

AUSTRALIAN

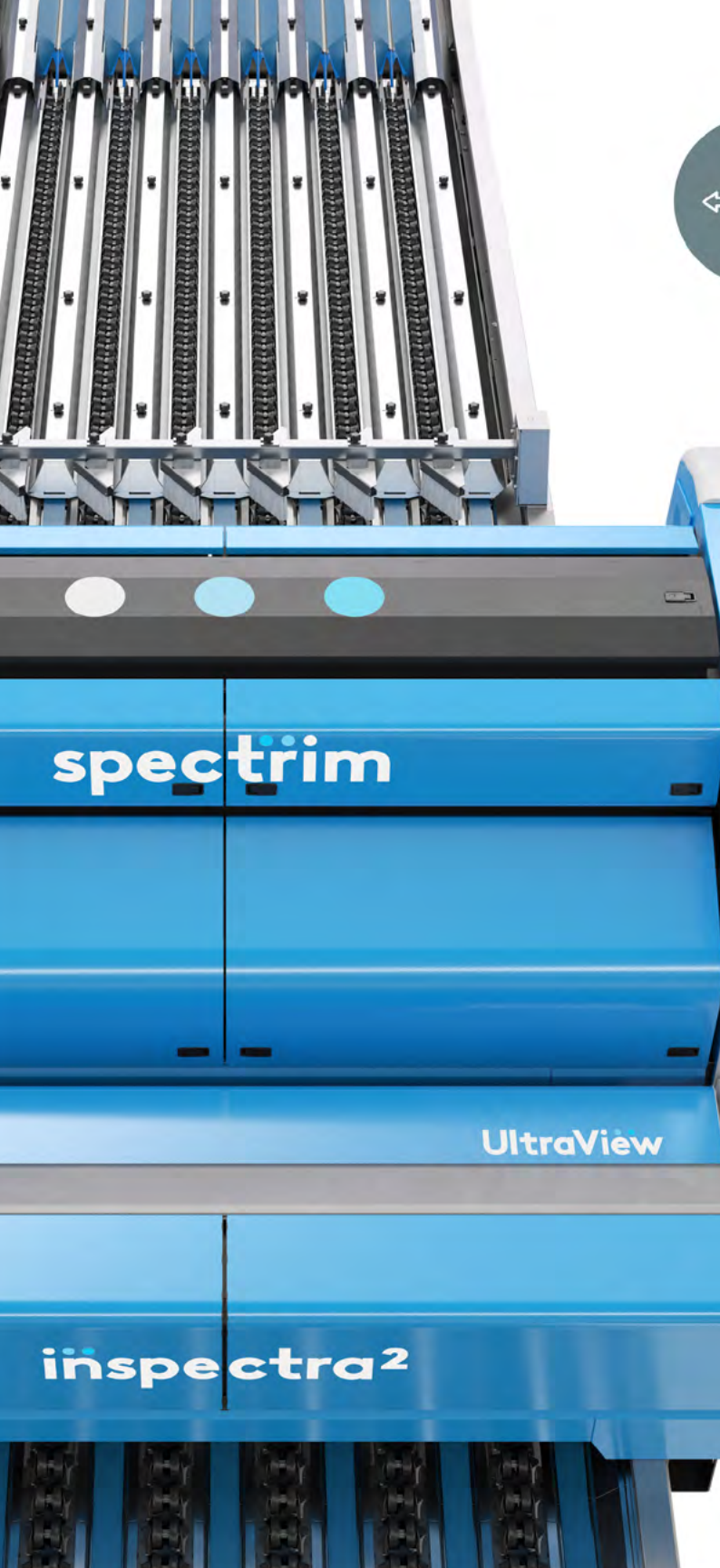
Citrus News

WINTER 2020



Silver lining to a tough year

P 6-8



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Citrus News

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Cover image: Justin Lane, MFC, with Toby Hederics of Belah Heights, Trentham Cliffs, Vic.
Photo: Paul Mensch, Mildura Weekly.

OUR CORPORATE PARTNERS





Hard work is paying off but we can't rest yet

Citrus businesses, indeed hort and agri businesses in general are in the privileged position of being considered essential or critical services during COVID-19. Privileged in that in this challenging environment we're able to continue trading.

Whilst it's not been easy for all horticultural businesses many are experiencing a surge in demand for their product.

It may be that COVID-19 may recalibrate community sentiment toward our sector as the realisation dawns on some that fresh produce is relatively cheap and abundantly available in our country.

This could be a fresh produce renaissance where industry claw back some of the ground lost to 'functional' and 'fortified' foods.

Critical to business continuity is our ability to avoid outbreaks in orchards, packing sheds and process plants.

In reality, given our adoption of food safety principles and the wide spread knowledge and awareness of biosecurity principles puts industry in a uniquely prepared position.

In itself food safety accreditation

covers many of the requirements a sound COVID-19 plan requires.

Our industry's adoption and implementation of COVID-19 Health Plans was integral to our success and I thank every business that went above and beyond to adapt during this trying time, right in the throes of harvest.

For those still harvesting that do not have a plan, it is incumbent on you to implement one immediately so we can successfully finish our harvest and maintain consumer confidence.

Since our last edition, in addition to our daily work on market access, biosecurity and agrichemicals, our team has been:

- Ensuring growers' requirements are both raised and met in COVID-19 (coronavirus) talks with state and federal governments
- Advocating for a proper assessment of the structural failings of the Paradise Dam on the Burnett River in Queensland in response to the state government's preference to lower the dam wall and reduce future water availability
- Through advocacy earned a 12 month reprieve to the Goulburn

Murray Inter Valley Trade rules and a focus on reliable delivery of water below the Barmah Choke through investment in infrastructure

- Lobbying to maintain a high Health Star Rating for juice
- Reviewing and responding to the ACCC interim report into water markets in the Murray-Darling Basin
- Outlining growers' requirements through government submissions on mobile blackspots and labour requirements
- Promoting the quality and health benefits of citrus on various consumer-facing social media platforms

Citrus businesses that choose to become members of Citrus Australia fund this work, which benefits the entire industry.

If you feel this benefits your business, we ask you to contact Kerry Thompson on 0448 213 330 to join us today. I can assure you, there is no shortage of issues that could affect our growth and prosperity.

I would like to welcome the 16 citrus businesses who have supported Citrus Australia by becoming members in the last six months.

Members can always gain support for issues important to them, by contacting their Regional Advisory Committee, who will work with the Citrus Australia team. Visit the Membership section at www.citrusaustralia.com.au for more information.

Stay safe, keep growing delicious healthy citrus and remember to wash your hands. ●



Nathan Hancock speaks to an ABC TV crew and other media during the NSW-Victoria border closure.



NATHAN HANCOCK
Chief Executive Officer,
Citrus Australia

Positive start for exports despite global uncertainty

Australian citrus exports have had a positive start to the season despite the uncertainty caused by COVID-19, with increased orange exports offsetting a slight decline in mandarin exports in the first six months of 2020.

As of June 30, both Japan and Greater China had imported 26% of Australian oranges. Japan imported 25% of Australian mandarins, with Greater China importing 16%.

Japan's imports had increased compared to the same period in 2019 while China's decreased.

Citrus Australia CEO Nathan Hancock said it had been a pleasing start to the export season.

"Last year's record year was characterised by an on crop, large volumes of fruit, and an increased volume of smaller size fruit," Nathan said.

"We also saw an increase in mandarin exports which isn't a great surprise given the number of new plantings we've seen in the past decade. This year the crop volume has been down depending on the variety and timing but sizing has been good."

Nathan said the industry had adjusted to operating under different conditions than in the past - a virtual marketing space - due to COVID-19.

"There hasn't been the opportunity to visit the market, to view the fruit and to get a sense for the flow of product, so trust in relationships has been important," he said.

"There has also been increased risk that at any time a market may close or a port may be heavily congested due to COVID-19 regulations in the importing country.

"Despite this, demand for citrus globally has been very strong. Since the beginning of the pandemic many markets saw a sharp rise in demand and this has continued through to our season too."

Nathan said demand has been strong from a range of Australia's key markets.

"Demand from Japan has been strong all season, as have other markets such as New Zealand, Singapore and Malaysia for oranges and the Philippines and Thailand for mandarins.

"We predicted the 2020 citrus season would be smaller in volume than last year but it seems certain varieties have

been lower in volume than we first thought, particularly early and mid-season Navel oranges and Murcotts.

"However, Citrus Australia is still optimistic it will be a reasonably strong export season given strong demand domestically and across our export markets."

Nathan said that due to the size of the crop, there has been less fruit available overall that suits the China market specification.

"Given the difficult end to the northern hemisphere season where port congestion caused delays causing fruit from Egypt, the USA and other markets to build up and then took time to clear, there will be traders in China who will also be more cautious about the volume they are prepared to import.

"Traders on both sides will be hoping to get the balance of supply and demand and ensure it is a profitable season for all involved.

"Early indications are that the navels and mandarins arriving in China are receiving good prices and the fruit is in high demand, but you never really know until the last consignments are paid for". ●



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High demand and lighter volumes keep prices strong

A combination of heightened demand and reduced yields in most regions is buoying citrus returns both domestically and on the export front.

Far North Queensland

In Far North Queensland, Debra Caamano-Bermudez, Julum Citrus, Mareeba, sees humour in the situation.

“That’s always the way: the price for lemons and limes is up so there’s no fruit around,” Debra said when we called early August.

“It we had it we could make good money right now.

“Melbourne’s screaming for it – our agent’s calling them ‘Lockdown Limes’, because alcohol consumption’s actually increased during lockdown.

“There’s plenty of crop but it’s just not ready yet.

“COVID shut us down and we had nowhere to send our fruit so it stayed on the trees, and instead of flowering they were putting their energy into feeding that fruit.

“Everyone seems to be in the same boat: a couple of growers are doing a little bit constantly but then some are two to three weeks away and others won’t start for a couple of months.

“The Dimbulah area was hit badly with frost in the middle of July.

“There isn’t much damage to limes but

a lot of seedless lemons have been burnt.”

While there is enough labour in the area to see growers through the 2020 harvest, Debra says concern is building over how replacements will be found once the current wave of backpackers and seasonal workers leaves Australia.

Central Queensland

At Gayndah in Central Queensland, the Honey Murcott harvest on Benyendah’s four properties finished in early August.

Matthew Benham says the operation experienced a “lighter year after quite a sizeable crop in 2019 that was 20-30 per cent above normal”.

“This year we were roughly 50pc down due to overloading of the trees last year and the dryness we’ve had,” he says.

Matthew says Benyendah’s sales of fruit into China, Thailand, Indonesia and the UAE have been pleasing and “the returns on domestic fruit have certainly been a surprise”.

“We were lucky to finish our lemons at the end of May when the hospitality side of the market was just starting to struggle because of Australia’s

lockdown; we should be into them again before Christmas.”

Matthew says guarding against COVID-19 “has increased the workload on the administration side” but hasn’t impeded the business to any significant degree.

“At the start of the export season we weren’t sure what chaos was ahead but it’s been surprisingly good to date,” Ainsley Emmerton, Mundubbera, says.

“Most orchards are down 30-50% on yield and domestic and chainstore pricing is competitive with export.

“We had initial concerns over the Australian-Chinese political relationship and Thailand’s maximum residue limits so growers have spread the risk by including more consignments to Vietnam, Taiwan and the Philippines.

“There’s less fruit on the water, less supply and more demand.”

Ainsley says the China market is strengthening in the lead-up to the Moon Festival on October 1 and “Thailand is ticking away nicely, with a Queensland Exporter Group promotion due to commence in August for the Hungry Ghost Festival



With seedless lemons and limes in short supply on the domestic market, producers including Julum Citrus at Mareeba, Far North Queensland, are desperate to start harvesting.



Mandarins from Quebec Citrus, Mundubbera, and fellow Central Queensland exporters will be available during the Hungry Ghost Festival in Thailand and the Moon Festival in China this spring.



in early September”.

“Pricing has been similar to 2019’s but there will be a much stronger finish.”

Lighter loads have produced an increased percentage of rougher skin and creasing at the calyx and “acid levels have taken longer to come down”, she says.

“Most growers, if they aren’t still picking, are starting pruning, fertilising and post-harvest spraying.”

Central NSW

In northern NSW, Gunnible Pastoral, Gunnedah, has bucked the downward volume trend, setting records in tonnages produced and exported.

Supplying Salustiana oranges for domestic juicing and to the fresh fruit market in China, Gunnible is benefitting from investment in water management technology that now irrigates 80% of blocks using solar power, according to Robert Hoddle.

“There was a degree of nervousness in China caused by the political environment; they were a little bit apprehensive,” Robert says.

“We’re experiencing strong demand for our juice fruit from buyers – COVID is having an effect on that with consumers looking for healthy alternatives.

“We’re very proud to be supplying a good-quality product to help people through this.”

Robert says Australian growers are following with interest reports of declining production in the Americas.

“We’re hearing that Brazil has fallen by 19% and Mexico is almost down 50% on oranges – the lowest since the 1990s.”

Tri-State

In the Riverina, an abnormally dry few months have forced enterprises at Leeton to water throughout winter, Frank Mercuri, Pacific Fresh, says.

“Prices have come back by \$50-\$100 a tonne, or \$3-\$4 a box, but that’s off the past few really good years so we can live with that.

“The fruit’s not overly big this season but the quality is good.

“The volume overall is down about 20% on 2019 – everybody’s picking a little bit less than what they thought – but the demand is there so as soon as we can pack it, it’s gone.”

The coldest morning of the year – at -4°C – was recorded on August 6.

“The frost fans started up at 8pm when the temperature hit 0.5°C and ran for 12 hours straight.”

In the tri-state area, Mildura Fruit Company is negotiating three sets of government regulations and cross-border travel restrictions while working to move both people and fruit from South Australia, NSW and Sunraysia to its facility in Victoria, grower services technical manager Justin Lane says.

“It’s been a bit of a nightmare for our truck drivers and labour; we had a couple of weeks when they couldn’t get permits,” Justin says.

“The yields are down slightly after a pretty tough growing season last year with no winter rain and a lot of wind and dust storms but the quality is high and the size is up.

“The blemish is variable – where growers have done their pruning and have windbreaks the fruit’s very good.

“There were a couple of frosts in the first week of August but it’s not looking too bad at this point.

“At the moment we’re at the start of the late navels and Afourers; our mid-season navels and Imperials are done.

“Hopefully by the end of September we’ll be close to finishing.”

Justin says markets in Australia and overseas are “all quite strong”.

“The demand is certainly there for citrus.”

In the Riverland, grower liaison officer Fabio Spiniello, Venus Citrus, Loxton, says the Washington navel season has finished and the first late navels are being delivered.

“We’re also still doing Cara Caras, Afourers, tangelos, lemons and Sumos,” Fabio says.

“The quality is one size better than last year.

“Some of our growers have had heavy wind blemish but it’s not as severe as it was last year.

“Across all varieties the yield is a little bit down but in Afourers we’ve had a 50% increase as younger trees come into production.”

Fabio describes orders as “outstanding – very, very solid”.

“There’s a shortage of citrus worldwide so the markets we’re dealing with in Japan, the US, Taiwan and Thailand are



Simon Lehmann, Nippy’s, Waikerie, South Australia, says growers with large, clean fruit are being rewarded this season.

very strong in price, and domestically it’s also holding up.

“We have more orders than fruit.

“If anything, as the season’s progressed, the market demand and prices have both increased.

“On Late Lane navels returns should be a lot better than on Washingtons this year.”

Fabio says COVID-19 is causing minor logistics disruptions, including to the availability of containers, transport and shipping spaces.

Nippy’s manager of grower services, Simon Lehmann, says late navels, Afourers, winter Valencias, lemons and grapefruit are being picked in the Riverland.

Fruit quality “has improved as we’ve moved through the varieties”, Simon says.

“All have had extremely good Brix levels and the rind has been firm, resulting in a superior product being delivered to our export destinations.”

Mid-season navel sizes “peaked in the 88s, 72s, 64s and 56s”, with average class one packouts of about 50%.

“Early indications are that the late navel crop load will be heavier than initially estimated but we still have around five weeks of supply to come,” he says.

“With the national Imperial crop being down we’ve seen strong demand; this has been reflected in grower returns.

“The Afourers are on the larger end of the grader and average class one packouts are 70-80%.”

continued on page 8



continued from page 7

Simon says “demand has outstripped supply”.

“We had to decline orders because we couldn’t physically get enough volume through our shed in the peak from the end of June to early July [and] we’ve now encountered a shortage of labour affecting our ability to harvest fruit.”

Western Australia

In Western Australia, Richard Eckersley, Yambellup Estate, Harvey, says 2020 is “so far, so good”.

Richard says the state’s two exporters are straining to fill orders – particularly from Japan, where buyers are seeking “a lot more fruit than usual”.

“We’re seeing excellent demand,” he says.

“Fruit going through the supply chain is moving really quickly so the product in store is fresh.

“Volume is a bit of a mixed bag in WA – some farms are up and some are down – but packouts are higher this year.

“We’re seeing a reduction in albedo-breakdown crinkling and the little bit of splitting we’ve had in navels isn’t serious.

“There were borders up between regions at the start of the season that created extra paperwork and we had

two storms prior to harvest with high winds that knocked some fruit off the trees.

“Our Imperials went really well and we’re harvesting Afourers at the moment, although we’re still seeing touches of green on some fruit.

“We’ll be finishing up in October – that’s four to six weeks earlier than normal for us.”

Just over 300km north of Harvey, Damien Guthrey, export and distribution manager at Moora Citrus, echoes Richard’s comments.

“It’s been very inconsistent across regions and varieties in terms of crop profile,” Damien says.

“The late navels look like they’ll be below the forecast but the late mandarins are the other way around.

“Total tonnages year-on-year are going to be slightly down but the eating quality is great.

“There’s always a degree of wind rubbing and scarring in WA but it’s no worse than the five-year average and we’ve picked up between 0.5° and 1° Brix on sugar content.

“This has brought very strong demand and pull-through at the retail level.

“The COVID crisis has put more focus on healthy eating and boosting the

immune system, we have a good-eating piece of fruit and we’re one to two weeks earlier in maturity.

“There was a massive hole domestically when we started our mandarins and navels in April – the North American imports had been soaked up in the panic buying.”

Despite overseas port congestion affecting shipping, WA exports are streaming into Southeast Asian markets.

“Most of the countries we’ve been supplying are reporting similar demand and the returns have been good for clean fruit, class one fruit, premium fruit,” Damien says.

“We’re through the mid-season and specialty varieties now – we’ve seen the last of the blood oranges and Cara Caras.

“We’ll be busy with late navels and Afourers until October, then the Valencias will come in.

“When we started this year there was an abundance of workers who weren’t able to find jobs in hospitality.

“Well over half our workforce at that time had arrived between Christmas and the national border closing in the second week of March.

“The concern in the industry now is around what will happen in 2021.” ●

Practical measures protect packing crews

Keeping packing houses free of COVID-19 is crucial for Venus Citrus in the Riverland.

“The way we’ve had to run things is different to last year,” Venus Citrus’s grower liaison officer Fabio Spiniello says.

“We’ve split the workforce up into different teams running at different times to minimise people in the shed, and also to create a safe environment we have sanitising stations everywhere – it’s all about hygiene and staying aware.

“We temperature-test everybody every morning.

“With the machines that are running, we send people off to smoko and to lunch at different times so they’re not all out there together.

“We’re lucky enough that we’ve had no issues but we just have to make sure we keep following protocol.”

Citrus Australia has helped citrus businesses adapt to the changing landscape through its industry-leading document ‘Guide to COVID-19 in the Orchard & Packing Shed’, and our updated COVID-19 section at www.citrusaustralia.com.au

This information provides businesses with a one-stop portal to help them navigate the changes.

Information is gathered through weekly discussions with government departments, where Citrus Australia ensures the industry’s needs are raised and met. ●



Venus Citrus is staggering workers’ breaks and running teams at different times as part of its COVID-19 prevention strategy.



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Ratings decision defies common sense

We've all been left scratching our heads with the decision to remove fresh juice's 5-Star Rating under the Health Star Rating system, particularly when a glass of diet cola is rated 'healthier'.

Under the revised system, fresh Australian orange juice will no longer receive a 5-Star rating, the highest available.

Instead, juice packed with Vitamin C, Potassium, Folate, magnesium and antioxidants, will likely receive 2 or 2 1/2 Stars.

That's because the HSR system has a laser-like focus on eliminating sugar from the population's diet, without regard to the overall nutritional value of the food.

Orange juice contains complex natural sugar, and its nutritional value has earned it a place in the 'eat more of' category of the Australian Dietary Guidelines as a substitution for a whole piece of fruit in the diet. One 125mL glass of fresh orange juice contains half the recommended daily intake of Vitamin C.

It is clear to Citrus Australia that the HSR system is misguided and that the Federal and State Ministers on the Forum on Food Regulation that oversee the system must ask themselves: Are we promoting healthy nutritious diets, or simply less sugar?

With an annual decline in the number of Australians eating the recommended intake of fresh fruit and vegetables, it would seem an inappropriate time to discourage alternate sources like fresh juice.

The most recent (2017-18) Australian Bureau of Statistics survey on fruit and vegetable consumption reveals only 51.3% of Australians aged 18 years and over met the guidelines for the recommended daily serves of fruit (2 or more serves), while 7.5% met the guidelines for serves of vegetables (5 or more). Only 5.4% of adults met both guidelines.

These rates have remained fairly consistent over time.

The Government should clearly be attempting to increase the intake of

fresh fruit and vegetables within the Australian population. Governments in other countries are attempting to do this.

In the UK, the government has implemented a Soft Drinks Industry Levy (sugar tax), of which juice and milk-based drinks are exempt.

Public Health England has a target to reduce sugar in juice-based drinks by mid-2021 but this excludes 100% fruit and vegetable juices – a decision based on their nutritional value.

Citrus Australia will continue to advocate for the nutritional qualities of fresh juice and lobby each member of the Forum on Food Regulation to see sense and look at the bigger picture – we must get it back on the agenda and have the health benefits of fresh juice acknowledged by this rating system. ●

NATHAN HANCOCK,
Chief Executive Officer,
Citrus Australia



The story so far

The Health Star Rating System was introduced in Australia and New Zealand in 2014.

Fresh 100% juice was granted the maximum 5-Star rating through a 'policy position'.

The results of a 5-year review were released in May, 2019. Under the review recommendations, the policy position would be removed and fresh juice would receive a rating of as low as 2 Stars under the revised HSR 'calculator'.

This is because the calculator assesses juice on its sugar content alone and does not take nutritional value into account.

Under the current HSR 'calculator', diet cola would receive 4 Stars, because of the artificial sweetener it contains.

The final decision is made by the Australia and New Zealand Ministerial Forum on Food Regulation (Forum), comprising Ministers from the Australian and New Zealand Federal governments, and each Australian State and Territory.

At the Forum's meeting in July, Federal Agriculture Minister David Littleproud tabled two motions for fresh juice to be granted an automatic 5-Star rating. Neither of these motions received support.

The NSW and SA state governments

then tabled a motion that juice receive an automatic 4-Star rating.

This received the support of Minister Littleproud but did not receive the backing of any other states and was defeated.

Minister Littleproud highlighted the anomaly of diet cola receiving 4 Stars under the revised system and the Forum asked the Food Regulation Standing Committee to "consider and provide further advice on the treatment of artificially-sweetened beverages and 100% vegetable and fruit juice beverages" at the November Forum meeting.



Where to from here?

Citrus Australia is working to build support for the proposed automatic 4-Star rating for fresh juice, as proposed by the NSW and SA governments, and to have a motion tabled at the November Forum meeting.

Citrus Australia is working with a coalition, including the Australian Beverages Council, the National Farmers Federation, Apple and Pear Australia, and juice manufacturers, on a two-pronged approach.

“We will continue to raise the absurdity of the current situation through the media in a bid to gain support from consumers; and heavily lobby the Agriculture Ministers in each State, as well as all local politicians in fruit juice regions,” Citrus Australia CEO Nathan Hancock said.

“We received excellent coverage in the media in the lead-up to the July meeting, which led to Minister Littleproud publicly declaring he would push for a 5-Star rating.

“The new coalition will help amplify this message in all states.”

Each state on the Forum is represented by the Agriculture Minister or the Health Minister.

“It has come to our attention that the agriculture ministers in each state may not be fully aware of the situation and we will work to change that.

“Fruit juice currently contributes \$736m to the Australian economy and Australian juice processors have stated that the proposed changes to the Health Star Rating for fresh juice will have an immediate and detrimental effect on sales.

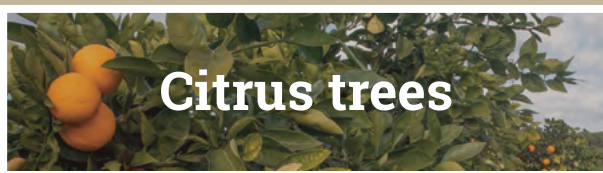
“We hope that by stimulating earnest discussion between Ministers at cabinet level, we could receive more support at the next Forum meeting.”

Fresh juice would receive a rating of as low as 2 Stars under the revised HSR ‘calculator’.



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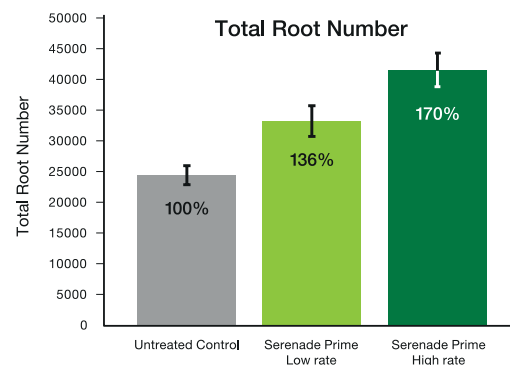
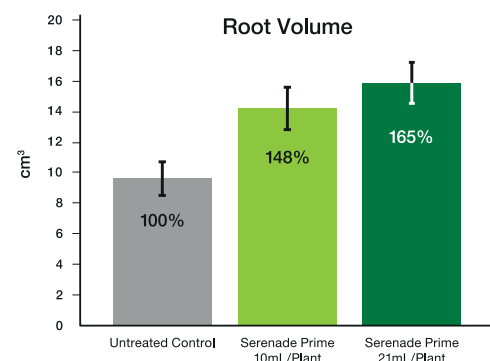
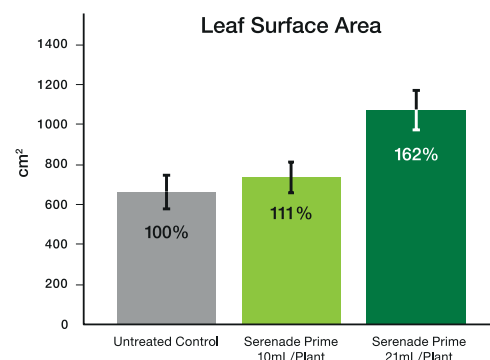


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Government reopens pathways for overseas workers

The Federal Government announced in August the reopening of the Pacific Labour Scheme and Seasonal Worker Programme.

The Federal Government has assured the horticulture industry it would approve the visa applications, but it now depends on each state and territory to “opt-in” to the reopened schemes and administer their arrival into the regions.

Citrus Australia is working with all state government departments, advising them of the importance of their help in administering these schemes, and supplying necessary data on required worker numbers in each citrus region.

Strict conditions will be imposed including a 14-day isolation period following the arrival of the workers. SWP-approved employers will be covering the costs of finding and quarantining employees.

Citrus Australia CEO Nathan Hancock welcomed the Government announcement and looks forward to working with state governments to ensure all growers have a full workforce for the 2021 harvest and into future seasons as Australia tracks its way to recovery from the pandemic.



Work continues on ensuring there will be enough labour for next season’s harvest.

“Citrus businesses also have an important part to play. We have been collating information on just how many workers are required across the country for every month of harvest. Specific examples of any difficulty in filling these roles this season or in past seasons is powerful in telling industry’s story.

“We will need accurate data ahead of time to help Government prepare good policy.

“This information provided by our businesses will help us in our meetings with government, and in turn help government create appropriate policy in a timely fashion.”

Nathan said Australian growers have worked hard through the uncertainty and additional requirements caused by COVID-19 this season.

“I commend all growers for their response to a rapidly changing situation that occurred just as harvest was beginning in Queensland.

“Having to secure and rapidly train workers, and put in place protocols in the field and the packing shed to keep employees and their family safe, placed great strain on everybody.

“But the response was tremendous, particularly when the goal posts could, and sometimes did, shift overnight.”

Demand for citrus in domestic and export markets has been strong this year and the majority of growers have had enough workers to harvest. ●

Citrus Australia members can access a comprehensive document ‘Farm Labour: All you need to know’, containing facts and links to useful websites on how to source labour, how to manage workers, how to ensure they are safe, and that you are paying them correctly. The guide is available in the members’ section of the Citrus Australia website. The website also contains a section on labour which is regularly updated.

Unions want Working Holiday Maker visa banned

The Australian Workers’ Union, the Shop Distributive and Allied Employees Association and the Transport Workers’ Union have formed an alliance, calling for an end to the working holiday maker visa.

In a submission to a federal review of the farm workforce, the Retail Supply Chain Alliance called for more Australians to work on farms as well as an expansion of the seasonal worker program.

Citrus Australia was quick to point out that removing the Working Holiday Maker visa at this time would only add to the pain Australia faces as a nation.

“Throwing out the Working Holiday Maker program goes against all advice. Government must keep all options open when it comes to finding people to work in agriculture,” said Citrus Australia CEO Nathan Hancock.

“The need for programs like the Working Holiday Maker program and the Seasonal Worker Programme were developed and supported by federal governments over the years because the need existed; industry could not find workers no matter the unemployment rate, and I am afraid under current policy settings that will remain the case,” Nathan said.

“These simplistic statements by the unions show how out of touch they are with the issue at hand,” Nathan said.

The unions’ ‘solutions’ ignore the key issues Australians face when working in these seasonal roles, of the lack of short-term accommodation options in regional and rural areas, and the clash of priorities for transient workers who have a family. ●



Border closures should have been avoided

As State Governments eased harsh border restrictions in August, Citrus Australia says the pain and angst these decisions caused border communities could and should have been avoided.

The National Cabinet (comprising the Federal and state and territory governments) agreed in August to develop a national code to allow cross-border travel for agricultural workers.

Citrus Australia is contributing to the national code, which will involve a consistent set of rules for the agriculture supply chain to cross state boundaries more freely.

Citrus Australia CEO Nathan Hancock said interstate border closures that were issued by most states were done with very little warning and did not seem to be based on evidence of potential COVID-19 risk in the border communities.

“The crippling effect of health ministers and departments with city-focussed policy making had a severe impact on borders around the country and the movement of ag workers,” he said.

“So much of this could have been resolved with proper consultation and if it was not driven by the health departments alone.”

Since the National Cabinet decision, the SA, Queensland and NSW governments have eased their strict border closures, which prevented workers and residents from a range of states from crossing the border without written exemptions, which were difficult to obtain.

The NSW border closure in July prevented seasonal workers based in Victoria from working on NSW farms.

After 10 days of lobbying, significant work with the NSW DPI and discussions with the NSW Agriculture Minister, the decision was overturned for seasonal workers. Citrus Australia was relieved the citrus harvest in NSW resumed in July with minimal damage inflicted.

Nathan said the initial decision to close the border with no warning or consultation should have been avoided and urged the Government to consult with relevant communities and industries before making such drastic changes in future.

“The decision made little sense, and although a logical conclusion was finally reached, growers and workers were left in limbo for 10 days,” Nathan said.

Nathan said growers working around the clock minimized damage caused by the worker restrictions. Support from packers ensured quality fruit was delivered to domestic and export markets.

“Unfortunately soon after this issue was resolved in NSW, we saw further restrictions implemented in border communities across Australia which did not reflect the risk of COVID-19 transmission and unfairly impacted agribusiness continuity.”

“We sincerely hope that the national code will prevent growers and workers from being placed in this situation again.” ●



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Compac partnership offers great value for growers

Citrus Australia welcomes global sorting equipment specialist Compac, part of the TOMRA Food family, as a Major Partner, with CEO Nathan Hancock saying Citrus Australia members will benefit greatly from the relationship.

“We look forward to working together and sharing Compac’s expertise and technology with our members,” Nathan said.

“The team at Compac will be an active presence at our regional forums, and our biennial Tech and Market Outlook Forums, and also share new R&D through webinars on our online channels.”



As part of the partnership, Compac will assist Citrus Australia in preparing a future overseas trip to North America for Citrus Australia members.

Citrus Australia members will also gain introductory access to Packhouse Academy – the industry’s leading education and training platform for packhouse professionals.

Compac will also host a series of R&D open days at its Australian facilities on topics including Spectroscopy and Near Infra-Red Technologies; and advances in external grading and sorting technologies.

Compac Regional Director, ANZ, Damien Gibson, said Compac, which is headquartered in New Zealand, has been actively engaged with the Australian citrus community for over 30 years.

“Although we are headquartered out of New Zealand, Australia is our second home,” Damien said.

“During this time, we have built an unrivalled local knowledge, along with a dedicated Australian based team covering all aspects of our business including account management, full service, customer support, and training.

“Our market position gives us a unique insight into global best practices and sharing this knowledge with Citrus Australia members will help to strengthen the industry and foster innovation and new ways of working.”

“Citrus Australia’s relationship with Compac will provide unparalleled access to the technology, people, and resources within the TOMRA Group, and opportunities for Citrus Australia members to strengthen their own businesses, and to collectively grow the value of Australian Citrus.”

Compac provides integrated post-harvest solutions and services to the global fresh produce industry using the world’s most advanced grading technology.

Combining industry-leading solutions with award-winning grading platforms like Spectrim, the company’s mission is to enable its customers to improve returns, gain operational efficiencies, and ensure a safe food supply via smart, usable technologies.

To achieve this, Compac operates centers of excellence, regional offices and manufacturing locations within the United States, Europe, South America, Asia, Africa and Australasia.

With a strong focus on technological innovation, research, and development, Compac’s technical superiority and market success lies in matching advanced engineering and design concepts with the differing and unique needs of its customers around the world.

Compac is a member of the TOMRA Food family, active in over 80 markets worldwide. TOMRA Food offers the widest range of food sorting and peeling equipment available in the food industry today, supplying optical sorting solutions for a multitude of food applications, for fresh and processed food. ●

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*Left: Damien Gibson,
Compac Regional Director, ANZ.*

edp australia demonstrates its commitment to Australian citrus industry

edp australia pty ltd continues to demonstrate its commitment to the Australian citrus industry by renewing its Major Partner status with Citrus Australia.

The Australian company, based in Mooroopna, Victoria, is a leading supplier of fresh fruit and vegetable grading and packaging solutions, including machinery and consumables.

edp australia pty ltd also has a long-term relationship with Spanish company Giro, a leader in sustainable packaging systems.

Citrus Australia CEO Nathan Hancock said Citrus Australia members had greatly benefitted from the 5-year relationship with edp australia pty ltd, which has also been the major sponsor of the biennial Market Outlook Forum during this time.

In addition to the Major Partnership, edp will renew its status as major sponsor for the 2022 Market Outlook

Forum. This will be edp australia pty ltd third Major sponsorship of the Market Outlook Forum event.

“We look forward to building on our relationship with both edp and Giro. We have been working together to increase the benefits for our members,” Mr Hancock said.

General Manager Ray Thrum explains that edp australia pty ltd has been supplying manufactured and packaging turnkey solutions to its citrus customers for over a decade.

edp australia pty ltd provides the marketplace with locally stocked consumables, dedicated service technicians and provides a wealth of knowledge to the Citrus Australia members.

“We are committed to sharing this knowledge in a very practical way to assist the continued growth of this industry and its growers,” Ray said.

“As part of this, edp and Giro will produce a biannual magazine featuring the latest information on best global practices in sustainability, technology and new machinery, exclusively for Citrus Australia members. It is part of our goal to raise awareness of existing opportunities beyond our border.

“edp and Giro will also work with Citrus Australia, COVID-19 permitting, to hold a grower tour to Spain in 2022, and fund the trip of one citrus grower. The tour will visit Giro facilities and major Spanish citrus businesses, led by edp Business Development Manager, Mick Schirmer.

“We look forward to continuing our relationship with Citrus Australia and its members.” ●



edp with Giro have been the major sponsor of the past two Citrus Australia Market Outlook Forums and will also continue this support. Giro sales director David Porta spoke at this year's Forum and will expand his support under the new deal.

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Review underway of ACCC Water Markets Inquiry interim report

Citrus Australia’s review of the interim report into water markets in the Murray-Darling Basin by Inspector General Mick Keelty can be summed up in a simple phrase – nothing changes if nothing changes.

Policy and Membership Officer Kerry Thompson expressed frustration that much of the report reflected on policy and reviews from previous years all calling out the same issues.

“It is no secret that the Murray Darling Basin is complex due to the levels of government involved, the report goes in to great depth to explain this, but these issues are not unfamiliar to growers or to past inquiries,” she said.

The ACCC found that water users do not trust the water market and believes that increased regulation and compliance is required to build back that trust.

The report states that many of the Basin’s issues are grounded in failure of governance, and the market has outgrown its original design.

“Because of the substantial differences in Basin States’ entitlement frameworks and trade processes, trade is cumbersome for individual traders,” Kerry said.

“These differences result in more than 150 classes of water in the Basin making trade incredibly complex.”

The report identifies two broad grouping of issues with brokers, client facing (i.e. not disclosing to the buyer how much the water is being sold for), and market facing (i.e. registering \$0 trades to manipulate the market).

Citing an audit conducted by the MDBA which found gaps in state process which allowed \$0 trades to be recorded and that over 50% of trades sampled were not compliant.

Sixty-six per cent of the volume of approved water allocation trades in the Southern Connected Basin in 2018-2019 had a reported price of \$0.

Entering \$0 trades is an easy way to manipulate the true value of the market, by only reporting high priced trades to bump it up.

Brokers do not have to provide a reason for this because the current regulations and processes do not require it.

“The ACCC found that the inconsistencies in the trade processes between states meant that the ‘new products’ beyond entitlement and allocation transfers such as options, forwards, contractual leases have increased financial risk to water users due the lack of transparency, reporting and infrastructure.”

The ACCC has so far acknowledged the issues Citrus Australia has highlighted on behalf of industry. However, the ACCC need more clarity and detail on certain matters so please respond to our survey which is coming out soon

We look forward to the Inspector General’s final report but more importantly the change that’s got to come. ●

Please contact Kerry Thompson by email at Kerry.Thompson@citrusaustralia.com.au



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ROD ULCOQ 1927-2020

When a 2300km road trip turned the fortunes of Gayndah growers

It was the late 1950s and farmers growing citrus in the Gayndah region of Queensland were under pressure. Their popular Glen Retreat mandarin had competition.

The rivalry came from a new variety gaining interest and attention in the domestic market “down south”.

Intrigued, Rod Ulcoq and Robin Darrow hit the road to Sydney – they were both working for local grower Les Darrow – and wanted to understand what all the new variety fuss was about.

The 2300km round trip would become historically significant for the state, the citrus industry, and the Gayndah locals.

When Robin and Rod returned, they introduced the first Imperial mandarins to the Central Burnett region.

The Central Burnett Imperials would go on to provide earlier domestic market supply of Australia’s favourite commercially grown mandarin.

Rod Ulcoq passed away in February at the age of 92. His son, Nick, said his father never recalled scepticism about the introduction of the Imperial.

“I just think the growers in the area felt they were getting pressure in the market because of their varieties and needed to look at new varieties,” he said.

Not long after returning from Sydney, Rod, his wife Iris and Robin Darrow – Les Darrow’s son – and his wife Jennine set up their first orchard at the foot of Mount Debatable on the Burnett River.

The business partners planted 1000 Imperial mandarin trees in 1960 – the first commercial block of that variety in the region.

“That winter they all got frosted,” Nick said. “Fortunately, they shot away

again above the (graft) union. That’s where they learnt how to grow it. That block was where all the nutrition and all the management of the Imperial mandarin, all the trial work on that variety, was done.”

With the assistance of Queensland Department of Primary Industries employee John Chapman, Rod and Robin took 20 years to discover “what was required to grow good quality Imperial Mandarins in the Central Burnett area”.

To start with, they realised Imperials grown in the more humid climate of Queensland ripened six weeks earlier than those produced further south. They also had the most success growing the budwood on Cleopatra rootstock.

Nick was not sure why they chose the Cleopatra rootstock but, at the time, it was a rootstock used in the area.

“It suited their climate a lot better,” Nick said. “They were in a more humid climate and that led to issues as well with disease up here.”

This research developed standards for nitrogen and potassium levels as well as general management guidelines for growing Imperials.

Nick’s brother Tim Ulcoq manages the Mount Debatable orchard now.

He said there were still about 250 of the original trees on the property— they make-up about 3 per cent of the total planting.

Starting out in citrus

Rod was working on the local Arambanga Cattle Station, when he had a chance meeting with Les

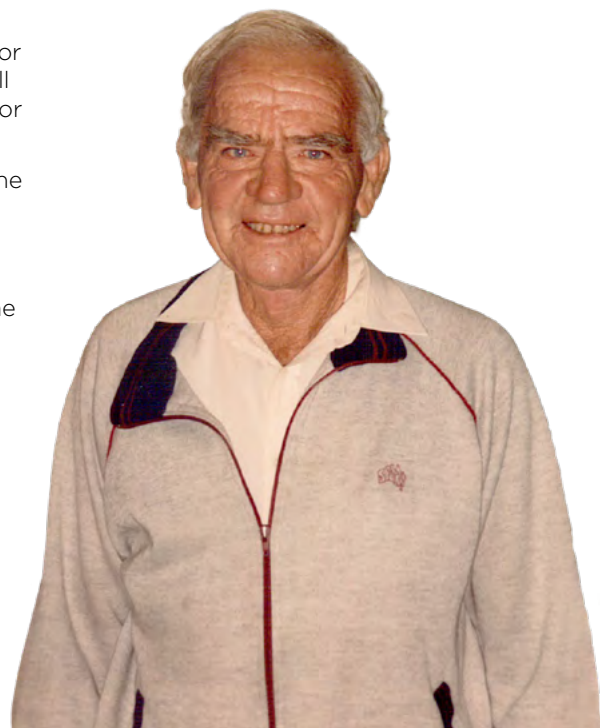
Darrow and an introduction into the world of citrus.

Employed as a farmhand for Les, Rod met Brisbane girl – Iris – who was working as a nurse at the Gayndah hospital.

Rod and Iris married and had eight children, with many of their sons going onto work in, own or operate citrus orchards.

Nick recalled his dad’s passion for producing quality fruit, managing trees, learning and innovation.

Rod was among a group of up to 10 citrus growers who established the local grower owned co-operative called Gaypak. The founding growers had the foresight to promote cohesion among the local smaller growers as it was becoming uneconomical for these businesses to upgrade their packing lines, according to Nick.



Rod Ulcoq brought the first Imperial mandarin trees to the Burnett region of Queensland.

Quality counts

“(Dad) was always very particular about the quality of fruit he’d provide to Gaypak,” Nick said. “Often, when we were picking as kids, he’d say, ‘don’t pick that fruit, there’s too many marks on it’ and he didn’t want to send it in.”

“He was pretty proud of the fruit he’d grown and became a pretty well-renowned grower of quality Imperial mandarins.”

Rod focused on quality right from the first trees he planted at Mount Debatable.

“(Imperials) were probably not a difficult variety to get growing, but it was difficult to grow the quality of fruit,” Nick explained. “In Queensland the tree is very vigorous compared to NSW because of the different climate, management of the tree size was a challenge.

“Dad was always adamant about the importance of pruning to get good quality fruit. All his orchard life, the quality of fruit he grew was quite exceptional and being the first Imperial mandarin grower, he learnt to grow them really well.”

The Imperial mandarins from the Central Burnett region were sold

into the Brisbane, Sydney and Melbourne markets.

Their “much better fruit size” and early maturity placed them in a unique market position.

Imperial Mandarins became the “mainstay” of the Mount Debatable orchard.

The Ulcoq and Darrow families farmed in partnership at Mount Debatable until 20 years ago when Rod and Iris bought the entire property and expanded their family business.

At the time, Ulcoq Citrus Orchards already owned other properties in the region.

Since, the Mount Debatable orchard has been sold.

Other Ulcoq orchards have been purchased by individual family members.

Nick and his wife Deb own one of the family’s orchard’s closer to Mundubbera. It was originally 14ha and they expanded it to 24ha.

Like many growers, Nick and Deb have had to respond to the market oversupply of Imperial mandarins during the past decade. The couple reduced their planting from up to 70

per cent of the orchard to 45 per cent.

“It was always a very popular mandarin, but there just aren’t enough people in Australia to buy what we grow,” Nick said. “It is easy to peel, very sweet, it doesn’t have a lot of seeds. Plus, it fits a window, April to May, when there isn’t a lot of citrus fruit available.”

Moving with the times

Nick said his father willingly embraced change in the citrus industry and was often at the forefront of developments due to his involvement in the local fruit growers’ association, water boards and other local industry committees.

“When we would talk to him later about things, and the new ideas being put into industry in last 20 to 30 years, there were a lot of things he had already been doing or had learnt how to do to produce good fruit,” Nick said.

“One example, a few years ago, people started talking about reducing irrigation before harvest, drying down the trees to get good quality fruit. Dad had been doing that for 30-40 years, it wasn’t anything new in that sense. It was one of the things he learned as he grew Imperial mandarins.” ●

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Will you have a home for your future fruit?

AUSTRALIAN citrus growers, packers and marketers will need to find a home for about 200,000 more tonnes of fruit in the next three years.

That's according to Citrus Australia modelling which also includes information from Auscitrus and The Australian Citrus Propagation Association.

This 28 per cent surge in production comes as the industry has experienced buoyant growing conditions, record citrus exports and healthy domestic demand for most citrus varieties.

Citrus Australia is reminding growers not to become complacent with planting decisions, stressing choosing the correct varieties plays a huge role in profitability.

Planning and research before choosing new varieties isn't the biggest time-lag in the process of establishing or redeveloping a profitable orchard, according to NSW DPI Dareton research horticulturist Dr Dave Monks.

"There's a lag time between making the decision and getting the nursery to propagate the trees, there could be a wait of six to 18 months for access to the trees," he said. "Planning won't be a waste of time and won't be your biggest time-lag."

Dr Monks said he regularly fielded queries from growers looking at new varieties, with 300 people, looking to make planting decisions, visiting the Dareton variety evaluation site last year.

He said most people were looking at a specific variety or timeslot, but he said there were many things that should be considered.

For example, internal quality and yield data, such as sequential juice testing during the proposed maturity window, can feed into decision making according to Dr Monks.

"It helps to consider the performance relative to other known varieties," he said.

The National Citrus Variety Evaluation Program, funded by Hort Innovation, is specifically designed to help growers make planting and marketing decisions based on internal quality.

Dr Monks said, as an example, some may already grow Afourer mandarins and their decision-making would take the maturity window of a new variety into account so they could avoid harvesting the new variety at the same time as their existing Afourers.

Those looking to export, have many other physical appearance and taste

considerations to take into account, he said.

"If you are growing a piece of fruit for the Asian market, that market prefers fruit to be lower acid than Australians," he said.

"Most people making decisions on private varieties need to export to be profitable, or at least have the potential to export."

Other factors include the fruit skin texture and its size and shape, all issues that can be independently evaluated by the Australian industry.

Specific rootstock requirements should also be investigated. Dr Monks said rootstock incompatibility was an important consideration.

A well-known incompatibility, reported by South Australian researchers Mark Skews and Peter Gallasch, is the Navelina Orange with two common rootstocks the C35 Citrange and Swingle Citrumelo.

Dr Monks warned growers to be careful when it came to rootstocks, especially paring these rootstocks with Navelina Sport varieties. "It is so early in their production life, we don't know if they are incompatible, but its best to err on the side of caution," he said. "Consider an interstock, a double-bud, or use a different rootstock."

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These rootstock incompatibility considerations must be weighed against suitability to soil type and drainage on farm, too.

Some varieties may require specific management practices by the orchard manager, and the required staff and equipment should also factor into planning, according to Dr Monks.

Those considering a plant breeders' rights (PBR) variety could also investigate the technical support available from the variety manager.

Dr Monks said some varieties have management packages as part of what a grower purchases with the royalty payment.

This article was commissioned by the Citrus Australia Variety and Rootstock Committee.

Consideration must be given to the following areas:

- Who will buy the fruit from you? What are the consumer trends for this variety?
- Will that, or similar, markets still be there in 25 years? Is there a domestic market potential? Speak with your pack house and ask their thoughts on these issues, do they consider it a 'blue chip' variety that they will support into the future?
- Seeded vs Low seed?
- Are there internal quality and yield data available for the variety? In your environment, can you meet the Australian Standard and grow the premium size fruit? Is it susceptible to sunburn? Is it cold enough to promote colour in blood oranges (if you go that route)?
- Is there a specific rootstock requirement? What soil constraints need to be considered?
- Are there specific skills required to grow the variety profitably?
- Does the pack house have space to receive the fruit? Will this give you a 'balanced portfolio'?
- Are there Plant Breeders' Rights associated with the variety? What is the royalty structure? An ongoing per-hectare fee? What happens to those fees if you have a failed crop?
- Is there a packing and marketing structure? Are those fees acceptable to you? Is there a minimum hectare planting required? Which nursery will supply these varieties? What happens if you sell your farm?

Citrus Variety information sheets

The NSW Department of Primary Industries, supported by Hort Innovation, has evaluated new citrus varieties for Australian citrus growers for the past 20. DPI was the first to show Afourer mandarins in Australia, were involved in developing common oranges for fresh fruit and processing, and continue to provide an independent evaluation of new citrus varieties in this new era of PBR (Plant Breeder's Rights) protected varieties.

A new suite of variety information sheets is being released, developed from data collected at the Dareton Primary Industries Institute, Sunraysia. The sheets, available through our website (Search: NSW DPI citrus), present the estimated maturity window in the Riverina and Sunraysia, internal quality in that maturity window (Brix°, acid %, ratios, skin thickness, number of seeds), general comments, and, in most cases, sequential juice results from representative seasons.

In addition to the varieties presented in these newly released information sheets, we are evaluating fruit from 40 varieties this year, with 26 new varieties entering the program in the last 3 years (Table 1) in different stages ranging from early budwood-

multiplication through to first fruits on top-worked trees.

This work has spanned more than 20 years, supporting good decisions on-farm and providing information to allow growers and industry members to also make informed decisions. You are welcome to get in touch to discuss citrus varieties and to find

out more about visiting the trial site and seeing fruit. Please call Dave Monks on 03 5019 8400, or email dave.monks@dpi.nsw.gov.au ●

Dr Dave Monks
Research Horticulturist



Table 1. Recent variety introductions to the evaluation program.

2017-18	2018-19	2019-20
Mojo (MJR 11 and 12) mandarin	Sugar Belle mandarin	Daisy LS (California) mandarin
Afourer selection (x2)	C4-15-19 mandarin	Cambria late navel
Honeybee mandarin	Pink Marvel (variegated) lemon	UF900 mandarin
Orah and Or4 (Orri) mandarin	Kinnow LS mandarin	UF950 mandarin
Sonet mandarin		Seedless Snack mandarin
Valley Gold mandarin		HBI02 sugar mandarin
M8 mandarin		HBI06 very late mandarin
Italian lemon		
Star Ruby grapefruit (x3)		
Gusocora valencia		



Blank slate for 450ha citrus expansion

Developing an orchard from a blank slate is something many citrus growers dream about.

How would it be laid-out? What varieties would be planted?

Chislett Farms on the Murray River at Kenley in Victoria's north west has its own blank canvas – a new 450-hectare dryland block – thanks to its recent expansion.

Improving management through uniformity is at the heart of the development.

Brothers Brenton and Jonathan Chislett believe this approach will deliver cost savings, yield, and quality benefits.

“One of the key things we are trying to achieve is to keep everything uniform in terms of block sizes, road widths, tree spacings and headlands, all that sort of thing,” Jonathan said.

“Our home block was developed over a long period of time, when money became available small areas would be developed where it was easiest. It resulted in lots of small patches of different varieties here, there and everywhere.

“So, when it comes to picking and spraying and irrigating it takes considerably more management.”

Grouping varieties on bigger blocks should make it easier to manage, a crucial consideration as the business –

Key points

- ❖ Grouping varieties on bigger blocks
- ❖ Improved management through uniformity
- ❖ Thiosulphate fertiliser trials

which also includes a nursery – grows.

“The main thing for us is having the varieties or crop types on dedicated mains and fertigation systems,” Brenton explained.

“For example, late mandarins may need to be fertigated longer in the season than an early navel that’s picked in April-May.

“We want to be able to turn the fertigation off (for the navels) and still fertigate the mandarins.

“Being able to do this will result in better yields and better quality fruit, because sometimes if you are having to fertigate a later block, and an earlier block is still getting a bit of fertiliser, it can make (the fruit) rougher.

“Alternatively, if a variety needs more fertiliser to get more size, fertigation

can continue on those blocks.”

Planting at the new block, across the river from their home block, is set to start next year.

Varieties and rootstocks for planting are yet to be finalised, but Jonathan anticipates spreading about 10 different varieties of mandarins and navels across the block, with land not suitable for citrus planted to pistachios.

Chislett Farms produces about 4,500 tonnes of citrus, with a lot of its orchard still quite young, as well as avocados and pistachios.

The family business includes a nursery, the plant breeders’ rights for the M7, the Chislett Summer Navel and the world rights to the mid-late season Rohde Summer Navel.

Staff are shared between the nursery and the orchards to keep as many people employed year-round as possible. At peak, the farms have up to 50 people employed without including contractors for harvest.

Brenton and Jonathan are third generation farmers at Kenley, their parents Greg and Susan are the managing directors of Chislett Farms.

The farm expansion will take the entire operation to 800ha a far-cry



Aerial picture of the nursery and part of the home block at Kenley



Jonathan and Brenton Chislett

from the 16ha purchased in 1959 by first generation citrus producer Norm Chislett.

The extra land will help Chislett Farms achieve scale, something Jonathan said was important to support three families and develop the business for the next generation.

The farm business includes his parents, his wife Jessica, and their children Nate 3 and Ruby 1 as well as Brenton and his partner Sam and their children Jack 7 and Max 5.

“We wanted to make sure we were of sufficient scale so that we could be sustainable,” Jonathan said.

Chislett Farms’ citrus orchards’ primary plantings include navels and mandarins with a “handful of lemons”. The seedless lemons were added to diversify a few years ago when they were quite profitable. Citrus makes up about 50 per cent of the business, the remainder split between pistachios and avocados.

Avocados were first planted by the family more than 25 years ago, but six years ago this part of the business went through a resurgence due to increased demand for fruit and they have since planted another 40ha.

Brenton is the operations manager, in charge of running the farms. He said pistachios were also introduced to the business to make the most of the ground which was not suitable for citrus. “It was either too cold or the soil too heavy for citrus,” Brenton said. “Pistachios are a machine harvested crop and they are a little less labour intensive than citrus and avocados.”

Both the avocado and pistachio plantings are still young, so currently, most of the business remains driven by citrus.

All citrus fruit is packed by the Mildura Fruit Company with up to 30 per cent of the Chislett citrus sold to export.

For the past two years Chislett Farms has trialled thiosulphate fertiliser – a clear liquid fertiliser containing nitrogen and sulphur.

The trial began on a separate 20 ha farm, with the product working out the same “dollar for dollar” as traditional fertiliser. It cost more, but less was required, according to Brenton. Unlike dry fertiliser, which would take a few hours to mix manually before it is placed into a storage tank, the thiosulphate fertiliser does not require this extra labour. Brenton has now extended this fertiliser program across the other two farms.

Looking to the future, Jonathan believes the opening of export markets and the resulting price increases has improved the industry compared to where it was a decade ago.

“The nursery is always a good indicator of what’s happening in the industry,” he said. “Orders are quite strong and there’s still quite a bit of interest in citrus and other people are obviously thinking the same thing.” ●

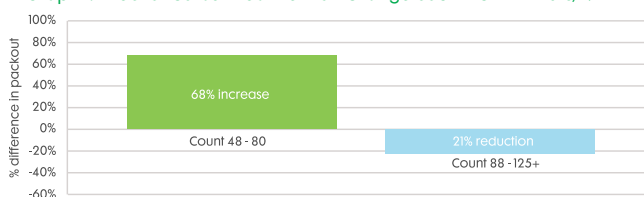


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New tech underpins evolution of world class citrus nursery

Automatically seeding into paper pots and using heated greenhouses has radically reduced the plant production cycle of citrus trees, according to the manager of a north west Victorian nursery. Using paper pots to make transplanting in the nursery easier, is an established technology overseas, but Chislett Farms nursery at Kenley is one of the first Australian businesses to embrace this practice.

This alternative potting method is one of the “bigger investments” the business has made, and it is working well into its second season, according to Chislett Farms business and nursery manager Jonathan Chislett.

“We bought a machine that makes a little paper cell instead of having a little plastic pot for your seedling to grow in,” he said.

“The outside of it is just paper so you can pot up the whole seedling and the paper biodegrades overtime. We make (the pots) onsite and we have an automated seeding line. The machine drops a citrus rootstock seed into each of the paper pots automatically.”

Growing the rootstock in the paper pot means there is less work needed for transplanting and the individual approach to germination has improved quality.

“When the rootstock seedling is big enough you can plant that into your final container without having any transplant shock, or take it out of one container and put it another, you just put a little hole in your final container, put the paper pot seedling in, and off it goes,” Jonathan said.

“Anecdotally, the paper pots combined with the heated greenhouses have easily taken six months off the production cycle and it’s given us much more uniform root-stock to bud, eliminated j-roots, and it has given us a lot more flexibility to produce root-stock when we need it.

“Also it grows faster as there is not as many set-backs during transplanting. Overall, it has been a really big improvement on our whole production process.”

Key points

- ❖ Seeding into paper pots
- ❖ Biomass burner heats greenhouse
- ❖ “Twin skin” greenhouses added

Heated “twin-skin” green houses also play a vital role in the germination process. “It is like a traditional greenhouse with two layers of plastic,” Jonathan explained.

“We pump air in between the two layers, and it creates insulation for the greenhouse.”

The greenhouse is kept cool through evaporative air conditioning in summer, while during the winter it’s warmed through a new biomass burner.

The burner runs on bought-in fuel such as woodchips or sawdust and is used to heat water which circulates around some of the greenhouses to promote growth during the colder months.

This heat allows seeds to germinate year-round and it was a more cost-effective, long-term option compared with other heating methods, according to Jonathan.

Adopting these new technologies has been driven by a desire to improve the

quality of the nursery plants.

Quality has always been a focus in the Chislett nursery.

Greg Chislett, a second-generation citrus grower, started the nursery more than 30 years ago after having trouble with field grown trees at his orchard. “He said ‘damn it, I will just grow my own,’” Jonathan said.

About 20 years ago the Chislett’s original in-field nursery was replaced by a container nursery and it has continued to grow.

The nursery has had The Nursery Industry Accreditation Scheme (NIASA) accreditation since 2001.

It is a national scheme for production nurseries which operate in accordance with a set a national ‘best practice’ guidelines. Some requirements include water sterilisation to eliminate pathogens, having pots raised off the ground, good drainage and ensuring quality inputs.

Owning a nursery also has additional benefits.

“You get a good idea of what everyone else is planting in terms of varieties,” Jonathan said.

“Lately there’s been a big trend towards mandarins and mid-season navels, we are planting these varieties ourselves and growing them in the nursery for customers.” ●



Fuel being delivered for the Nursery Biomass heater

Endoprime for healthier roots

Cor Greyling is the farm manager at Vitonga (PTY) LTD in Moree where he looks after 350 hectares of citrus trees, the produce from which goes to the company owned juicing facility Grove Juice at Warwick in Queensland.

When Cor started in the role a couple of years ago, the previous farm manager mentioned in the transition that he had treated a row of newly planted trees with EndoPrime®, a plant and soil enhancement product from Sumitomo Chemical Australia.

Cor freely admits that for the first year or so of the tree growth stage, he was very dubious and felt that the trial had been unsuccessful. Now however, as the trees have reached their second year of growth, he says that the difference between the treated and the untreated trees is quite marked.

As we spoke to Cor, he was driving through the orchard and described the visual differences between the treated and untreated areas of the crop. "The treated trees are definitely bigger," he said, "I would estimate between seven and ten percent bigger than the untreated. Apart from this, there is much less variability in the row with the treated trees showing a much more consistent size. The final thing that I notice is that the treated trees appear to have a greener canopy which I would expect is a result of the mycorrhizae in the Endoprime colonising their root systems leading to improved nutrient availability and utilisation". "We all know the value of a kilogram oranges, but how do you calculate the value of additional growth?"

Cor is so happy with the results from Endoprime that he is planning to treat a production block of adult trees as he believes that a healthier root system will allow better utilisation of fertilisers which should lead to




Cor Greyling of Beela, Moree

improved yield. "It doesn't take much of a yield improvement to justify the cost of the Endoprime" he told us.

EndoPrime is a plant and soil enhancement product that contains mycorrhizae. Mycorrhizae are beneficial fungi that naturally exist in soils colonising the root systems of plants. EndoPrime includes 4 high performing endo-mycorrhizae species that have been

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Residue testing service

Citrus packing houses and growers in Australia are careful to make sure that chemicals used for pest and disease control in Australia are also permitted on citrus in our overseas markets. The practicalities of this are made difficult by the fact that tolerances for chemicals keep changing in our export markets.

Tolerance limits for chemicals in food are called Maximum Residue Limits (MRLs). Because MRLs in citrus can vary between different countries, orchards need to tailor their chemical program around the MRLs of each export market.

To help growers make suitable chemical choices, Citrus Australia collates and regularly updates lists of the MRLs for all chemicals permitted in citrus in our major export markets.

Sometimes changes to export MRLs happen without warning. Planning the season's pest and disease management program is challenging when export markets suddenly change MRLs mid-season.

Citrus Australia facilitates a citrus residue testing program because exporting growers need certainty that residues on their crop are compliant with the MRLs set by each market.

Why do laboratories offer a selection of multi-residue screens?

Laboratories develop screens to suit the commodities they test: water, soil, wool, meat, milk, grains, fruit and vegetables. Not all screens are relevant to citrus samples. Laboratories keep testing affordable and relevant by including chemicals that match clients' needs. Sometimes a unique method is required to extract and quantify a particular chemical from a sample, and a separate test is required, adding significant cost to a multi-residue test.

Why send samples from other states to Queensland rather than using a local laboratory?

Symbio Laboratory in Queensland has a large amount of expertise in

testing citrus. Over a ten-year period, the laboratory has been subject to proficiency testing with spiked samples to ensure that it can accurately measure chemicals used on citrus. The same laboratory is also testing for the Australian Government National Residue Survey. The laboratory is accredited to screen citrus for more than 200 chemicals and more than 100 key breakdown products. That wide screen of chemicals is very relevant to our major export markets.

What is the difference between requesting tests through Citrus Australia or testing through the National Residue Survey, since Symbio Laboratories services both?

The same chemicals are included in both screens, but Citrus Australia keeps costs down by reducing administration. Participants also have a direct line of contact to the laboratory via Citrus Australia, so we can negotiate and tailor reporting or tests.

What is the difference between testing through Citrus Australia or through FreshTest or through another market agent?

A multi-residue screen for the domestic market is typically cheaper than the Citrus Australia screen, because it includes fewer chemicals. Fruit in the domestic market is only tested for chemicals that are relevant and of interest in the Australian domestic market. Domestic market tests do not include all the chemicals needed to satisfy export markets. Export markets want a broader screen because they import fruit from a wide range of countries and want testing to include chemistry used everywhere, not just chemicals available in Australia and/or used on citrus.

Who sees our results if we send samples via the Citrus Australia program?

Results are sent to the grower or packing house who submitted the sample. Individual results are not sent to Citrus Australia. In fact, if you have an issue and need our help you will have to reach out to us because we don't know until you ask.

De-identified summary results are sent to Citrus Australia in bulk, to help with industry-wide analysis. There is no grower information in the summary. The bulk data only shows lab codes for samples, so no-one can link any data to an orchard, grower or packer.

If I have a breach are my results shared with export markets?

If the residue in a sample breaches an Australian MRL, the laboratory is obliged under Queensland law to notify the Queensland Government, who then notify officers in the state or territory where the fruit came from.

If the residue exceeds an export MRL, there is no action. Some packers worry that residues are reported to export markets. Under the Citrus Australia testing program that won't happen, because the laboratory has no detail about your destination markets. Packers are responsible for comparing their results against the MRLs of importing countries, and some packers choose to send the test result to their import agent.

How long do we wait for test results?

Under our contract with Symbio, results are sent within five working days to whoever submitted the sample.

How many patches do I need to test, or samples do I need to send?

That's entirely up to you, your packer and your agent. The program is to help your business manage MRL risks. ●

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This article was written by Citrus Australia Agrichemical Manager

Alison MacGregor

as part of the Hort Innovation-funded project CT18001.

Email: Alison.macgregor@citrusaustralia.com.au



Red Scale suppression with *Aphytis melinus* wasps

Aphytis melinus is a parasitic wasp that was introduced to Victoria in 1961, when red scale was spreading rapidly and causing serious problems in citrus orchards.

For the next decade, the parasitic wasps were released throughout the southern citrus districts and significantly reduced red scale populations.

This resulted in the first commercial insectary in Australia in 1971 – Biological Services in Loxton. Since then *A.melinus* has been widely used by growers.

To maintain good populations in their orchards, many growers release extra wasps each year. The wasps control red scale naturally, and many orchards still only require occasional back-up controls with sprays.

A. melinus reproduces by laying its eggs inside nymphs and crawlers of red scale. The wasp larvae grow inside the immature scale, eventually killing the scale. One or two new parasitic wasps emerge from each parasitised red scale, to continue the process.

To improve establishment of parasitic wasp populations, and increase their effectiveness, growers should employ practices that reduce dust, raise humidity and reduce summer temperatures. For example, the use of cover crops between rows, vegetation on borders, windbreaks and irrigation is known to be effective.

Parasites also work well under netting which is becoming popular for wind and hail protection. Large populations of ants are detrimental for all beneficial insects and where ants are in high numbers, baiting is recommended.

Some of the newer chemicals available for red scale control are not directly toxic to parasitic wasps. They are also very effective against scale because of their systemic nature or residual activity.

However, these chemicals mostly control the young early stages of



Red scale on a young citrus tree.

scale development, which means they remove a significant portion of the scale population that *A.melinus* can attack.

The result of removing young scale is that wasp numbers are also reduced. To avoid wiping out the wasp population, IPM specialists recommend that growers avoid spraying whole orchards at any one time and avoid repeatedly spraying the same chemical in one season, or subsequent seasons. Preferably, avoid using systemic-type chemicals as a preventative strategy.

Only use systemic chemicals to control scale where necessary. This is appropriate for general pest control, because overuse or regular use of certain chemistry will eventually lead to chemical resistance, and then these valuable tools will be lost.

Releases of parasites should commence in spring and continue through summer and autumn. Nearly all red scale over-winter as adults, which *A.melinus* cannot parasitise. Therefore, top-up releases of parasites should occur in spring, when the next generation of scales start to appear.

Further releases should occur after toxic spray use, and after significant

periods of severe heat. Parasites are most active in autumn and releasing is still worthwhile in March/April.

However, research has shown that releases in spring and early summer lead to the highest wasp populations later in the season.

Best practice with many larger growers is to release modest amounts of parasites throughout the year into areas of low to moderate scale history, and into varieties that do not need harsh chemical treatments, on boundaries, and for replenishment after chemical use or heatwaves.

Using this strategy combined with a sensible IPM plan will help to limit scale outbreaks, reduce pesticide resistance, and maintain a healthy environment. ●

James Altmann is the Owner/Director of Biological Services in Loxton, SA.



Shaping Australia's response to HLB

Learning how other countries manage HLB will help shape Australia's response if the damaging citrus disease hits our shores, according to NSW Citrus Pathologist, Dr Nerida Donovan.

And one of the biggest lessons so far has been the importance of treating the psyllid vector with the same "respect" as the disease.

Dr Donovan, NSW DPI, is part of a team working to strengthen the Australian citrus industry's biosecurity with a project focusing on graft-transmissible diseases funded by Hort Innovation.

"The program is designed to enhance the preparedness of industry and government to combat citrus disease threats," she said.

"To be able to do that, we have developed the capability to test for citrus diseases that we have in the country and exotic diseases that are not found here yet. (The graft transmissible pathogens) are in the vascular tissue of the plants and there is no cure for them. You either prevent them or you live with them. Some diseases lead to reduced yield or they can kill your trees."

The project works closely with the Auscitrus propagation scheme to ensure industry has access to high health status propagation material by testing their budwood and rootstock

Key points

- ❖ Focus on graft-transmissible diseases
- ❖ HLB preparedness a priority
- ❖ Nursery industry must play part

seed source trees for disease and by maintaining foundation trees (of the highest health status) in the National Citrus Repository Program, Dr Donovan said.

Huanglongbing (HLB) preparedness is a priority of this project- looking at different detection methods, expanding the diagnostic capability to other labs in Australia and participating in surveillance programs.

A Citrus Australia Citrus Pest and Disease Prevention Committee member, Dr Donovan is part of that team looking at other ways to improve HLB preparedness, as well as preparedness for other disease and

pest threats which she said would be dangerous to ignore.

A focus of the HLB preparedness has been building awareness of field systems and what the vector looks like, according to Dr Donovan.

International collaboration and field work have better equipped scientists with these identification skills, but Dr Donovan said one of the challenges for the Australian industry comes from outside citrus.


"It is particularly concerning that Murraya is a preferred host of the psyllid, it is a plant you see across most Australian towns and cities, in hedges in schools, businesses and homes," she said.

"This means the nursery industry has to be equally invested in eradication for it to be successful."


Dr Donovan said there were many factors which determined Australia's ability to deal with HLB.

"It would depend on where it is found, the magnitude of the spread, and how early we detect it as to how we respond and even if we are able to respond and eradicate," she said. ●


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Global networks critical in tackling disease

Global and domestic citrus networks are the key to tackling diseases threatening the industry and improving biosecurity. That's according to the International Organisation of Citrus Virologists (IOCV) Chair Elect, Nerida Donovan. Dr Donovan is Citrus Pathologist with NSW DPI and also a member of the Citrus Australia Pest and Disease Prevention Committee.

Dr Donovan said the IOCV provided "invaluable" learning opportunities through conferences and study tours with attendees returning to Australia to share their knowledge.

These global networks also leverage Australian research through collaborations and advice.

"I work with a great team of experienced citrus scientists in NSW DPI but in Australia there's a lack of citrus pathologists," she said. "There are fantastic pathologists who have some experience with citrus, such as those working hard to protect our north with the Northern Australian Quarantine Strategy, but I do rely on the citrus disease specialists who I've met through the IOCV," Dr Donovan said. "And all of those connections have come about by going to conferences."

Dr Donovan said collaborative work with international colleagues such as Professor Georgios Vidalakis and his team at the University of California, Riverside and Dr Glynnis Cook, at Citrus Research International in South Africa, enable Australian pathologists to value add to existing work.

In 2023 the IOCV conference will be held in Australia and will coincide with the Citrus Australia Technical Forum.

Formed 63 years ago, the IOCV promotes cooperative international study and sharing of knowledge of citrus diseases caused by viruses and other graft-transmissible and systemic pathogens of citrus.

Recently celebrating 21 years in her



Nerida Donovan received the Service to Industry award at the 2019 Citrus Australia Tech Forum.

role, Dr Donovan will take over as IOCV chair in 2023.

Involvement in the global organisation supports her professional motivations of industry and environmental sustainability, with the collaboration delivering benefits at both an academic and practical level for the Australian citrus industry.

Time in the field – and meeting the growers behind the trees – is vital for gaining perspective across the production system, according to Dr Donovan. It also delivers opportunities to observe and understand the field symptoms of citrus diseases and to be able to recognise insect vectors associated with disease transmission.

When it comes to responses to disease outbreaks, such as citrus canker, Dr Donovan's involvement taught her about the importance of working with and respecting the emergency management structure and the vast experience of the people involved, while "understanding that they rely on your specific knowledge of the industry or the disease to enhance the response outcomes".

"It is really important to push for science-based decisions, to be the voice for industry but also understanding the economics and social science behind a lot of the decisions as well," she said. ●



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DV Valencia ticking all the boxes

When DV Valencia oranges are delivered to the Lion Leeton factory, their arrival at the NSW juicing plant is noticeable.

Initially it is because the new variety of fully-coloured Valencia fruit start landing in December, earlier than some other Valencia varieties.

The DV Valencia enables Lion to expand its season, according to Lion Leeton Fruit Scheduler Jason Hammond.

“We have access to fresh Valencias in the earlier months as opposed to having to put in a late Lane navel or something like McMahon or mid-season variety,” he said.

“It fills a really good niche for access to fresh Valencia oranges...the DV yield in general, you get more bang for your buck.”

Consistently producing 480-495 litres a tonne – up 2- 5 per cent compared to other summer juicing varieties, at the Leeton factory, the DV is attracting interest.

There’s been little development in the Valencia range for years, with poor returns and a shrinking industry deterring grower interest.

At the factory, Jason believes the variety has created more enthusiasm around Valencia oranges and juice production.

“Anything which has a niche in this case a high yield and a particular

Key points

- ❖ More litres per tonne
- ❖ Trials yield 160kg/tree
- ❖ Colour appealing to fresh fruit market

window when other competitors aren’t there, bodes well for a market that wants fresh juice on demand,” he said.

The DV Valencia has also stacked-up in official NSW Department of Primary Industries trials.

It yielded 160kg per tree across the five years from 2015-2019, just eclipsing the Keenan Valencia at 157kg/tree during the same period.

This data was collected by NSW DPI project leader at the Dareton Research Institute Dr Tahir Khurshid and Leeton NSW DPI industry development officer Andrew Creek as part of a larger project evaluating new rootstock for the Australian citrus industry.

Funded by Hort Innovation, the project included a Valencia clone trial with a range of rootstocks at Stanbridge near Leeton.



Dr Tahir Khurshid is displaying “DV” Valencia during harvest at Stanbridge in Dec 2019.

Six different Valencia clones were tested against the Keenan Valencia, on four Chinese rootstocks.

The study proved the combination of the DV Valencia (known in the trial as Valencia 5) with the Zao Yang rootstock type, in each season, was able to hold higher sugar levels compared to the control combination, according to Dr Khurshid.

He said the results for the 2019 season recorded DV Valencia sugar levels at 14.5 to 15 OBrix across different rootstocks, while it remained 11.2 to 12.7 OBrix for Keenan Valencia across different rootstocks.

“The interaction effect indicated that OBrix for the for the Valencia 5 (DV Valencia)/Zao Yang combination was 14.7 as compared to the control combination Tri22/Keenan Valencia 11.2,” Dr Khurshid said.

For the Davidson family who have the plant breeders right, the success of the DV - Davo’s Valencia – is testament to John Davidson and his quest to find a good juicing orange variety.

It has been more than 20 years since John identified a stand-out tree at their family orchard at Stanbridge in the NSW Riverina.



Valencia clone trial with a range of rootstocks at Stanbridge, Leeton.



The late John Davidson with his son Justin and grandson (Jack).

For the past few years, since John's death, his wife Carol and son Justin have championed the variety.

Justin said his dad couldn't believe his luck one of his own trees started producing unusual fruit.

"Dad found this one tree, in February, that had fruit which was completely orange, when the normal Valencia regreening process has occurred," he said.

"It just stood out so much he thought that has to be a different variety. Once he started testing it, each year the fruit stayed the same orange colour. Every year it stands out."

After testing for juicing qualities, John started to grow trees from the 'mother tree' - a process which took three to four years. Trees were then grown from the 'daughter trees' and the process kept going, Justin explained.

This time-consuming method proved the colour and fruit quality endured with each trial - meaning, it wasn't a "freak" tree.

John Davidson was a founding member of the Quelch juice factory at Leeton, now owned by Lion, and worked as the fruit purchasing officer for 44 years.

He held several industry roles and, as a fourth-generation citrus grower, ran the family's 100ha orchard which spanned two properties.

Last year, John was posthumously inducted into the Citrus Australia Hall of Fame.

This award recognised his outstanding service to the industry through committee and volunteer activities and his work to develop the industry and Citrus Australia.

Last year about 25,000 DV Valencia buds were sold domestically, with budwood sent to Europe and South Africa for trials.

It is being marketed by Variety Access and Wayne Parr.

The DV was originally investigated for juicing purposes, but Justin said it was now being considered for the fresh fruit market because of its colour. This characteristic also ensured better returns for growers too.

"Everyone wants an orange, orange, they don't want a green orange and that's sort of what you can get in the summer months when it is all thrown in a bag and put on the shelf," he said. "The class one fruit stands out on its own. It is ticking the two boxes, getting the good colour for packing and the juice quality is there."

"The DV does not re-green to the same extent as other Valencia selections, it remains its orange colour longer into the summer and autumn."

Valencia oranges had been a casualty of an expanding mandarin and navel market in recent years.

Developing a new Valencia variety would help improve the cost-effectiveness of the product for growers, according to Justin.

"There hasn't really been a variety in the Valencia category where you are going to get more money," he said. "Whereas the navel category, if you compare the two, returns are based from your pack-outs. If you get a good quality navel with good skin, they are in demand, people want them for

export... the navel growers are getting really good returns now because of the quality varieties coming in and they know what to plant because there's data backing it up."

Justin hopes the increased yield, quality, and orange colour of the DV Valencia will make Valencia's more profitable for orchardists.

"It definitely gives (growers) the option, especially if they want to rework old trees or pull out aging trees, that are only producing 20-25 tonnes a hectare," he said. "When you look at the data from the NSW DPI trial work, and we know ourselves, what we are getting from our tonnes/ha, it is pushing 40 tonnes- plus per hectare. That is quite good. You can make money off that." ●

Justin Davidson is Chair of the Citrus Australia Juice Committee, bringing his passion for the juice industry in this advocacy role for all growers.

Citrus Australia formed the Juice Committee, comprising growers and other industry stakeholders, to harness experience and knowledge needed to develop export markets and improve juice quality.

Growers at the 2019 Juice Forum led a discussion, facilitated by Citrus Australia CEO Nathan Hancock, on what the Juice Committee should prioritise. You can find committee members on the Growers and Industry section of our website.

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Smooth transition for citrus traceability project

Citrus Australia's decision to engage with Agriculture Victoria in a \$200,000 pilot program aimed at improving traceability in horticulture supply chains was borne out of necessity.

CEO Nathan Hancock said the scope and audacity of IP theft cost individual citrus businesses and the wider citrus industry millions of dollars every year.

"The citrus industry relies on its quality and the safety of the product we produce here in Australia," Nathan said.

"We have a premium product in our export markets and we need to be able to prove to our end supplier the origin of our product."

Under the pilot project, announced at the MOF in March, Citrus Australia has engaged technology companies Laava ID, provider of Laava Smart Fingerprint technology, and Trust Provenance, a provider of blockchain technology, to develop a traceability system for export citrus fruit supply chains.

Laava ID uses advanced computer vision technology developed in collaboration with CSIRO to produce a unique 'fingerprint' that can be scanned by any smartphone.

Unlike barcodes or QR codes which have been used in the past, Laava's Smart Fingerprint technology is much harder to impersonate or replicate (a

Key points

- ❖ New tech integrates well
- ❖ Smooth transition across supply chain
- ❖ Benefits growers and consumers

technique known as 'spoofing') and much more secure, making it more resistant to counterfeiting.

Trust Provenance have built an integrity system that allows multiple data points to be linked into the one data platform.

Fruit grown by Nu Leaf IP and packed at Mildura Fruit Company has been labelled and landed in China. Boxes and 1kg pre-packs are now being sold in stores with the Laava Smart Fingerprint technology.

Nu Leaf IP General Manager, Matthew Cottrell, one of the partners in the project, said growers invest significant time and resources planting premium varieties such as Tang-gold.

Nu Leaf IP is the master licensee in Australia for Tang-gold, a high value seedless mandarin variety bred by the University of California, Riverside, USA.

"By using the digital fingerprint labelling on our packaging and our blockchain, it will help us protect our brands and also will allow the customer to directly access proof of origin and also the features of our fruit

"For consumers, it also helps give confidence that they are buying a premium variety with the features they desire.

"This technology is providing benefits throughout the supply chain, from legitimising plantings and fruit through to the protection of brands."

Laava ID CEO Gavin Ger said the trial proved that the unique Fingerprint technology could integrate with existing systems, in this case, MFC.

"Any pack house of any fruit can apply this solution," Gavin said. "It's a game changer."

The project adds further value by providing consumers with additional information.

"By scanning the Laava Smart Fingerprint with their mobile phone, consumers can authenticate the products that they buy, learn more about their products, and engage deeper with the brands that made them," Gavin said.

"The benefits of blockchain in traceability is that any data point that is stored on the blockchain cannot be changed," Trust Provenance CEO Andrew Grant said.

"Bringing all these data sets together on the one platform also enables a number of business efficiencies and ultimately that brings a fresher and better quality product through to the consumer, who will have confidence they're buying authentic Australian-grown produce.

"In this project, we're integrating data points from the grower, the pack shed, the logistics company, the food safety certification body and from data loggers which have got GPS and temperature data points throughout the journey." ●



Fruit at Nu Leaf IP has been exported to China this season as part of a traceability pilot project.

High levels of technical resistance to some fungicides a concern

Postharvest fungicides control decay such as green and blue mould during storage.

These fungicides are essential for marketing and storage, but their effectiveness can be reduced with the development of resistance.

Fungicide resistance occurs from the formation of fungicide resistant decay spores which go on to multiply.

Constantly using the same fungicide allows for the build-up of resistant spores within a packhouse, particularly if packhouse hygiene is poor.

Overtime this can lead to a situation where the decay fungus is able to grow on fruit following fungicide treatment resulting in the growth of the decay and breakdown in the marketplace.

Fungicide resistance is a serious and important postharvest problem which needs to be actively managed in the packinghouse to minimise any potential losses.

It is therefore critical to measure and monitor both packinghouse sanitation and hygiene, and the levels of technical resistance to postharvest fungicides.

Key points

- ❖ Resistance relies on hygiene fungicide rotation
- ❖ Change postharvest fungicides
- ❖ Fungicide Resistance Service available

A *Postharvest Sanitation and Fungicide Resistance Service* is now available to provide timely information to packers on the levels of sanitation and technical resistance to postharvest fungicides in their packinghouses.

This service looks for the presence of decay-causing fungi in the packinghouse and identifies if these fungi have any technical resistance to common postharvest fungicides.

Agar petri dishes containing different postharvest fungicides are exposed to the air in different areas of the packinghouse and coolroom to estimate the levels of fungicide resistance present.

The service can be accessed via the Citrus Australia website. It is run and coordinated by the NSW DPI.

A sample of this season's anonymous packinghouse results from this *Postharvest Sanitation and Fungicide Resistance Service* are summarised in Table 1 (page 36).

The results show there were large differences observed in the levels of sanitation and technical resistance to postharvest fungicides between the different packinghouses around Australia with different management methods.

Overall there were high levels of general moulds in the packinghouse and coolroom (first column in Table 1).

These are general moulds, bacteria etc which live in the environment and are generally not related to postharvest decay.

But packinghouses with lower overall general moulds also often have fewer decay causing fungi spores. Good general hygiene in the packinghouse reduces all general fungi and bacteria.

continued on page 36

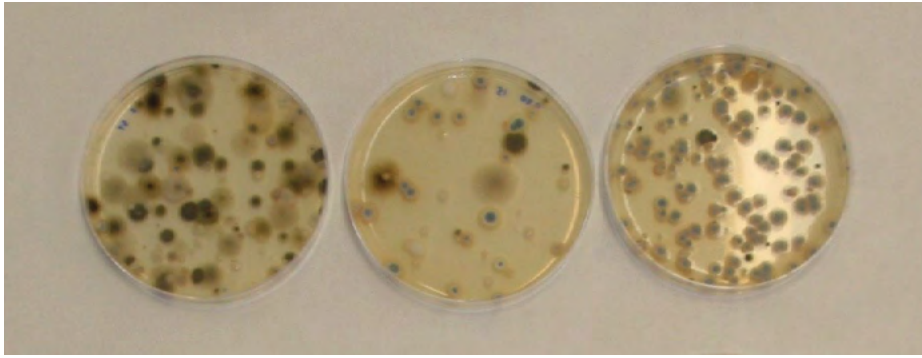


Green mould infection in oranges



Preparing fungicide amended plates for packinghouses.

continued from page 35



Decay causing fungi from packinghouse growing on plates with added postharvest fungicide.

including decay causing fungi.

Looking at the number of decay causing spores in the packinghouse (second column in Table 1), there was considerable variability in the results between the different packinghouses.

Some packinghouses had excellent hygiene and sanitation with very few decay causing fungi detected (for example Packinghouse B and H), while other packinghouses had very high levels of decay causing fungi both in the packinghouse and in the coolroom (Packinghouse G and I).

All packinghouses assessed with this Service were fully operational and commercial. This shows that it is possible to reduce the levels of decay causing spores in the packinghouse with good management techniques.

In general, the highest levels of decay causing fungi were detected at the start of the line. This is not unexpected as this is where the fruit is transferred

from the orchard.

However, it is important to improve hygiene and reduce the numbers of decay causing fungi in all areas of the packinghouse and particular attention should be made in this area, as these spores can remain in the packinghouse and coolroom and be a risk for decay and resistance development.

The levels of technical resistance to the postharvest fungicide, thiabendazole, TBZ in the sample packinghouses is presented in the third column in Table 1.

In this sample of packinghouses, over half of the packinghouses had some technical resistance to TBZ detected, with two packinghouses in particular (Packinghouse G and I) having very high levels of spores with technical resistance to TBZ.

These very high levels of resistance to TBZ fungicide would have begun with low levels of spores with resistance and were encouraged with poor sanitation

and continued use of TBZ fungicide.

These high levels of technical resistance to TBZ are a concern and improvements in packinghouse hygiene and rotation of fungicides are recommended.

This is why it is important to know what levels of potential technical resistance in your packinghouse, so that it is possible to fine-tune and improve management practices during the packing season.

The use of other postharvest fungicides such as imazalil, pyrimethanil and fludioxonil with other modes of action against green and blue mould are widely used and are essential to help manage postharvest decay.

However, in this sample of packinghouses from this season, there was one packinghouse with high levels of technical resistance to imazalil (fourth column in Table 1).

Imazalil is a mainstay of citrus postharvest fungicides and its efficacy needs to be actively managed to maintain to control postharvest decay.

Although this observation was un-common among the different packinghouses, this is a big concern for this packer and needs to be eliminated.

Fortunately, no technical resistance to fludioxonil was detected in these packinghouses at this time (fifth column Table 1).

The management of resistance to

Table 1. Summary table of some results from the 2020 Sanitation (hygiene) and Fungicide Resistance Packinghouse Service. Plates were assessed at (1) start of the line, (2) end of the line and (3) in the coolroom for each packinghouse.

Shed	General Hygiene			# Decay Spores			TBZ			Imazalil			Fludioxonil		
	Start	End	Coolroom	Start	End	Coolroom	Start	End	Coolroom	Start	End	Coolroom	Start	End	Coolroom
A	1	1	1	1	2	3	1	1	1	1	1	1	1	1	1
B	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
C	1	1	2	1	2	3	1	2	1	1	1	1	1	1	1
D	1	1	2	1	2	3	1	2	1	1	1	1	1	1	1
E	2	1	1	1	2	3	1	2	1	1	1	1	1	1	1
F	1	1	2	1	2	3	1	2	1	1	1	1	1	1	1
G	1	1	1	1	1	1	5	5	5	1	1	1	1	1	1
H	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
I	1	1	1	1	2	3	5	5	5	2	5	5	1	1	1
J	1	1	2	1	2	3	1	2	1	1	1	1	1	1	1

Scores were given coded colours according to the relative hygiene or levels of technical resistance in each area of the packinghouse:

- 1 = very low spore levels (very good)
- 2 = low spore levels
- 3 = moderate spore levels
- 4 = high spore levels
- 5 = very high spore levels (very poor)

postharvest fungicides requires a whole-of-system approach, starting from harvest through to packing and storage. Some of the key management factors in reducing the risk of fungicide resistance includes:

- *Optimise fruit health.* Good postharvest practice to minimise physical damage to the fruit during harvest and handling.
- *Use best hygiene practices.* Lowering the populations of decay-causing spores in the packinghouse, cool room and on the fruit are keys to a successful management program. This includes removal of rotten fruit from the packinghouse and coolrooms, the regular sanitation of equipment, coolrooms and packingline by washing (or using fogging technology).
- *Optimise fungicide use.* Understand the way each fungicide works to develop strategies to minimise the development of resistance by using rotations and mixtures whenever possible and before resistance selection occurs.
- *Optimise fungicide efficacy.* The correct fungicide concentration and coverage determines the efficacy of the treatment and minimises the

chances of decay spores surviving following treatment.

- *Monitor fungicide resistance.* The early detection of resistance increases the chance that its development can be managed and stopped. ●

John Golding is Research Horticulturalist and **John Archer** is Technical Officer with NSW DPI.

Acknowledgement

We would like to thank the chemical companies, packinghouse managers and growers for allowing the use of their anonymised data for this article.

How to order a test kit and what happens

The Postharvest Sanitation and Fungicide Resistance Service is coordinated by NSW DPI. Orders for test kits can be made through the Citrus Australia website. Visit the postharvest section under the Growers & Industry tab on our website. After the order is purchased, a set of test plates are sent to the packinghouse with instructions on where and how to put out the plates. After the test plates have been exposed to the air in different parts of the packinghouse and coolroom, they are returned to NSW Department of Primary Industries in an Australia Post Express Post bag for analysis. The results are then returned as a confidential report back to the packinghouse. Third parties are also able to purchase the kit and place in your packingshed on your behalf.

For more information, contact **John Golding** at NSW Department of Primary Industries. Phone 02 4348 1926, email john.golding@dpi.nsw.gov.au



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