

TALKING AVOCADOS

A man in a blue shirt and grey shorts is crouching in an avocado orchard, holding a young child in a yellow and grey shirt. They are standing next to a young avocado tree supported by a black stake. The orchard has rows of similar trees in the background under a blue sky with white clouds. A black irrigation pipe runs along the ground in the foreground.

NT grower trialling avocados

Avocado industry leadership
development

Research & Development a priority

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The Northern Territory's Mathew Bosanac is trialling
Cover: avocado in the hopes of establishing an orchard. Full story page 41

Chairman's Perspective

At the Annual General Meeting of Avocados Australia Ltd, held in Brisbane on 9 November 2017, I was honoured once again to be appointed as Chair of the board for 2018. I am particularly pleased to announce that Daryl Boardman was appointed as Deputy Chair.

Daryl has a tremendous passion for this industry and its future and he has been a strong advocate for making changes to the systems within Hort Innovation and the Australian Government Department of Agriculture & Water Resources to allow for better, faster outcomes for the growers from the use of your levy funds.

I am constantly reminded of how growers view the position of Chair, and now I hope Deputy Chair as well, by the respect that growers, industry stakeholders and international avocado bodies have shown and continue to show as recently as the final study group workshop held at Terry Clark's orchard at Blackbutt on Thursday 7 December. It was a memorable day because I was back to visit Terry's orchard again after many years, to meet some 100 avocado growers attending the day, and to see that there were four AAL directors in attendance as well. A great day all round, and thank you to Terry Clark for hosting the day. (More on page 32-33 about the study group events.) It was interesting to see that there were growers from other districts in attendance as well as the locals and I would strongly recommend to all growers to travel to the different regions or even countries to expand your knowledge about avocado. I have been in this game since ... well, let's not say, it's too many years to count ... but it was this final workshop where I heard a most interesting explanation on irrigation management and it has changed the way I now do things on my farm. You

are never too old to learn and the information or the way you receive it may surprise you.

My visit to Blackbutt was unplanned but I was in Brisbane for some business and with a day to spare before returning to Cairns, my family decided to visit Toowoomba for the day. So, Toowoomba means Daryl Boardman's territory, and he reminded me of the study group workshop. My dear wife, Mary, overheard the conversation and enquired if I would like to attend it. Well, an offer too good to refuse on so many counts because she knows how happy I can be in an avocado orchard, anywhere, and especially with growers.

The New Year 2018 will present some challenges. The first wave of the new plantings will roll in this year starting with a big crop from North Queensland which is potentially forecast to surpass the Bundaberg region production for the first time. The combined supply from North Queensland and Central Queensland could be around 7 million tray equivalents so it will be a test of all our systems, especially *Infocado*, to advise growers, packers, wholesalers, transports and the retailers of the most accurate information so plans are in place to manage the crop supply and flow through the supply chain.

The quality of the information coming in to *Infocado* will determine the final result, so everyone has to be on best behaviour and supply accurate information on time, all the time. There is a more agricultural way to explain this process but I will leave that for another time.

Best wishes for the 2018 season to you all.

Jim Kochi

Jim Kochi, Chairman, Avocados Australia Limited



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CEO's Report

Season Update

2017 was another great year for the Australian avocado industry. Although production was down on expectations in some regions, growers again received very good returns throughout the year. At the start of 2018, we again have the usual problem of not being able to meet demand at this time of year and retail prices are creating lots of media attention.

Crop forecasts are variable across the regions for 2018 with North Queensland expecting a big start to the year as new orchards come into production. Strong returns are expected once again as Australia's insatiable appetite for avocados shows no sign of slowing.

Marketing progress

The development of the new avocado marketing campaign is progressing well and the new campaign is expected to be implemented in April/May this year.

An excellent piece of consumer research was completed late last year that provides valuable insights into Australian consumers and a solid foundation for the new marketing plan. A summary of this work will be published in Talking Avocados soon.

Along with other members of the Marketing sub-committee, I was involved in selecting the creative agency who will work with Hort Innovation to implement the new campaign. We are confident that the agency we have selected, and their proposed creative strategy will continue to drive consumer demand over the next three years. I'm really excited to see the new campaign come to life during the next few months and, of course, we will keep you updated through our communication channels.

R&D Progress

We are now starting to see some good traction with the avocado R&D program. You will see in this edition a number of reports on research currently underway. A very important area of work has been around improving quality, mainly at the post farm gate end of the chain.

In terms of on-farm R&D, this is an area that needs more planning to ensure we focus our efforts in the right areas. Late last year Avocados Australia worked with Hort Innovation to host an Avocado R&D Forum in Brisbane focussed on production-based R&D.

The purpose of the forum was to bring together key researchers, consultants, agronomists, Hort Innovation staff, and industry leaders to develop R&D priorities to address on-farm productivity and fruit quality. The forum, held over one-and-a-half days, was very productive and was a great opportunity for researchers, growers and other industry stakeholders to share their ideas about the needs in this area.

We are keen for all growers to have the opportunity to provide

input to this planning and the next step will be to provide all growers across Australia an opportunity to contribute to the prioritisation through an online survey. So, look out for this in your inbox soon and please take the time to share your thoughts with us.



Developing future export markets

Avocados Australia has a signed contract with Hort Innovation for an export development project, Avocado Export Readiness and Market Access (AV1700). The aim of this new project is to ensure the avocado industry is prepared to export, maintains a robust industry capacity to pursue new and improved market access, and provide necessary support to the government in their negotiations. The overall objective of this project is the continued pursuit of the industry's market access and market maintenance goals in line with the recently delivered avocado export strategy (<https://goo.gl/f24vc4>).

A part-time Export Coordinator, Joy Tang, started with Avocados Australia on 29 January 2018 for this project. Joy has extensive experience in export market development having worked with Austrade and Meat and Livestock Australia in trade development roles in China for many years and speaks fluent Mandarin. Joy will be a great addition to the team here and help us achieve our export ambitions in Asia in years to come.

AGM and election results

In November 2017, Avocados Australia held its Annual General Meeting in Brisbane. At this AGM, Western Australian Director Neil Shenton did not stand for re-election. As there were no nominees to replace Neil, Dudley Mitchell is currently the only West Australian representative on our Board. I would encourage anyone with an interest in joining our Board to contact us. Western Australia is a major part of the avocado industry in this country and we are keen to have a full complement of representatives at the national level.



Avocados Australia CEO John Tyas (far right) in New Zealand at the end of 2017.

The resignation of Neil from our Board was the only change at this election and we thank Neil for his contribution over the past three years. You can find out more about your Avocados Australia Board in the Around Australia section of this magazine, or on our website at www.avocado.org.au/about/our-board/.

New Zealand data trip

In December 2017, Data Analyst Sue Plunkett-Cole and myself travelled to New Zealand. This brief trip was an important opportunity for Sue to become familiar with how the data from New Zealand interacts with our system here at Avocados Australia. It's important that we have a good understanding of what the New Zealand industry does, and what we do in terms of data collation. The key is to ensure accuracy of information as best we can.

OrchardInfo response high

Accurate industry data is critical for effective industry planning and I am very pleased with the excellent response rate this year to our OrchardInfo Tree Census and productivity surveys – thank you!

Congratulations to the following growers who won prizes for completing their OrchardInfo Tree Census surveys. We really appreciate the time and effort all growers put into answering our requests for information. We work hard to provide informative and useful reports back to our stakeholders to

benefit us all in the planning and management of our industry. The OrchardInfo Tree Census report helps us prioritise everything from what research to advocate for on behalf of industry, to the domestic marketing effort, and developing export markets based on future predicted production. You can read more about the latest census on page 15.

The winners of \$100 visa gift cards from Avocados Australia for completing the OrchardInfo Tree Census were:

- | | |
|-----------------------------|--------------------------------|
| Penny & Ernst Tideman, CNSW | Duncan Randell, CQ |
| William Ericson, NQ | Loh Ai Tee & Alan Hartley, TNR |
| R & C Maywald, SC | Bev & Des McCulloch, SQ |
| C & E Perkins, TNR | Andrew Thompson, Tristate |
| KA & RD Spencer, WA | Sue & Simon Keast, WA |

Winners of \$50 visa gift cards from Avocados Australia for completing the OrchardInfo Productivity Survey were:

- | | |
|-------------------------|------------------------------|
| Janelle Lendrum, CNSW | Noalene & Alvis Brazzale, NQ |
| Marion Peters, Tristate | |

John Tyas

John Tyas, CEO, Avocados Australia Limited

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Around Australia

South Queensland Report

By Daryl Boardman,
Avocados Australia Director



Well it was a year of great rain in October 2017, which was well overdue and was followed by reasonable rain through until Christmas, but has turned off so far in January.

Summer storms have been around with damage from none ranging through to severe in some orchards.

The worst storms have been in the Kumbia region with up to 100% losses in some orchards. I have been through this myself in past years and it's not much fun seeing a crop being lost and the tree damage that occurs. The one plus is that the trees do recover with much love and care and come back to reward you over time. I guess if it was easy everyone would be doing it. All the best to everyone effected for a full recovery to your orchards.

Well, what an amazing summer for consumption of avocados! We have seen high demand, and yes, high prices. Lately we have heard the stories that the world is going to end because avocados are short in supply; all this shows is how popular avocados are and in demand!

Just before Christmas we had the final study group day at Blackbutt hosted on Terry Clark's and the Beutel's orchards (read more on page 32). It was a very well attended event and had four Avocados Australia board members in attendance. There was our chairman Jim Kochi, Eric Carney, Ian Tolson and myself. It was disappointing that Simon Newett had an unexpected engagement which meant he could not attend. Peter Rigden stepped in, as well as Bridie Carr (more about the department's new Developmental Horticulturalist on page 32) and they did a great job.



In late 2017, newly employed graduates from the Australian Government Department of Agriculture and Water toured a variety of industries as part of their induction. This included a visit to Avocados Australia and to Daryl Boardman (third from right) at his South Queensland avocado farm. The visitors included Ruby Faithful, Bonnie Birch, Mary Alys Shuttleworth, Alex Townsend, Guy Coleman and Samantha Mahood.

Thanks to all the hosts, speakers and the department for a great day it was a good way to end 2017.

I would like to say thanks to Peter for his service to the avocado industry and wish him well with his retirement from the department. You can read a Q&A with Peter about his time in the industry on page 51.

Central Queensland Report

By Eric Carney, Avocados Australia Director



A new year and a new season upon us. For the Central Queensland district, final fruit set seems a little mixed, but generally up on last year for the Hass crop whilst most Shepard growers are experiencing a lighter crop compared to 2017. Late December and January have been mostly dry, pumping the brakes on fruit size development. However, fruit size is still generally expected to be large thanks to numerous rain events late in the spring months.

Looking back, it was an eventful year 2017. HARPS, backpacker tax, Hort Innovation constitutional changes, the last extension workshop, the Good Fat restaurant just to name a few. The outlook for 2018 seems promising but there will no doubt be some challenges. Supply is currently an issue for the industry

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Around Australia - continued

with minimal volumes going through the system during the New Year period, which yielded fantastic returns for the growers. As of writing this in mid-January, reports of Shepard in small amounts are making their way into the markets. A few more weeks and North Queensland will be churning out some decent volume bringing relief to customers. With reports suggesting North Queensland has a sizeable Hass crop, it will be interesting to see how the May and June months shake out for pricing. I hope everyone has a prosperous year, let the silly season begin.

Tristate Report

By Kym Thiel, Avocados Australia Director



As harvest is now completed in the Tristate, growers can sit back and reflect on what went wrong or right for them over the last 12 months.

Many growers harvested only an average or well below average crop and there is no doubt that the heat wave last February played a major role in dropping a lot of fruit and giving poor crops. Therefore, what could growers have done differently to help manage this as there have been some orchards that

have exceeded all expectations and produced very heavy crops? Irrigation and water management are at the forefront of this in our region. If growers cannot manage this they should not be attempting to grow avocados in a desert where just recently once again we had temperatures exceeding 47°C. Avocados cannot handle this dry heat!

This season saw markets once again deliver very healthy returns and growers should have been happy with the way the fruit has been handled and moved through the market. With the industry at such a high, growers should be doing everything they can to produce quality fruit by pruning and always looking at ways to improve their orchard and increase productivity. This is at the forefront of the national industry as well as evidenced by the outcomes and direction given at the recent R&D planning Forum held in Brisbane. (You can read more about the forum on page 11.)

Turning our attention to next year's crop and although very early for the Tristate it appears as though we are looking at volumes anywhere from 30-70% down on the past season. A weaker but still okay flowering, cold winter and early spring, poor pollinator activity and last year's heavy crop until the heatwave has culminated to give a poor fruit set. At time of writing most growers are hoping that what appears to be a very low crop becomes more as it sizes and maybe there will be better fruit retention with a lighter crop. We can only hope so and certainly no two years are the same in horticulture especially in avocado growing!

Sunshine Coast Report

By Robert Price, Avocados Australia Director



Summer is here, well half-over by the time you read this, and what another exception to the norm it has been so far. After the first showers in the early Spring we have been subject to some consistent rainfall, enough to cause minor flooding, quite a bit of hail but very patchy. In the Sunshine Coast region the sporadic hail was heavy enough to cause some crop damage, although I haven't heard of catastrophic destruction. All in all, the trees are looking healthy, still a lot of fruit even after some pre-Christmas drop.

It seems now we are in another dry spell with the obvious drying off of grass, a sure sign the moisture is evaporating on the surface. But, Summer is not over and we haven't had any real floods, which I assume will come before picking.

The good news for avocado growers is that avocado is listed as one of the 'Worlds Healthiest Foods' and there are reams of articles describing how avocados provide numerous health benefits including:

- anti-inflammatory benefits
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I could go on and talk about beta-sitosterol, stigmasterol, and campesterol etc if I knew what they were, but I don't. I do note, however, there always seems to be something new in the media like the benefits of the seed from the husk to the pit, where it is claimed most of the nutrients are hiding and it's becoming a trend for people to blend the pit and put it in smoothies or biscuits. Will we see powdered avocado seed on the shelves for baking and as an additive for food and drinks, if it proves to be safe? If it is more than a fad it would be a great resource to be utilised especially when you consider the tons and tons of the seed thrown out. Maybe we could have our smashed avocado on avocado bread. A bit much maybe.

Tamborine and Northern Rivers Report

By Tom Silver, Avocados Australia Director

Crops in the Northern Rivers Tamborine growing district can best be described as patchy. Some farms coming off big 2017 crops are well down, whilst other nearby farms are set for average to excellent crops, often with much variability between blocks.

Following the incredibly dry winter, Huey turned the taps



While there were initial fears after hail storms in the Tamborine and Northern Rivers, by December Tom Silver's crop is looking quite promising despite the hail.

back on throughout late spring and summer giving us plenty of thunder storms, and plenty of beautiful sunshine between them. This has helped an excellent spring and summer flush, and quite quick fruit filling for this time of the year. Hail has been an issue this season, with storms causing severe down grades and crop losses for a number of farms, whilst sparing other farms only a few kilometres away! Such is farming.

Western Australia Report

By Dudley Mitchell, Avocados Australia Director

As I write this, the Western Australian season is almost at its end, with only a handful of growers still picking. Since August when the northern areas started, we have experienced one of the most consistently high-priced seasons in history with only a small hiccup in November when a



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Around Australia continued

media article suggested that supply would increase and prices would drop. Thankfully no-one paid much attention, Avocados Australia quickly countered the negative media and the avocado train rolled on. Good discipline on the marketing and supply side has ensured the crop, which will be less than predicted, will cover the majority of the season. Demand has been very strong which bodes well for the medium term when more younger orchards start to come on line. Quality, however, must be kept at the forefront of everybody's mind as we try to do everything in our power to reduce the wastage at the retail end. A report on postharvest handling by Applied Horticulture Research has highlighted the potential for substantial damage to occur at picking especially in cherry picker bags as fruit fall on to each other as well as the potential for serious rots to occur from picking and storing wet fruit – these are things we can and must control at the grower level if demand is to be maintained and increased (see page 63).

The crop for next year is still not very well defined. It seems the northern areas set well but the southern areas are quite mixed. Flowering was prolonged with two distinct sets, the first seemingly holding on but the second experiencing quite a bit of drop. Those orchards with pollinisers certainly benefitted from their presence with adjacent trees setting very well.

As we head into the backend of a very mild summer and look forward to a bit of respite over the off season I would like to wish everyone well, pass the baton onto North Queensland and see you on the other side!

Central New South Wales Report

By Ian Tolson, Avocados Australia Director



The last of the Study Groups for the Central NSW area was held on 2 November at the Stuarts Point Hall. An interesting mix of more than 70 attendees and presenters including Dr Marisa Till and Phillip West from the New Zealand Avocado Grower's Association who gave a presentation on their industry's R&D program. These days provide growers with the necessary tools to manage their orchard and crops. It would be unfortunate if some form of group environment information sharing was not able to continue, especially with many new growers entering the industry, good to see some of those are on the youngish side. Thank you to Roger and Karen for hosting the orchard walk and talk, the presenters and growers for your contributions to such a wonderful day.

Early November, Alison paid a visit to the Good Fat café, the avocado pop-up restaurant in Sydney. Once the chef was

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Around Australia continued

advised that a supplier was having breakfast he was more than happy to spend time chatting to her about the area in which we grow and the areas we source fruit from to pack.

The harvest for this area is almost over for another season (as at mid-January) and what a financially rewarding season it has been. Consumers have become accustomed to the price of avocados, to reward their loyalty growers need to provide the best possible product to the market place.

The majority of growers are reporting a good fruit set, the challenge will be to ensure the fruit reaches its potential in both size and quality. The regions had been experiencing very dry conditions up until Christmas Eve when a number of thunderstorms rolled through bringing heavy rain, strong winds and a very impressive lightning show. Stormy conditions continued for a few more days.

I would like to take this opportunity to wish everyone a safe, healthy and prosperous 2018.

North Queensland Report

By Jim Kochi, Avocados Australia Director

North Queensland is currently experiencing its driest summer since 1951 and with that comes the stress of water management. Tinaroo Dam,



which supplies avocado farms from Tolga, Walkamin, Mareeba, Mutchilba and Dimbulah and some Kairi growers on the dam foreshore, is now standing at 38% capacity. The aquifers in the Atherton/Tolga area are still holding up but it is difficult to measure 50 or so metres underground.

Well, look at this, as I write this report (in early January) it has started raining in Atherton.

Like some other areas, North Queensland has had its share of wild weather with some farms hit by hail in November and one grower hit by hail on two consecutive evenings. All of us are at risk of these crazy weather events, but some are lucky to miss them. That word starting with "C" has not been mentioned by the weather man yet so hopefully we will avoid those this season.

A reminder to all NQ growers that QDAF will continue to conduct dry matter tests for your avocados this year, but it could be the final year as well. So, use the service or lose the service. It would help the industry as a whole if samples were taken correctly and randomly through the orchard because the ultimate aim is to provide the consumer with a good taste experience. That is the only way to get repeat buys from the consumer.

Anyone had a Domino's Pizza over the Christmas break? Their cartons feature pictures of avocado all over the lid with the words "Free your Flavour". Wow!

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On-farm focus for R&D

The most recent research and development forum for the avocado industry had a strong on-farm focus.

Avocados Australia Chief Executive Officer John Tyas said the November 2017 event, hosted by Hort Innovation and Avocados Australia, was very much about on-farm production issues related to productivity and fruit quality.

“It was a great opportunity to bring avocado researchers, experts and industry leaders together to discuss R&D activities and future needs,” Mr Tyas said.

“This event brought together more than 60 growers, researchers, agronomists, Hort Innovation and departmental staff from across the country.”

Mr Tyas said the first day was dedicated to updates on the current program and projects, to better allow for a discussion of gaps and potential priorities for new production-based R&D.

“The forum delivered specific outputs that can be actioned by Hort Innovation and Avocados Australia to progress the avocado R&D program, to further improve the future of our industry,” he said.

Mr Tyas said the forum identified six broad areas of investment for future R&D:

- genetics and propagation
- disease
- pests and insects
- crop production
- precision ag and
- fruit handling.

“This is far from the end of the discussions on these new priorities,” Mr Tyas said.

“We will now be going to the broader grower group, to determine their priorities within these on-farm investment areas.

“Once this feedback is incorporated, Hort Innovation will progress toward commissioning appropriate new projects with the avocado Strategic Investment Advisory Panel.”



Simon Grabbe (Simpson Farms), Cormac te Kloot (Costa Group), John Walsh (Avocados Australia Director).



Jayeni Hiti Bandaralage (QAAFI) and Neena Mitter, who is now leading the new Centre for Horticultural Science at UQ.



Daryl Joyce and Lindy Coates (Queensland DAF) with retired avocado researcher Ken Pegg (centre).



Brenda Kranz (Hort innovation) and Treena Burgess (Murdoch University).

R&D Forum Continued



*Stewart Learmonth (WA DPI)
and Penny Measham (Hort Innovation).*



Jenny Margetts (Hort Innovation Director), Gordon Rogers (AHR), Jenny Ekman (AHR) and Matt Weinert (NSW DPI).



Ian Newton and Bridie Carr (Queensland DAF).



*Peter O'Brien (SIAP Chair)
and Jim Kochi (Avocados Australia Chair).*



*Andrew Robson (University of New England)
and David Innes (Queensland DAF).*



*Denis Roe (Subtropical Fruit Consultancy Services)
and Kerry Walsh (Central Queensland University).*

Industry participation vital for project success

By Sue Plunkett Cole, Avocados Australia Data Analyst

The Australian avocado industry continues to receive comprehensive reporting, thanks to an ongoing Avocados Australia project.

In the first six months of the *Avocado Industry and Market Data Capture and Analysis* (AV16006) project, the level of industry participation in the production of reports such as Avocados Australia's *Infocado* continued to be high.

Verification using avocado levy and ABS data showed that avocado supply data captured for quarterly reports represented at least 89% of industry avocado supply. Verification using ABS data shows that Avocados Australia's 2016 orchard planting data represents more avocado plantings than ABS have recorded.

Via the project, Avocados Australia also produced its annual *Facts at a Glance* document, compiling key industry statistics for 2016-17: www.avocado.org.au/news-publications/statistics/.

The data capture and reporting are to be improved over the course of the project, with planning and activities underway. Although not funded through this project, Avocados Australia is working on updating the software with: improved web form collection screens, improved capacity for data queries and analysis, and improved reporting functionality.

Another important aspect of the project is data verification. As part of the project, we will cross check and verify collected data with suitable sources and/or techniques to ensure accurate, valid, consistent and reliable reporting. This is a key to maintaining the trust and participation of our stakeholders, and the wider public with regard to avocado industry data.

Stakeholder engagement

It's vital a high level of industry participation is maintained throughout this project and into the future. Engagement drives for feedback and training, particularly on *Infocado* data capture,

are planned for the new year. This will involve regional visits across Australia, including workshops and one-on-one meetings.

The objectives are to continue building strong relationships with stakeholders; facilitate training and education on the data capture and reporting programs; gather feedback on how the programs can be best implemented to meet stakeholders' needs; ensure accuracy of the information provided; and drive increased participation for all data capture.

Reports for industry

Avocados Australia produces a number of important regular reports, to support our industry. This includes the weekly *Infocado* reports and weekly *Online Retail Pricing* reports, distributed to contributing packhouses and wholesalers directly each week via email. The reach of the directly distributed reports is approximately 85% of avocado packhouses and wholesalers. These reports contain:

- the latest four-week forecast and prior week's dispatch volumes by region (including New Zealand), variety (Hass, Shepard, Other), fruit size, pack type, export quantity, processing quantity, origin and destination of fruit
- New Zealand export information
- a wholesale report showing volume of fruit sold in the main central markets to supermarkets and other traders
- seasonal forecast information by region.
- Hort Innovation marketing updates
- Coles' and Woolworths' online retail prices over the past year
- the week's online retail prices on all fresh avocado produce and catalogue offers.

These reports are published on the Avocados Australia website



after six weeks at www.avocado.org.au/our-programs/supply-chain-data/infocado/.

As well, quarterly *Infocado* reports are produced in the months of January, April, July and October and are distributed to contributing packhouses and wholesalers each quarter directly via email. The reach of the directly distributed reports is approximately 85-90% of avocado packhouses and wholesalers and they include:

- forecast volumes by month and region for the coming 12 months for the Hass and Shepard varieties
- volumes dispatched by month and region over the past twelve months for Hass and Shepard
- average retail price per month
- two years of New Zealand monthly dispatch volumes shown against ABS and/or GTA import data and the forecast at the time, plus the next 12-month forecast from New Zealand.

These reports are published on the Avocados Australia website after six months at www.avocado.org.au/our-programs/supply-chain-data/infocado/#QuarterlyReports.

Acknowledgement

The project *Avocado industry and market data capture and analysis* (AV16006) has been funded by Hort Innovation using the avocado industry research and development levy and contributions from the Australian Government.

More information

For more information on how to contribute to *Infocado* and OrchardInfo, please contact Sue Plunkett-Cole on 07 3846 6566 or supplychain@avocado.org.au.





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2017 OrchardInfo – initial observations

Sue Plunkett Cole, Avocados Australia Data Analyst

An additional 200,000 avocado trees were added to the national plantings in 2017, according to preliminary analysis of the 2017 OrchardInfo tree census data. This confirms the four-year trend of increased tree planting across Australia, as can be seen in *Figure 1*.

As widely expected, the data indicates that the WA/NT region have planted the largest number of trees during the last two years, followed by North Queensland, particularly in the last year.

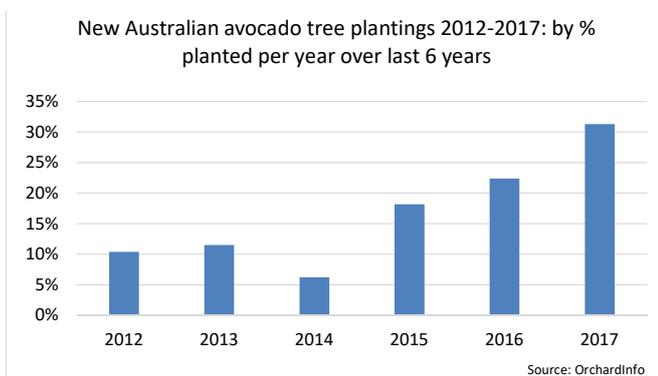


Figure 1: Percentage by year of all new trees planted during the last six years

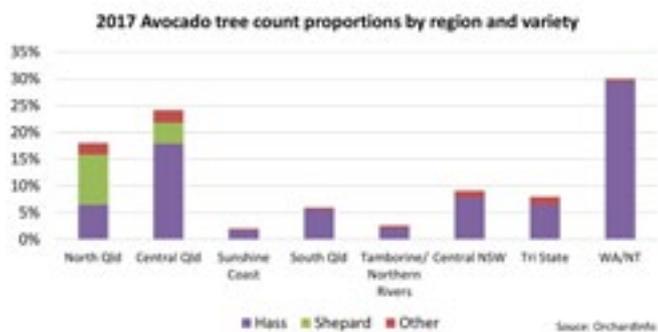


Figure 2: Percentage of tree numbers by region and variety recorded in 2017

Figure 2 shows the proportions of varieties and tree numbers across the eight growing regions.

The 2017 OrchardInfo report provides contributors with statistics from the tree census, including tree number and hectare by variety, region and tree maturity, as well as the results of the productivity survey. The report is sent only to contributing growers as an incentive for growers to participate in the annual tree census. The report is being finalised at time of writing.

We greatly appreciate our growers providing us with this key data. More than 80% of the growers we contacted responded to the tree census, which is an outstanding result. The simplified tree census form has made contributing much faster and easier, with further improvements planned for the 2018 census.

Congratulations to the growers who won prizes for their on-time contributions, we were very happy to be able to send out 13 gift cards in time for Christmas shopping (see the CEO Report on page 4 for names of winners). Special thanks must also go to Amanda Madden whose cheerfulness is untiring in assisting growers to complete the census and survey.

Acknowledgement

The OrchardInfo tree census is undertaken under the umbrella of Avocado Australia's *Infocado* data program, under the **Avocado industry and market data capture and analysis project** (AV16006). The project has been funded by Hort Innovation using the avocado industry research and development levy and contributions from the Australian Government.

More information

If you are an avocado grower and would like to contribute to *OrchardInfo* in order to receive the annual report, please contact Sue Plunkett-Cole or Amanda Madden on 07 3846 6566 or infocado@avocado.org.au.

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The beehive on your property...

the tale of a grower and a beekeeper

Hamish Lamb, Biosecurity Officer, Biosecurity Queensland, Department of Agriculture and Fisheries, Nambour

You've heard the saying, 'things are not always what they seem' and so too with the dynamics of getting a beehive located, cared for, and carrying out the intended purpose of pollination on your property.

A beekeeper needs to supply you with a hive that is going to do the job of pollination, that is, adequate bees (strength indicated by number of bees on the frames), young brood (25% unsealed larvae) that will need pollen collected by foraging bees, and a vigorous queen bee.

Bees for pollinating avocados are predominately nectar foraging and the flowers aren't highly attractive to bees. The beekeeper will be mindful of the risk of pesticide poisoning and how the bees will fare with foraging resources (some crops other than avocados produce a surplus of nectar and pollen but some don't produce enough to sustain a hive).

But what can you do to provide the best circumstances for excellent pollination to your crop of avocados?

Location, location, location

Primarily it's important to locate the hives where they benefit the bees and trees, with the secondary importance being for other farm management concerns like thoroughfares.

Do some planning and thinking about a suitable location for the beehives and ask if they all need to be located together or spaced out over a large orchard? As it is recommended to place up to eight hives per group, aim to spread hives throughout the orchard and less than 20 metres from the trees.

One option for hive placement is to locate them in small groups throughout the orchard to have foraging bees penetrate into the orchard. Young orchards may provide more open environments for the bees to fly whilst mature orchards may be more enclosed. Bees work from flower to flower so achieving foraging activity completely around a tree may be difficult and a higher stocking rate may be considered.

Hives do better with morning sun and start foraging earlier if facing north-east to catch first light. They are also better out of prolonged shade. The beekeeper should have considered access to water for the bees during their stay, but it may be up to you, the orchardist, to monitor and check water levels. Most likely water will be in the form of a dam, although if this is not close, an alternative water source such as open drums with floats or hessian draped across the top to stop the bees from drowning should be available.

Also consider whether you are placing the hives near a competing floral resource and whether there a prevailing wind you know about at that time of year that will hinder the bees' flight path from a proposed location.

Shifting beehives into the orchard at night may compromise selection of optimum positions. It's best to prepare and plan for the arrival and it may require you, the grower, to assist with navigation and lighting.

Timing is everything

The rule of thumb is to have about 10% of the trees flowering so there are enough flowers for the bees to become interested. Stocking rate could be 10 hives per hectare. If your orchard has an extended flowering (eight weeks) it may be prudent to have replacement hives shifted in half way through the flowering time.



Competition

Bees are attracted to many weed species so if possible, slash these other floral resources prior to the bees arriving.

Agricultural chemicals

Before using chemicals, read the label and understand the potency to bees, which can fly up to 5km, and the longevity in relation to bee foraging hours. The class of pesticide (1=cannot be applied safely to flowering crops, 2=can be applied late evening after foraging, 3=can be applied whenever bees are not foraging, 4=can be applied at any time) and the pesticide group eg insecticide, herbicide, miticide, fungicide etc will shape bee-management strategies if spraying has to be conducted whilst bees are located in orchard. Surfactants can also be toxic.

Beehives are not only vulnerable with immediate adult bee kills but some pesticides can have long-lasting effects such as hive dwindle due to compromised queen laying and brood death. Closing the entrance to the hives, covering with hessian for short periods, and applying pesticides at night may all help. Any pesticide application activities must include communicating with your beekeeper. Tell your neighbour you are introducing beehives.

Observe

Can you see activity at the hive entrance, mid-morning on a warm day? Can you see bees on your avocado flowers, how many are there and are they flying to your trees? This is all useful information to convey to your apiarist. Some beekeepers feed sugar syrup (nectar alternative) to hives whilst on a pollination contract. The practice is mainly used on crops other than avocados but the objective is to change the behaviour of bees within the hive (nectar gatherers are not assisted by the now otherwise-occupied in-hive bees, to unload their collected nectar thus triggering the foraging bees to swap to pollen-gathering duties). It is unclear if this method is successful in an avocado setting.

Have a look at your hives when your apiarist arrives; remember to borrow a veil and let the beekeeper direct you to the best position around the hive.

Please note

This is general advice and each orchard will have its own characteristics that may influence some of these points. The choice of your cultivar mix and your local temperature range will influence pollination, and bee management may or may not be able to be modified to assist.

Caring for honey bees in the orchard

After a lifetime in the industry, apiarist Ken West says he's still learning when it comes to beekeeping.

Mr West, Amber Flow Apiaries, based out of Maddington in Western Australia, has 2,000 European honey bee hives that both produce honey for sale and offer pollination services to the region's avocado and melon industries.

"My grandfather had bees back in 1914 and its gone from there," Mr West said. "I'm still learning and I am coming up to 74 this year."

Mr West has been providing pollination services to the region's avocado industry for almost 35 years but after a disastrous 2016 season when he lost a large number of hives, he's changing his practices.



It was an unusual occurrence for the industry veteran, who noticed an absence of bees returning to the hives.

To help mitigate all possible risks to his bee stocks, Mr West plans to request gazetted areas for his bees when they are working, providing the bees with access to the trees but not positioned directly under the trees.

"The practice of putting hives under trees has, I think, come from other colder countries. Here in Australia, that's not necessary where it's warmer and the bees love to fly," he said.

"I had one grower last season, who had hives placed out from the trees and they monitored the bee activity carefully and they have a beautiful crop of avocados, which is encouraging."

Mr West said he hoped bee placement at the edges of orchards would also boost the activity of natural pollinators such as hoverflies, wasps and blow flies.

"The natural pollinators won't travel as far as bees, and if the bees are depleting the pollen at the edge of the orchard that should drive natural pollinators into the orchards," he said.

Mr West said having the hives in easily accessible locations would also make it easier to monitor hive health, for both the apiarist and the farmer.

"If you walk passed a hive you can work out what's going on," he said.

"If the bees are bringing pollen back and not aggressive at all, you know the hive is going well."

Australia's premium product well received

The Australian avocado industry has had a 38% year-on-year growth in export value in the first half of 2017, according to the most recent *Horticulture Trade Intelligence* report for the avocado industry.

The report, compiled by Euromonitors for Hort Innovation, for the January-June 2017 period notes the value of avocado exports had reached \$5.6 million during the six-month period.

"Malaysia and Singapore are Australia's main export markets for avocados, representing more than 80% of total exports by volume/value," the report said.

As noted in the report, the Australian industry is focused on developing new export markets in Asia, such as Thailand and Japan.

However, Avocados Australia Chief Executive Officer John Tyas said the volume of Australian avocados that were exported was still quite low, but expected to increase as production volumes increased in the next few years

"This latest report also shows we imported 7,395 tonnes of avocados in January-June 2017, double the figure for the same period in 2016," Mr Tyas said.

"Domestic demand continues to be extremely strong and will continue to underpin the Australian industry."

On the export scene, the Euromonitor's report indicates Australia faces competition from major growing nations including Mexico and Chile. For example, the value of the avocados exported from Mexico to Singapore in January-March 2017 was \$1.54 million, more than double Australia.

However, in Malaysia, Australia remained the primary avocado supplier with a product value of \$777,000 in January-March 2017, followed by Kenya, the US, Mexico and Spain.

"Kenya has the right climatic conditions for the production of Hass avocados, and is gradually increasing exports to key Asian markets by improving the supply chain," the report said.

The report also noted that one of Australia's competitive advantages in the Asian region, when compared to Mexico and the US, was the shorter freight distance and therefore fresher product.

Acknowledgement

The *Horticulture Trade Intelligence Avocado* report (season to date: January to June 2017) has been funded by Hort Innovation using the avocado industry R&D levy with contributions from the Australian Government.

More information

Direct link to the report PDF: <https://goo.gl/K5rr5x>



Learning module added to BPR

There has been an exciting major new addition to the Best Practice Resource (BPR) for 2018.

Avocados Australia Chief Executive Officer John Tyas said the new Learning module provided registered BPR users with access to online learning in six key industry areas: growing, packhouse, retail, ripening, transport and wholesale.

“You can choose to complete any of the courses, as they are offered individually, for example, if you are a ripener, you may only want to complete the ripening course,” Mr Tyas said.

“When beginning a course, you will need to start at the first module and work your way through the units in consecutive order and your progress will be shown on the course page, allowing you to take your time and come back to the course when it suits you.

“To successfully complete a module, you will be required to pass a quiz (you can revisit units and retake a quiz if you need to) and once successfully completed, you will be able to download your results to keep as a record of your learning.”

Mr Tyas said the online Learning module allowed industry members to have their existing knowledge and experience recognised, and to upskill in key areas.

The BPR is Avocados Australia’s free online one-stop-shop to support best practice throughout the Australian avocado supply chains. We encourage all of our stakeholders to register and access this vital resource: www.avocado.org.au/best-practice-resource/.

New content on your BPR

A host of new resources have been added to the BPR since the last edition of Talking Avocados.

This has included a range of meeting minutes and presentations from the study group events held in the second half of 2017, new videos and Library resources.

To make it easier to keep up with what’s new in your BPR, we’ve added a handy link to the BPR homepage. Once you have logged in, the main page will provide you with a link to the “what’s new” page, where you will find a summary of new content and links.

Acknowledgement

The content of the Best Practice Resource is maintained through the project *National avocado industry communications program (AV15002)*, which is a strategic levy investment under the Hort Innovation Avocado Fund. It is funded by Hort Innovation using the avocado research and development levy and contributions from the Australian Government.

More information

You can log in (or request access!) via www.avocado.org.au/best-practice-resource/.

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Malaysian 'Ripe & Ready to Eat' extended

By Jenny Margetts, P2P Business Solutions

The trialling of 'Ripe & Ready to Eat' Australian avocados in the Malaysian market in the later months of 2017 has shown very promising results. These trials, part of a project being led by Avocados Australia, were timed to coincide with the main supply from Western Australia.

"We have seen increased demand for avocados where 'Ripe & Ready to Eat' has been trialled," The Avocado Export Company's Jennie Franceschi said.

"This demand growth has been at a time when prices have been strong and, so it is quite impressive and demonstrates that Malaysian consumers want to be able to access quality avocados that are ready to be consumed," she said.

Ms Franceschi said the response and support of the Malaysian market to the initiative was pleasing.

"The Malaysian consumer is already aware that avocados are healthy and anecdotally many indicate they would like to be eating more avocados," she said.

"However, many people are not sure how to choose a good avocado, know when it is ripe to eat or how it can be used in different meal offerings.

"If we can continue to support the development of the market by providing quality fruit and educating the supply chain and consumers, demand can only grow.

"Retailers often say that consumers only want hard green (mature green) fruit, but these trials are indicating otherwise. Our message to retailers is that they need to offer the consumer the choice and one of those choices should be 'Ripe & Ready to Eat' product."

However, Ms Franceschi said offering this

choice placed additional responsibilities on the supply chain and the retailer.

"Our Malaysian partner that ripens our fruit now needs to be able to deliver fruit to retailers at different ripeness levels to cater for the changing demand," she said.

"Retail staff also need to be more skilled in identifying fruit ripeness and managing the fruit at retail level."

Given the results and interest expressed by retailers, the reach of the Australian 'Ripe & Ready to Eat' program in Malaysia is now being extended.

Avocados Australia CEO John Tyas said there had been a number of training sessions with leading retailers in the Malaysian market in recent months and it was hoped there would be more in 2018.

"We are aiming to develop the knowledge and greater understanding of delivering an Australian 'Ripe & Ready to Eat' product," Mr Tyas said.

"The retail staff want to understand more about avocados – many retail staff have not had a lot of exposure to the product, so they are very keen to learn.

"We have focused on understanding quality and ripeness, how to manage ripeness and how to present the product – all with the aim of ensuring the consumer has a good experience with the product and that waste at store level is minimised.

"At our last training session, we demonstrated how to make guacamole and also a pumpkin and avocado salad."

Mr Tyas said the goal was to show retail staff members how simple it was to make a great dish with avocados and a few other simple and healthy ingredients.

"This was a great success and certainly helps with giving staff confidence in our product," he said.

"The point of sale signage and consumer leaflets highlighting how to choose a ripe Australian avocado and the ways they can be used are also helping to support the process."

Acknowledgement

These market development activities are being undertaken as part of a project being funded by the Australian Government's Package Assisting Small Exporters Program, the Avocado Export Company, Sunfresh and The Avolution.



Point of Sale material that is being used to highlight 'Ripe & Ready to Eat' avocados and educate consumers on how to test for ripeness when purchasing avocados.

Avocados and the Australia/Peru FTA

There may be medium to long term implications for avocados with the signing of Australia's most recent free trade agreement, with Peru.

Signed on 10 November 2017, the Peru Australia Free Trade Agreement (PAFTA) provides for complete removal of tariffs on avocado imports to Australia from Peru.

However, Avocados Australia Chief Executive Officer John Tyas says while Peru is understandably keen to extend the market for their Superfoods of Peru brand, fresh avocados from Peru are currently prohibited in Australia due to quarantine restrictions and to date no application had been made for avocados.

"At the moment, Peru has no market access into Australia," he said.

"If they do seek market access the process takes a number of years before any approval would be made."

Mr Tyas said the focus of the Australian industry would be to ensure a strong market was maintained for Australian avocado.

"This most recent free trade agreement is a clear example of why our industry is working to ensure we provide a consistently high-quality product, improving the reliability of supply and developing new markets for Australian avocados."

The Peru-Australia Free Trade Agreement aims to expand



Australian Prime Minister Malcolm Turnbull (seated right) signs the Free Trade Agreement with Peru in late 2017.

Image: Mincetur Peru.

trade between Australia and Peru, one of the fastest growing economies in Latin America during the last decade.

Australian Prime Minister Malcolm Turnbull said PAFTA eliminated 99% of tariffs that Australian exporters faced into Peru.

"There will be immediate duty-free access for Australian sheep meat, most wine and most horticulture products including almonds, (as well as) kangaroo meat and wheat," Mr Turnbull said.

For Australian horticultural exporters, PAFTA will mean the elimination of most of Peru's tariffs, which were up to 9%, once the agreement comes into force.

Both countries will now follow their own domestic treaty making processes before PAFTA can enter into force. For Australia, this will include a Joint Standing Committee on Treaties (JSCOT) inquiry. The Australian Government

says full text of the agreement will be released once the agreement has been signed.

"Avocados, fresh grapes, blueberries, tangerines, asparagus, quinoa, prawns, natural colorants, shirts, polo shirts and cotton shirts, alpaca garments, are some of the products that will enter Australia without tariffs and immediately, once the free trade agreement (is in effect)," Peruvian Vice Minister of Foreign Trade Edgar Vásquez said.

Mr Vásquez highlighted Australia's high purchasing power, and the third highest GDP per capita in the Asia Pacific, as a reason for pursuing the agreement.

More information

Australian market development – www.avocado.org.au/our-programs/export-development/

Australian consumption improvement – www.avocado.org.au/industry-programs/about-industry-programs/

Australia/Peru FTA – <http://dfat.gov.au/trade/agreements/pafta/Pages/peru-australia-fta.aspx>

Australia isn't the only market in the sights of Peru's avocado industry.

Hass Avocado Producers Association of Peru General Manager Arturo Medina Castro told *Fresh Plaza* in December 2017 that his country was planting about 1,500 hectares of Hass avocado each year.

"In 2017 we doubled shipments to China with respect to 2016 and, as a result of this year's campaign, we expect to double exports to the Asian giant in the next campaign," Mr Medina told *Fresh Plaza*.

He said while it was too early to discuss the 2018 campaign, ProHass expected the export volume to increase by 15%, compared to 2017, when a record 230,000 tons was exported.

According to August 2017 figures from the US Department of Agriculture, Peru's peak harvest season is April-June. The country's main varieties are Hass (95%) and Fuerte, primarily for domestic consumption. The USDA puts domestic consumption at about 170,000 metric tonnes/year.

For more international news, see page 70.

Countdown to HARPS

By the HARPS Project Team

HARPS (the Harmonised Australian Retailer Produce Scheme) is a retailer-led scheme designed to assist with compliance to food safety, legal and trade legislation for suppliers to the major grocery retailers in Australia.

A decision graphic has been developed to help suppliers in determining whether their business requires HARPS (see below). The terminology in this graphic replaces the previous references to Direct and Indirect suppliers, and uses a tiering system to define supply chain responsibilities and actions required by suppliers.

Based on the feedback received from low volume producers requesting more support and time for implementation, a number of provisions have been made.

Additional support

There will be HARPS awareness sessions held in each state-based Central Market as well as some key growing regions. Additional webinars will be held for those unable to attend these sessions. Dates will be advertised on the HARPS website, via peak industry bodies and directly to those businesses that are registered on the HARPS website.

Additional time & tier information

Tier 2 suppliers that may require HARPS approval will have until 1 January 2019. However, these businesses should register their interest in achieving HARPS approval at www.harpsonline.com.au by 30 June 2018.

In addition, low volume producers supplying less than 10 pallets per year will not require HARPS approval. These suppliers will fall under Tier 3 and will be required to be certified to an approved base scheme (see the decision graphic for details).

More information

Please visit www.harpsonline.com.au for further information. If you have any questions about HARPS not covered in our Frequently Asked Questions section at www.harpsonline.com.au/faq/ please contact the HARPS Helpline on 1300 852 219 or email harps@harpsonline.com.au.

Would you like to have a say? HARPS is seeking involvement from more growers to participate in the HARPS Technical Advisory Group workshops, to help refine and improve the elements within the HARPS scheme. Please register your interest at www.harpsonline.com.au.

Is HARPS required for my business?

HARPS is a retailer-led scheme designed to assist with compliance to food safety, legal and trade legislation for suppliers to the major grocery retailers in Australia.

Tier 1	Tier 2	Tier 3	Out of Scope
<p>Your business has a Vendor or Supplier Number for one of the HARPS Participating Retailers*.</p>	<p>Your business packs or re-packs: Loose product with PLU/DataBar stickers applied as specified by a HARPS Participating Retailer*; or Retail-branded pre-packs; or Retail Returnable Plastic Crates (RPC's); or Proprietary-branded pre-packs; or Loose product in final retail packaging, packed to a retail specification destined for a HARPS Participating Retailer*; or Your business is part of an Approved Supplier Program for your Tier 1 customer, who supplies to a HARPS Participating Retailer*; or Your business provides Ancillary Services^</p>	<p>Your business supplies bulk produce (not in final retail packaging) for further packing to a Tier 1 or Tier 2 supplier. You are a low volume producer supplying a total of 10 pallets or less per calendar year, per site. This is a collective total across all HARPS Participating Retailers*. (NB: Suppliers of retail-branded pre-packs are excluded from this rule as they qualify as a Tier 1 or Tier 2 supplier).</p>	<p>Your business processes fresh produce. (e.g. value-adding such as bagged salads, fresh cuts, sliced mushrooms/carrots, shelled nuts etc.) Virtual brokers that do not qualify as a Tier 1, 2 or 3 supplier.</p>
<p>Action Required</p>	<p>Action Required</p>	<p>Action Required</p>	<p>Action Required</p>
<p>If you have not yet achieved HARPS approval go to www.harpsonline.com.au to register your interest in achieving HARPS approval. Contact your respective retailer customer(s) for further information.</p>	<p>Your business may require HARPS approval (this includes certification to an Approved Base Scheme** and the HARPS requirements) by 1st January 2019. Notify HARPS of your interest in achieving approval by registering at www.harpsonline.com.au by 30th June 2018.</p>	<p>Your business may be required to be certified to an Approved Base Scheme** by 1st January 2019.</p>	<p>No action required for HARPS.</p>



Version 1.0 January 2018

* **HARPS Participating Retailers:** ALDI, Coles, Costco, Metcash (IGA), Woolworths
 ** **Approved Base Schemes:** BRC, Freshcare, GLOBALG.A.P., SQF
 ^ **Ancillary Services:** Supporting or additional services including ripening, brokerage activities, storage and cooling (where product handling and traceability are the responsibility of the Ancillary Service supplier).

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Industry Profile

Jennie Franceschi

Jennie Franceschi is a managing shareholder of Fresh Produce Alliance, a business started in 2016 alongside husband Wayne and two other growers. Jennie is also the managing director of Advance Packing and Marketing, also based at Manjimup, Western Australia.

What does it mean to you to be recognised at both the state and national level by the Telstra National Business Women's Awards (TBWA)?

It was a great honour to receive these awards as all the women who made it to the finals were amazing women with such inspiring stories. Being a finalist and a winner means I am now a part of the TBWA Alumni and for me this is very special, as I am now a part of a professional group of women who are supportive of other women. Part of the prize for the national award is mentoring by a senior female executive in Telstra and I think this too will be a great learning experience for me.

Why is it important to raise the profile of agricultural businesses in Australia?

I have noticed that agriculture often doesn't even make it to a careers day in school. The Australian agribusiness sector needs to encourage young people to enter the industry and we need to build capacity within them. You have many farming enterprises being sold as they do not have a succession plan within the family. If we want to keep Australians farming in Australia to feed our nation then we need to raise the profile of agriculture, encourage people to enter the industry and for the wider community to realise and understand the value proposition that Australian farmers bring to the table.

You've spoken before about the importance of raising awareness of regional opportunities. How important is that for women in agriculture, and the overall sustainability of regional areas in general?

Women already play a big role in agriculture, many times in the lead but often in supporting roles. What I am trying to bring attention to is the necessity for investment in regional areas to create employment opportunities in the regions. We cannot continue to have our youth grow up in the regions and then move to the cities because there's nothing on offer in their home towns. So, we need to create diversity and look at how we can invest in ways that create opportunity, so we can keep people in the regions. We need this to continue to keep services and to make regional areas vibrant places. As people leave it becomes harder and harder for regional areas to hang onto services like medical, schooling etc. Without decent services and some sort of vibrancy to the towns people won't want to live there. We need to create opportunity in any way we can.

You started your career on the family orchard. Why did you decide to branch out into other areas of the supply chain?

While I may have started my career as a grower, we also had a packing facility early in the piece and as other growers came along we handled the fruit for them. We left the family farm for a number of reasons. The area needed a dedicated packing facility as without it you would get fragmentation within the market place. By running the packhouse for many growers it gives the critical



mass to do programmed supply into a diverse range of markets. This actually gets the growers better money than they could get if they were all doing their own thing. Individually none of them have enough to run a program but collectively we do. Having a couple of dedicated packing facilities in an area means growers can focus on growing and we can focus on getting them the best return on investment we can. This has worked well for growers in our region. I moved into export and process because we need to be thinking strategically well in advance. Export was to help stabilise the domestic market and it has been very successful at that, and processing is about targeting markets we cannot with fresh and adding value to otherwise unmarketable fruit.

You work with a wide range of fruit and vegetable suppliers in developing your products for the domestic and export market. Why is it important for various sectors to work together?

What we try to do is add value where currently none exists. As Australians we are small in the global scheme of things and growers across all sectors need to be competitive in a global environment. We have some of the highest compliance and production costs so I think we need to leverage the great reputation Australia has in the global market to find a point of difference. I think it is important for all sectors to see how we can all work together in a positive fashion to help us be competitive. The export market doesn't really care about provenance, they care about consistency of supply, quality of the product and stability in pricing. As long as its Australian and the other conditions are met, then we can be competitive.

In mid-2017, Fresh Produce Alliance received a Western Australian Government grant to commercialise a ready-to-eat product range for the aged-care market in Asia. How important is the growing Asian market for Australian agribusiness, especially those in WA? And how well do you have to know both your consumers and the marketplace before making a significant time and dollar commitment?

Let's face it we are a part of Asia and the population is immense and the population is also aging. While we are working on a "ready to eat" aged care range that is low GI we are doing that also for domestic markets as well. There is a gap for quality aged care food and if we can make their final years better and still support Australian farmers then it is win:win. I am in market fairly often, but we did change direction when we did some intensive in-market research.

What is the one thing you know now that you wish you'd known in the lead up to the business launch in 2016?

How much time and effort it takes to get things ranged as FMCG in a chiller section. Everything takes longer than we originally anticipated.

Bringing it back to avocados, what advice would you give to anyone entering the industry in Australia today?

Go into it with realistic expectations and do your research. The industry is growing at an exponential rate, however, the industry is very proactive and in general collaborative in approach. It is this mindset that has helped strengthen the avocado industry in Australia as well as it just being an awesome product that is so unique it stands alone.

What does the future hold for the Australian avocado industry? What do you see as the greatest opportunity in the next 20 years?

The avocado industry is going to continue to grow and the challenge will be to increase consumption and market distribution channels to absorb the growth as it occurs. We will have to continue to look at our export markets and develop the value-added products. I expect we will gain access to some other countries in the next 20 years and as long as we remain disciplined and remain proactive then I believe we can continue to keep the industry strong and vibrant. I think it is important to always be aware that the world changes at a very fast pace so for us to be relevant in the future we need to be constantly improving and learning.

The greatest risk to our industry will be complacency. Things have been going well in the past few years so for us to make the most of the opportunities that present themselves we need to be constantly on point.



Jennie Franceschi (right) with WA Minister for Regional Development, Agriculture and Food Alannah MacTiernan.

Avocado business champion recognised at Telstra awards

In 2017, Western Australian avocado industry pioneer Jennie Franceschi was first named the 2017 Telstra Western Australian Business Woman of the Year, going on to win the 2017 Telstra Australian Business Women's Corporate and Private Award at the national event.

Mrs Franceschi has been immersed in the avocado industry ever since she took on her first summer job, working in her family's commercial orchard.

More recently, Mrs Franceschi founded a processing facility, Fresh Produce Alliance, alongside her husband and two other growers in 2016.

The business champions a sustainable agriculture ecosystem and uses innovative technology such as high-pressure processing and individual quick-freeze to produce "naturally healthy, delicious, real food that people love".

Mrs Franceschi's career in the avocado industry spans four decades, and has taken her to opening her own orchard, being involved with the state association and national industry board for avocado growers, and launching an avocado packing facility.

"As a pioneer of our industry in Western Australia, I believe the contribution I have made over many years has made a real difference to the people I represent," she said.

The Telstra Business Women's Awards shine a light on women's achievements as business leaders and celebrate the positive results of inclusive leadership, such as better organisational performance, increased competitive advantage and, at a macro level, a thriving economy.

More information

The Awards: www.telstrabusinesswomensawards.com

Fresh Produce Alliance: www.freshproducealliance.com.au/about-us



Jennie Franceschi (right) with the Governor of WA, Her Excellency the Honourable Kerry Sanderson AC.

Grower HPA templates available

The new Horticulture Code of Conduct has been designed to protect growers but also reflect the flexibilities that need to operate in the market place.

All growers and traders must have a Code-compliant Horticulture Produce Agreement (HPA) and the ACCC has the power to enforce civil penalties and infringement notices on both growers and traders. The only exemptions are if you trade directly with a retailer, processor or exporter.

Growcom has launched templates to assist growers in the development of their HPAs, as required under the Horticulture Code of Conduct.

The templates have been developed with significant input from solicitors, growers and grower organisations around Australia. These templates are a useful starting point for negotiations around the horticulture produce agreement and provide a clear and easy to understand outline of the responsibilities of both parties.

Growers can choose to pursue either an agency or merchant style agreement with their wholesaler or packhouse, depending on the preference of both parties.

How to use the 2017 Growcom HPA templates

There are two different types of template, a merchant template

and an agent template.

A merchant template is used when the trader (wholesaler) takes ownership of the produce and pays the grower an amount determined on or before delivery or using a pre-agreed method or formula for calculating a price. If a method or formula is used then there are additional reporting requirements such as letting the grower know the final sale price of the produce to the third party.

An agency template is used if a trader sells the produce on the grower's behalf to a third party and takes out a pre-agreed commission.

Choose the template which best suits you and your trader (don't forget packing sheds also come under the new Horticulture Code of Conduct).

Make sure you check both the Commercial terms schedule and the accompanying terms and conditions within the detailed agreement.

Please remember that this template is the starting point for negotiation and Growcom strongly recommends having an open discussion with your trader about developing an agreement that works for both parties.

More information

Download the templates from here: www.growcom.com.au/horticulture-produce-agreements-hpas/

Simpson Farms recognised by Woolworths

Queensland-based Simpson Farms was named the Supplier of the Year – Fruit at December's Woolworths annual Supplier of the Year Awards.

The other finalists included Montague and Driscoll's.

Simpson Farms Director John Walsh said it was a great achievement by everyone within all areas of Simpson Farms, including our growers and business partners.

"Without their efforts we would not be able to deliver a high-quality product, consistently, to the service level required by Woolworths and their customers, which has been recognised by this award," he said.

Greek Yoghurt brand Chobani was named the 2017 Overall Supplier of

the Year award and Perishables Supplier of the Year award. Among Chobani's activities in 2017, was a partnership with Australian Avocados for the Good Fat pop-up café in Sydney during November.

"Chobani launched in Australia five years ago and has quickly become one of Australia's most loved brands," Woolworths Director of Buying and Merchandising Steve Donohue said.

"Chobani was selected for the top award among a number of strong contenders because they are not afraid to doing things differently, and for consistently bringing innovation and passion to the category."

The Supplier of the Year Awards recognise suppliers to Woolworths in 22 categories.

Perfection Fresh was the Vegetable Supplier of the Year, B E Campbell was awarded Meat Supplier of the Year and Kailis Bros were awarded Seafood Supplier of the Year. Blantyre Farms were awarded the sustainability award in recognition of their ongoing efforts to reduce food waste, and Aaron Laboratories as Woolworths FoodCo Supplier of the Year. For the second consecutive year, Tasmanian based R&R Smith were awarded Organic Supplier of the Year.



Hort Innovation Marketing Update

By Claire Tindale-Penning, Hort Innovation Marketing Manager

Welcome to the *Talking Avocados* Summer 2017/18 marketing update, where we give you a snapshot of the latest marketing activity that's helping Aussie consumers connect with Australian avocados. This activity is managed by Hort Innovation on behalf of the industry, and is funded by the avocado marketing levy.

It has been a busy quarter for Australian Avocados, with the pop-up restaurant, Good Fat, launching to huge fanfare in November. More details about this, as well as the rest of the avocados activity that occurred, below.



In-store demonstrations

As part of Hort Innovation's levy-funded marketing activity for the industry, Australian Avocados undertook in-store demonstrations in 100 Woolworths stores nationwide. Introducing a new way of using avocados for many Australians via smoothies fits with the *Everyday Gourmet* pillar of the marketing strategy, and helps offer a solution to consumers who don't know what to do with "the other half".

There were two Thursday-Saturday sampling periods, from 21-23 October and 26-28 October 2017. Each session ran for four hours, and involved sampling avocado smoothies and handing out recipe cards. The objective of the in-store demonstrations was to demonstrate the ease of use and versatility of avocados via what is right now a hugely popular food trend that appeals

to consumers wanting the ease of a "healthy all-in-one meal/snack that is packed with nutrients". Working with retailer, Woolworths, to influence consumers at point of purchase, the store locations were picked based on foot traffic and retail performance, with a focus on busy metro stores.

During the 100 sessions, there was a total of 13,921 interactions with customers, and 8,918 samples handed out. This equals on average 89 samples handed out to consumers per session. Consumers loved the smoothies, as shown both by their comments, and the quantity of avocados sold at the store during the demonstration. In fact, 10,178 avocados were sold during the sampling period, equating to more than 102 per four-hour session, an amazing conversion rate of 118% when you look at the number of samples handed out, with the assumption that 1 avocado sold = 1 sale. The promotional staff also used the demonstrations as an opportunity to ask shoppers questions about their attitudes to avocados, and helped educate shoppers on how to pick the perfect avocado based on when they wanted to consume it.

Feedback on the smoothie was overwhelmingly positive, with comments including:

- "It tastes so good! I usually have my avocados on toast, never thought of making a smoothie" and
- "I love that creamy texture the avocado adds to the smoothie".

Digital

A three-month digital campaign went live from September to mid-December 2017, to keep avocados top of mind for consumers. This campaign involved playing the 30-second "Perfect Match" television commercial (TVC), and included placements on catch-up TV sites such as Tenplay and on contextually relevant websites. The aim of this activity was to remind and inspire consumers of the versatility of avocados, "the perfect partner to so many other ingredients". One of the goals of the campaign was to reach more than 1.7 million eyeballs over its duration. With a fortnight to go on the activity, the content had already delivered more than 2.1 million impressions. A single impression is counted when an ad is displayed on a website. There has also been activity on YouTube, with the 15-second ad running before the selected video (known as a pre-roll). This activity targeted food, recipes and cooking related content, to ensure it was reaching people who were interested in the content. Final results and analysis on the performance of the digital activity will be available in the next edition.

Social Media

With the Australian Avocados Facebook page (www.facebook.com/AustralianAvocados/) liked by more than 190,000 consumers, social media is an important part in the marketing strategy.

The aim of the Facebook page is to share content such as health



facts, recipe ideas and hints and tips to consumers in a way that will resonate with the target audience, whilst keeping avocados top of mind for consumer's year round. Each month, the content reaches more than one million people in Australia.

An example of the type of content is the image above, featuring a recipe suggestion; this video was viewed more than 200,000 times.

Cinema

The Australian Avocado Out of Home Cinema campaign started on 21 September, and ran for eight weeks into November, running a rotation of two Perfect Match videos: Chocolate and Haloumi.

The first burst of activity ran during the school holidays and the October public holiday in order to capitalise on increase in audiences at this time, while the second burst of cinema activity coordinated with blockbuster releases such as *Thor: Ragnarok* and *Blade Runner 2049*.

The two Perfect Match ads were played more than a combined 596 times during the campaign, with the aim to reach more than 436,000 people. Full results will be reported on in the next edition.

Good Fat

The Australian Avocados pop-up restaurant, Good Fat, closed its doors on 1 December, after a very successful one-month activation.

Good Fat launched with an exclusive story in *The Weekend Australian* (<http://bit.ly/2mh65Ki>), coinciding with the one-year anniversary of Bernard Salt's famous "avo-gate" column. *The Australian* exclusive also helped to secure Bernard Salt's involvement in the media launch, which provided an interesting angle for the media coverage. This coverage was amplified by launching a search for someone to fill the dream job of "Head of Avo Control" at Good Fat. A job ad was posted on *seek.com* and *pedestrian.tv*, which went global. The ad was talked about 49 times in media, reaching a huge 44.1 million people globally, and was shared 41 times on social media, reaching 81.6 million people. Media highlights include an article on *Ladbible* (<http://bit.ly/2jHa05b>), which has more than 29 million Facebook followers worldwide, and a segment on *Sunrise* (<https://yhoo.it/2zQPYve>). We received 25 job applications, with Sach Trikha, a 25-year-old from Bondi being the successful candidate. To see her menu recommendations, watch here – <http://bit.ly/2qHWzoi>.

Eighty high profile food influencers and media attended our launch event for Good Fat, generating instant social media



Meet the avocado industry Relationship Manager and see how she can support you.

Astrid is keen to chat with you. She is your link to the latest R&D and marketing developments and how these can help your business grow. It's easy to request a phone call – just go to the 'Contact Me' form at horticulture.com.au/contact-me. Alternatively, call 02 8295 2300 or email membership@horticulture.com.au and let us know you would like Astrid to call you.

horticulture.com.au

**Hort
Innovation**

#GoodFat success in Sydney

by Hort Innovation

The nation's first-ever industry-funded pop-up restaurant has proven a smash hit with almost 500kg of avocados sold at the month-long venue, located in the New South Wales hipster heartland of Surry Hills during November 2017.

Adorned in avocado wallpaper, and kitted out with avocado-themed décor, The Good Fat featured 14 creative dishes for breakfast, lunch and dinner including the signature dish, Avocornetto ice cream. Social commentator Bernard Salt and 'Head of Avocado Control' Sach Trikha were ambassadors.

The initiative was delivered by Hort Innovation with input from growers. With close to 2,000 meals served during the four weeks, Kylie Collins – from Blushing Acres farm at Dimbulah, west of Cairns – said the pop-up venture far exceeded expectations.

"The Good Fat was fantastic. My husband, who spends 24-7 growing on the farm, got to go down and see it with me, and he was blown away. It was wonderful to be part of it all," she said.

"It was also good to show consumers creative ways to eat and cook avocados, through the recipes on the back of the placemats which they could take with them.

"Ideally, we would love to see more pop-up restaurants in Melbourne and Brisbane. Amsterdam and New York have one, why stop at Sydney?"

The venture piqued the interest of avocado fans from all over Australia, with one keen restaurant goer driving up from Tasmania to sample the fare. All profits made through the venture were also fed back into the marketing levy, which helped offset the cost.

Hort Innovation chief executive John Lloyd said The Good Fat, which was rolled out along with a retailer campaign, exemplified an increasing sophistication in grower-levy funded marketing campaigns.



Avocados Australia members Katrina and Tim Myers, from Barham Avocados, New South Wales, being interviewed by The Australian at Good Fat Sydney.



**Hort
Innovation**

Mr Lloyd said in the avocados category, television advertising, digital efforts and engaging with influencers were key facets of the campaign over recent years and in-store sampling had also been part of the push.

He said following on from the momentum of The Good Fat restaurant, Hort Innovation recently issued a tender for a creative agency to deliver an innovative three-year marketing campaign that includes television advertising, a digital and social media strategy and an overall brand refresh.

You can check out the Good Fat website and all the recipes at www.goodfatsydney.com.

Chinese market keen for avocado

Market opportunities for fresh avocados in China are strong, a fact highlighted to Avocados Australia at China FVF in November 2017.

Avocados Australia CEO John Tyas and member Andrew Serra from Tolga in North Queensland attended the event and associated activities as part of Hort Innovation presence at the fruit and vegetable fair.

Mr Tyas said while Australia did not yet have access to the Chinese market, Chinese government officials continued to indicate their desire to support access for Australian avocados to China.

"There is a very large market opportunity for avocados in China and at the moment, the current supply window they're particularly looking to fill is April to May," Mr Tyas said.

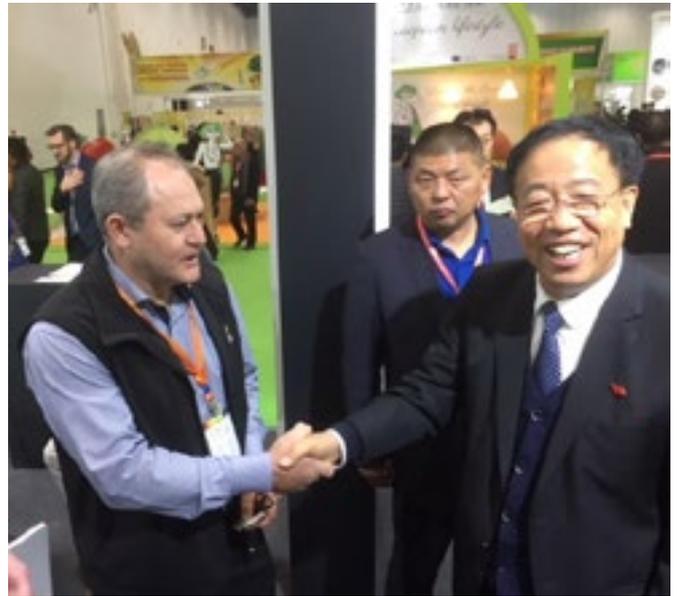
"However, once access to the Chinese market is achieved, Australia will be competing with low-cost Hass producers from across the world.

"We must develop a strong point of difference in order to justify the price premiums required, due to our high production costs.

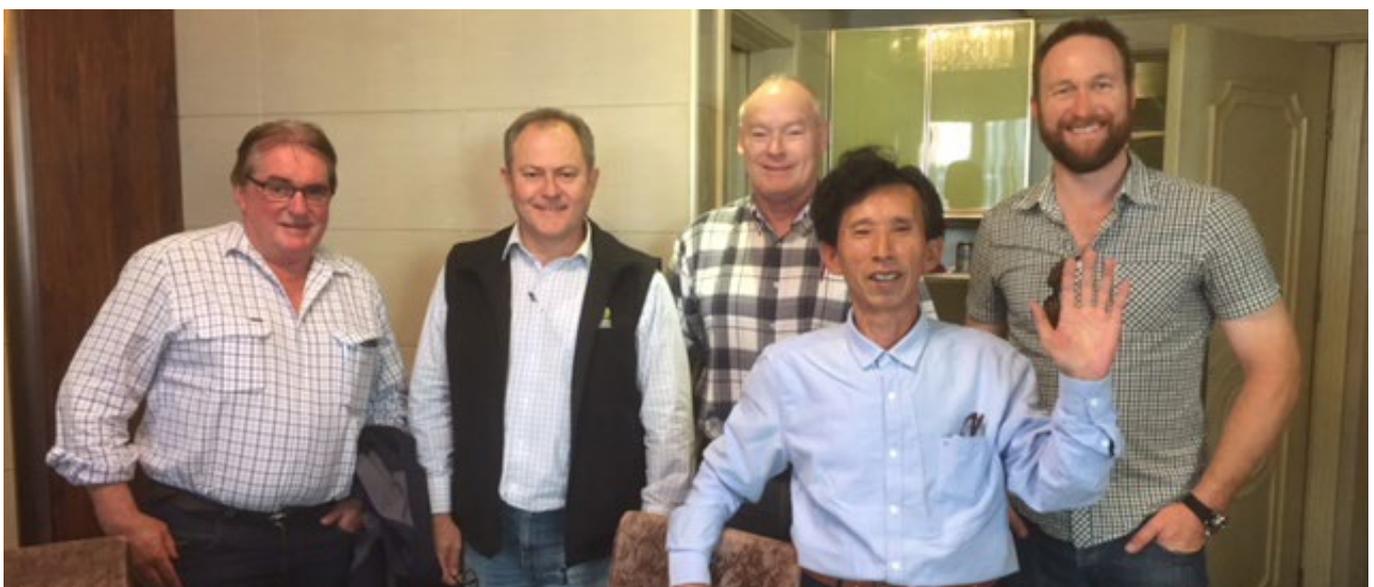
"High quality product with good supply chain support will be paramount and coupled with promotion of the positive Australian image will put Australian avocado exporters in a strong position in China."

Mr Tyas said there are currently limited ripening facilities or organisations with experience in ripening avocados, as well as many tiers of handlers from when the fruit lands in country to when it reaches the consumer.

"In order to support our premium market point, we will have to ensure consumers can purchase a premium product," he said.



The Chairman of the Xinfadi Markets, Mr Zhang YuXi, visited the Australia Fresh Stand and the Avocados Australia booth during the event, meeting John Tyas.



Among the Australian horticultural industry members who met with Mr Bao Hua Jiang (front), a procurement manager for large fruit importer at Xin Fa Di markets, are (from left) Summerfruit Australia CEO John Moore, Avocados Australia CEO John Tyas, Australian Table Grape Association Chief Executive Jeff Scott and North Queensland avocado producer Andrew Serra. John Tyas reports Mr Jiang is "very keen" for the day he can import Australian avocados to the markets.

Avocado Grower Study Group Workshops

The final study group workshop under the current Hort Innovation project was held in South Queensland on 7 December 2017.

The Avocado Study Group Workshops were extremely popular in 2017, drawing more than 1,068 growers to 16 events.

Queensland Department of Agriculture and Fisheries' Simon Newett said the popularity of the events was the combination of having presentations made on topics chosen by the growers themselves, researchers presenting their latest findings, updates on industry matters, plenty of time for attendees to network and a chance to see how other growers are tackling common issues during the field walk.

"The study groups were part of an extension project to help growers adopt best practices, resulting in a more consistent supply of avocados to the market," he said.

At the most recent events, 113 attendees at Tinaroo Falls Avocados near Atherton in North Queensland on October 12 were encouraged to foster a diversity of pollinators to improve yields, learnt about the use of compost in organic and conventional orchards, and received an update on black root rot, the use of silicon and on the use of Plant Growth Regulators.

There were two events in November, with 65 attendees at the Stuarts Point event in Central New South Wales on 2 November and 81 people at Simpson Farms and David De Paoli's orchard in Central Queensland on 16 November.

At Stuarts Point, attendees learnt about the avocado industry in New Zealand and their research programme, the exciting future for remote sensing in farming, the potential benefits of silicon and were provided with updates on root and fruit health. During a field walk on Roger Cotterell and Karen Welch's orchard, highlights included canopy management work, the use of native stingless bees to improve pollination, irrigation and the use of compost.



Growers inspecting David De Paoli's Knockroe Road orchard at a Central Queensland study group in November.

At the Central Queensland event, growers received updates on phytophthora and remote sensing, as well as two orchard visits directed at canopy management practices – one at Simpson Farms and another at David DePaoli's orchard.

The last event of the year and the project, was held at Terry Clark's orchard near Blackbutt in South Queensland on 7 December, where 109 attendees discussed results from the Small Tree High Productivity Initiative, irrigation and nutrition practices before heading out on two farm walks, one on Green Nugget orchards with Terry Clark and one on Googa Farms with Anthony and David Beutel.

"In this three-year project we have had more than 2,600 people attend the 42 study group workshops and Qualicado events," Mr Newett said.

"One of the hard-to-measure but real benefits of these events is the networking that takes place amongst attendees and the information that people learn from each other."

Mr Newett would like to thank his team, the presenters and in particular all the growers who have hosted the events without whom the events would not have been possible.

Changing team

After 21 years working with the avocado industry, Development Horticulturalist Peter Rigden has retired from the department. You can read more from Peter about his time in the industry on page 51.

Joining the QDAF team as a Development Horticulturalist, Bridie Carr has recently moved over from Hawkes Bay, New Zealand. Bridie's most recent role before joining the department, was working for the New Zealand Institute of Plant and Food Research, in postharvest physiology. Her research included work on apples, pears, stonefruit and peonies. She has also



As well as experience in the New Zealand horticultural sector, Bridie Carr has also worked with the Kenyan avocado industry.

contributed to NZ aid work programmes in vegetable production in Cambodia and avocado in Kenya. Previous to Plant and Food Research she was a Technical Field Representative at Hortcentre Ltd in Northland, New Zealand. She provided technical advice to large and small scale producers in avocado, kiwifruit, tamarillo and passionfruit. Bridie is excited about her new role at QDAF and is looking forward to learning from and meeting more growers, helping out where she can, and working alongside the Australian avocado industry.

Acknowledgement

These workshops were part of project *Achieving More Consistent Yields of Quality Fruit in the Australian Avocado Industry* (AV14000), which is a strategic levy investment under the Hort Innovation Avocado Fund. This project is

funded by Hort Innovation using the avocado industry research and development levy, co-investment from the Queensland Department of Agriculture and Fisheries, and contributions from the Australian Government.

More information

The illustrated minutes and presentations from these workshops have been added to the BPR Library: www.avocado.org.au/best-practice-resource/. The BPR is Avocados Australia's free online one-stop-shop to support best practice throughout the Australian avocado supply chains. We encourage all of our stakeholders to register and use this vital resource.



Event hosts Karen Welch and Roger Cotterell in their orchard near Stuarts Point, during the November event.



There were more than 100 attendees at the North Queensland event in October 2017, near Atherton.



Growers listening to one of the presentations in Simpson Farms packing shed, in Central Queensland in November.



David Beutel speaking at Googa Farms during the avocado study group workshop near Blackbutt in December.

Encouraging horticulture industry innovation

Under a partnership with Hort Innovation, three Churchill Fellowships are being offered annually, specifically for international research on a topic related to horticulture.

They will be awarded on the basis that the research undertaken will provide clear benefit to the Australian horticulture sector and, ultimately, to the wider community.

The scholarships are available to anyone working in a registered levy-paying Australian horticulture business, including those in the avocado industry.

“As an industry, horticulture represents an important contributor to our nation’s economy, and the Trust is excited to see how these Fellowships can impact Australia,” Churchill Trust CEO Adam Davey said.

“There are two things every Churchill Fellowship applicant needs to display – the first is to present a research project that will provide benefit to the Australian community.

“The second is showing how all of the skills, insights and knowledge they gather from world experts on the Fellowship can be shared once they return home.”

Hort Innovation chief executive John Lloyd said the organisation’s investment in the sought-after Fellowship opportunities formed part of its biggest industry leadership drive in history.

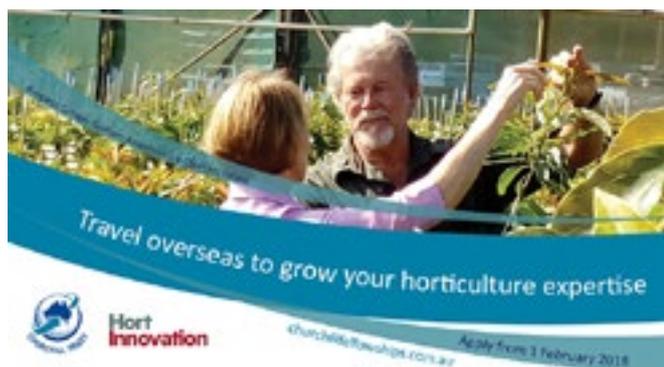
“In the face of an ageing horticultural industry and a fast-moving technological landscape, we are rolling out a host of tailored development opportunities for growers, and this is one not to be missed,” he said.

Acknowledgement

These Churchill Fellowships are funded by the Hort Frontiers Leadership Fund, part of the Hort Frontiers strategic partnership initiative developed by Hort Innovation, with co-investment from Winston Churchill Memorial Foundation and contributions from the Australian Government.

More information

<https://goo.gl/GSfH2Q>



Q&A Graham Anderson

One former Churchill Fellowship recipient is avocado grower Graham Anderson, who has continued to utilise his studies in the 1970s to benefit the industry today.

What was your Churchill Fellowship research?

To study developments in avocado production in both nursery and field in Israel, USA.

Why did you apply for a Churchill Fellowship?

I was a third-generation farmer at Duranbah, north-eastern New South Wales, where my father started growing avocados in around 1950 and I followed in his footsteps in 1958 at the age of 15. About 1960 I started an avocado nursery. In 1970, I built my third nursery under the guidance of Patricia Barkley from the Department of Agriculture NSW and Professor Ken Baker from the University of California, Berkeley. Professor Baker was brought to NSW by the Department of Agriculture to introduce the University of California system of nursery culture using steam pasteurisation and strict hygiene control.

In 1976, I studied tissue culture under Professor Ron De Fossard at UNSW and then worked on this method using the facilities at the Biological and Chemical Research Institute at Rydalmere with Dr Alan Smith.

This was not successful and Dr Smith encouraged me to apply for a Churchill Fellowship to see other tissue culture laboratories as well as all aspects of avocado culture.

What were the benefits of the Churchill Fellowship?

The main laboratory attempting to tissue culture avocado was Rahan Meristem in Israel. I visited many countries but most of my time was spent in Israel. The two important cultures I was taught there were at Rosh HaNika kibbutz. The first was selected limb removal to prune avocado trees and the second was the method of using open bottom pots to air root avocado plants to prevent root binding.

How did the knowledge gained on your Churchill Fellowship benefit the wider avocado industry?

This method of pruning avocado trees to control growth and maximise production was very quickly adopted by not only Australian growers but worldwide.

Air root pruning took a long time to be adopted by others, but was immediately a huge benefit to my nursery.

What major achievements or milestones have you reached since going on your Fellowship?

In 1988 I was made a Member of the Order of Australia (AM), for my services to horticulture mainly in the avocado industry. In 2017, while working with Professor Neena Mitter at the Queensland Alliance for Agriculture and Food Innovation at the University of Queensland, developing a world first system to provide a faster way to develop avocado rootstocks.

What's next for you?

My two sons (fourth generation) have joined the business and now I will concentrate on developing facilities to produce tissue cultured rootstock for Australian and overseas avocado growers, and continue with research into the avocado industry. I have kept in touch with some of the people who taught me overseas, and now visit these friends in South Africa and Israel as well meeting with new generation growers and researchers as friends and collaborators.

**CHURCHILL FELLOWSHIP
IMPORTANT DATES**

1 February 2018	Applications open
27 April 2018	Applications close
May/June 2018	Applications reviewed. Short-listed applicants called for interview
June/July 2018	Short-listed applicants attend interview in relevant State or Territory
September 2018	Successful applicants notified
February 2019	Fellowship travel commences

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Boosting avocado industry leadership skills

The Australian tropical fruit industry is set to benefit from the Australian Government's \$5 million Leadership in Agricultural Industries Fund.

Assistant Minister for Agriculture and Water Resources, Senator Anne Ruston, said the fund would provide \$224,800 to the Australian Melon Association to develop leadership skills through an industry consortium.

"The Melon Association will work with Avocados Australia, Australian Banana Growers' Council, Australian Lychee Growers Association, Australian Mango Industry Association, Passionfruit Australia, Persimmons Australia, Queensland Strawberries and GROWCOM as part of a consortium of organisations which will benefit from the LEAD program," Minister Ruston said.

This funding will help a consortium of horticulture associations come together to establish a leadership program for 40 participants.

"The Leadership Exploration and Development (LEAD) program will include residential workshops, webinars and mentoring programs," Minister Ruston said.

"It is wonderful to see iconic and emerging horticulture industries working together to make sure they have the leaders of today and tomorrow."

Avocados Australia Chief Executive Officer John Tyas said horticultural industries needed both the current and next generation of industry leaders to lead through transitional and structural adjustments.

"One of the biggest barriers to building leadership skills is the cost of training and lack of available funds," Mr Tyas said.

"Via this funding, seven future avocado industry leaders will be provided with the opportunity to develop relevant skills, network with government and other stakeholders, and increase their cross-industry knowledge.

"This leadership program will further increase collaboration between our industries as the program benefits from the existing networks and skills base of the Tropical Horticulture Group members."

The successful applicants will take part in pre-program activities, residential workshops, a webinar program and mentoring.

The project leader is Australian Melon Association Industry Development Manager Dianne Fullelove, supported by a steering committee with nine members from the consortium.

Acknowledgement

The Tropical Horticulture Group project has been funded by the Australian Government's Leadership in Agricultural Industries Fund.

More information

Additional detail will be provided in early 2018, in the meantime, contact Avocados Australia on 07 3846 6566 if you are interested.



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Fair Farms Initiative supports growers

Jane Muller, Growcom Policy and Projects

With the treatment of farm workers in the national media spotlight and an increased focus in Australia’s Fair Work laws on the protection of vulnerable employees, now – more than ever – growers must ensure their employment practices are up to scratch.

Employment matters and industrial relations laws are highly complex, so it can be challenging for farm business owners to be sure their employment systems and practices comply with all legal requirements.

While the majority of growers aim to do the right thing, sadly the actions of a few tarnish the reputation of the industry as a whole. This increases the risk of losing workers to other industries – or even other travel destinations.

The Fair Farms Initiative was established in 2017 to foster good employment practices across the Australian horticulture industry and ensure that workers are treated fairly while they are employed in fruit or vegetable farms and packhouses. Coordinated by Growcom and funded by the Fair Work Ombudsman, the national initiative will be rolled out over four years.

Fair Farms was officially launched by Senator Anne Ruston during the HortConnections conference in Adelaide last May. The Senator described the project as “bottled gold” and praised the horticulture industry for taking responsibility for addressing the exploitation of workers on farms.

The Initiative supports growers with the tools and knowledge to ensure their employment systems comply fully with workplace relations laws, and demonstrate this to customers and the wider community. Key elements of the Initiative include:

- assistance to growers in all states to conduct a confidential risk assessment of their current employment practices, using Growcom’s Hort360 Workplace Relations module. This process steps growers through all aspects of their legal requirements and industry standards and identifies areas for improvement



- the development, under Freshcare, of a voluntary third-party audited certification – enabling growers to demonstrate to their customers that their employment practices are fair and meet legal requirements. The Freshcare Fair Employment Standard has been drafted and the training, audit and certification process is being piloted. Certification of fair employment will be available to growers by mid-2018
- an information campaign, including regional seminars and articles in industry magazines to inform growers of their risks, obligations and solutions and to target significant matters of non-compliance. The campaign will also target farm workers to ensure they are informed of their rights and entitlements
- development of a pathway to qualifications in Human Resources for interested growers
- an annual award to showcase excellence in employment practices in the Australian horticulture industry. The inaugural award will be held in 2018
- in delivering Fair Farms, Growcom and Freshcare will work closely with state and national horticulture industry groups, retailers and supply chain stakeholders to ensure the Initiative meets the needs of all industry members.

More information

Jane Muller at Growcom jmuller@growcom.com.au



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The dangers of agriculture

2017 ended with 43 deaths in the agriculture, forestry and fishing industries, the second highest industry of workplace result for Australia.

The latest Safe Work Australia data is based on initial media reports and is a preliminary estimate only.

The comprehensive *Work-related Traumatic Injury Fatalities, Australia 2016* (released October 2017), shows a continuing decline in the annual number of fatalities but 50% of all fatalities occur in either the transport, postal and warehousing industries, or in agriculture, forestry and fishing industries.

However, the report says despite accounting for the vast majority of fatalities, the top two industries have recorded relatively substantial falls in the number of fatalities during the past 14 years – transport, postal and warehousing down 31%, and the agricultural industries down 27%.

According to Safe Work Australia Chair Diane Smith-Gander, poor work health and safety costs \$5,000 per worker each year and equates to 4.1% of Australia’s gross domestic product.

“This doesn’t even touch on the immeasurable cost of grief and trauma to workers and their families,” she said.

According to the Work Safe report on the 2016 statistics, fatality rates, expressed as the number of fatalities per 100,000 workers, are best used when comparing risk across industries. In 2016 the agriculture industry recorded the highest fatality rate with 14 fatalities per 100,000 workers.

“While the fatality rate for this industry fell in 2016, down from 18 in 2015, it remains almost 10 times the all industries average of 1.5 fatalities per 100,000 workers,” the report said.

Agriculture & workers comp

Unfortunately, agriculture is also in the top three industries in another Safe Work Australia report released late in 2017, *Australian Workers’ Compensation Statistics 2015/16*.

Agriculture, forestry and fishing had 17.5 claims per 1,000 employees in 2015/16, and recorded the highest rate of serious claims per hours worked.

Agriculture recorded 16.7 claims per 1,000 employers for injury and musculoskeletal disorders. This category includes traumatic joint injuries, wounds, fractures, burns and intracranial injuries.

The agricultural industries have actually had a 36% reduction in serious claims since the 2000/01 period.

Despite these figures, the median time lost to serious claims has actually increased for all industries between 2000 and 2015. In 2014/15, agriculture’s median time lost was 5.6 weeks, a 17% increase. The median compensation paid has also increased for all industries since 2000; agriculture paid \$9,600 per claim in 2014/15

The report says older workers also account for a greater proportion of the fatalities in agriculture. In the 10 years to 2016, workers aged 55 and over accounted for 55% of fatalities.

For the fruit and tree nut growing industry sub-division, there have been 27 fatalities between 2007 and 2016 (see *Table 1*).



Industry	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Other livestock farming	2	5	2	5	8	6					28
Fruit & tree nut growing	1	8	2	8	4	6					27
Dairy cattle farming	6	2	5	2	6	4					25
Mushroom & vegetable growing	3	2	-	1	5	6					17
Nursery & floriculture production	1	-	-	-	4	-					5
Poultry farming	-	-	1	-	-	3					4
Agriculture - Total	42	42	38	38	32	148					418

Table 1: Worker fatalities: Agriculture industry sub-divisions by age group, 2007-2016 (combined) from the Work-related Traumatic Injury Fatalities, Australia 2016 report

More than a quarter (112 or 27%) of the fatalities in the agriculture industry were due to vehicle collisions during the 10 years to 2016. This was followed by the rollover of non-road vehicles (65 fatalities or 16%) and being hit by moving objects (60 fatalities or 14%).

The continuing downward trend for workplace fatalities has not translated for female workers, however. While the rate of male fatalities was 2.6 per 100,000 workers in 2016 (down from 5/100,000 in 2007), the fatality rate for female workers has remained relatively constant at 0.3 per 100,000.

More information

The Safe Work Australia *Work-related Traumatic Injury Fatalities, Australia 2016* (the source of the table and infographics on this page) and *Australian Workers’ Compensation Statistics 2015/16* are made available under CC BY 3.0 AU. The fatalities report is available at <https://goo.gl/Ryjk5X> and the compensation report is available at <https://goo.gl/pbGS9b>.

Agriculture mobile plant roll-over fatalities

eSafe Incident alert

In December 2017, a worker on a Tamborine Mountain avocado farm was killed when a single seat ride on mower being driven by another worker rolled over on a steep slope and crushed her.

A few weeks before, a worker was killed when the tractor he was driving went over the edge of a steep embankment on a banana farm in North Queensland. He was attempting a U-turn on a road when it appears he drove over the embankment and was thrown or jumped from the tractor. Although there were no witnesses, the injuries he sustained indicate the tractor rolled over him.

Environmental conditions may have contributed to the incident as it had been raining in the preceding days which left the road muddy and boggy. The tractor was fitted with a roll over protective system (ROPS) but was not fitted with a seatbelt.

Workplace Health and Safety Queensland says both investigations are continuing.

Preventing a similar incident

Tractors and other items of agricultural mobile plant are safe when operated properly, however, like any equipment, they become dangerous if used incorrectly. Before operating them, the person conducting a business or undertaking (PCBU) must ensure:

- the vehicle selected is the right vehicle for the task
- weather and ground conditions have been assessed
- a ROPS that complies with AS/NZ1636.1-1996 is fitted to tractors in accordance with WHS Regulation

s216 Roll-over protection on tractors

- a seat belt is worn where fitted
- the manufacturer's operating instructions have been read and are followed. For older items of mobile plant where operating instructions are not available, operational procedures and instructions for use should be developed by a competent person.

When operating mobile plant:

- ensure it is driven to suit the environmental conditions and slow enough to retain control in unexpected circumstances
- reduce speed before turning or applying brakes
- use as wide a wheel track as possible when working on hillsides and sloping ground
- descend slopes cautiously, keeping the tractor in low gear to allow motor compression to act as a brake. Watch out for ditches, embankments, and depressions – unstable banks can cause overturns
- do not park on a steep slope
- ensure the park brake is on and operating effectively before dismounting
- if towing a trailer, ensure the load is evenly balanced, well secured and you operate at a lower speed.

More information

To read the full alert, including safety and regulation fact sheets, visit <https://goo.gl/FyAbiv>.

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Hort Innovation constitution changes passed

Two of the three resolutions put forward at the 2017 Hort Innovation Annual General Meeting were passed, with overwhelming support.

Three resolutions were put forward to make changes to the constitution, attracting a combined 737 votes from members at the 24 November 2017 event.

Each resolution to change the constitution had to be passed by at least 75% of votes cast by voting members entitled to vote on the resolution.

Resolution one was to change the composition of the Director Nomination Committee to add a levy payer. This was supported by the Hort Innovation Board, and more than 98% of votes saw the change pass.

Resolution two was to adjust the composition of the Board to five elected directors and four appointed directors. This was supported by the Hort Innovation Board, and more than 99% of the votes were in favour of the change, leading to it being implemented.

The third resolution put forward was to change the voting rights of members to one member, one vote, rather than votes being calculated on the amount of levy paid. This resolution was not passed – 18.5% of votes were in favour of the change, and 80.55% of votes were against it.

Following a vacancy on the Board, 30 applications were received for the position, with each considered by the Director Nomination Committee. This was filled on a casual basis by Dr Mary Corbett in June. In line with constitutional procedure, following the November AGM, the Board met to determine a permanent appointment. Dr Corbett was appointed to the full-time director position, effective as of the AGM, in which she will serve a three-year term to 2020.

Dr Corbett has more than 22 years' experience as a director, spanning a diverse range of industries from cotton growing to public health, and has a strong focus on research and development and corporate governance.

After that appointment, Selwyn Snell was returned as Chair with Mark Napper returned as Deputy Chair.

Hort Innovation is charged with investing more than \$100 million per year into research, development and marketing activities using industry levies, contributions from the Australian Government and other sources.

More information

www.horticulture.com.au

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AUSTRALIA WIDE



Testing the Northern Territory's potential

Lisa Yorkston

The summer heat didn't stop the establishment of an avocado trial plot in the Northern Territory during the Christmas/New Year period.

Grower Mathew Bosanac will eventually have 10 different varieties planted on the family property near Berry Springs, an hour south of Darwin.

"The first few days I struggled with the heat and the last few the rain held me up, but the trees have had a good soaking and hopefully a good start," Mr Bosanac said.

A mechanic in underground mining, Mr Bosanac hopes avocados are a way to eventually transition to a farming business that won't regularly take him away from his family.

"I love my work, but I do travel a fair bit to a variety of sites around the country so eventually, I'd like our farm to support our family but that is quite a few years down the track," Mr Bosanac said.



The plot's first fruit, from one of the three-year-old trees.



Preparing the raised rows for the avocado tree trial at Berry Springs in the Northern Territory.



The Wet season held up planting for a few days but also helped water in the new trees planted in January.

"While I'm at work, my wife Amanda takes care of the property, monitoring irrigation and the condition of trees, sending me regular updates so I don't need to worry."

At the moment, a majority of the 100 hectare property is leased to a cattle operation but if successful, at least 40ha can be converted to avocados in the first commercial stage.

Mr Bosanac has a small number of three-year-old trees on the property, including Hass, Shepard and unknown varieties all planted from seed "just to see if they'd grow".

"One of my neighbours said avocados wouldn't grow up here, so I decided to give it a go and prove him wrong," he said cheerfully.

Mr Bosanac's trial plot was significantly boosted over Christmas and there are now 90 Hass, 150 Wurtz, 20 Reed, 20 Shepard, 20 Maluma, 20 Carmen, 20 Fuerte, 20 Edranol and 20 Sharwil in the ground. He's waiting on a further order of 100 Hass and 30 Linda, to take the trial to 10 different varieties.

The mixed variety three-year-old trees planted from seed have had fruit for the first time this year, and the Wurtz trees that have been in the ground for nine months are looking



Planting underway at the trial plot on Mathew and Amanda Bosanac's property at Berry Springs, south of Darwin.



healthy.

"There's been a lot of trial and error on our way and we did lose some of the early trees because of over-fertilisation but I found the information from the Queensland Department of Agriculture and Fisheries and the Best Practice Resource to be really useful," Mr Bosanac said.

"I've also had a lot of support and advice from Daniel Honzatko at D&G Nurseries in Queensland which has been very beneficial."

During these initial stages, the Bosanacs have also been on the front foot to prevent pests and diseases.

"We've seen no Phytophthora Root Rot yet, but I've been proactive to prevent an issue we definitely have up here – white ants and termites," Mr Bosanac said.

"You only have to look over my fence to see the giant ant mounds so every tree I've planted has been treated."

The Berry Springs property has black topsoil, a band of rocky/sandy soil and then clay about 1.5-2 metres down. The avocado trees have been planted into mounds up to 700mm high and the new plantings will be mulched after the Wet season.

"Mulching does wonders up here," Mr Bosanac said.

The property receives 1.5-3 metres of rain annually, mainly in the January-March period of the main Wet season. The property dam is filled during the Wet and this is used for irrigation during the rest of the year, the supply supplemented by underground bores if necessary.

Mr Bosanac already has an eye to the future, planning not only to attend interstate avocado field days and workshops when he can but also checking into local marketing and packing expertise, mainly in the local mango industry.

"We're a bit of a way from that yet as one of the things I'm hoping this trial delivers is a variety that performs well in our harsh Northern Territory conditions that can also be harvested outside of our Wet season," he said.

"We really want to avoid picking and transporting in the Wet; from February to March the top of our property is inaccessible due to water and while we can put in infrastructure to overcome that, we would still need to be able to get the crop off the property and to the market."

Acknowledgements

All images: *Amanda Bosanac*



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What consumers are looking for in food

Changes in lifestyle patterns have influenced the food product attributes welcomed by consumers. *Freshlogic Managing Director* Martin Kneebone profiles the underlying consumer attitudes that now affect food buying and what that means for food producers.

Consumers have a range of attitudes towards food, and the strength of these attitudes change over time and vary across household segments. Indications are that consumers are becoming more informed and involved in their food and that this is affecting their expectations.

Freshlogic evaluates and tracks consumer behaviour using unique research tools, including the Mealpulse™ food consumer panel, which delves into prevailing attitudes and values and how they influence the behaviour of today's fresh food consumers.

Wellness is an everyday aim

Consumers are now viewing food as their wellness platform and are eating to feel good and improve their health. Almost one third of Mealpulse™ panellists have made changes in their food buying purchases to enable positive health considerations. In the year ending June 2017, the proportion of panellists trying to eat more fruit and vegetables increased to 40%, while those trying to eat calcium-rich foods grew to 38%. Panellists appear to be managing their health considerations through positive lifestyle changes, with 31% reporting that a low-fat diet is their

way of life.

This awareness has been fuelled by the increasing reach of social media, where content on wellness ranks highly and encouraging others to improve the quality and state of their health is a positive way to grow readership. This increased activity from bloggers and social commentators has amplified the profile of food properties and their potential impact on overall health and wellbeing.

There is scope for food producers and marketers to become involved with social media, and to work with social influencers to impact attitudes and ultimately behaviour. Products that positively and clearly communicate their benefits for longer-term, improved health are clearly welcomed.

The wellness priority is also reflected in that almost half of Mealpulse™ panellists actively seek to buy additive-free food. This clean label trend has boosted investment into ingredient research and development, presenting an opportunity for vegetable growers. Labels and marketing material are being redesigned to improve transparency and ultimately gain consumer trust.

Where my food comes from

Consumers continue to be more interested in understanding the story behind their food. This invites a well-told provenance story around a product to inform consumers and also establish a connection to the producer and their produce.

Mealpulse™ panellists indicated a willingness to pay more for 'local' (42%), 'free-range' (35%) and 'organic' (23%) attributes. 'Local' has been elevated by consumers over product system attributes, likely to be due to differing value propositions.

With the recent growth of culinary tourism, the interpretation of 'local' has expanded to place a greater emphasis on 'location'. This allows for the positive reputation of a production region to be leveraged, and higher value captured. There is scope for a well-told regional provenance story, often supported by tourist investment, to complement 'local' claims and reach more consumers.

Reducing home waste

Concern about origin is evolving to include concern regarding sustainability and waste minimisation, as these factors also contribute to feeling good about food. Consumers typically view waste as irresponsible, and it is influencing how they shop. Almost 70% of Mealpulse™ panellists would buy a smaller portion to avoid throwing food out. At 81%, empty nesters are the household segment



most averse to waste.

Reducing waste can present challenges to the traditional growth model, as consumers who effectively manage waste may ultimately require less product volume. However, the popularity of 'ugly' produce indicates that there may be opportunities to increase yields through the sale of products previously considered unacceptable. Additionally, aversion to waste appears to be strengthening demand for smaller portions, which typically generate higher values. Likewise, waste concerns also support demand for recipe kit meals, where quantities provided are carefully matched to requirements and waste is all but eliminated.

Make fresh easier

Australians are increasingly working non-conventional hours, which has created pressure on the time available to shop and prepare meals. Households now typically shop 3-4 times per week, favouring smaller and faster 'top-up' shops. As a result, consumers now have shorter meal planning horizons, with many decisions made on the shopping trip in the hours before the meal.

Despite time pressures, consumers continue to express interest in cooking and experimenting with food. More than 50%

of Mealpulse™ panellists love to cook while the interest in new food ideas and recipes is applicable across all household segments, but strongest among families.

Consumers are welcoming of products that are close to the consumption form, either through minimal processing such as washing, peeling and cutting or ready prepared meals. These products save preparation time, allow for immediate meal preferences and variety, while reducing waste through portion control. This demand is clearly reflected in the 11% growth of Mealpulse™ panellists buying more fresh and chilled foods than they used to over five years.

These changing attitudes result in far more opportunities than challenges, especially for vegetable growers who are acknowledged as credible producers of food that is the essence of healthy eating.

Acknowledgement

This article was provided by AUSVEG and prepared by FreshLogic. The Economist Sub-Program has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government. Project Number: VG15027.

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Registrations open for Hort Connections 2018

The Hort Connections conference and trade show will be held at the Brisbane Convention Centre on 18-20 June 2018. The event caters to buyers and sellers from every segment of the fresh produce and floral supply chain including seed companies, growers, packers, processors, shippers, importers and exporters, wholesalers and retailers, foodservice, associated suppliers to the industry, and many more. If you would like to speak at Hort Connections 2018, the deadline for applications is 2 March 2018. Attendee earlybird registrations close on 28 February 2018. More information: <http://hortconnections.com.au/>

Hort Innovation avocado annual report

The Hort Innovation Avocado Fund 2016/17 Annual Report has been released. During the period, more than \$2.68 million was invested into R&D for the avocado industry, including a range of new projects. You can find the report online at: <https://horticulture.com.au/grower-focus/avocado/>

2018 APEN Extension Skills Mentoring Scheme

Have you ever considered being a mentor or being mentored? Perhaps 2018 is the year to give it a go through the 2018 APEN Extension Skills Mentoring Scheme. There is information on the website at www.apen.org.au/mentoring and links to the information booklet and registration for either a mentor or a mentee at the bottom of the page. Please get your registration in by 16 February. The pairing will be done by mid-March. The scheme will commence with an introductory web-conference in late March or early April. Contact Jeanette Gellard, the facilitator at jeanette@innovativeinfluences.com.au or Roe at info@apen.org.au or 02 6024 5349.

John Lloyd to retire from Hort Innovation

Hort Innovation chief executive John Lloyd will set down from his role with the national research and development body in the second half of 2018.

Mr Lloyd joined Horticulture Australia Limited (HAL) as CEO in 2009, and led it through a challenging yet successful transition to Hort Innovation in 2014. He has also been the principal driver behind the development of the new company's innovative funding models.

Under his leadership, Hort Innovation has also grown significantly as a business and delivered substantial economic, social and environmental benefits to Australia through its research and development and marketing activities.

After a decade of leadership in the horticultural industry, Mr Lloyd said he will move on to pursue new opportunities in the

latter part of 2018.

"For the last eight and half years, it's been my privilege to lead the Research and Development Corporation for horticulture in Australia. This industry is one of which industry participants can be proud," he said.

"Everything we do in horticulture allows people to live happier, healthier, longer and more productive lives – this has been reflected in the tremendous growth of the sector over the past 10 years.

"It's been an honour to work with the wonderful variety of industries, the quality of leadership, and the professionalism of the employees inside Hort Innovation, and across Australian horticulture more broadly."

Mr Lloyd would support the Board during the succession process and would continue to provide leadership continuity through this period.

Hort Innovation Chairman Selwyn Snell said there is a lot the organisation wanted to achieve in the coming year."

"With the contribution of an experienced management team and talented and dedicated people, we look forward to the journey ahead," Mr Snell said.

"The Board recognises the significant contribution that John has made and thanks him for his excellent management and leadership."



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Mapping Australia's orchards

For the first time, Australia's avocado, macadamia and mango orchards have been mapped. The map delivers new foundation information for industry in an easily accessible online web map for improved decision-making, biosecurity and natural disaster response, recovery and monitoring.

A collaborative team from four universities, government agencies, industry partners, grower groups and commercial providers have developed a new interactive web map of horticulture tree crops across Australia.

Launched by the Assistant Minister for Agriculture and Water Resources, Senator Anne Rushton, the Australian Tree Crop Rapid Response Map provides stakeholders and growers from the avocado, macadamia and mango industries the first opportunity to see the location and area of commercial (>2 hectares) avocado, macadamia and mango orchards across Australia.

The mapping is accessible from any desktop or mobile device web browser and does not require a user account or subscription. It uses coloured polygons to identify horticulture tree crops (avocados, macadamias and mangoes) on the base satellite imagery. It was formulated using satellite imagery together with industry and government data, regional surveys and on-ground validation.

The mapping will be used by industry to develop a better understanding of changes in growing areas, grower demographics, cultivars used and regional variations in production and quality. The information supports improved marketing and decision-making, and informs improved biosecurity and pre and post natural disaster planning, response and monitoring.

For example, in the event of a pest or disease outbreak industry groups can access the map and know exactly where surrounding crops are and quickly develop management strategies for

Geography of avocados in Australia

- Most northern orchard: Daintree, Queensland (-16.373 145.330)
- Most southern orchard: Gawler, Tasmania (-41.187 146.131)
- Most eastern orchard: Cudgen, New South Wales (-28.267 153.552)
- Most western orchard: Carnarvon, Western Australia (-24.846 113.683)
- Highest orchard (elevation): Evelyn, Queensland, 1,080m (-17.499 145.468)
- Lowest orchard (elevation): Telegraph Point, New South Wales, 2m (-31.324 152.776)
- Largest single feature: Childers, Queensland, 314 hectares (-25.221 152.305)

A unique whole industry view. This new map allows growers to help safeguard the future of their industries by pin-pointing where farms are. For example, it provides important contextual information for growers, industry bodies and relevant agencies involved in biosecurity planning and response.

It provides valuable input to natural disaster recovery. By overlaying storm track or tropical cyclone trajectory information onto the map, relevant authorities and industry bodies can quickly identify which farms were affected post event.

A brave future for emerging Australian crop monitoring technology. A host more work is underway as part of this project including using robots to monitor and measure orchards, employing new technology, including drones, to help identify disease through heat stress sensing, and deriving yield maps from satellite imagery.

The best use of the map will be your idea! The full value of this information can be realised when it's combined with other spatial data—for example soils, climate, market, etc. This information can 'spatially' inform decision making and form the basis of industry scale business cases.

Cross-sector collaboration is the key. The success of this map shows what can be achieved when growers, industry, academia, commercial organisations and government agencies work together.

containment. The product can also be used following natural disasters like floods and cyclones and speed up applications for recovery assistance. In fact, the map has already proven useful following the devastating Tropical Cyclone Debbie which crossed the Queensland coast in March 2017.

The map is also presented in an interactive web app that summarises the area (hectares) of each commodity within the map extent. Panning and zooming the map extent will update the statistics on-the-fly. Users can also search for a place of interest, and optionally switch the background display to see other basemaps (for example streets or topography).



Summary Statistics

Orchards in Australia by State/Territory (Hectares)

Note: total orchard areas currently include non-orchard areas such as roads, infrastructure and amenities

State/Territory	Avocado	Macadamia	Mango
NSW	1,642	14,872	273
NT	0	0	7,264
QLD	9,044	13,243	9,980
SA	177	0	0
TAS	4	0	0
VIC	555	0	0
WA	1,714	62	1,288
Total	13,136	28,178	18,806

Search www.arcgis.com for "Australian Tree Crop Rapid Response Map".

Rapid response tool to protect orchards

More than 60,000 hectares of the nation's orchards stand to benefit from increased biosecurity and disaster response times after the release of the Australian Tree Crop Rapid Response Map in November 2017.

The map shows commercial avocado, mango and macadamia crops around the country, and has been formulated using satellite imagery analysed by scientists; land-use information from industry and government, as well as 'citizen science' data collected via a purpose-built app.

Hort Innovation chief executive John Lloyd said more than 12 months gathering data had paid off for avocado, mango and macadamia growers who had called for increased technology on-farm to protect crops and boost efficiency.

"By conveying where avocado, macadamia and mango crops are across the country, the Australian Tree Crops Rapid Response Map will help industry bodies and government agencies instantly plan quarantine areas following any disease incursions," he said.

"And when overlaid with weather maps, as we saw in 2017 with Cyclone Debbie in Queensland, responders, and even insurance companies, can quickly and easily identify which farms have been impacted by severe weather events."

Mr Lloyd said this work also has the potential to be extended to other crop types into the future, supporting growers through

Australia's National Tree Project

The Web Map is the first component of Australia's *National Tree Project*, an ambitious project that combines innovative technologies such as satellite mapping, laser scanning and on-ground robotics with citizen science apps to deliver improved industry information and methods of monitoring tree health, productivity and quality.

Acknowledgement

The National Tree Project is funded through the Australian Government's Rural Research and Development for Profit program, managed by Hort Innovation and coordinated by the University of New England. The success of the project can be attributed to the multi-disciplinary team from industry, research/academia and government, including The University of Queensland, University of Sydney, Central Queensland University, Agtrix Pty Ltd, the Queensland Department of Agriculture and Fisheries, Queensland Department of Science, Information Technology and Innovation, Simpson Farms Pty Ltd, Avocados Australia, Australian Macadamia Society and Australian Mango Industry Association.

faster damage assessments, aid decisions and disease control plans. The technology also provides a glimpse into a future where growers could potentially quickly identify areas of their crops that are less healthy than others, indicating pollination, nutrient or soil health issues for example.

The Australian Tree Crops Rapid Response Map is supplied by the Queensland Department of Science, Information Technology and Innovation, working with the University of Queensland.

The Map is one tool from a broader \$6.8 million project that is supported by Hort Innovation, through funding from the Australian Government Department of Agriculture and Water Resources as part of its Rural R&D for Profit programme, and led by the University of New England (UNE).

Various studies are taking place around the country as part of the larger project – from the University of Sydney using robots to identify certain types of produce to the UNE employing technology, including drones, to help identify disease through heat sensing.

More information

See a video of the map in action: vimeo.com/243031888

Access the map: <https://goo.gl/RnmvN8>

Understanding yield and fruit size variability using satellite imagery

Andrew Robson, Muhammad Moshir Rahman and Jasmine Muir

In the absence of a commercial yield monitor, high resolution satellite imagery and the targeted ground sampling of a few selective trees may serve as an accurate surrogate for mapping yield and fruit size variability in Australian avocado orchards.

An added benefit of this method is that these variability maps can be derived weeks before actual commercial harvest.

The results from this three-year study into the use of satellite remote sensing indicates that high-resolution multispectral satellite imagery coupled with targeted field sampling can be used to accurately determine the spatial variability of yield (kg/tree) and average fruit size (g) per tree across an avocado orchard. Although growing season and location did influence the relationship between canopy reflectance properties (vegetation indices) with total fruit yield (kg/tree) and fruit size (g) per tree, highly accurate results could be achieved if only 18 trees per orchard were used as calibration points. This result offers a number of benefits to avocado growers. An understanding of fruit size variability allows growers to selectively harvest regions of an orchard in response to market demand as opposed to the current method of selectively harvesting every orchard row. This offers efficiencies in time, fuel costs and labour.

In terms of yield, the prediction of average crop yield from the satellite imagery and targeted field sampling method far exceeded those derived from the commercially adopted 'eyeball' method of yield estimation. A more accurate method of yield forecasting allows growers to better manage harvesting requirements ie labour, storage, packing, as well as identify the volume of fruit available for forward selling.

Current estimation methods

Accurate pre-harvest yield estimation in avocado offers improved decision making from the grower to the industry level. For individual orchards, a strong understanding of yield variability allows growers to form improved decisions regarding the variable rate application of inputs (water, fertiliser, pesticides) and the logistical planning of field operations (eg, harvest scheduling, number of pickers and bins required, etc.)

Currently, yield estimation in avocado orchards is undertaken by the visual counting of fruit growing on a small number of selected trees. However, this method possesses several disadvantages:

1. poor accuracy as the avocado fruit is often occluded by leaves that are the same colour and shape
2. time consuming and labour intensive, with many man hours required to undertake the counts on selected trees
3. limited sample size, with the trees selected not accurately

representing the high spatial and temporal variability of an entire orchard block.

Other options such as crop simulation models and digital imaging or machine-vision techniques have also been investigated for yield estimation.

Satellite and aerial remote sensing

Satellite remote sensing platforms, and potentially unmanned aerial vehicles (UAVs), present an accurate and time efficient alternative to the manual fruit count method as well as for the non-invasive measure of avocado yield. Whilst these technologies have been found to be highly effective for measuring yield in row crops, generally attributed to the size and health of a plant and therefore its ability to set yield, similar studies in perennial fruit tree crops, such as citrus, apple, pear, peach, mango, have produced varying levels of success. For avocado, there has only been limited remote sensing research investigating fruit size and yield mapping.

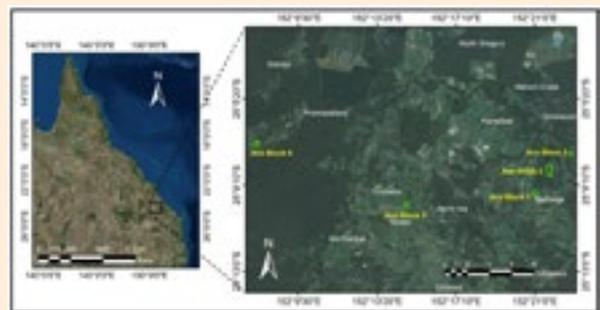


Figure 1: location of the five avocado orchards in Bundaberg, Queensland (green polygons).

In the field: Bundaberg, Queensland

This study evaluated the accuracies of high resolution WorldView (WV) 2 and 3 satellite imagery and targeted field sampling for the pre-harvest prediction of total fruit weight (kg/tree) and average fruit size (g) and for mapping the spatial distribution of these yield parameters across the orchard block. WV2 satellite imagery was acquired over two avocado orchards during 2014, and WV3 imagery was acquired in 2016 and 2017 over these same two orchards plus an additional three orchards. Sample trees were selected from each orchard representing high, medium and low vigour zones and sampled for total fruit weight (kg/tree) and average fruit size (g) per tree. Tree vigour (size, health, canopy density) was determined by the amount of solar energy reflected (near infrared region) and absorbed (visible region) by each canopy, the ratio of which is termed as the normalised difference vegetation index (NDVI).

For each sample tree canopy, the eight spectral band reflectance data was extracted from the multispectral WV imagery and 18 vegetation indices (VIs) derived. A number of statistical methods were employed, including Principal Component Analysis (PCA) and non-linear regression analysis to determine which VI was better correlated to the measured total fruit weight and average fruit size.

For all trees measured over the three-year period (2014, 2016, and 2017) a consistent positive relationship was identified between fruit weight (kg/tree) and average fruit size (g), measured within the near infrared band and the red edge band (VI RENDVI1). The separate analysis of each orchard block individually produced stronger correlations between the RENDVI1 and the measured parameters.

This suggests orchard location and growing season were influencing the relationship of spectral reflectance to total fruit weight and average fruit size. Classified maps of avocado yield (kg/tree) and average fruit size per tree (g) were produced using the relationships developed for each orchard block.

Using the relationships derived between the measured yield parameters and the optimal VIs, total fruit yield (kg) was calculated for each of the five sampled blocks for the 2016 and 2017 seasons and compared to actual yield at time of harvest and pre-season grower estimates.

Yields vs predictions

Prediction accuracies achieved for each block far exceeded those provided by the grower estimates.

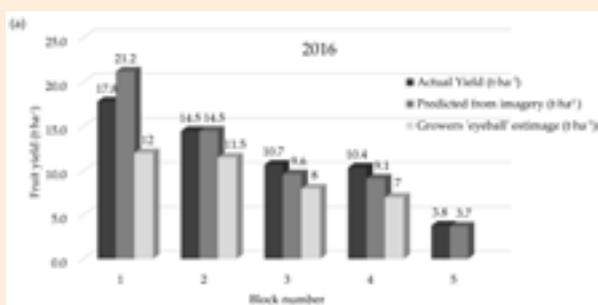
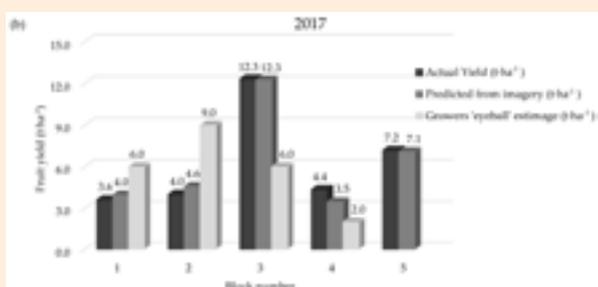


Figure 2: Comparison between the actual yield (t/ha) to that predicted from satellite imagery and that made by visual assessment from growers in (a) 2016 and (b) 2017. Note that no growers estimate was supplied for Block 5.



Estimations of total fruit weight (t/ha) per block were compared against actual commercially harvested yield as well as to grower 'eye ball' estimates (Figure 2). The results demonstrate that for all blocks the predicted yield derived from the remotely sensed imagery calibrated with the sampling of strategically located trees, was much closer to actual yield than that provided by the growers 'eye ball' estimate. The average estimation accuracy for all 10 blocks was 98.2% in 2016 and 99.5% in 2017.

Fruit yield and fruit size potential

The results from this study indicate the potential of high resolution imagery for accurately mapping fruit yield (kg/tree) and average fruit size (g) across multiple avocado orchards and seasons in the Bundaberg region of Queensland, Australia. However, the results suggest that a single 'generic' algorithm is not suitable, and that a site specific algorithm (ie, for each block) is needed to estimate the yield parameters at the individual block level, a result that is consistent with those presented for apple and pear crops. It is likely that climatic factors based on location as well as other factors such as tree age, orchard management (pruning, irrigation and fertiliser or mulch use), soil type, and pollinators are influencing the yield achieved for each block as well as the relationship between canopy reflectance and yield. Furthermore, the relationships between yield and VIs are different for each growing season for each block. This shows the importance of using targeted field sampling during each growing season to calibrate the relationship between yield and the VIs derived from the satellite imagery.

Acknowledgement

The authors of this paper would like to acknowledge the Australian Government-funded Rural Research and Development for ProFit Scheme and Hort Innovation for funding this research, as well as Avocados Australia for their support. Also, Chad Simpson (Simpson Farms), David Depaoli (Auschilli), and Tom Redfern (Bundaberg region) and Ben Schaefer (Renmark Region) for their collaboration with this research. Derek Schneider, Lucinda Frizell, Ashley Saint, Bryony Wilcox and Oliver Robson (University of New England) and Jonathon Smith (Department of Agriculture and Fisheries Queensland) for assistance with in-field sampling.

The initiative, led by the University of New England's Precision Agricultural Research Group (PARG) is a large collaborative effort that includes an impressive team of researchers, industry partners, grower groups and commercial providers, more specifically: University of New England, The University of Queensland, University of Sydney, Central Queensland University, Agtrix Pty Ltd, the Queensland Department of Agriculture and Fisheries (DAF), Queensland Department of Science, Information Technology and Innovation, Simpson Farms Pty Ltd, Avocados Australia, Australian Macadamia Society and Australian Mango Industry Association.

More information

The full research article, including all references, is available

Avocado industry veteran retires

After a 21-year association with the Australian avocado industry, horticulturalist Peter Rigden has retired. He shares some final thoughts on the industry and its bright future with *Talking Avocados*.

How long have you been involved with the avocado industry and in what capacities?

I am pleased to say I have been involved with the avocado industry since I began my career with the Queensland Department of Agriculture and Fisheries (DAF) in 1997. In those days (and since) I was responsible for answering the tree crop horticultural enquiries that the Department received, many of which were from people seeking to enter the avocado industry and others from growers already in the industry seeking help.

In more specific avocado work, my partnership with Simon Newett in the Avocado Study Group projects began in 2006 and I have continued to collaborate with Simon on projects that he has led since then up until the last workshop of the current project, which was earlier this month. I have been very fortunate to work with Simon whose leadership, depth of knowledge on all things avocado and dedication is legendary.

What prompted you to work with the avocado industry? What do you enjoy the most about it?

The opportunity to work with the avocado industry really arose through sharing an office with Simon and collaborating with him on an earlier passionfruit industry information project. Simon's offer to include me in his avocado project back in 2006 and through that becoming more involved with such an important industry was a great opportunity and I am pleased I took it.

What industries were you involved with before avocados, and what have been the key difference?

Before moving to Queensland, I was working in Papua New Guinea as a plantation manager on a 5,500 hectare oil palm and cocoa project in New Ireland and I had been working in tropical plantation management for the previous 16 years. Whilst my experience working with cocoa, a tree crop with the usual range of pest, diseases, canopy management and nutrition issues, provided a good foundation, I must say that I was on a learning curve when, on joining DAF, I started working with crops like avocado, stonefruit, citrus, mango, custard apple and macadamia.



Peter Rigden

What makes your work with the avocado industry unique?

I believe that the Small Tree High Productivity Initiative work that I have been involved with for the last three years in a communications role, has an important place in the future of the avocado and other tree crop industries. Improving productivity and reducing costs by growing compact easy to harvest trees has to have a place in the future of the industry. Whilst work has, and continues to be done, in high density avocado growing systems in other countries, I believe it is important to research such systems in Australian growing conditions. (You can read the latest on the Small Tree project on page 65.)

In a more general sense I am fortunate to have worked in an era when an extension officer's ability to provide growers with information has been facilitated so massively through the development of the internet, allowing me to be involved with the development of Avocados Australia's Best Practice Resource website and videos tailored to the industry needs. Whilst there are still many unique benefits from face to face interaction, these tools have made it much easier to make up-to-date information available to growers than in the old days of sending out newsletters and farm notes on different topics, which were still a feature of an extension officer's life when I began work with the DAF!

During your time in the industry, what project do you believe has delivered the most value to the industry and why?

The two growers study group workshop projects that I have been involved with are probably the ones that have delivered the most. They have been challenging but rewarding. I feel they have contributed enormously to keeping growers alert to improvements in practice change and research developments. I don't think this could have been achieved effectively without the personal interaction of growers with leading researchers, consultants and other growers that happened in these study group meetings.

What's been the biggest change you've seen during your time with the industry?

The scale of the industry both overall and at an individual grower level has changed dramatically. In the early days of my involvement with avocados there were a lot of small 5-20

hectare orchards, especially in the Sunshine Coast region of Queensland. Since then the expansion of the avocado industry in other production areas where large scale orchards have been developed has been phenomenal. Also, the establishment of a number of packing and marketing groups has been a major change for the better; I think this is perhaps one of the key factors leading to a significant improvement in the quality of fruit that is marketed now compared to 15 years ago. But I am still making the odd disappointing purchase of anthracnose and stem end rot affected fruit – so there is still work to do!

What do you see as being the biggest opportunity for the industry in the next five, 10 or 20 years?

It would have to be the development of exports. Whilst I believe there is room for a further increase in domestic consumption, a thriving export market is going to be essential in the medium and long term to maintain returns for all growers, both exporters and non-exporters.

What's the best advice you would give to someone who has just entered the avocado industry in an extension/research capacity?

Pretty simple really, it is all about getting to know the growers and what their successes have been and what their challenges are. Also develop your relationships with the researchers and the consultants who service the industry.

What's next for Peter Rigden?

I am looking forward to spending a few months each year in the Solomon Islands where my wife is from. We have a house in the village where she is from, on an island called Ulawa. We have been there several times over the last three years and I look forward to staying there longer in future – no telephone, no TV, no cars, no traffic and being just 50 metres from the sea where I enjoy snorkelling and swimming on the reef. Other than that, I have had a lifelong interest in aircraft, so I am joining the Caloundra Air Museum and intend to volunteer there. Astronomy and birdwatching are other interests I would like to pursue. So hopefully life will continue to be busy and interesting.

I would like to close by wishing all growers and everyone associated with the industry, who I have met and worked with over the years, happiness and health for the future.

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Does silicon amendment benefit avocado tree health or fruit quality?

Liz Dann and project collaborators

We are aware that growers have been applying various forms of “silicon” to trees in their orchards for many years, and the benefits of silicon applications in many other crops is well known. However, reports of effects in avocado or other tree crops are limited.

Preliminary research by our group suggested that injection of avocado trees with soluble potassium silicate (Si) eight, 12 or 28 weeks prior to harvest may reduce fruit anthracnose severity by 40-80% (Anderson et al 2004, 2005).

However, orchard sprays at intervals of approximately six weeks throughout fruit development were not effective at reducing post-harvest disease or improving marketability of Hass avocado fruit, compared with industry standard fungicide applications (Smith et al 2011). Other groups in South Africa and New Zealand applied Si as a soil drench to mature orchard trees, with some indications of improved root growth, yields and tree health, but effects were inconsistent (Bekker et al 2007, 2014; Dixon et al 2008).

Hort Innovation funded a non-levy project from 2014-2016, with voluntary contributions from PQ Australia Pty Ltd (manufacturers of Agsil®32, a soluble potassium silicate product with high available Si), to further evaluate effects of Agsil®32 in avocado orchards. Further field and glasshouse trials in 2016-2017 were funded by Shiftwaste Pty Ltd, to assess effects of Mineral Mulch, a soil amendment product derived from building board waste with approximately 5% available Si (see *Talking Avocados*, Spring 2016). The full results have been published (Dann and Le, 2017), and this article provides a brief summary of key outcomes from orchard trials.

AgSil®32 orchard trials

AgSil®32 is a soluble potassium silicate product from PQ Australia, and contains 32% w/w SiO₂ and 21% w/w K₂O. Agsil was applied as a drench (300mL per tree delivered in 20L water) 2-3 times per year coinciding with active root flushes, at three orchards. At a fourth orchard Agsil was applied as a drench, spray (50mL Agsil per tree delivered in 5L water) and injection (approximately 1mL Agsil per tree delivered in 5 x 20mL injections). Tree canopy health was determined at each site visit by visual assessment according to a widely-used 0 – 10 rating scale (Darvas et al 1984). Other assessments for some sites included yields, postharvest disease and commercial packout analyses.

Site 1, Childers (Central Queensland)

The entire orchard had been treated with a low dose of potassium silicate on a monthly basis by fertigation, with additional drench treatments of 300mL Agsil per tree applied to declining trees. Tree health generally improved in two years across all 34 trees in the trial (Figure 1), however, there were no significant effects at any time on tree health of Agsil drench applications compared with trees which did not receive the drench. Average yields in May 2015 were 68 and 80 kg/tree, respectively, for Agsil drench and non-drenched trees. Single bins of fruit from each treatment were run through a commercial packing shed. There were small increases in the percentage of fruit in premium grade and total percentage packouts from the Agsil drench treated trees, however, there was a 40% increase in 2nd grade fruit (and decrease in 3rd grade fruit) from Agsil-drenched trees compared with non-drenched trees (Table 1). There was no pepper spot in downgraded fruit from Agsil treated trees.

Table 1. Packout data collected May 2015 from Agsil amendment trial (Site 1, Childers)

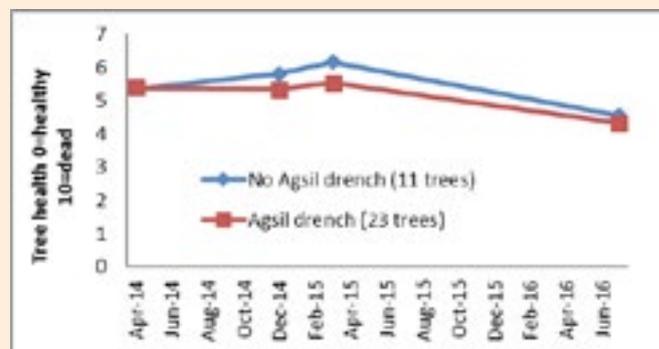


Figure 1. Tree health and yield data for 2014-2016 from Agsil amendment trial (Site 1, Childers). Tree health is rated on a scale where 0=healthy and 10=dead

	% packout by fruit grade			
	Premium	AustAvo	Generic	Total
No Agsil Drench	50.3	21.1	26.2	97.6
Agsil Drench	51.3	36.5	10.8	98.6

AustAvo=2nd grade, and Generic=3rd grade fruit

No Agsil drench - downgrades due to limb rub (70%), sunburn (20%), insect chew (5%) and pepper spot (5%)

Agsil drench - downgrades due to limb rub (45%), hail (35%), sunburn (20%) and insect chew (5%)

Site 2, Goodwood (Central Queensland)

This trial was established on an orchard with no history of potassium silicate treatment. Agsil was applied as a soil drench to one row (25 trees) in a block of relatively “healthy” trees, and to a row (30 trees) within a block of “sick” declining trees. Rows either side were assessed as the untreated controls. Agsil did not consistently improve tree health compared with untreated trees at any assessment time. However, tree yields from Agsil drenched trees were 74 and 47 kg/tree for healthy and sick blocks, respectively, compared with 65 and 34 kg/tree for corresponding untreated controls, representing 13% and 39% higher yields for Agsil trees.

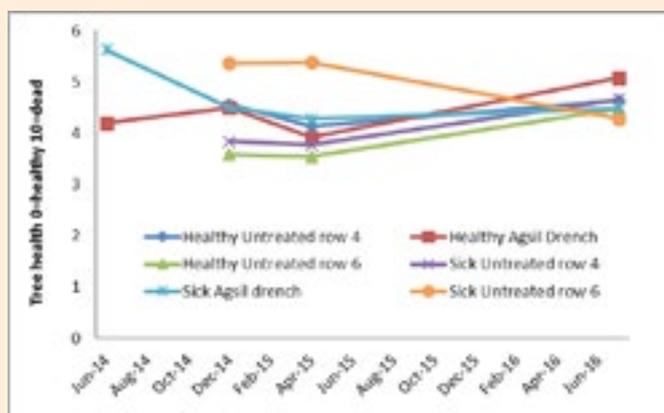


Figure 2. Tree health and yield data for 2014-2016 from Agsil amendment trial (Site 2, Goodwood)

Site 3, Comboyne (Central New South Wales)

This trial was established on an orchard with no history of potassium silicate amendment. Agsil was applied to selected trees in mid-decline from August 2014 to June 2016. Some trees in advanced stages of decline were either pruned heavily or staghorned in March 2015.

Health of all trees improved during the course of the trial, and there was no significant difference in tree health between Agsil treated or untreated trees (Figure 3). However, in August 2016, estimated yield was 14% higher for the Agsil drenched trees (55kg/tree), compared with untreated (48kg/tree). Packout rates were obtained from one bin of fruit from each treatment. While the percentage of fruit in the Premium grade was similar for fruit from the two treatments, there were more fruit in A Grade from Agsil treated trees than from untreated controls. Library trays held for defect analyses showed that there was less pepper spot (4%) in fruit from Agsil treated trees and no anthracnose compared with 8% pepper spot and 3% anthracnose in fruit from untreated control trees (Table 2). The

net return, estimated based on prices received at the time of packing, was \$2.63 and \$3.20/kg for fruit from untreated and Agsil treated trees, respectively, representing a 20% increase in net return for fruit from Agsil trees. The regrowth in pruned or staghorned Agsil treated trees, seemed to be stronger and healthier than that in untreated trees (Figure 4), although we have no data to support this observation.

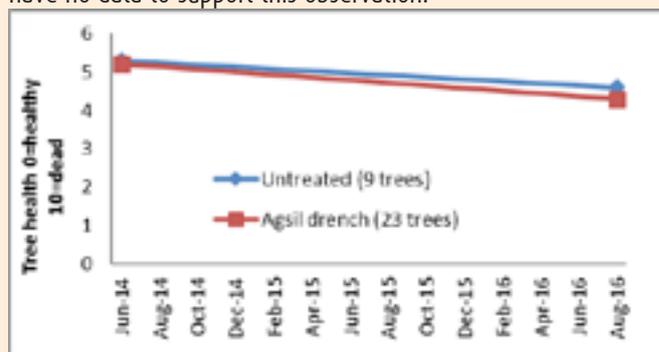


Figure 3. Tree health data for 2014 and 2016 and estimated yield 2016 from Agsil amendment trial (Site 3, Comboyne)

Table 2. Packout data collected August 2016 from Agsil amendment trial (Site 3, Comboyne)

	% packout by fruit grade			
	Premium	A Grade	Class 1	Processing
Untreated	56.5	27.8	13.2	2.5
Agsil Drench	55.6	32.6	9.4	2.3

A Grade=2nd grade, Class 1=3rd grade fruit, Processing=defect

Untreated – downgrades due to caterpillar (16%), hail (13%), wind rub (19%), sunburn (22%), pepper spot (8%) and anthracnose (3%).

Agsil drench – downgrades due to caterpillar (18%), hail (21%), wind rub (22%), sunburn (24%), and pepper spot (4%). No anthracnose.



Figure 4. Regrowth in pruned Agsil-treated trees was prolific and healthy (Site 3 Comboyne)

Site 4, Beechmont (South Queensland)

This trial site was established on an orchard with no history of potassium silicate treatment, and a section of trees in mid-decline was selected. Canopy health was not significantly affected by Agsil treatment. Trees sprayed with Agsil had improved health over 2015 and the first half of 2016, however, by the end of the trial had similar tree health scores to those in all other treatments (Figure 5). There were no significant differences in severity or incidence of postharvest anthracnose among treatments when fruit were assessed for quality in 2015 or 2016. In 2015, Agsil spray or drench significantly reduced severity of severe stem end rot (SER) compared with those from injected trees (Table 3), and all Agsil treatments reduced SER severity, (although not significantly) in 2016 compared with controls (data not shown). The reduction in SER resulted in a greater proportion of marketable fruit.

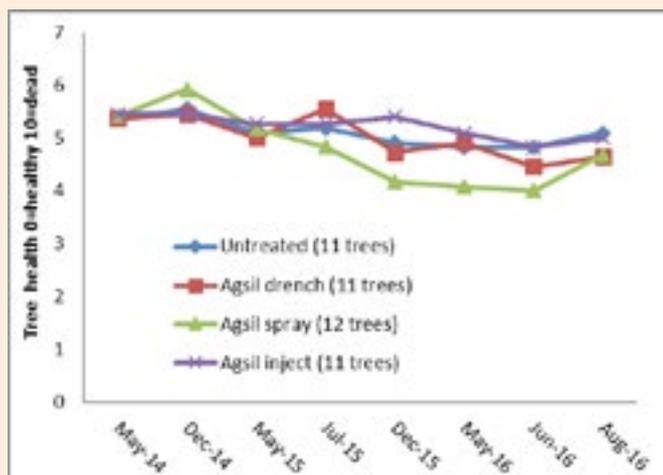


Figure 5. Tree health trend for 2014-2016 from Agsil amendment trial (Site 4, Beechmont)

Mineral Mulch orchard trials

Preliminary trials were conducted at Kumbia, Childers and Goodwood. Mineral mulch was applied in July 2016 at approximately 250g/m² of canopy area (ie calculated according to tree size) and broadcast by hand around sprinkler zones (Figure 6). At Kumbia, eight individual declining trees amongst four rows were selected for each Mineral Mulch and untreated controls, and trees varied in ages and heights from replants to five-year-old trees. At Goodwood and Childers, Mineral Mulch was applied to 10 consecutive trees in a single row, in blocks



Figure 6. Mineral Mulch spread under trees at the Goodwood site, July 2017

with uniform decline. Trees in rows either side were evaluated as appropriate untreated controls. Tree health was assessed 10 months later in May 2017.

At Kumbia, all trees improved in health irrespective of treatment, and there was no significant difference in canopy health between treatments (data not shown). At the Goodwood orchard, canopy health at the start of the trial was significantly worse in the trees selected for Mineral Mulch application than those in adjacent rows selected as the untreated controls (Figure 7). However, 10 months after Mineral Mulch application, the tree health had improved considerably, to be the same as that in untreated trees. A similar trend was also observed in the Childers orchard, where the improvement in tree health over time was more rapid for the Mineral Mulch treated trees than untreated controls (Figure 7).

Table 3. Fruit quality data collected from fruit harvested in August 2015 from Agsil amendment trial - Site 4, Beechmont

Treatment	Severity side	Severity stem		Incidence side	Incidence stem	Marketability
Untreated	9.60	6.97	abc	55.9	19.1	51.4
Agsil drench	9.04	3.65	c	45.5	11.4	58.6
Agsil spray	9.03	5.09	bc	41.7	16.3	58.8
Agsil drench no phos	12.77	8.26	ab	52.7	20.0	45.9
Agsil inject	9.79	9.16	a	48.6	20.9	50.5

Means followed by the same letter are not significantly (P<0.05) different

Fruit marketability = less than 5% severity of anthracnose and no stem end rot

Si concentration in leaves and fruit peel was determined for a single bulked sample for each tissue type and treatment at each site. Si concentration in leaves was higher after Mineral Mulch at Childers, and in fruit peel at both sites compared with tissue from untreated trees (Figure 8). This provides strong indication that Si is taken up by roots in mature orchard trees, translocated and deposited in leaves and fruit peel, within a relatively short time frame.

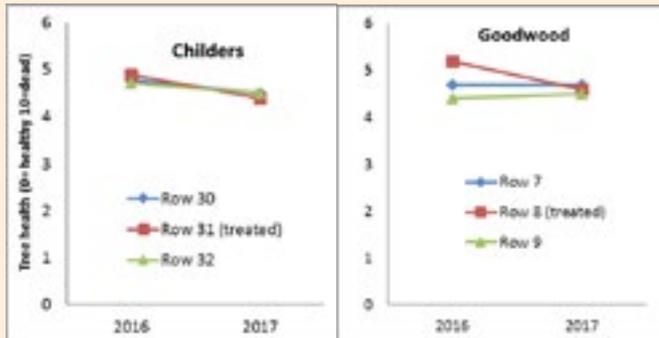


Figure 7. Canopy health of avocado 10 months after Mineral Mulch application to trees at Childers and Goodwood

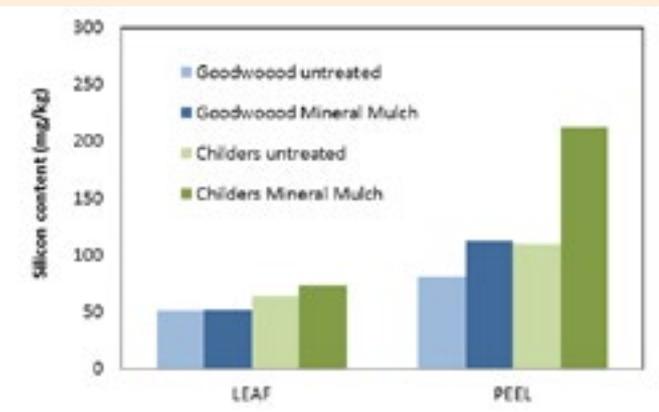


Figure 8. Silicon content in dried avocado leaf and peel tissue 10 months after treatment of avocado trees with Mineral Mulch

Conclusions

- There were indications of positive effects of Agsil and Mineral Mulch on tree health, although effects were largely not significant nor consistent.
- Agsil drench had a beneficial effect on yields and packouts at one site, and grower returns were improved by 20% due to better quality fruit.
- There was a reduction in stem end rot after Agsil treatment in one year, but not the next.
- Mineral Mulch increased silicon content in peel.
- Cost:benefit analyses of Si applications have not been conducted in the current study.
- Further field studies should assess yield, packout, nutrient analyses, soil and tree health and cost:benefit for incorporating Si in management of avocado.

Acknowledgement

Project AV13021 *Exploring alternatives for managing Phytophthora root rot in avocados* was funded by Hort Innovation using contributions from the Australian Government and PQ Australia Pty Ltd. Hort Innovation is the grower owned, not-for-profit research and development corporation for Australian horticulture. Trials with Mineral Mulch were funded by Shiftwaste P/L. Several avocado growers, orchard managers, farm staff and packing sheds collaborated in the field trials and their assistance is greatly appreciated.

More information

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Boosting Australian avocado consumption

Applied Horticultural Research

A retail-oriented research project is demonstrating the potential for significant reduction in bruising and growth in avocado purchase by Australian consumers.

Research to determine how to reduce bruising and wastage at retail, and increase consumption, is delivering on both goals.

The *Retail Point of Purchase Improvements Project* (AV15011) has the goal to reduce the level of damaged avocados at retail to no more than 10% within three years, through:

- retail education and training programs, in consultation with retailers, and
- consumer education tools and merchandising concepts, to assist consumers in the selection process.



Shooting the training video at Trim's Fresh, Penrith

The research

Previous consumer and retail research, undertaken in Australia and internationally, was reviewed, along with consultation with all the major Australian retailers (Woolworths, Coles, Aldi, Metcash/IGA, Costco) and representatives of independent retailers. In-store observations and interviews were undertaken with consumers. In addition, a cross-section of US grower/packer/marketers and retailers were interviewed, to assess options to achieve the goal.

During the consultation process, a range of merchandising and training options were presented to retailers. Ultimately, a combination of four merchandising elements were identified, for testing across a range of retail formats. The four elements include:

- displays sorted based on stages of ripeness
- always having ripe fruit consistently available
- using coloured 'stages of ripeness' foam pads, supported by
- 'stages of ripeness' header cards.

Trails have been undertaken and successfully completed with a Sydney multi-store independent retailer and one supermarket chain, with stores selected in both Sydney and regional New South Wales and Queensland. Trails are scheduled to commence with another national supermarket chain in January 2018.

The findings

Avocados are in a sweet spot, with both retailers and their customers. For many retailers, avocados are a top-two fresh produce item, challenging bananas for the number one position. All Australian retailers supported the approach being taken to assist them to reduce wastage and increase sales, although some were in a better position than others to implement the findings and recommendations.

Research revealed more than 90% of Australian avocado eaters want fruit that is ready to eat today or tomorrow. That means they want ripe avocados consistently available.

Research also demonstrated when ripe avocados are combined with fruit identified by stages of ripeness, consumers handle fewer fruit, fruit losses are reduced, more consumers buy avocados, and they buy more each visit.

For retailers, meeting consumer needs for ripe avocados provides another bonus – around 40% of consumers who buy two or more avocados weekly regard consistent availability of ready-to-eat avocados as a factor in choosing where to shop.

The research also identified a significant issue to be addressed. Avocados coming out of the conditioning process can be at different stages of ripeness, probably due to mixed maturity and variable cold chain conditions. Concurrent project *Cold Chain Best Practice Adoption* (AV15010) is investigating this situation.

Delivering retail education and training online has a number of advantages. Retail staff can undertake the training in their own



Produce Manager Ramesh with the four element merchandising concepts being successfully trialled at Georges Hall

time, they do not need to be away from their store and staff in regional and rural areas can easily access the resources.

The practical applications

The four elements of best practice merchandising continue to be used by retailers involved in the trails, well after their conclusion in their stores. Significant reductions in bruising and wastage and increased sales are still being reported. Other retailers are also implementing the approach, confident it will work for them, at a cost of around \$50 per store.

Other benefits also resulted. For example, during the trails retailers identified simple and practical ways to expand or reduce the size of ripe fruit displays, according to demand. Country stores identified the problem of inadequate stock levels of ripe or sprung fruit, which was resolved by showing how to use bananas to successfully accelerate the ripening process.

The online avocado retail training program has been developed in five sections, with a short quiz at the end of each section to reinforce key best practice messages. The five sections cover:

- customer expectations
- ordering, receipt and storage
- ripening
- care & handling
- display, signage & merchandising.

To support each section, video footage was shot at Trim's Fresh Penrith, a leading multi-store independent retailer in Sydney. The training has been structured to allow content to be customised for specific national supermarket retailers, who have expressed interest in using the resources.

The training program, to be hosted on the Avocados Australia website, qualifies participants for an Australian Avocado Industry-endorsed "Certificate of Recognition". It has been developed for Produce Manager-level staff. A shorter induction version has been developed for entry-level staff.

The plan is to launch the best practice avocado merchandising and the online retail training prior to the start of the 2018 Australian Hass avocado season.

Acknowledgement

Retail Point of Purchase Improvements Project (AV15011) is funded by Hort Innovation using the Avocado industry levy and contributions from the Australian Government.

More information

Mark Baker from Produce Marketing Australia at mark@producemarketing.com.au or phone 02 9642 1555

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Producing better fruit by innovation

Best practice handling to reduce flesh bruising

Melinda Perkins, Muhammad Mazhar, Daryl Joyce, Noel Ainsworth, Lindy Coates and Peter Hofman

Improving the quality of avocado fruit purchased by consumers is a primary goal of the Australian avocado industry. Flesh bruising is among the most common avocado quality defects encountered at retail. It can cause substantial consumer dissatisfaction. In our last *Talking Avocados* article (Winter 2017), we discussed production of more robust fruit through careful pre-harvest management and harvesting as a farm-based approach to reducing flesh bruising at retail. Here we discuss the post-harvest side of the issue in terms of: what can be done to limit exposure of the fruit to damage events likely to cause bruising; and, how much is 'too much' damage? We briefly review the current state of knowledge and propose best practice recommendations towards reducing flesh bruising at retail.

When does bruising occur?

Flesh bruising is most evident in avocado fruit at the retail and consumer stages in the supply chain. Studies conducted within the past five years suggest that bruising affects around one in every three Hass fruit sampled from retail displays^{1, 2}. In contrast, bruising has been reported to occur in less than one in every 10 fruit sampled between harvest and packhouse³ and from ripener and distribution centre¹. In investigating events that lead to flesh bruising, we note that injured avocado flesh takes about 24 hours to develop the visible resultant bruise¹ (Figure 1).

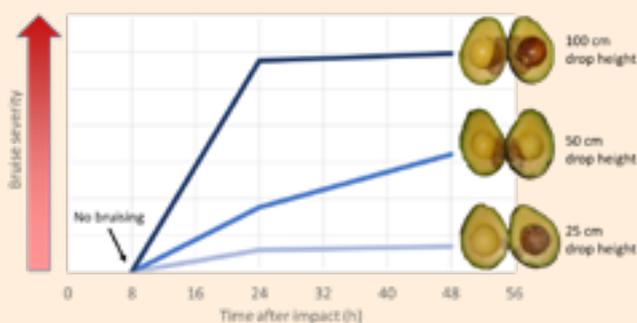


Figure 1: Relative bruise severity development over time in 'firm-ripe' stage cv. Hass avocados subjected to impacts from various drop heights. Photos show visible flesh bruising 48 hours after impact

What events cause the most bruising?

Greater degrees of bruising at later stages in the supply chain are the result of two factors. Firstly, fruit becomes more susceptible to bruising as they ripen and soften^{1, 4-7}. Secondly, fruit are increasingly squeezed by retail staff, shoppers and consumers when being 'tested' for ripeness⁶ (Figure 2). In a

survey of Australian avocado consumers, 97% squeezed avocado fruit when assessing ripeness⁸. Moreover, shoppers have been observed to handle three times more avocados than they actually purchase⁶. Thus, most fruit on retail display have likely been squeezed multiple times.



Figure 2: Squeezing of avocado fruit on retail display to 'test' for ripeness (courtesy Sha Liao)

These squeezing or compression events generally cause enough damage to express as bruising of the fruit flesh. It has been found that shoppers typically apply compression forces ranging from three to 30 Newtons (N) to firm-ripe avocado fruit when assessing ripeness⁶. For context, a 'slight' thumb compression of 10N applied to a firm-ripe fruit causes visible bruising within 48 hours at 20°C. Single squeezes by shoppers produced varying degrees of bruising in every fruit assessed and bruising was more severe than in non-handled fruit⁶. Extensive bruising occurred in fruit subjected to multiple handling; that is, fruit handled once by each of 20 different shoppers⁶ (Figure 3).

Post-purchase handling of fruit by consumers also contributes to total bruising. Bruise-free fruit provided to consumers at retail check-out and subjected to their 'normal' handling practices for two days developed greater incidence (ie frequency) and severity (ie degree) of bruising than non-handled fruit⁶.

In addition to squeezing or compression, striking or impact damage at all stages of the supply chain can adversely affect final fruit quality. For unripe Hass avocados at the hard green mature stage, controlled impact from a drop height of 100cm caused tissue injury. However, flesh bruising did not show up when the fruit finally ripened⁹. Nevertheless, our research suggests that a drop height of 30cm for hard green mature fruit can trigger body rot development upon ripening, while a drop height of 15cm does not (unpublished data). These findings of increased decay highlight the need for careful handling of fruit from harvesting onwards through the whole supply chain. Hence, keeping drop heights below 15cm for hard green mature fruit will probably reduce the incidence and severity of body rots at retail and consumer stages.

As fruit ripen, the drop or impact height at which bruising



Figure 3: Hass avocado fruit exhibit extensive flesh bruising in response to multiple handling by shoppers

develops decreases. At the 'softening' stage, a 10cm drop height caused substantial bruising of >3mL flesh bruise volume. Bruising was relatively negligible at <1mL bruise volume for drop heights \leq 5cm (Ledger, unpublished data). For 'firm-ripe' fruit, drop heights of 2-3cm were sufficient to cause bruising^{5, 7}.

Temperature can affect avocado bruise expression. For cv. Hass, damage events result in substantially less bruise volume

if fruit temperature is maintained at 5°C post-injury. Impact from 25cm did not result in bruise expression in 'firm-ripe' fruit subsequently held at 5°C¹. However, the same impact caused visible bruising in at least nine of 10 fruit held at either 15 or 25°C¹. Maintaining relatively low fruit temperature is also important for suppressing postharvest disease expression^{10, 11}.

How can bruising be avoided?

Education and training

Retail staff, shoppers and consumers all need to be aware of their crucial roles in maintaining avocado fruit quality. In this regard, education is critically important in reinforcing correct handling techniques which minimise flesh bruising. Most consumers do not link their 'bad avocado experience' with excessive handling. Only 42% agreed with a statement that "bad avocados have been handled or touched too much"⁸. Importantly, shoppers should be encouraged to limit their squeezing of fruit. Moreover, fruit selected for purchase should be carefully packed with chilled grocery items and promptly taken home. Once ripe (ie, soft), avocado fruit can then be kept in the refrigerator for use within three days. On the other hand, encouraging consumers to purchase unripe fruit may reduce their risk of encountering bruising. However, many consumers seek 'ripe-and-ready' fruit. Also, consumers generally lack the confidence to ripen fruit at home⁸. In this respect, 'how-to' guides can be provided.

Workers at all stages in the supply chain from harvest to retail need to be instructed and reminded to maintain cv. Hass fruit at 5°C wherever possible, except during ripening. Drop heights \geq 15cm must be avoided for hard fruit. For softening fruit, drop heights should be kept below 10cm. Retail staff should be educated and reminded to handle fruit from firm-ripe stage onwards 'like eggs', without dropping and/or careless squeezing.

Retail display

Managing retail displays to promote rapid stock turnover can reduce handling of individual fruit. Small volume displays might logically be assumed to result in rapid stock rotation. However, data from the USA suggests that small volume displays are a barrier to purchase¹². Large displays, on the other hand, were reported to promote sales by inspiring shopper confidence that the avocados are fresh¹² and by capturing the attention of impulse buyers¹³. Around one-third of impulse buyers in the USA indicated that an eye-catching display influenced their decision to purchase avocados¹³. The display size required to minimise bruising is likely to vary with retail store type and location and also shopper demographics. It is problematic to make recommendations on retail display size until its effects on fruit quality have been fully researched.

Posters, signage and leaflets add visual impact to displays

Best practice handling to reduce flesh bruising continued

and also present opportunity to provide point-of-sale advice (Figure 4). Most consumers considered that posters at the point of purchase are a preferred source of information on avocado selection, storage, ripening and usage⁸. Arranging the display into different ripeness categories has been shown to reduce fruit handling by shoppers (Hort Innovation project AV15011, unpublished data).



Figure 4: Prominent point-of-sale poster provides information to shoppers on avocado selection (courtesy Sha Liao)

Packaging

Selling avocados in pre-pack formats, such as plastic-wrapped trays, netting bags or clamshell punnets (Figure 5) may potentially reduce bruising by limiting individual fruit handling by consumers. However, careful studies are warranted to quantify the effect of packaging on avocado bruising at retail. Moreover, consumers in general prefer to purchase loose avocados, including because they find it difficult to judge quality and ripeness of packaged avocados^{12, 13}. In Australia, 83% of avocado consumers indicated that their purchases for the previous month were comprised solely of loose avocados¹⁴. Nonetheless, pre-packaged avocados are gaining popularity in overseas markets. In the USA, the pre-packaged segment of the retail avocado market has risen sharply in the past two years to now comprise around a third of total sales volume¹⁵. Small avocados marketed as 'mini', 'baby' or 'cocktail' fruit are increasingly available in Europe¹⁶⁻¹⁸ and North America¹⁹, and tend to be sold in pre-packaged formats.

Technology

Development of in-store decision aid tools (DAT) to enable non-bruising assessment of fruit firmness by retail staff and shoppers is a relatively novel approach to reduce flesh bruising in avocado fruit. A range of sensor technologies have been tested with a view to non-destructively assessing avocado firmness. They include acoustic resonance, laser Doppler vibrometry, low mass impact sensors, micro-deformation sensors, near infrared spectroscopy, optical-based tactile sensors and ultrasound. However, none are currently being used in retail environments.



Figure 5: Avocado 'pre-pack' options available in Australian supermarkets: (a) flowpacked rigid plastic tray, (b) netting bag and (c) clamshell rigid plastic punnet

Obstacles to commercial use include cost, operator skill and / or maintenance and calibration. A prototype DAT based on a force-sensing resistor placed between the thumb and the fruit was recently developed and tested by us for in-store use. In-store surveys found it was favourably received by shoppers. The device was rated as "helpful" or "very helpful" for assessing avocado firmness by 97% of survey participants (unpublished data). However, a cost-effective retail-ready DAT is still some

development and commercialisation 'time' away from adoption.

Recommendations

On the basis of past and recent studies, the following post-harvest practices are recommended to reduce the flesh bruising and/or body rots in avocado:

- keep drop heights below 15cm for hard green mature fruit
- keep drop heights below 10cm for softening fruit
- handle fruit carefully without dropping or excessive squeezing from firm-ripe stage onwards
- hold fruit at 5°C where possible (except during ripening).

Practices which are likely to limit avocado bruising, but for which strong supporting evidence is still lacking, include:

- train retail staff in appropriate handling techniques
- arrange retail displays into ripeness categories
- provide point of sale information on fruit selection for ripeness
- provide consumers with 'pre-pack' options

- inform consumers of appropriate in-home handling and storage techniques.

The above measures have already been implemented by the Australian avocado industry in varying combinations and extents. Presumably, widespread uniform adoption requires more compelling evidence of effectiveness in lessening flesh bruising. In this regard, three concurrent co-ordinated Hort Innovation avocado supply chain quality improvement projects are working towards this goal through investigating techniques to reduce bruising (AV15009) and quantifying benefits of appropriate cool chain management (AV15010) and retail displays (AV15011).

Acknowledgement

The *Supply chain quality improvement - Technologies and practices to reduce bruising project* (AV15009) is being conducted by the Queensland Department of Agriculture and Fisheries in collaboration with The University of Queensland and Avocados Australia Ltd. The project is funded by Hort Innovation using the avocado levy and contributions from the Australian Government.

References

A full list of the referenced works in this review article can be found online at www.avocado.org.au/news-publications/talking-avocados/feature-articles/

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Avocado cool chain best practice adoption

Applied Horticultural Research

Growing the perfect avocado requires money, time and effort. While getting things right in the orchard is important, it is essential that the cool chain is managed well for that avocado to reach the consumer still in perfect condition.

The *Cool Chain Best Practice Adoption Project* (AV15010), undertaken by Applied Horticultural Research (AHR) has focussed on increasing adoption of best practice in the avocado cool chain, in order to increase the quality of avocados at retail. That has involved working closely with packhouses around the country to help identify practices that can be improved. In addition, new resources have been developed that will help all supply chain stakeholders to reduce risk and sell better fruit.

Packhouse studies

Temperature management and physical handling from harvest has been monitored in 12 major avocado packhouses in Queensland, New South Wales, South Australia and Western Australia.

Real-time location tracking temperature loggers were used to monitor temperature from harvest to the packhouse, during transport, ripening and in some cases, all the way to retail.

Physical impacts were monitored at harvest and on packing lines using an impact recorder.



Adding pulp temperature loggers to picking bins in the orchard

Impacts at harvest

Even hard-green fruit are still susceptible to external bruising and skin damage. We wanted to know what impacts could occur during harvest, and how those related to impacts known to potentially damage fruit.

An impact recording device (IRD) was used to compare the forces experienced by fruit when picking into ground bags versus half-depth or full-depth mechanical work platform

(cherry picker) bags. Impacts of 200G are equivalent to a drop of around 10cm onto concrete, while an impact of 250G is similar to a 20cm drop. Hard, green avocados can develop skin damage from a 10cm drop, while a 20cm drop increases the risk of rots and external bruising in ripe fruit.

Fruit fell approximately 1m when harvesting into full-depth mechanical work platform bags. These impacts averaged over 200G, with some over 250G! However, if the drop is reduced using rope extenders on the bags, impacts are reduced to safe levels (*Figure 1*). Harvesting into ground bags also limits fruit damage.

Impacts along the packing line

It was good to find that there were very few potentially damaging impacts along packing lines. Most were generally flat, with plenty of foam padding and baffles to soften direction changes and drops. The one point of major difference between packhouses was the bin tip. Bin tippers with covers that gradually release fruit recorded much lower impacts compared to those left uncovered.



Impact recording device moving along a packing line

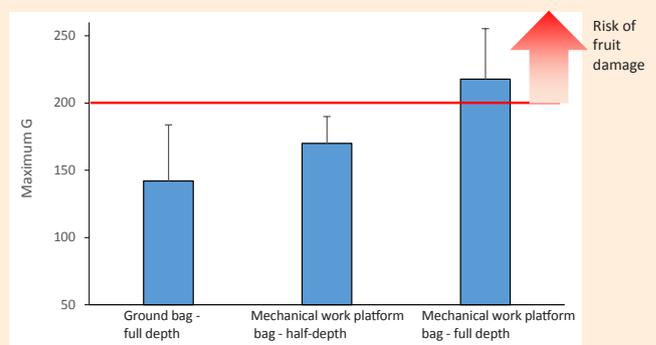


Figure 1: Harvesting fruit into full-depth mechanical work platform bags with a single layer of fruit in the bottom (1m drop) exceeds the impact level that can result in external bruising or skin damage. Halving the height of the bag using baffles (or rope extenders on the bags), or using ground picking bags will eliminate most of this damage (AHR data)

Fruit cooling in picking bins

Fruit that cannot be packed within 24 hours of harvest should be cooled before packing, especially if the avocados have been picked hot. In many packhouses this is done by simply placing bins in the coolroom. This poses a problem, as fruit in the middle of picking bins cools at a much slower rate than those in the top of the bin. The result is that warm fruit in the middle of the bin may start to ripen, while those on the outside of the bin remain cool and firm.

Forced air systems can overcome this issue, cooling fruit rapidly, evenly and without condensation (Figure 2). While forced air is more commonly used to cool packed and palletised fruit, it can work even better with bins.

Transport temperatures – a cause for concern

Nearly all of the supply chains monitored had temperatures well above the optimal (ie 5°C for Hass). In many cases, the cooling capacity/air circulation in the truck trailer could not prevent product warming during the trip, with avocados arriving at the wholesale markets at 12°C or even higher (Figure 3).

Most trucks can only maintain temperature, not reduce it. In some cases, product was not thoroughly cooled before loading, resulting in avocados staying warm for the whole trip. Temperature should be monitored in all loads using readily available single or multi-use air temperature loggers.

New best practice materials

The avocado industry identified a need for updated and more detailed postharvest guidelines. AHR has developed four new resources in consultation with growers, packers, transporters, wholesalers and retailers. The resources will be available online

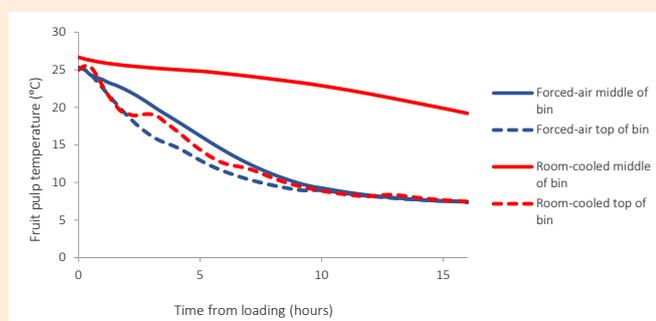


Figure 2: Pulp temperature of avocados in the middle (solid line) or top (broken line) of picking bins forced-air or room-cooled within the same storage room. A large temperature gradient developed between the middle and outside of the room-cooled bin. In contrast, fruit in the forced-air system cooled quickly and evenly (AHR data)

in the Best Practice Resource, and as printed resources in coming months. Requests for copies can be made in advance by email to sandra.marques@ahr.com.au. The resources are:

1. Review of best practice – a detailed review of Australian and international research of pre and postharvest factors affecting quality of avocados
2. Supply chain best practice guide – a concise guide for recommended postharvest best practice from orchard to retail
3. Postharvest problem solver guide – focusing on fruit quality issues
4. Check lists – a series of risk-preventing check lists for each stage of the supply chain.

Extension rollout

The final phase of the project involves a rollout of the extension materials to major avocado growing regions. To get your copies of the new materials, and discuss the best practice recommendations with the project team, come along to a workshop in your region during the coming months. Dates will be advertised shortly through Avocados Australia.

Acknowledgement

The *Cool Chain Best Practice Adoption Project* (AV15010) is funded by Hort Innovation using the Avocado industry levy and contributions from the Australian Government.

More information

Adam Goldwater from Applied Horticultural Research at adam.goldwater@ahr.com.au or phone 02 8627 1040

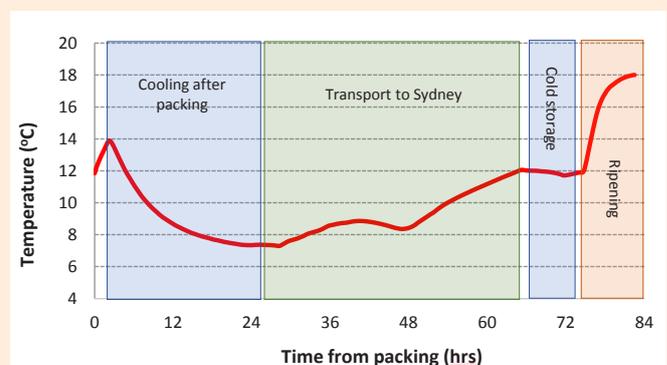


Figure 3: Typical temperature management from packing to ripening. Fruit warmed from 7°C to 12°C during transport to the ripening facility in Sydney (AHR data)

Rootstock availability critical to high density success

Helen Hofman and Bridie Carr, Department of Agriculture and Fisheries

Availability of rootstocks that control vigour are critical to the success of high density plantings of tree crops.

As part of the *Small Tree – High Productivity Initiative*, we are evaluating a range of the available rootstocks to see how they perform in a high density planting of Hass. In the first phase of this trial we are evaluating nine different rootstocks (181, Ashdot, Bounty, BW2, Dusa, Latas, Reed, Velvick and Zutano). The trees are planted at the Bundaberg Research Facility at a two metre plant spacing with 4.5 metres between the rows. The trees are tied to a single upright three metre high trellis and pruned to a single central leader. We are aiming for a good distribution of strong, horizontal branches in a ‘Christmas tree’ shape, maximising the light received by the whole canopy. The trial was planted in May 2016 and is now carrying its first crop.

In early growth, most of the planted rootstocks show little sign of reduced vigour. Trees on Bounty and Ashdot rootstocks have smaller canopies on average (*Figure 2*). The initial small size of trees on Reed rootstocks were because they were grafted later than the other rootstocks: they are now well on the way



Figure 1: Rootstock trial row in July 2017 – starting to show canopy and flowering differences

to ‘catching up’. We also found reduced canopy vigour from the Ashdot rootstocks compared to Velvick rootstocks in the Planting Systems Trial (see article in the last issue of *Talking Avocados*).

The cross sectional area (CSA) of the trunks is often used as a measure of tree size, and differences in rootstock and scion CSAs can be an indication of unbalanced canopy and root systems. In the trial, the CSAs of the rootstock and scions have not followed



Figure 2: Canopy volumes of Hass on a range of rootstocks in April and December 2017

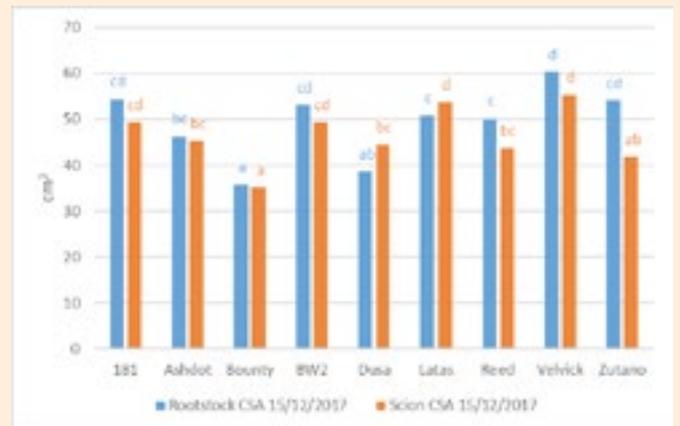


Figure 3: Cross sectional area (CSA) of various rootstocks in combination with Hass scions in December 2017

exactly the same pattern as the canopy volume (*Figure 3*). Bounty and Ashdot indeed have smaller trunk sizes, but Ashdot is not significantly different from most of the other rootstocks although trunks are significantly smaller than the trees on Velvick. It is interesting that Dusa and Latas show on average smaller rootstock than scion CSAs, despite being quite vigorous trees.

Most of the trees are now near the top wire in height and more than two metres wide, so in December 2017 we began pruning to confine them to their long-term 'space' of a one-metre radius, and height of no more than 3.5 metres. The data shown in *Figure 2* is canopy size after this pruning. Our experience with canopy shading in the high density treatment in the Planting Systems Trial prompted us to take a different approach to pruning in the rootstock trial. We are pruning far more frequently and being much 'stricter' on keeping trees to their space and shape, particularly removing growth from the 'shoulders' which casts shade on the lower part of the canopy, and including heading the tops as necessary.

In April 2017 we also did a subjective assessment on whether or not the trees were conforming to a central leader shape, rather than developing competing central leaders. Those on Zutano showed the greatest tendency to grow into a single leader structure and thus be easier to train. Trees on Latas, Velvick, Dusa and Bounty rootstocks had the least 'inclination'

to develop a central leader structure, and thus require more pruning of branches competing with the central leader.

This year there were also some differences between rootstocks in flowering times. Trees on Dusa, Bounty and Latas flowered slightly earlier than those on other rootstocks, with those grafted on Velvick being the latest to flower.

During the next few years it will be interesting to see if any of these characteristics lead to differences in yield efficiency (fruit per m³ of canopy). We will also report on whether our changes to our pruning strategy helps us to better manage canopy vigour and the light environment of the trees.

Acknowledgement

The Small Tree – High Productivity Initiative is an initiative of the Queensland Government. Major partners include the Department of Agriculture and Fisheries (DAF), DAF's research alliance with The University of Queensland (Queensland Alliance for Agriculture and Food Innovation), and the NSW Department of Primary Industries. A key element of this initiative has been co-funded by Hort Innovation – using the across horticulture levy, contributions from DAF and contributions from the Australian Government – through the Hort Innovation project *Transforming tropical/subtropical tree crop productivity* (A113004). We are especially grateful to Hort Innovation and the various associated industries and horticultural businesses for their support for this initiative.

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Snapshots

International Avocado Research Update

This series of research snapshots is compiled from abstracts of published scientific papers accessed through CAB Direct and AGRIS (FAO, UN) databases as well as Google Scholar searches. Dates provided reflect the date research was published.

Production

Growing Hass avocado fruit under different coloured shade netting improves the marketable yield

South Africa (2017): Sunburn damage is one of the major problems affecting the avocado fruit production. Shade netting has been introduced so that growers can cover their orchards with the nets to protect their trees/fruit. However, little is known on the effect of different coloured shade netting on avocado fruit quality. The influence of blue, red and white photo selective netting on Hass avocado fruit was investigated. Blue and white netting was shown to be a suitable pre-harvest tool to improve the marketable yield.

Effects of avocado scion on arbuscular mycorrhizal and root hair development in rootstock

China (2017): The mechanism through which the scion affects the absorption capacity of rootstock remains poorly understood. The effects of the scion on arbuscular mycorrhizal (AM) fungi types in the rhizosphere soil of rootstock and the absorption capacity of mycorrhizal root were determined in this study. Kampong avocado rootstocks grafted with five different scions and Kampong seedling trees were used. Results showed the main types of AM fungi in avocado seedling trees and trees grafted with five scions were nearly identical, however, the proportion of main genera exhibited differences. Grafted Kampong rootstocks (including those grafted with 'Hass') possessed stronger absorption than Kampong seedling trees because of high AM colonisation and root hair density. This study suggests scions regulated both the AM and root hair development systematically and lays the foundation for future research of AM-enhancing avocado production.

Screening identifies compounds that inhibit *Phytophthora* life cycle

New Zealand (2017): Management options for *Phytophthora cinnamomi* and *Phytophthora agathidicida* are limited. More than 100 compounds have been screened as a potential first step toward identifying new control strategies. Eight compounds that show activity against both *Phytophthora* species have been identified. Further testing is required to determine their efficacy and potential phytotoxicity.

The potential of foliar phosphonate sprays for the management of avocado root rot

South Africa (2018): In South Africa, alternative and more cost-effective options to phosphonate trunk injections for the control of *Phytophthora cinnamomi* were investigated. The efficacy of different phosphonate foliar spray treatments was evaluated in two trials in a climatically different region. The trials provided mixed results. In most cases, but not all, foliar potassium phosphonate sprays did not result in significantly lower root phosphite concentrations than the trunk injection. Ammonium phosphonate foliar sprays, three sprays applied in fall and two in summer, consistently yielded higher or similar root phosphite concentrations than the trunk injection. In most cases, the ammonium phosphonate foliar sprays yielded significantly higher root phosphite concentrations than the corresponding potassium phosphonate foliar spray treatment.

Postharvest

The role of abscisic acid during ripening of Hass avocado

UK (2017): The importance of ethylene in avocado ripening has been extensively studied. In contrast, little is known about the possible role of abscisic acid (ABA). This research studied the effect of 1-methylcyclopropene (1-MCP), e+® Ethylene Remover and the combination of these products on Hass avocado quality. Treatment with e+® Ethylene Remover reduced ethylene production, respiration rate and physiological ripening compared with controls. Fruit treated with 1-MCP + e+® Ethylene Remover and, to a lesser extent 1-MCP alone, had the lowest ethylene production and respiration rate and hence the best quality. It was shown that mesocarp (pulp) ABA concentration increased as fruit ripened. The results suggest a relationship between ABA and ethylene metabolism since blocking ethylene (and removing ethylene) resulted in lower ABA concentrations. Whether ABA influences avocado fruit ripening needs to be determined in future research.

Avoiding chilling damage in 'Hass' avocado fruit by CA storage at higher temperature.

New Zealand (2017): Sea-freight distribution of Hass avocado is by refrigerated containers, sometimes supplemented by controlled atmosphere (CA). In this project, the potential to avoid chilling damage by storing fruit at a higher temperature of 7°C compared with 5°C, in both CA conditions and air for 4 or 6 weeks, was investigated. Increasing the storage temperature from 5°C to 7°C did not affect the quality of fruit immediately out of CA storage. Both CA storage regimes, at 5°C or 7°C, resulted in better fruit quality than for fruit that had been stored in air at 5°C. Overall, CA at 7°C was less effective at retarding the progression of ripening in storage than CA at 5°C, although after 4 weeks of storage, fruit from both CA regimes took longer

to ripen than the air-stored fruit. After 6 weeks of storage, there was no difference in ripening time between fruit that had been stored in CA at 7°C or in air at 5°C, with fruit that had been in CA at 5°C still taking longest to ripen. However, the incidence of diffuse flesh discoloration (DFD) in the air-stored fruit was high compared with that in fruit from CA at 7°C or 5°C. The main negative aspect to storing fruit in CA at 7°C rather than at 5°C was the higher incidence of rots in ripe fruit.

Effects of heat shock and nitrogen shock pre-treatments on ripening uniformity of Hass avocados

Chile (2017): Lack of ripening uniformity in Hass avocado creates logistics problems for importers and ripeners and results in higher costs, inconsistent quality delivery and postharvest losses. One of the main aims of this research was to evaluate the effectiveness of two postharvest pre-storage treatments (nitrogen shock N₂ and heat shock) on ripening uniformity of Hass avocado and their effect on the fatty acid profile of the fruit. Results showed that heat shock, prior to controlled atmosphere storage, significantly reduced ripening heterogeneity in early and middle season fruit while N₂ + CA did not. The treatments did not alter the fatty acid profile. These results point to ripening synchronization in Hass avocado subjected to heat to be related to induction of metabolic processes related to ethylene, with the efficiency of the heat treatment related to the maturity stage of the batch.

Product

The effect of avocado seed flour content as an extender in the production of plywood

Indonesia (2016): The use of avocado seed flour as an extender in the manufacture of damar plywood (*Agathis alba*) to reduce the cost of gluing was examined. The addition of 10% seed flour provided maximum bonding strength over other treatments and met required national manufacturing standards.

Health

Antioxidant activities and phenolics contents of avocado peel

Indonesia (2017): The demand for natural antioxidants is increasing. One potential source is avocado peel. The study found that avocado peel has the potential to be used as food supplement due to its antioxidant activities.

Effects of avocado on Metabolic Syndrome: A Comprehensive Review

Iran (2017): Metabolic syndrome (MetS) is a clustering of risk factors including high blood glucose, dyslipidemia, hypertension, and obesity that lead to the increased risk of type 2 diabetes mellitus and cardiovascular diseases (CVDs), which are among leading causes of death in the world. Avocado is a well-known

source of carotenoids, minerals, phenolics, vitamins, and fatty acids. The lipid-lowering, antihypertensive, antidiabetic, anti-obesity, antithrombotic, antiatherosclerotic, and cardioprotective effects of avocado have been demonstrated in several studies. This review aims to find out avocado's pharmacological effects on different components of MetS and the value of peel, seed, flesh, and leaves of avocado.

More information

If you would like more details on any of the snapshots, please contact Jenny Margetts, P2P Business Solutions, at jmargetts@bigpond.com or 0418 215 276.



See your levy at work in the new HORTLINK

Don't miss the latest edition of Hort Innovation's Hortlink, which provides an update on all new, current and recently completed levy-funded activity in each levy industry. Check out the avocado section at www.horticulture.com.au/hortlink-2017-edition-4/avocado.



Hortlink includes easy-to-read project updates, results and resources you can use in your business, plus case studies, industry contacts and more. You can choose to browse the whole avocado snapshot or use the interactive project list to jump straight to the information you want. Also look out for the 'ACT NOW' tags to easily identify project resources and information you can make use of straight away.

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News from Around the World

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China lowers tariffs on avocados

Avocados are among the 187 products on which China unilaterally lowered tariffs on 1 December 2017. Fresh and dried avocado has gone from a 25% to an average 7.7% tariff.

Chile's Hass Avocado Committee says the move may benefit Mexico, but they're unsure of the impact for Chile, given the country already has a zero tariff for avocados going into China.

Avocados Australia CEO John Tyas said the move could be beneficial for the Australian industry, if and when access was granted for Australian avocados into the burgeoning Chinese market.

"We see great opportunities for Australia in that market but it was only in 2017 that progressing access was accepted through Hort Innovation's trade program, with the Australian Government," Mr Tyas said.

According to the most recently available figures from UN Comtrade, China imported just over 25,000 tonnes in 2016. This is a significant increase on the 153t the country imported just four years earlier, in 2012. (Source: DESA/UNSD, United Nations Comtrade database)

Speaking to *SimFRUIT* (the official portal of the Chilean Fruit of Exportation), Hass Avocado Committee of Chile General Manager Juan Enrique Lazo said the Chinese market had a high growth potential.

"We have sent almost twice as many avocados as last season to China, shipments reach around 12 million kilos and the last period on the same date we exported seven million, volumes that are being supported with various promotional campaigns, which also will help us raise prices," Mr Lazo told *SimFRUIT*.

He also noted that as Chile already enjoy a 0% tariff on avocados, he did not anticipate any impact for his country's exports to China from the most recent changes.

Speaking to *Fresh Fruit Portal*, APEAM advisor Ramon Paz said the development was good news for Mexico.

"The cost of importing Mexican avocados to China is going down, and that should stimulate our exports," Mr Paz told *Fresh Fruit Portal* in December.

The latest tariff reductions by the Chinese Government have been widely reported as a move to disrupt the grey channel imports from "daigou", personal shoppers living overseas (in countries such as Australia) and sending products back to China.

According to Dezan Shira & Associates, an Asian professional services firm specialising in foreign direct investment, the tariff cuts on consumer goods was a new effort to improve economic growth by, in part, driving domestic consumption.

"Because of high tariff rates on many foreign goods, many



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middle and upper class Chinese consumers would often fly overseas to combine holidays with shopping sprees," the business' China Briefing of 29 November.

The high tariffs also contributed to the rise of grey market sellers peddling foreign goods at lower rates. Individuals known as daigou travel overseas to purchase foreign products, bring them back into China without paying import tariffs, and sell them at lower rates than branded stores."

While this does not include avocados, the tariff on the fruit has been reduced along with those on milk powders and diapers, all items in high demand in China.

"By reducing tariffs, the Chinese government hopes to encourage more consumption within China's borders, rather than watching wealthy Chinese spend their money abroad," Dezan Shira says.

More information

From *SimFRUIT* – <https://goo.gl/4BMEzG> (Note: Spanish language, use Google Translate feature)

From Dezan Shira & Associates – <https://goo.gl/heemsh>

From *Fresh Fruit Portal* – <https://goo.gl/d2Gb4w>

Chile dominates Chinese market

Chilean avocado exports to the world grew by 42.9% in volume and 61.7% in value from January through September 2017 when compared to 2016, reaching 90,985 metric tons (MT) and \$197.5 million.

According to the latest Chile Avocado Annual from the US Department of Agriculture's (USDA) Global Agricultural Information Network (GAIN), Chilean exports are expected to reach 155,000MT in the marketing year 2018.

"The United States is the largest importer of Chilean avocados with 30% market share," the report said.

The report noted the country's avocado exports grew 42.9% in volume between January-September 2017, reaching 90,985MT and US\$197.5 million in value.

Avocado exports were a bright spot for Chilean fruit exports in the 2017 calendar year, with export revenues rising 20% to US\$446 million, according to *Fresh Fruit Portal* in January.

In 2017, Chile took advantage of Mexico's lower production to increase exports to the US.

"Chinese demand for Chilean avocados is on the rise and most of the Chilean avocado industry's promotion resources have been destined to that market," the GAIN report said.

"In MY 2017 exports to China increased by 76.5% in volume and 88.1% in value, and are expected to keep growing in the future."

The marketing commitment showed results in 2017, when

Chile became the top supplier of avocados to China, surpassing Mexico.

Chile is also pursuing other markets, having signed an agreement to export avocados to India in May 2017 and negotiations are underway for market access to South Korea.

The GAIN report noted Chile had 29,319 hectares planted to avocados in 2016, a decrease from a peak of 30,330ha in 2013.

"The most planted variety with 88% of the total planted area is the Chilean Hass avocado variety, which is very sensitive to low temperatures and frosting, thus, the planting area is limited to the regions that present less risk of frosting and in the hillsides where temperature is higher than in the flat areas," the report said.

"Other avocado varieties, mainly destined for the Chilean domestic market, are Edranol, Negra de la Cruz and Fuerte."

The November 2017 GAIN report said while water scarcity had been the main production limitation, rainfall was abundant in 2016 and 2017, favouring a production increase despite the reduction in planted area.

"According to the Chilean Avocado Committee, production was 215,000MT in production year (PY) 2016/2017 (July 2016-June 2017) and is expected to reach 220,000MT in PY 2017/18," the report said.

More information

GAIN report PDF: <https://goo.gl/9TFjii>

Chile

Main markets are the US, the Netherlands, Argentina, China and the UK

Avocados are one of the few fruits produced and consumed locally, instead of destined completely for export markets



News from Around the World continued

Mexican production to increase

Mexican avocado production could reach 1.9 million metric tons (MMT), according to the latest Mexican Avocado Annual from the US Department of Agriculture's (USDA) Global Agricultural Information Network (GAIN).

More favourable weather conditions and phytosanitary pest control programs are expected to boost production in the 2017/18 marketing year (July/June).

The report also notes the 2016/17 production is likely to finish at 1.7 MMT with growers reporting avocado trees had an alternate-bearing low crop and hard winter rain that lowered volumes.

Published in late November 2017, the USDA GAIN report estimates the total area planted for avocados in Mexico for MY 2016/17 at 220,334 hectares (ha), an increase of 7.3% over MY 2015/16. "Area planted for MY 2017/18 is forecast to keep growing as growers in different states in Mexico are interested in increasing area due to good domestic and international demand for Hass avocados," the report said.

This predicted growth comes with concerns about deforestation via illegal logging for wood and wood products and the establishment of avocado orchards, particularly in Michoacán.

Various Mexican government agencies have reportedly denounced the practice APEAM (the Mexican Avocado Association of Producers and Export Packers) has also committed to reforestation efforts.

On the consumption front, the GAIN report said the higher-paying international markets are also impacting on supplies available for domestic consumption within Mexico.

"Domestic consumption for 2016/17 is estimated at 656,000MT due to lower availability of product at higher prices," the report said. "Consumption for 2017/18 is forecast to be higher over 760,000MT due to expected higher production; however, this will depend on supply and prices."

According to the GAIN report, traders forecast avocado exports for 2017/18 to increase close to one million metric tons due to expected good international demand.

"The United States is the top export market for avocados from Mexico, consuming between 77-79% of total exports. Japan and Canada are strategic niche markets where Japan has about 8-9% of the market and Canada 6-7%."

More information

GAIN report PDF: <https://goo.gl/vvmwJM>

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New Zealand secures access to Chinese market

New Zealand avocados will be approved for export to China for the 2018/19 season, following the late January announcement of a successful technical audit of the regulatory system for exporting.

New Zealand’s Ministry for Primary Industries (MPI) and China’s General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) signed the protocol to agree export requirements in November 2017, and a successful audit was the final step.

NZ Avocado will airfreight a trial shipment to Shanghai in the current season, for a New Zealand Trade and Enterprise event at NZ Central.

The 2018 export season starts in August, and the first shipments are likely to be in mid to late September, reports Avocado Export Council Chair Alistair Petrie.

“We have established relationships in China and will work with them to develop niche markets for our avocados,” Mr Petrie said.

MPI Director-General Martyn Dunne said securing access had been New Zealand’s top horticultural priority.

“MPI and the avocado industry are committed to getting our avocado trade with China underway as soon as possible,” he said.



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Grower Member Application Form continued

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News from Around the World continued

In the 2016/17 season, New Zealand’s avocado industry achieved its best ever season reaching a record breaking industry value of more than \$200 million from 7.9 million trays.

Avocados are still relatively unknown in China, but demand for New Zealand’s avocados has boomed. In 2016/17, New Zealand exported \$155.5 million of avocados into markets such as Australia, Japan, Singapore, Korea and Thailand – growth of around \$64 million from the previous season.

China is expected to be a significant market for New Zealand avocados.

“China is very aware of the significant global increase in avocado consumption, the associated health benefits and the strong growth and huge potential in the avocado category,” New Zealand Avocado Chief Executive Jen Scoular said.

New Zealand Avocado Growers Association Chair Troy Ponder said the aim was to create a globally competitive, high-value, sustainable horticulture industry delivering real returns to New Zealand.

Avocado exports will join New Zealand’s other fresh fruit exports to China that include apples, kiwifruit, cherries, plums, citrus and persimmons.

Growth in the avocado industry is also being enabled through the New Zealand Avocados Go Global Primary Growth Partnership programme between New Zealand Avocado and MPI. It’s a five-year, \$8.56 million collaboration that has made real progress towards goals to triple productivity and grow industry returns to \$280 million per year by 2023.

More information

https://industry.nzavocado.co.nz/industry/news_results.csn



Avocados Australia CEO John Tyas (left) in New Zealand in December 2017, discussing recent industry developments.

Asia will dominate growth in global grocery

The global grocery retail market will add \$2.7 trillion in sales to 2022, with growth in the next five years dominated by Asia, according to new forecasts released late last year by international grocery research organisation IGD.

Asia's grocery retail market will be significantly boosted by a rising population and increased shopper spend, with consumer spending in the region accounting for nearly half of additional sales generated to 2022.

Global growth will be driven by several factors including inflation, population growth and increased consumer spending on grocery products.

Key findings from IGD's global grocery forecasts to 2022 include:

- Asia's grocery market will add \$1.2 trillion in sales, which is more than Africa, Europe and Latin America combined, and will enjoy a compound annual growth rate (CAGR) of 6.6%
- with a CAGR of 4.2%, Europe is set to benefit from the biggest increase in shopper spend, driven by countries in Central and Eastern Europe (CEE)
- North America will add almost \$100 billion to its grocery retail market by 2022
- Latin America's market will be dominated by Brazil and Mexico, accounting for nearly 10% of sales.

Jon Wright, Head of Retail Insight, IGD, said the new global grocery forecasts revealed a positive outlook for the sector, as it was predicted most regions would experience faster growth to 2022 than forecast in 2016.

"However, an awareness of the underlying causes of growth in each region is key," Mr Wright said.

"The most attractive and sustainable growth opportunities are in markets where sales increase will be due to population growth or consumers spending more money – for example, Asia, Latin America and North America.

"With China, India and Japan all in our top five, Asia's grocery market continues to be in rude health thanks to growing populations and shoppers with more disposable income.

"Innovations in this market also continue apace, especially in China, where retailers are experimenting to drive the online and convenience channels."

More information

Read the full IGD report here: <https://goo.gl/i7MkRj>



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