography with mallee tree boundaries) - Afourer mandarins have a clear economic benefit under nets from seedless fruit (seeded fruit still have a good price, but are becoming lesser in value). <u>Mature tree</u> ~ 10% more first grade under net vs outside; - Some seeded fruit on headland; under nets and in isolated areas. - In totally isolated area with no pollen source, economic benefit of nets could be variable – highly depends on site situation? - Seven fields(Sunraysia) Navels (flat topography with mallee tree boundaries)

	- No benefit or negative economic benefit (pulling out trees) - No gains in packout or yield for mature trees prone area. Fruit tended to be dryer. - Pyap produce, Loxton (2016 season; hillside) - Navellina: 58%→ 79% 1st grade = + 21% = +\$122/t - Washy: 37%→ 66% 1st grade = +29% = \$234/t - Afourer: 70%→ 73% + 3 % = + \$240/t, mainly due to seedless fruit - Moricom (Leeton, base of large hill – noticeably more windy than flatter regions) 2017 Afourer : + 12 % 1st grade with no thinning. 2016Afourer: about + 20% 1st grade - a windy spring. - Unnetted blocks were thinned for blemish at a cost of \$3000 /ha, no thinning required under netting 1.5 ML/ha less water used - Colour development is harder if not pruned well each year - Seedless fruit = premium price most years; influenced by size of national crop
Afourer overhead netting economics (S.Falivene – NSW DPI)	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.
Variety highlights (G.Sanderson – NSW DPI)	- 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. - The export demand for red fleshed citrus selections such as Cara Cara navel is continuing to expand. - Natural mutation of citrus leading to the development of new varieties is a common trend in Australia and is creating international interest.
Session 2	Fruit quality
Plant growth regulators: navel end reduction & increase fruit set (S.Falivene – NSW DPI)	- G.A. at 90% petal fall and one week later increased fruit set, but set smaller fruit. Next trials will target an earlier application timing to target bigger fruit. - Auxin at 90% petal fall - 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. - 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.
Rind texture project: factors and results (A.Creek – NSW DPI)	- Controlled research trials definitively demonstrate that high levels of nitrogen and somewhat potassium increases rind coarseness. Phosphorous can help to reduce rind texture. - Comparison of blocks across regions and within regions was unable to find an association between level of nutrient application, leaf analysis N,P or K and rind texture. Suggests that other factors such as navel budline, tree age and crop load also affects navel rind coarseness. Soil type and other unknown factors (i.e. climate/season) can also influence. Do not compare blocks, manage nutrition and rind texture on a block by block basis (different blocks will need different nutrition and management to achieve similar levels of rind texture). - Manipulating crop load and nutrition is the best strategy to manage rind coarseness. - When replanting ensure trees were propagated from a known budline of high health status wood.

Windbreak economics: when does it pay? (S.Falivene – NSW DPI)	• Windbreaks - o Need 5-10% increase in 1st grade pack-out for windbreaks to be economically viable - o Anecdotal grower feedback suggest windbreaks in partially protected flat topography in Sunraysia provides about a 5% improvement in 1st 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. - o 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. • Pruning - o A key and essential practice to maximise packouts of fresh market fruit. - o Reducing blemish it also gives better spray penetration, light in the tree and encourages stronger flowers and larger fruit. - o Can make a significant impact on bin price (+\$50-\$100/bin) and yield. - o Prune annually and remove about 20% of the canopy - o Better to make 3-4 large cuts rather than many small cuts (cost effective) - o Pruning resources are available from NSW DPI Plant Protection Guide and NSW DPI Darren Minter pruning video (www.dpi.nsw.gov.au/citrus). Article also in September 2017 issue of the Australian Citrus news.
Session 3	Pest and disease
Accessing export markets: Fullers rose weevil integrated control (Group & Dupont)	• Commitment to monitoring and implementing control strategies is essential. • Single and dual side trunk band spray (TBS) machines; NSW DPI videos on website. • TBS can cause secondary pests: mites, redscale & mealybug. Monitor and probably need intervention of oil and/or chemical control. • Exirel® is a new foliar spray option. Block trials by Dupont indicate a potential to replace some or all TBS. More field work and experience required to better understand responses (control and beneficial insect impact) in various situations.
Control options for fleabane, feathertop and ryegrass (B.Scott - Syngenta)	• Fleabane, feather top and ryegrass have become tolerant to some common knockdown herbicides. • 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. • Specific strategies and general weed management procedures are outlined in the weed management chapter of the NSW Citrus Plant Protection guide.
Red scale : target lifecycles and management options (J.Mo – NSW DPI)	• Biological control is the key to successful red scale management. Avoid using broad-spectrum insecticides wherever possible. • Red scale populations are patchy. There is usually no need to spray the whole orchard. • 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. • 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.

Session 4	
Citrus Gall wasp: update on control trials and grower experience (J.Mo - NSW DPI)	- Research update: 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. - 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. - 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%). - 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. - 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.
Regrowth control on reworked trees: chemical trial results (A.Creek – NSW DPI)	- Naphthalene acetic acid (NAA) is not registered for citrus in Australia. - Current research is evaluating NAA use when reworking trees. - NAA can reduce the number of suckers. - Efficacy has been variable between sites. - NAA use has been cost neutral compared to de-suckering labour. - Future research will investigate adjuvant use to increase efficacy and reduce cost.
Black core rot & Biosecurity (N.Donovan & R.Pierce – NSW DPI)	- Disease caused by a fungus invading the fruit at petal fall or through the navel end - 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 - Once infection has established, it is too late to spray - Incidence differs with season, typically harvest is delayed to allow infected fruit to fall - Growth regulators applied at full bloom have been shown to reduce the size of navel end openings and consequently core rot infection in South Africa - Systemic fungicide sprays at petal fall have been shown to reduce disease levels in South Africa - Further work is needed to determine the optimum sprays for Australian southern citrus growing regions. - 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. An Exotic citrus disease booklet is available from NSW DPI (hardcopy and download).
Matching fertiliser to soil pH (B.Scott – Campbell Fertilisers)	- You need to know your soil pH to make the most appropriate fertiliser choices. - High pH and calcareous soils will typically "lock-up" nutrients such as phosphorus, iron, manganese and zinc. - Acidic soils can have harmful levels of available aluminium and manganese - Certain fertilisers if used regularly can have a significant on soil pH, particularly resulting in acidification.

Thanks is given to Citrus Australia and CASAR for their support, and Horticulture Innovation Australia is acknowledged for their investment in projects presented at the roadshow.

**Hort
Innovation**
Strategic levy investment

**CITRUS
FUND**

Citrus
Australia

E.E. Muir & Sons
AUSTRALIAN OWNED - SINCE 1917

SUMITOMO CHEMICAL

RYSET
AUSTRALIA
ELECTROCOMP

Campbell

syngenta

AgNOVA
TECHNOLOGIES

MFC
MILDURA FRUIT COMPANY

DUPONT