

TALKING AVOCADOS



NEW Avocados Australia Website

**NEW Australian Avocado Web Map
for Disaster Recovery**

HIA Strategic Investment Plan

AUTUMN 2017

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Avocados Australia Limited

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We all make mistakes: If we make a mistake please let us know so a correction may be made in the next issue.



**Horticulture
Innovation
Australia**

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Cover: New Avocados Australia website

Chairman's Perspective

I was in the process of writing this report a few days ago with the thought of how "lucky" our industry was to be in the new phase of 'smashed avocado on sourdough with goat cheese and poached egg for breakfast' in just about every breakfast bar in the country.



How lucky are we, and then along comes Tropical Cyclone Debbie from the shallows of the Coral Sea and all those visions of cashing in on our luck seemed to fade in the terrible memories of previous Cyclones Winifred, Larry and Yasi and the



devastating floods in Bundaberg. My initial selfish thoughts were to wish for Debbie to go somewhere else and leave North Queensland alone. Then I realised that if it was not here where I was then it was to be somewhere else, and that was most likely to be Bundaberg, or, as it turned out almost every avocado region from Bundaberg to Northern NSW.

The Northern growers dodged devastating Debbie and I hope that all the more southern districts did not suffer too much damage to orchards, homes and infrastructure.

In spite of these severe weather events, I hope we can move on to have a successful 2017 with a steady supply of good quality avocados for those Australians who depend on us for that memorable breakfast. Perhaps if we are really lucky we may even be able to convince our consumers to be daring enough to try avocado as a 'sweet' as well and make after dinner memorable as well.

Our industry's strength lies in the spread of geography and the different climate ranges where we are able to supply the market almost all year round, but our Achilles heel continues to be the internal quality of our product. We need to rely on more than luck to fix that problem. As I have said before, the harder we work at this quality issue the "luckier" we will get.

Jim Kochi

Jim Kochi, Chairman, Avocados Australia Limited



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CEO's Report



Season update

Since the New Year we have seen volumes of supply to the Australian market hovering around 200,000 trays per week with Shepard dominating during March and April.

Mother Nature has sent her challenges once again with Tropical Cyclone Debbie wreaking havoc down the east coast. Few avocado orchards are located where TC Debbie crossed the coast, but the rain deluge which followed impacted areas further south. Fortunately, there were few reports of major damage to avocado orchards.

Total Australian supply for January to December 2016 was about 68,000 tonnes, 8 percent above forecast for the year. Subtracting exports and including New Zealand imports, about 84,000 tonnes were consumed in Australia, bringing the per capita consumption to about 3.4kg per person. The current forecast for 2017 is for an increase in total supply of about two percent, with Australian supply up about 16 percent.

New PHA Levy now in place

The new Plant Health Australia Levy has now been implemented by the Australian Government, effective from 1 April 2017. The levy of 0.1 of a cent per kilogram has been set and is offset by an equivalent reduction to the R&D levy such that no additional levy is payable. Further information about this new levy and how it will be used is explained on page 11.

New website, social media and Guacamole launched

Our new industry website www.avocado.org.au was launched in March following about 18 months of planning and development work.

With a crisp new look the new website provides easy, intuitive access to a wealth of information. The new site includes an upgraded Best Practice Resource (BPR) with an extensive library of supporting resources and rich search functionality to easily extract information across the website.

One of the core roles of Avocados Australia is to be the information hub for the Australian avocado industry and this new site will help us to do that better than ever before. I am very proud of this new website and I hope our stakeholders make good use of it. I'd like to make special mention of Maree Tyrrell who did an excellent job in project managing the new website development.

In conjunction with the website we launched our industry-facing social media program using Facebook and Twitter, providing a further extension to our existing industry communication program. Note, Hort Innovation manages the consumer-facing avocado social media program.



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As part of the new website, we have been able to refresh and modernise the highly regarded newsletter, Guacamole. The new website enables us to deliver Guacamole in a much improved format.

Further information about the changes can be found on page 10.

Stakeholder survey guides engagement

Since the Qualicado workshop series concluded last year, we have been reviewing and planning what the future industry engagement and development program might look like. We sought the assistance from expert consultant Dr Jeff Coutts and a number of targeted phone interviews were undertaken with a sample of stakeholders.

The review assessed all current stakeholder engagement activities including our communication deliverables (Talking Avocados, website, BPR etc.), Qualicado workshops, facility checks, conferences, Infocado and so on.

The review has clearly demonstrated the need for face-to-face engagement but the challenge is how best to meet the needs of different stakeholders. A number of possible options have been suggested based on the industry feedback. The report will be provided to Hort Innovation with suggestions for potential future levy investment.

Order your Kangaroo Labels

Avocados Australia manages the Kangaroo Label and a set of barcodes for use on Australian avocados.

To order Kangaroo Labels through our registered label companies, grower packers or packhouses should contact Avocados Australia so they may be issued with a Packhouse Registration Number. Contact Avocados Australia on toll free 1300 303 971 or email admin@avocado.org.au, then source your Kangaroo Labels from a registered Kangaroo Label supplier listed below.



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New project approved by Hort Innovation

After a long period of uncertainty, Hort Innovation tendered a new project funded from the avocado R&D levy program called AV16006 – Avocado industry and market data capture and analysis.

Avocados Australia has won this open tender that will enable us to significantly increase our efforts into data management. Importantly, the running of our Infocado Weekly and Quarterly dispatch and forecast reporting program will now be properly resourced to ensure the ongoing delivery and to enable further improvements. The project will also undertake in-depth data analysis in relation to export markets and global trade. I have prepared a summary of this new project which is on page 24.

New Avocado Strategic Plan

The new Avocado Strategic Plan has been completed and is now available at www.avocado.org.au/industry-programs/about-industry-programs/. This plan will guide the avocado levy investment and the priorities for Avocados Australia over the next five years.

An overview of the new plan is provided on page 43. Thank you to all those who contributed to the development of this plan.

Staff changes at Avocados Australia

We have recruited a new Communications Manager, Lisa Yorkston, who will commence in the role in early May.

Lisa has a wealth of experience in communications and a background in agriculture having grown up on a cattle property near Taroom. She has held various journalism roles with regional publications, worked for AgForce as their Communications and Publications Officer and has been with the Queensland Murray-Darling Committee since 2008 in communication and community engagement roles. We look forward to welcoming Lisa to the team.

We will also be recruiting a new full time data analyst in the coming weeks to oversee the new data project AV16006.



New Avocados Australia Communications Manager, Lisa Yorkston

John Tyas

John Tyas, CEO, Avocados Australia Limited

Around Australia

South Queensland Report

By Daryl Boardman, Avocados Australia Director for the South Queensland Growing Area



After a hot dry summer it was great to have had much needed good rain through March and it's made a big difference to avocado trees in Southern Queensland. There was also thankfully limited damage to orchards from Tropical Cyclone Debbie and the rain that came with it was much appreciated.

Crops are growing well and the trees are looking good, especially since the rain, and hopefully everyone is keeping up their nutrition to have another good season. Be sure to keep a look out for the Avo Alert that was recently emailed out to stay informed about the best management practices to use in your region this month and next.

Pricing looks to be remaining strong for the North Queensland and Bundaberg growers and we hope this will follow on to the South Queensland growers. South Queensland will begin harvest around the May/June period and run through to October/November so crops are currently in growing mode and fruit size is looking good due to the good rain in March.

It's great to see the avocado marketing presence on television recently promoting avocados to consumers. This will hopefully stimulate continued purchases and increase demand.

Study Group Workshops by Simon Newett from DAF Queensland will be coming to our region in mid-June and mid-November (venues and programs yet to be determined), so please mark your calendars and attend these excellent workshops if you can. Stay tuned for updates on email as the dates get closer and you can also check the Events section of the new website - www.avocado.org.au/events/upcoming-events/.

There is also some good progress happening with export access of Australian avocados to Thailand and Japan and we are hoping to pass on more information about this in the near future.

Wishing everyone the very best for the harvest and hoping these summer storms have left us for another year!

Central Queensland Report

By John Walsh, Avocados Australia co-Director for the Central Queensland Growing Area



We have just come out of one of the driest summers on record with very little rainfall and a lot of days where temperatures were over 30°C. This has put a great strain on irrigation and has impacted on fruit sizing in the area.

The weather was broken by the tropical low, ex-cyclone Debbie, and our region was very thankful for the rainfall that replenished water storage and ground water and provided a good start for the next growing season. We were also very glad

that the weather continued to move south and didn't impact this region's growers like it did in 2011 and 2013. Unfortunately, this movement of the low southwards has instead impacted other areas in Queensland and northern NSW and so our region's relief is bitter sweet. This weather event highlights the risk we producers take each year.

Even though coming into the rainfall events the weather was dry, it has still been important for growers to apply scheduled copper sprays so that when these rainfall events arrive, such as just recently occurred, crops are protected from diseases such as anthracnose and stem end rot.

Since the region started to harvest at the beginning of March, the market has continued to hold its value. Coming into Easter, supply slightly dropped and values slightly firmed. These values were obviously very good for growers and also show that retailers have continued to promote the product with reasonably tightly priced single sales and multi-buys. It will be interesting to see if this trend continues once Hass comes into full supply at the end of April, beginning of May.

Tristate Report

By Kym Thiel, Avocados Australia Director for the Tristate Growing Area



The ups and downs of being an avocado grower have certainly hit home over the past quarter. The 2016/2017 harvest wound up in late January with above average prices being received once again for those that had fruit. Below average summer temperatures up until this stage had set us up for a record crop in 2017/2018. Overall the season can be described as a good one for the local industry with good crop loads coupled with consistently average to above average pricing making it a successful one for all involved.

Everything for 2017/2018 was looking too good to be true when a heatwave of temperatures between 46-50°C hit the region in mid-February and put paid to any thoughts of a monster crop coming. The terrible sound of fruit dropping throughout the orchard was deafening 5-7 days after the heat. Fortunately, most growers I think should still harvest average to slightly above average crops mainly due to the fact that there was so many on the tree to begin with. Although a lot of fruit was naturally going to shed, it would have been interesting to see how much the trees could have carried.

The Study Group meeting held in Waikerie in late March with Simon Newett from DAF Queensland proved to be another successful industry event with over 40 people attending including growers visiting from as far away as the Mornington Peninsula, Victoria. This was coupled with the South Australian Avocado Growers (SAAG) AGM.

Subs for SAAG members for this coming season are now due at \$25 and should be paid ASAP. Thanks to Mark Boehm

who has accepted the role of Secretary/Treasurer following Jamie Klingbiel standing down. After an interesting session inside, the group moved out to the Mark, Dawn and Aaron Boehm's property where we looked at the difficulties growers face when trying to grow avocados on drip irrigation in the Tristate. This session reinforced what Trevor Sluggett, one of the guest speakers from Total Eden, had to say about irrigation management and maintenance.

It was decided that the next meeting to be held in late July would be split into two with one being held in the Riverland and one in the Sunraysia district. Growers are encouraged to attend one or both if time allows.

Sunshine Coast Report

By Robert Price, Avocados Australia Director for the Sunshine Coast Growing Area



We are into the New Year and the industry is progressing steadily despite Tropical Cyclone Debbie reportedly causing substantial damage to horticulture crops of various types to seriously affect the markets. However, the extent of damage to avocado supply will yet be fully appreciated.

It is intriguing the irregular pattern of the storm through the Sunshine Coast area where some areas close to the coast received in excess of 200mm in a matter hours, while areas a few kilometres away and further inland barely received 80mm over five days. What is more concerning is the amount of runoff that flowed into storage dams and the permeation of water into the deeper soil. It is unlikely that the dams will fill to capacity if we don't get more substantial rainfall within the next six weeks or so. The impact of this will be reduction of water allocation later in the year which could see a short fall of available water particularly when the trees are flowering.

On a different topic, I was fascinated to read in FreshPlaza about the use of lasers to brand produce where logos are etched onto the skin. Below is part of a press release comment:

"The laser branding has been well received by consumers and the media attention that they have been receiving has also helped boost consumer awareness. However, there have been some teething problems with the stores. The laser branded avocados are organic, but we have had some issues with cashiers ringing them up as conventional."

Peter Hagg, Swedish ICA Group a large retailing company.

One wonders if it is just a marketing gimmick or are they seriously considering labelling their produce with this technology. I can't really see it as practical, apart from the damage to the skin, the time it would take on a packing line to be burning on any text or graphic would at this time be unacceptable. It does raise a point though and that is we must always be receptive to innovations and ideas to streamline our operations and give our produce a leading edge.

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*Around Australia continued***Tamborine and Northern Rivers Report**

By Tom Silver, Avocados Australia Director for the Tamborine and Northern Rivers Growing Area



Northern New South Wales and Tamborine avocado growers have endured the extremes of climate since my last report.

An already hot and dry summer got even worse, with temperature maximums above 35°C lasting for weeks, and two consecutive days in excess of 40°C. Temperatures in the avocado growing areas of this region rarely see such extremes, so damage to orchards resulted. Many growers' orchards, especially those with large crops, suffered extreme sunburn with much of the growing fruit having now dropped off. Another effect of the warm nights was the fruits' failure to size like it should, but we are hopeful that milder, wetter conditions leading to harvest may help remedy this.

Conditions finally broke at the end of February, followed by the remnants of Tropical Cyclone Debbie in late March dumping up to 570mm on farms in the north of the region but only 200mm on farms in the south. Growers in this region are well used to extreme rain events and can generally handle them. Thankfully the winds were not too bad and didn't strip much fruit from the trees.

The flooding that has occurred in Lismore, the south Tweed and other areas is extreme. The tragic loss of lives and the widespread destruction of all low lying houses and businesses is unbelievably shocking. It will take a big effort for a small city like Lismore to get through the next stage. My thoughts are with all of those affected.

Harvest will soon begin in our growing area. At risk of sounding like a broken record, only mature, quality fruit should be sent to market! Don't let your product be the piece of fruit that gives the consumer a bad experience and turns them off a repeat purchase.

**Western Australia Report**

By Neil Shenton, Avocados Australia co-Director for the Western Australia Growing Area



Summer made a valiant attempt to arrive this year, but ultimately it failed, and consequently the crops are behind in size compared to last year, and harvesting will probably be delayed this year. However, who knows what the winter will bring. It seems to have started early too, with colder than normal mornings but sunny days so far. There has been plenty of rain around, but not in all areas. The crops too seem a little patchy, although we will still produce a lot more than last year. This will mean that marketing and consultation with the large packhouses will be more important than ever and Infocado is a superb tool to help achieve this.

The new website is up and running and is more intuitive and easy to use than ever. All you need to be the best grower is on that site and we need to congratulate AAL, and especially Maree Tyrell, for the effort they have put in to it. Use it! Also the AAL newsletters, including Guacamole and Avo Alert, from CEO John Tyas are always a timely reminder of what needs to be done and are an excellent tool.

Import substitution for us in the West, and others, needs to be well managed and a priority. Again, accurate and timely information into Infocado is very important. New orchards, and extensions to existing orchards, are popping up everywhere and seem to be breeding like rabbits in the springtime.

Although I missed it, it seems Simon Newett from DAF Queensland and his team had another excellent presentation in March. What are we going to do when he retires?!

I hope Debbie didn't do any, or too much, damage to any crops in the regions she visited in Australia. I have never been in one of those monstrosities and hope I never do.

Central New South Wales Report

By Ian Tolson, Avocados Australia Director for the Central New South Wales Growing Area



A very hot, humid and dry summer had growers concerned about tree stress and the reliability of their irrigation systems. Unfortunately some growers did experience fruit loss due to the harsh conditions. Decent rainfalls were required but were not forthcoming.

Summer came and went and it was looking grim! A few storms contributed nothing to replenishing dams or water tables. Southern areas received rain before the local area, which had to wait until mid-March for some much welcomed rain events. Over 400mm of rain was recorded and thankfully this was not accompanied by strong winds.

The surrounding area is looking refreshed and growers are

now smiling. It is a bit of a double edged sword though with very dry conditions that changed almost overnight to wet conditions. These weather changes can lead to orchard issues and growers will need to be vigilant to maintain orchard health. As growers, the weather dictates our livelihoods and it must be heartbreaking for the areas to the north who have experienced such severe flooding, damage and loss.

It is now April and this area will no doubt be gearing up for harvest season. With a few 'greenskins' to pack, it won't take long for the Hass harvest to begin, dependant on dry matter of course. The fruit loss experienced due to the extreme heat should have minimal impact on the forecasted increase in volume to previous years.

North Queensland Report

By Jim Kochi, Avocados Australia Director for the North Queensland Growing Area

Phew! We dodged a bullet called Tropical Cyclone Debbie!

The North Queensland growers have all but completed the Shepard harvest. By all accounts yields were average, the size



range a bit smaller due to the long hot dry summer, but the quality regarding fungal pathogens was very good.

The Shepard harvest started a bit earlier, in February, and filled the gap left by the receding supply from Western Australia and New Zealand. However, the main Hass crop in the Atherton/ Tolga area is running later than expected and began in earnest at the end of Easter (19 April) and will continue into June.

The North Queensland growers have been diligent in sending samples to the Mareeba DAF Queensland office for independent Dry Matter (DM) testing this year, as they have done in previous years. The delay in the Hass harvest by two weeks is due to fruit samples showing less than 23% DM, but by early April, DMs should be favourable for harvest. This is the example that all the other districts should follow as well. It is a good start to the internal quality issue.

Again, quality should be good due to the long, dry summer season.

I hope this region can have a good clean run through autumn and winter to get the crop harvested, because as we all have seen lately, the weather can change very quickly.

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New Avocados Australia website launched

By John Tyas, CEO Avocados Australia

After 18 months of planning and development, Avocados Australia is pleased to announce the launch of its new website - www.avocado.org.au. We trust that avocado growers, supply chain participants, researchers and service providers will find it an excellent resource and a one-stop solution to your industry information needs. We are confident you will find it an excellent tool and hope you check it out today!

With a crisp new look, the new website provides visitors with easy and intuitive access to a plethora of industry information and sports a host of new features.

The upgraded Best Practice Resource houses the latest science-backed avocado management practice information and an extensive library of supporting resources. The new website also has an upgraded and powerful search functionality to easily extract information across the site.



Other features include a new Supply Chain Directory that will allow easy access to all sorts of businesses that play a role in the avocado industry.

The website has an extensive news and publication section where the latest, most relevant news items from Australia and around the world are regularly posted. Previous editions of Guacamole and Talking Avocados, as well as past Grower and Industry Notices, can all be easily accessed.

A new member's area has also been included where information is housed exclusively for Avocados Australia members.

As an added function of the website, Guacamole newsletters and email notices have also undergone a visual and functional transformation and are now seamlessly integrated within the new website. These changes aim to provide regular information in an easier to read and navigate format. We hope you like it, with even more improvements yet to come!

Avocados Australia gets Social!

By Beth Welden (acting Communications Manager)

Avocados Australia has launched into social media with a new industry-facing presence on both Facebook and Twitter. Avocado growers and the avocado supply chain can stay informed of avocado industry news, events and information as it happens.

Be sure to Like/Follow us and turn on notifications for our posts so you will never miss another thing on Facebook: www.facebook.com/AvocadosAustralia/ and Twitter: www.twitter.com/AvocadosAu.

If you haven't yet signed up to Facebook or Twitter, now is a great time! It is fast and simple to do and we know you'll be impressed with the 'as it breaks' nature of the news content and may even form new industry networks to help your businesses.

Do you have a story to share on social media? If you have a good news story, event, photos/videos of your business, crops or supply chain please forward them to the Communications Manager for sharing on these platforms: co@avocado.org.au. We'll look forward to speaking to you online!

New Avocado PHA levy

By John Tyas, CEO Avocados Australia

The new avocado Plant Health Australia (PHA) Levy has been approved by the Australian Government and came into effect on 1 April 2017. The levy is set at 0.1 cents per kilogram and the R&D levy has been reduced by an equivalent amount meaning no change to the total levy payable.

Managing national biosecurity

Maintaining effective biosecurity may not be the most exciting topic for some, but it is essential. National biosecurity is everyone's responsibility and Avocados Australia plays a key role in representing the avocado sector on biosecurity matters, particularly at a national level.

Australia's biosecurity system is a collaborative effort between federal and state governments and industry and this is coordinated through PHA. PHA was formed in 2000 as a not-for-profit company to service its members, Avocados Australia being one of the industry members.

Avocados Australia is a signatory to the Emergency Plant Pest Response Deed, managed by PHA. This is a formal, legally binding agreement between PHA, the Australian Government, all state and territory governments, and national plant industry body signatories.

The Deed covers the management and funding of responses to emergency plant pest incidents including the potential owner reimbursement costs for growers. It also formalises the role of industry's participation in decision making, as well as their

contribution towards the costs relating to approved responses.

What is the new levy for?

The new avocado PHA levy will provide a relatively small amount of funding to PHA to enable the avocado industry to manage its biosecurity obligations.

The levy will cover Avocados Australia's cost of membership to PHA and provide some funding to meet costs of participation in core processes under the Deed and to meet obligations as an industry member of PHA. Until now, these costs have been borne by Avocados Australia and its members.

Currently, avocados are involved in two Emergency Plant Pest Responses. One of these is dealing with an incursion of Varroa mite (*Varroa jacobsoni*), a pest of bees, in Townsville. The other is dealing with exotic fruit flies in the Torres Strait, an ongoing response plan to manage incursions in this 'buffer' region.

Avocados Australia has been actively involved in the approval of the response plans for these pests as well as providing funding for the implementation of the response plans. The Australian Government has underwritten our funding contribution for these responses that will now be repaid from the new PHA levy.

It is important to note that in the event of a major avocado pest incursion requiring a large investment from the avocado industry, a separate avocado levy which is currently set at \$0 can be implemented – the Emergency Plant Pest Response levy.

How will the PHA levy be managed?

The PHA levy will be collected in the same way that the R&D and Marketing levy is collected, by the Australian Government. Rather than it being remitted to Horticulture Innovation Australia Limited, it will be remitted to PHA. Each year, PHA and Avocados Australia will develop an annual plan for the expenditure of these funds that will be submitted to the Australian Government. We will continue to provide updates for industry as the PHA levy program develops.



A Varroa mite feeding on a European honey bee. The mites cause death and disease in bee colonies.
Photo by Scott Bauer, USDA - ARS, Bugwood.org.

Phosphorous acid monitoring service returns

By Graeme Thomas, GLT Horticultural Services

In 1977, I commenced work in the avocado industry with the aim of getting the first phosphorous acid product, "Alette", registered to control phytophthora root rot in avocados. After seven years of work, registration was granted. As usual in the trial process, we made many errors. We applied product from when the flush emerged following flowering, every six weeks until winter. We had no idea that during that period, there were times when the applied phosphorous acid would not have been translocated to the roots.

During that period I was extremely lucky that the avocado industry had the best plant physiologist and pathologist in Dr Tony Whiley and Dr Ken Pegg.

As time progressed, we became aware that the application of phosphorous acid needed to be applied at a time when energy was being translocated from the leaves to the roots. Applying outside these application windows would result in the

phosphorous acid being translocated to the leaves or to the fruit.

In consultation with both Dr Whiley and Dr Pegg we were also made aware as to what level of phosphorous acid was required in the roots to protect them from phytophthora attack.

The standard method of analysis to detect phosphorous acid in root tissue at that time involved the transporting of the roots from the orchard to the lab in a frozen state using dry ice. The method in the laboratory also posed a risk of explosion.

I gave the task of developing a user friendly test to the laboratory manager of SGS in Toowoomba, Queensland. What was needed was that roots could be sampled anywhere in Australia and posted to the laboratory without the risk of explosion. It needed to give the same result as the standard test. After a little over a year, this was achieved.

In the next few years we were able to develop a level of phosphorous acid in the roots that would last from one application window to the next. We also found that the persistence of phosphorus acid in the roots varied dramatically with orchard location. For example root levels declined very rapidly in the Atherton Tablelands region when compared to the southern growing regions.

The test is now used to verify any registration changes that have occurred. If we only knew in 1977 what we know now, it would not have taken seven years to register the product in the first place.

I have also used this test to check if different brands of phosphorous acid produce similar results.

Phytophthora root rot in avocados is undoubtedly still the single most important aspect of avocado management. Without roots, you have no crop and no income.

This is the only test that is available where you can scientifically test if a treatment you apply is present at levels sufficient to



Healthy avocado roots ideal for sampling.



The effects of phytophthora on avocado roots. Healthy roots on left with varying levels of damage. Damage can be more extreme than seen on this photograph.



Approximate volume of healthy roots required for phosphorous acid sampling.

Phosphorous acid monitoring service returns continued

produce a result. You are not flying by the seat of your pants.

With the work done on phosphorous acid, we have an effective method of managing root rot in avocados. If it is applied correctly, it works extremely well. I have been amused over the years to see the number of alternative “cures” that come and go after a period of time.

Up until December 2016, SGS provided the monitoring service for avocado growers throughout Australia. When they closed their Brisbane office, we were then without a service.

MA Analytical Services have been working with me to fill in the void. This service will work in a similar fashion to the service offered previously, in that samples can be taken from anywhere in Australia and posted express post to the laboratory in Brisbane.

So now we are all in a position where you do not have to guess. You can do a simple scientific test, and then make an informed management decision.

More information on this test including access to a request form, interpretation sheet and contact details can be found on the Avocados Australia website: www.avocado.org.au/public-articles/phosphorous-acid-monitoring-service-returns/.



Trees in a poor state of health due to severe phytophthora infection.



Healthy trees with no signs of phytophthora infections.

60 years of service in plant pathology

By John Tyas, CEO Avocados Australia

This year marks 60 years of dedicated service to DAF Queensland by 80 year old Dr Ken Pegg AM. A celebration afternoon was held on Monday, 20 February 2017 in the ground floor conference rooms at Ecosciences Precinct, Dutton Park, Brisbane.

Avocados Australia CEO John Tyas attended the event on behalf of the avocado industry along with about 80 other attendees including local DAF Queensland staff, former colleagues and industry representatives.

Ken has played a key role in the development of the Australian avocado industry with his pioneering work on phytophthora root rot and other avocado diseases.

Tribute speeches were given by Malcolm Letts (Acting Director General), Nick Macleod (Director, Vegetables & Deciduous Fruit), David Peasley (Peasley Horticulture), Tony Whiley, Melda Moffett, Bob Dodman and John Harden.



Dr Ken Pegg AM

Avocados Australia Chairman Jim Kochi noted that Ken has been an outstanding asset to the Australian avocado industry for the work that he has conducted and supervised in the field of plant pathology. Equal recognition should be made of Ken's encouragement and supervision of younger plant pathologists who were encouraged to work in the avocado field.

"The avocado industry in Australia and all the other producing countries owe Ken and his family our best wishes for the future and our gratitude for the interest and work Ken has done for the world avocado industry," Mr Kochi said.

"Ken, you are a gentleman and a scholar and we will always be reminded of that each time we look at the 'Pegg Wheel Chart' that should be proudly displayed, in your honour, in every avocado shed in this country."

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Infocado – still going strong 10 years on

By Jo Embry, Acting Supply Chain Program Manager

The Avocados Australia Infocado System has now been operating for more than 10 years, providing industry with timely information regarding volumes of fruit on the market as well as acting as an invaluable tool to assist in marketing and investment decisions at both an individual enterprise and industry level.

Since reports first started being published and emailed to all Infocado participants, annual Australian avocado supply has increased from 7.28 million trays in 2007 to 12.37 million trays in 2016 - an increase of 70%! (NB: 2006 figures are excluded because being the first year of the program there was a low contribution rate therefore the figures are not necessarily reflective of actual production).

New Zealand imports similarly have increased from 1.56 million trays in 2009 (the first year we collected data from NZ) to 3.33 million trays in 2016 - a 113% increase over that period. Over that same period Australia’s production increased by 63%. See Figure 1 below for year on year changes.

Supply in 2016 reached a record level of 15.7 million trays up from 13.9 million trays in 2015. Figures 2 and 3 illustrate the monthly volumes by growing region. The average retail price across the full calendar year reduced from \$3.15 per piece of fruit to \$2.75 per piece of fruit over that period.



There was an 860k tray increase in imports from New Zealand between the 2015 and 2016 calendar years. The final import figures for New Zealand avocados, however, reached 3.95 million trays over the 2016/17 summer season (4.5 million trays were forecast at the beginning of the season) which is a 1.85 million tray increase from the 2015/16 season during which 2.1 million trays were imported.

The most recent forecast for the 2017 calendar year is 16.8 million trays including Australian and New Zealand fruit.

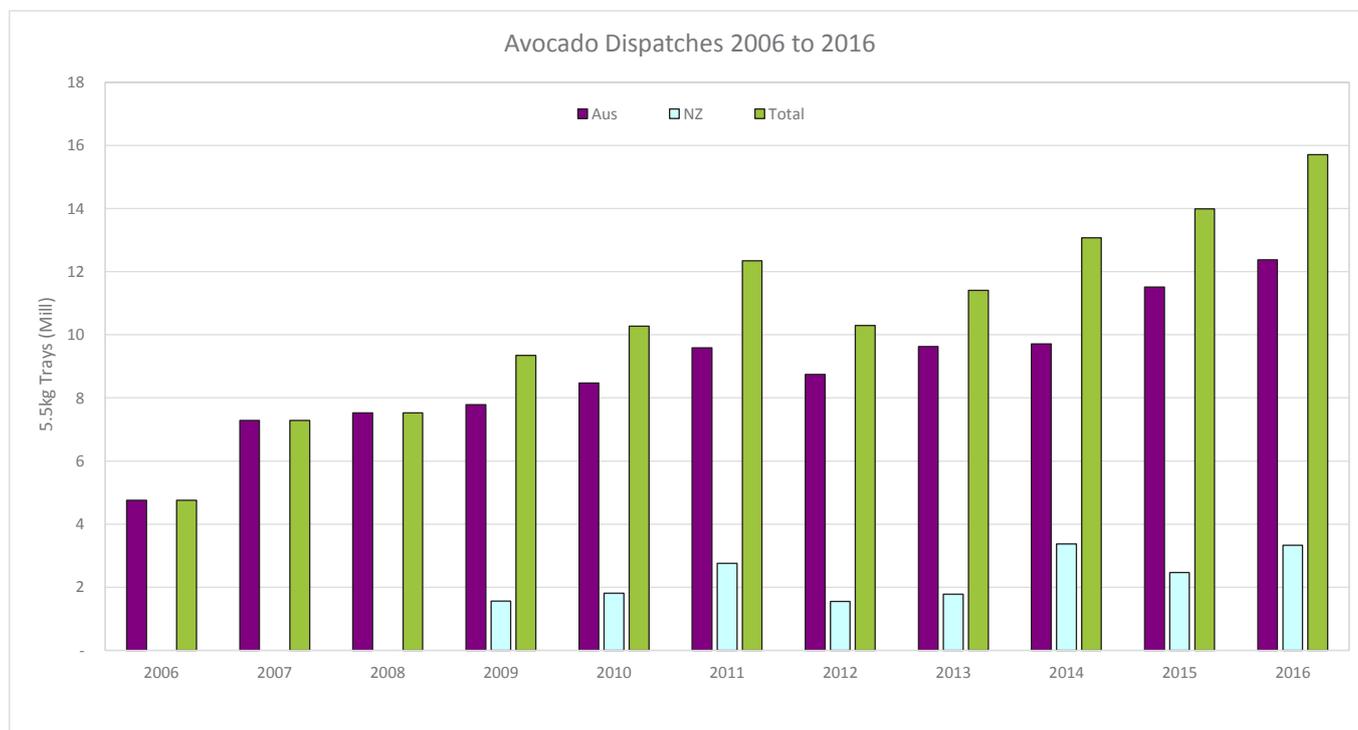


Figure 1: Avocado Dispatches from 2006 to 2016 (calendar years)

The April Quarterly report will be distributed to all Infocado contributors at the end of April and will include exact volumes of dispatched fruit for the first quarter of 2017. However, based on figures available so far, volumes are up by about 5% on 2016 for that first period.

Sydney retail prices are illustrated in Figure 4 below. Lower retail prices in early 2017 reflect the increased supply over the 2016/17 summer.

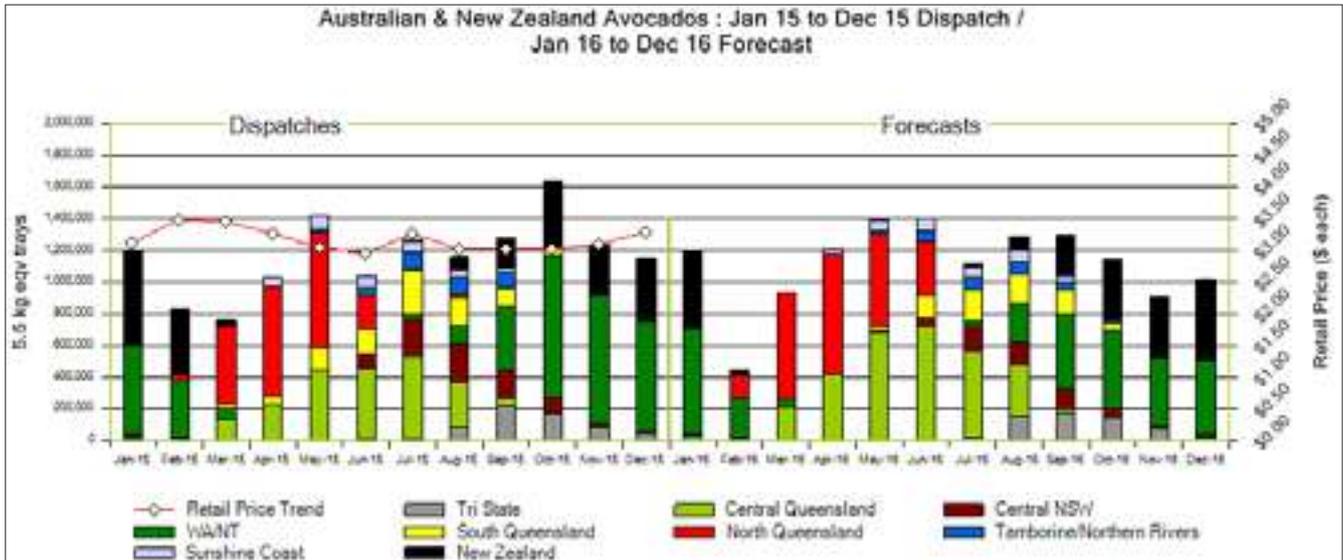


Figure 2: Avocado Dispatches and Forecasts Jan 15 to Dec 16

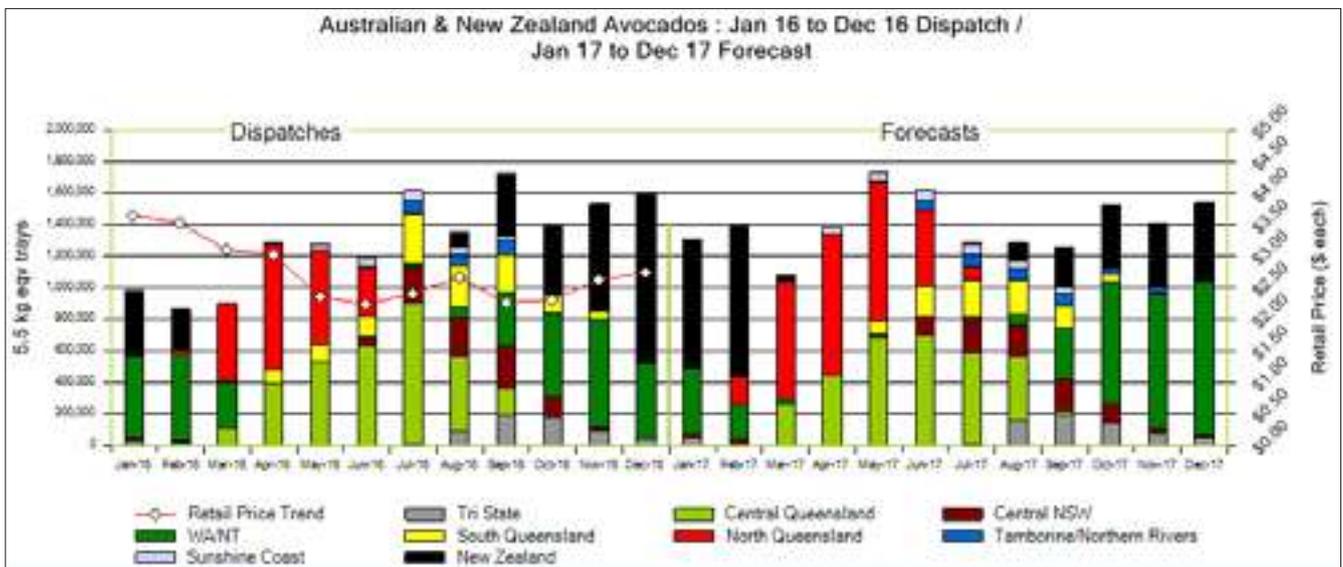


Figure 3: Avocado Dispatches and Forecasts Jan 16 to Dec 17

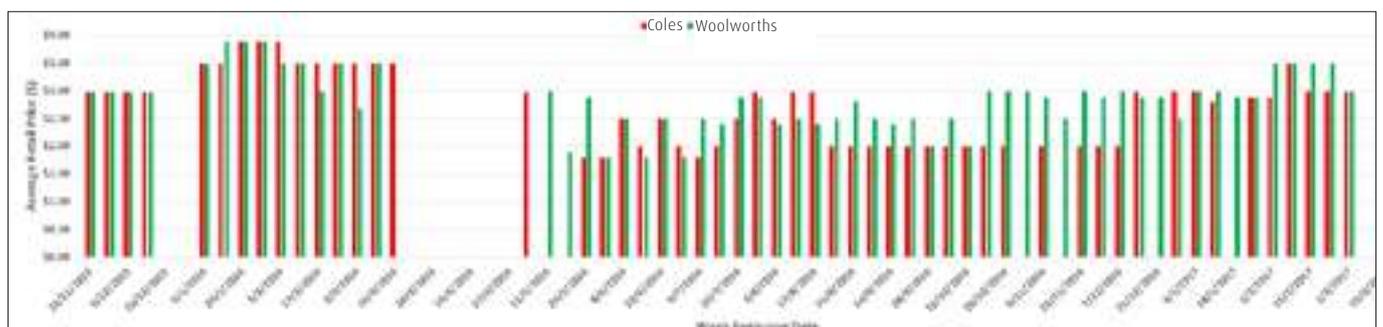


Figure 4: Online retail prices for Hass in Coles and Woolworths - Sydney



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Avocado Grower Study Group Workshops

By *Simon Newett*,
Queensland Department of Agriculture and Fisheries

Come along to an avocado growers' study group workshop near you hosted by a local grower and Simon Newett and Peter Rigden from the Queensland Department of Agriculture and Fisheries. These workshops will help equip you with the knowledge needed to implement practices that will lead to more consistent high yields of good-quality avocados.

Dates (can be subject to change) for upcoming study group workshop events around Australia can be found on the Avocados Australia's Event web page www.avocado.org.au/events/upcoming-events/. Final details for all events will be sent via email to all growers closer to the time and will include information regarding venues, times and workshop program plus a request to RSVP. If you are interested in offering your venue/farm to host an event, or have any further event enquiries please contact Simon Newett (Simon.Newett@daf.qld.gov.au).



Tom and Joel Winfield conducting the farm walk on their family's orchard near Manjimup during the WA growers' study group meeting on 16 March which was attended by over 60 people.

Upcoming workshops

- North Queensland – 13 July and 5 October
- Central Queensland – 10 August and 16 November
- South Queensland – 15 June and 30 November
- Tamborine/Northern Rivers – 18 May
- Central NSW – 1 June and 2 November
- Tristate – 26-27 July
- Western Australia – 20 and 22 June (bus tours)

Summary of 2017 workshops to date

The Western Australia avocado study group workshop was held on the Winfield family orchard near Manjimup WA on 16 March and was attended by 63 growers and industry stakeholders. The agenda included the first year's yield results from the Small Tree High Productivity Initiative, an update on six spotted mite and greenhouse thrips, post-harvest care of fruit from two perspectives, and mulching. This was followed by a farm walk.

The Tristate Avocado Study Group meeting was held in Waikerie, South Australia on 30 March and was attended by 42 growers and industry stakeholders. The agenda included the first year's yield results from the Small Tree High Productivity Initiative, yield results from the South Australian rootstock trial and a presentation by a local expert on irrigation and fertigation. The farm walk included an inspection of the rootstock trial on the Thiel family's orchard and a visit to the Boehm family's orchard nearby.

The illustrated minutes from both these workshops will be available on the BPR soon.



Over 40 people attended the Tristate growers' study group meeting in Waikerie on 30 March and had the opportunity to inspect the promising crop in the rootstock trial on Kym & Craig Thiel's orchard.

Beijing Fruit and Vegetable Fair

By Daryl Boardman, Avocados Australia representative to the 2016 Fair

Avocados Australia representatives attended the annual China Fruit and Vegetable Fair (ChinaFVF) from 30 October-1 November 2016 under the Australia Fresh banner lead by the Hort Innovation Trade Division. More than 11,000 professional visitors from 31 countries and regions around the world gathered at ChinaFVF 2016.

Avocados Australia has been attending the annual three day ChinaFVF event, held at the China National Convention Centre in Beijing, since 2012 to further develop export opportunities and build strong and sustainable relationships in China and other Asian markets. The event showcases products like fresh fruits and vegetables, dried fruits and nuts, chilled and frozen fruit and vegetables as well as post-harvest techniques and equipment, packing equipment and technology, planting techniques, logistics and financial solution services, and e-commerce services.

Australia Fresh exhibits at ChinaFVF for strategic reasons. Currently the horticulture industry has limited access to China for fruit and vegetables, or products that do have access are in a mature stage. The value of attending the show is to continue to develop relationships with key Chinese organisations including China Entry-Exit Inspection and Quarantine Association (CIQA) and General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ). It is therefore imperative to build on

these key relationships over the long term if Australian avocados are to achieve access into China and Asian markets – it took nectarines ten years to gain access.

Since first attending, the uptake and consumption of avocados in China has exploded as a result of access to Mexican avocados and now others including Chile and Peru. Like all Australian produce, avocados are grown in a very clean and high food safety environment that is highly sought after in China where



Australia Fresh Stand at ChinaFVF 2016



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Beijing Fruit and Vegetable Fair continued

consumers want safe fresh products.

The growth of the Australian avocado industry is increasing the need for more export markets in the near future and we were under no illusion that gaining access to China and other Asian markets will take some time. Australia hopes to gain access by 2020/2021 for avocados to this important market. Avocados Australia will continue to do whatever research and promotion is needed to open this vital market. The interest from China in Australian avocado orchards also demonstrates that they also see this industry as a big opportunity in their country.

Avocados Australia participants' feedback from the 2016 event was positive, expressing that the format worked really well being more open plan, well run and well received by visitors. The trade show in the past has also provided opportunities for industry to meet and network with Chinese officials, government, embassy representatives, professional associations and industry executives and commercial buyers - to share information, meet potential clients and get firsthand knowledge of the market. Unfortunately the format



Daryl Boardman, Avocados Australia representative to the 2016 ChinaFVF showcasing Australian avocados to Asian markets, pictured with a visitor.

this year was different and these talks did not occur with industry representatives, but we are hopeful that this level of engagement will be available to industry in the future.

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Fair Farms Initiative to be rolled out nationally



By Rachel Mackenzie, Chief Advocate, Growcom

A new Fair Farms Initiative is to be rolled out nationally by Growcom in an effort to improve the reputation of the horticulture industry in relation to the treatment of workers. Although it is acknowledged that the majority of growers do treat their workers fairly and are compliant with workplace legislation, sadly the actions of a few are getting significant media coverage and tarnishing the reputation of the industry as a whole.

The focus of the Fair Farms Initiative is to ensure that growers not only have the tools and knowledge to treat their workers fairly but also can demonstrate that to their customers and the wider community.

The Fair Farms Initiative is significantly funded through the Fair Work Ombudsman's Community Engagement Grants Program and has an initial focus on vulnerable workers, however, the program's goal is to benefit all workers and growers in the longer term.

The Fair Farms Initiative has five main components:

1. A series of information articles on key workplace relations issues for publication in an array of industry magazines including Fruit and Vegetable News, Vegetables Australia and other regional and industry publications;

2. The roll out of the Hort360 workplace relations best management practice (BMP) module nationally, over the next four years, to enable growers to do a confidential risk assessment of their current practice and identify areas for improvement;
3. Targeted regional seminars throughout Australia focusing on key areas of non-compliance;
4. The development, through Freshcare, of a voluntary third party Audited Certification for growers to enable them to demonstrate compliance;
5. Development of a pathway to qualifications in Human Resources for interested growers.

These activities will be supported by a strong presence at the 2017 HortConnections conference in May, where Growcom will be holding a workplace relations symposium covering off on issues such as the Horticulture Award and the certification scheme.

For more information on the symposium please visit the Growcom website: www.growcom.com.au/FairFarmsInitiative. For more information on the program please contact Workplace Relations Advisor, Annabel Hutch on 07 3620 3844 or email wrteam@growcom.com.au.



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Grower Profile **Katrina Myers, Barham Avocados**

How long have you been in the avocado industry? What industry (if any) were you in before this?

We have been back on the farm and farming avocados for six years. Prior to that I worked as an agronomist and in natural resource management. My husband Tim was a vet.

What prompted you to become an avocado farmer? What do you enjoy most about being an avocado farmer?

Both my husband Tim and I had grown up on farms and when we had our first baby Daisy, we realised we wanted to be on a farm. We also realised we probably weren't going to be able to afford to buy one where we were living at the time in Young, NSW. So we thought about the two farms that we had grown up on as options. We were really attracted to my family farm because of the avocado orchard. We thought avocados were a bit different and saw a lot of potential in the industry and to value add and do things differently.

What varieties of avocado do you grow? What is your main variety? What variety do you prefer to grow and why? What other crops (if any) do you grow?

We have two main varieties, Hass and Reed, as well as some Fuerte and Bacon that were original trees planted almost 40 years ago. The Reed are our absolute favourite. We grow a really good quality Reed down here because of the cooler climate and longer growing season. They are so creamy and delicious!

We grow 40 acres of avocados but the whole farm is 2500 acres so we also do some cereal cropping and some rice and run some merinos. It's a great use of the farm as the high value crop is grown on the best soil, the sand hill and then we opportunistically crop the rest and run sheep. Diverse and sustainable!

What makes your avocados unique?

We believe they are the best tasting avocados in Australia! Because of our cooler climate the growing season is much longer than in tropical climates and the fruit hangs on the trees for 12 months which means the oils really develop giving them a beautiful flavour. We also don't have any pests or diseases which means we can grow them without any pesticides which is a massive bonus.

Are there any growing practices you use that are different to standard growing practices (that you would like to share)?

We focus a lot on soil health and we are trying to minimise inputs as much as possible. We use a lot of fish fertiliser and of course no pesticides. We have considered going organic but prefer to focus more on sustainable production for people, profit



Katrina Myers and family

and planet, rather than specifically aiming for organic. We know exactly what we use on the orchard and what effect it has on the trees and the fruit. We know that nothing we use is harmful and we are very proud of the way we produce our avocados.

What is unique about growing avocados in your region/on your farm? What are the biggest issues affecting avocado growers in your region?

As mentioned earlier, the climate is the main thing that is unique about this area and the absence of pests and disease. The cooler climate also means greater risk and the biggest issues we face are frosts and extreme high temperatures in summer. We

have to have frost fans and overhead misters to manage these risks.

What's the best advice you would give to someone who has just started/entered growing avocados as a business?

Get a great consultant! We use Lisa Martin of Ripehort and she has been amazing. We could not have done what we have done without her. Also - water, water, water - managing the soil moisture is key. Definitely a good idea to be using soil moisture monitoring systems and have fun! They are the most beautiful trees to grow and we love every minute of it.

Do you have a favourite avocado recipe? What is it?

Our favourite way to eat avocados is on toast, on biscuits and in salads, but we love making chocolate avocado brownie. Message me on Facebook if you want the recipe.

Why did you become a member of Avocados Australia?

We became a member of Avocados Australia so we could stay up to date with what's happening in the industry. It's great to have access to the BPR and also to be able to attend the Qualicado field days to network with others in the industry. Avocados Australia is a fantastic example of how a good industry body should work.



Sunset at Barham Avocados farm



Family/farm details:

Our farm is located on the Murray River in Barham, New South Wales, on the border with Victoria and half way between Albury and Mildura. My husband Tim and I have three young children and love what we do! More information on our business can be found on our website: www.barhamavocados.com.au and you can also follow me on Twitter: @BarhamAvocado or Facebook www.facebook.com/barhamavocados.

Is there anything else that you are passionate about apart from Avocados?

I am a steering committee member for The Ripple Effect research project run by The National Centre for Farmer Health and funded by *beyondblue*. The aim of the project is to reduce the stigma around suicide in rural communities and to investigate if an online platform can help do this. The project is

the first of its kind that is specifically focussed on being able to build an accurate, national insight into what is going on in the minds of our farmers, what their stories and options are and to get that to the people who can help make a difference.

I was selected for the steering committee due to my firsthand experience of having lost my own father to suicide when I was fifteen. I am really passionate about helping to make sure this doesn't happen to other farming families and through raising awareness and openly talking about this issue, we can now help others. If you, or someone you know, has been feeling down for a spell, please speak out – it will make a difference and can literally change your life. You're not alone.

I'd also welcome you to participate in the online Ripple Effect platform by going to www.therippleeffect.com.au.

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...ISN'T IT TIME YOU CAME ON BOARD?

New avocado project – data capture, analysis and reporting

By John Tyas, CEO Avocados Australia

The Australian avocado industry has a strong history of being data-driven. From having the most up to date understanding of consumers to drive marketing strategies - to analysing the potential impacts from Mexican imports - to evaluating new export market opportunities, data is King.

One of the most valuable data systems for the industry is the Infocado™ system which monitors avocado dispatches and forecasts. Continuing the ongoing reporting of this data is just one aspect of a new project recently awarded to Avocados Australia by Hort Innovation using the avocado R&D levy with matching funds from the Australian Government (AV16006 - Avocado industry and market data capture and analysis).

The project will be led by John Tyas, Avocados Australia CEO and we have initiated the recruitment of a full-time data analyst to assist with this project.

Garry Goucher, an experienced agricultural economist, is also part of the team to provide expert advice along the way and other Avocados Australia staff will provide valuable project support.

The key components of the project are:

1. Seasonal avocado product dispatch and forecast system

This will involve the ongoing maintenance and development of the Weekly and Quarterly Infocado reports which monitor avocado forecasts and dispatches.

We have recently completed a consultation process with packers, consolidators and wholesalers to make changes to the Weekly Infocado Reports. These changes will require a significant investment in software development (not funded by Hort Innovation) but also an increase in the number of packhouses contributing data directly to the system.

This project will provide additional resources to increase industry participation and data accuracy through regional visits and on-ground validation of crop estimates.

2. Avocado industry strategic information system

The Orchard Info Tree Census is critical for gathering planting data. Without a good understanding of trees in the ground it is very difficult to reliably plan for future industry growth.

This project will continue the collection, analysis and reporting of this data. It will also continue to monitor orchard productivity levels through a targeted annual survey, as was undertaken with a subset of growers in the past few months.

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3. Industry data analysis

Data is only useful once it has been properly processed, analysed, organised, structured and presented as 'information'.

This project will undertake analyses of primary data and other available data to understand trends and relationships between supply, demand and price. It will also undertake analyses of available data to develop short, medium and long term production forecasts for industry.

4. Global trade data analysis

Given the rising importance of export market development for the Australian avocado industry, this project will support export development initiatives. It will provide analyses of target markets, provide a global trade data reporting system and produce global trade reports for industry communication.

5. Annual report of industry statistics

The various data sources will be analysed and collated on an annual basis to provide an annual status report on the industry. This will be available to industry stakeholders.

6. Support for ST15006 Multi-scale monitoring tools for managing Australian Tree Crops: Industry meets innovation

Avocados Australia is a project team member on this large multi-industry, multi-agency project. One of the objectives of this project is to map all avocado orchards in Australia and to gather orchard data using remote sensing (e.g. satellite imagery). The avocado data analyst will actively collaborate with the researchers involved in ST15006 and provide a dedicated primary point of contact for the avocado industry in this project. The aim is to incorporate this technology into our data capture systems.

7. ABS Collaboration

Avocados Australia has commenced working with ABS in a partnership to explore ways to improve the quality of avocado industry data and efficiency of data collection. The data analyst employed through this project will provide a strong resource to work with ABS and explore the best options for data collection and reporting.

This project will provide a key role in supporting the ongoing development of the industry. It will:

- produce high quality industry and market data to assist both short and long term industry planning and decision making;
- support seasonal harvesting and marketing decisions by avocado growers and supply chain participants through the collection of robust, relevant and verifiable supply throughput, trade and retail pricing information;
- help maintain a supply and demand balance to optimise value for growers and quality for consumers;
- produce long term industry production forecasts to inform stakeholders of the medium-long term outlook for the industry;
- monitor Australian orchard productivity over time to evaluate changes.

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Multi-scale monitoring tools for managing Australian tree crops – Industry meets innovation

By Horticulture Innovation Australia Ltd.

What's it all about?

The Multi-scale monitoring tools for managing Australian tree crops – Industry meets innovation project is managed by Horticulture Innovation Australia with funding from the Australian Government's Rural R&D for Profit program. The project is coordinated by the University of New England and is delivered by a broad range of research providers through a number of sub-projects. Its ultimate aim is to improve farm-gate returns, grower productivity and industry mapping capabilities, with a focus on tree crops including avocado, mango, macadamia and banana. Project activities involve developing and putting to use a range of monitoring and decision-support tools, from satellite imaging and sensing systems to cloud-based computing, on-ground robotics, in-hand devices, apps, and more.

These tools will help growers with yield forecasting and optimisation, early detection of issues such as pest and disease outbreaks, and bring cost and effort efficiencies in regards to

crop management and harvesting.

What's the latest update?

There's been a lot going on in the first 18 months since the program began. As just a small snapshot, in regards to avocado the following work has been progressing.

1. Decision-support tools

As a non-invasive tool for assessing fruit maturity, near-infrared (NIR) technology is becoming embedded in the mango industry as a valuable harvest-time decision-making aid. This most recent season it's also been used for avocado at a pilot site in Childers, Queensland. The trial has involved the use of a hand-held Felix 750 Produce Quality Meter to measure dry-matter content, and thus give an indication of fruit maturity in given areas of the orchard. The researchers report that while precision for avocados has been a little lower than that for mangoes, the data has been a useful tool in harvest management, and calibrations and testing will continue.

There is also the capability to merge the NIR technology with a web-app decision-support tool - allowing the field dry matter measurements from the Felix reader to be placed over a farm



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map, to help guide the decision to harvest. Likewise, this is being further developed.

2. Using drones to detect phytophthora on farm

Due to the growing interest in drone and UAV (unmanned aerial vehicle) imagery, one of the project teams is evaluating the use of thermal imagery in detecting Phytophthora. Imagery has been captured over targeted field sites in Bundaberg/Childers and Wamuran in Queensland, as well as in Comboyne/Port Macquarie in New South Wales, with data analysis currently underway.

3. Orchard imaging

Work continues in the use of satellite and drone-based imaging and sensing technologies to measure crop yield, fruit size and fruit quality. The end goal is to give growers the means to use maps relating to these attributes, so efficient decisions can be made about harvesting, pest control, nutrient inputs, water use and the like.

To this end, the researchers report that satellite imagery continues to be acquired over intensive tree-growing regions, including the Bundaberg region of Queensland for avocado. This data and others, including multi-spectral imaging from drones, is being used to map tree and crop characteristics that are of direct use for growers, and is currently being validated by ongoing on-ground testing.

Results thus far indicate that evaluating high resolution satellite imagery for mapping the variability of avocado yield and fruit size across orchards is very achievable and will be further explored in the next edition of Talking Avocados.

4. Orchard mapping

One element of this research program involves the development of a national 'footprint map', detailing the extent of Australia's commercial avocado, mango and macadamia orchards. The map will show the crops and varieties that are being grown across the country. This is in collaboration with the Australian Collaborative Land Use and Management Program (ACLUMP) and will help industries address biosecurity and disaster recovery, building on publically available data.

Currently, anyone is able to contribute to the national map with field-based observations, by using the free Land Use Survey app. The app is available for iOS and Android smart devices in the iTunes App Store or Google Play Store.

See the related article by Craig Shephard on page 28 that provides more detail about this component of the project.

For information about this project, contact Associate Professor Andrew Robson, Agricultural Remote Sensing Team: Precision Agriculture Research Group, University of New England, Armidale. Phone: 02 6773 4085 or email: andrew.robson@une.edu.au

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Mapping Australia's orchards for improved industry biosecurity and natural disaster recovery

By Craig Shephard, Principal Scientist, Remote Sensing Centre, Science Division, Department of Science, Information Technology and Innovation

Calling all citizen scientists, growers and horticulture industry experts. Your knowledge is required to improve a new map of Australia's avocado, macadamia and mango orchards. The map delivers vital information to industry bodies to aid in more informed responses to biosecurity outbreaks and post natural disaster recovery and monitoring. So grab your smart phone, get out into your orchard and become part of this collaborative land-use mapping project.

The Web Map is one component of the project Multi-scale monitoring tools for managing Australian tree crops – Industry meets Innovation.

In collaboration with Avocados Australia, Australian Macadamia Society and Australian Mango Industry Association, a collaborative team from four universities, government agencies, industry partners, grower groups and commercial providers have developed a new interactive web map of selected horticulture tree crops across Australia. The draft mapping integrates satellite imagery with industry and government land cover data, regional surveys and on-ground evaluations to map the location and area of every commercial (>2ha) avocado, macadamia and mango orchard across Australia.

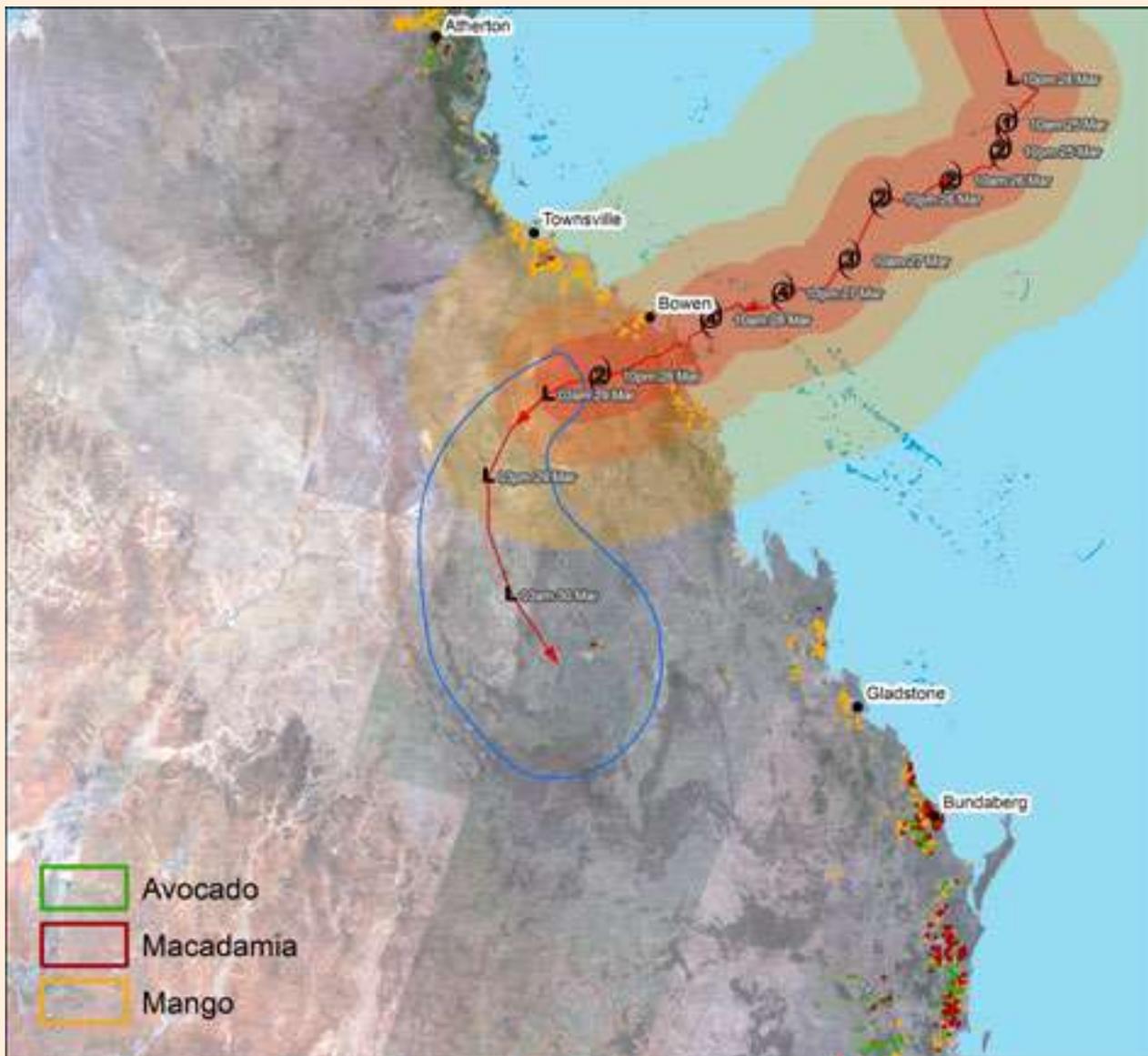
Launched earlier this month and now open for review, the Industry Engagement Web Map (Search www.arcgis.com for "Industry Engagement Web Map") provides stakeholders, growers and experts from the avocado, macadamia and mango industries an opportunity to review and improve the draft map.

The Web Map and its associated data will be used by industry to develop a better understanding of growing area and underpin improved biosecurity and post natural disaster response and monitoring.

For example, in the event of a disease outbreak, industry groups can access the map and know exactly where surrounding crops are and quickly develop management strategies. The product can also be used to map disasters like floods, fires and cyclones and speed up applications for recovery assistance. In fact, the map is already providing critical information to the natural disaster response and recovery effort in the wake of the devastating Category 4 Tropical Cyclone Debbie which crossed the Queensland coast on Tuesday 28 March 2017.

The Web Map—accessible from any desktop or mobile device web browser and no user account or subscription is required—uses coloured polygons to identify horticultural land-use classes (avocados, macadamias, mangoes) on the base satellite imagery.





Horticulture tree crops impacted by Tropical Cyclone Debbie

Stakeholders are invited to view this draft mapping, compare it with their own local knowledge and provide comments and feedback. Comments can be submitted if the information is missing, incorrect or misclassified using an easy pop-up window with predefined options in drop down menus live within the Web Map. Once the comment window is completed it will be synchronised for other users to see. Search www.arcgis.com for "Industry Engagement Web Map", open the web map and add your comments!

Stakeholders can also use the free Land Use Survey app (iOS and Android) to inform the classification of tree crops by capturing GPS-coded point observations and photos. Comments and data collected via the map and app will be interpreted before the final mapping products are compiled and released in September 2017.

For information about the greater project, please contact

Associate Professor **Andrew Robson**, Agricultural Remote Sensing Team: Precision Agriculture Research Group, University of New England, Armidale.

Phone: 02 6773 4085. Email: andrew.robson@une.edu.au

For information about the web map and cyclone Debbie response, contact **Craig Shephard**, Principal Scientist, Remote Sensing Centre, Queensland Land Use Mapping Program (QLUMP), Department of Science, Information Technology and Innovation, Brisbane.

Phone: 07 3170 5664. Email: craig.shephard@dsiti.qld.gov.au

This project is funded through the Australian Government's Rural Research and Development (R&D) for Profit programme, managed by Horticulture Innovation Australia 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, and Simpson Farms Pty Ltd.

Summary of growth and yield data from the Waikerie rootstock trial, 2013-2016

By Dr Elizabeth Dann, Senior Research Fellow, Queensland Alliance for Agriculture and Food Innovation (QAAFI)

The rootstock trial at Waikerie, in the Riverland region of South Australia, was planted in early October 2012 as a final activity of Tony Whiley’s project AV08000 “Rootstock Improvement for the Australian Avocado Industry”. It was planted six years later than the other rootstock trials due to the extended drought in the area and the lack of water for irrigation from the Murray River.

Table 1 lists the rootstocks planted in the trial, and provides some comment on each. Nine seedling rootstocks were chosen for this experiment. Following advice from local growers no pure Mexican race material was chosen for testing at this site due to past experience with high salinity in irrigation water (Mexican race varieties have the greatest susceptibility to salinity). All rootstocks were grafted with Hass.

Table 1. Seedling rootstocks used in the Riverland avocado rootstock experiment planted at Waikerie on 3 October 2012. All rootstocks were propagated to Hass. At least ten replicates of each rootstock (except Reed where there were eight trees) were planted in a randomised block design. (Reproduced from AV08000 Final Report)

Rootstock	Horticultural race	Comments
AA1	Guatemalan	AA1 An Anderson’s nursery rootstock currently untested in the rootstock project.
A8	Guatemalan	An Anderson’s nursery rootstock with good performance at some sites in the rootstock project.
A10	Guatemalan/Mexican	An Anderson’s nursery rootstock with good performance at some sites in the rootstock project.
Ashdot	West Indian	A Birdwood nursery rootstock (from Israel) with dwarfing characteristics and high yield efficiency.
Reed	Guatemalan	Reed is used extensively as a rootstock in Western Australia. Good production at some sites in the rootstock project.
SHSR02	Guatemalan	Consistently amongst the top yield rootstocks at sites across the rootstock project. Has good resistance to Phytophthora root rot.
TT	West Indian	An unknown rootstock with strong West Indian characteristics. Should have good salt tolerance.
Velvick	West Indian/ Guatemalan	Currently the most widely used rootstock in Australia. Consistently amongst the top yield rootstocks at sites across the rootstock project.
Zutano	Guatemalan/Mexican	Currently the main rootstock used in the Riverland and New Zealand. Good performance at some sites in the rootstock project.

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The trial was visited in August 2013, September 2014, May 2015, August 2015 and September 2016. Measurements included tree height, canopy diameter, trunk circumference above and below the graft union, and in 2015 and 2016, yield and fruit numbers per tree. Several trees died within 6 months of planting, due primarily to an extended period of extremely hot weather at Waikerie in February 2013. Only 30% of trees grafted to Ashdot survived. A severe frost occurred in August 2014 during flowering, and the subsequent yield for the 2015 crop was affected, particularly in rows 1-5, which are slightly lower-lying than rows 6-10.

Tree survival and height in 2013, ten months after planting are presented in Table 2. At least 85% of the trees grafted to Zutano, AA1, A10, SHSR02 and Velvick originally planted were still alive. While differences in tree heights were not quite significant across the nine rootstocks ($P=0.054$), the tallest trees were on A10, Reed and Zutano rootstocks, and the shortest on Ashdot, SHSR02 and TT. Canopy diameter and trunk circumference could not be reliably measured for all trees, as they were protected with hessian.

In September 2014, two years after planting, trees were approximately 50% taller than after the first year, however there were no significant differences among the nine rootstocks (Table 3). The tallest trees were on Velvick, A8 and A10. In both the first and second year evaluations, trees on TT and Ashdot rootstocks were amongst the shortest in the trial. Highly significant ($P<0.001$) differences in canopy diameter were evident, with trees on Velvick having the greatest diameter, which was significantly larger than trees grafted to AA1, Zutano, Ashdot, A8 and TT rootstocks (Table 3). There were no differences amongst rootstocks in severity of frost damage to the 2014 flowering (data not shown).

Table 2. Survival and heights of Hass trees grafted to different rootstocks ten months after planting at Waikerie, SA.

Rootstock ^a	% survival	Height (cm)
AA1	90	115.5
A8	70	112.2
A10	100	130.5
Ashdot	30	105.7
Reed	75	127.0
SHSR-02	100	108.6
TT	80	109.0
Velvick	100	121.8
Zutano	85	125.5

Table 3. Growth of Hass trees grafted to different rootstocks measured in September 2014, 23 months after planting at Waikerie, SA

Rootstock	Height (cm)	Canopy diam. (cm)	Canopy volume (m ³)
AA1	155	122 bc	0.63 bc
A8	184	104 cd	0.58 bc
A10	167	133 ab	0.84 ab
Ashdot	145	105 bcd	0.44 bc
Reed	159	132 ab	0.75 ab
SHSR02	158	123 abc	0.65 b
TT	133	92 d	0.30 c
Velvick	181	139 a	0.99 a
Zutano	153	118 bc	0.61 bc

Within each column, means followed by the same letter are not significantly different $P<0.05$



Rachel Abel assisted with fruit harvest at the Waikerie rootstock trial, August 2015

Summary of growth and yield data from the Waikerie rootstock trial continued

Research and Development

Nearly three years after planting, there were significant differences amongst rootstocks in tree heights, diameter and canopy volumes, but no significant differences in yields or fruit numbers per tree (Table 4). Trees on Velvick rootstock were significantly taller and had greater canopy volumes than all other rootstocks, except A10 and Reed. The smallest trees were on TT and Ashdot rootstocks. Flowering and fruit set of trees in Rows 1-5 were severely damaged by frost in August 2014, reducing yields almost completely for half of the trial. Omitting those frost-affected trees from analyses, highest yields per tree were from Velvick rootstock at nearly 8kg per tree (Table 4). Five Velvick trees yielded over 10kg each, and one tree yielded 26.5kg. Average yield and fruit numbers were also high from the 3 surviving Ashdot trees, however this result

must be viewed with caution as a single tree yielded 16kg in 2015, accounting for the high average yield and fruit number compared with most other rootstocks (Table 4). (The same tree in 2016, however, had less than 1kg, contributing to a very low average yield for Ashdot that year (Table 5)).

In September 2016, four years after planting, there were significant differences among rootstocks in tree height, diameter and canopy volume (Table 5). Velvick, Reed, Zutano, AA1 and A8 trees had canopy volumes over 8m³, and Ashdot and TT had the smallest canopies. Yield per tree and fruit numbers were not significantly different among rootstocks (due to large tree-to-tree variability even within each rootstock), however, A8, A10, AA1 and Zutano had the highest yields. Surprisingly, Velvick was one of the lowest yielding rootstocks in 2016, compared with

Table 4. Growth and yield of Hass trees grafted to different rootstocks recorded in August 2015, nearly 3 years after planting at Waikerie, SA

Rootstock	Rows 1-10 ¹						Rows 5-10 ²		
	n	Height (cm)	Canopy diam (cm)	Canopy volume (m ³)	Yield (kg)	Fruit no.	n	Yield (kg)	Fruit no.
AA1	10	228 bc	237 bcd	3.47 bc	2.47	9.50	6	4.06	15.7
A8	9	217 bc	222 cd	3.04 bc	1.05	3.69	7	1.31	4.60
A10	11	236 ab	247 abc	4.02 ab	2.87	11.8	7	4.04	17.0
Ashdot	3	183 cd	201 de	2.01 cd	6.94	29.3	3	6.94	29.3
Reed	6	249 ab	260 ab	4.60 ab	2.90	12.0	4	4.17	17.5
SHSR02	13	217 bc	246 abcd	3.48 bc	1.40	5.46	8	2.24	8.75
TT	7	162 d	165 e	1.17 d	1.56	7.71	4	2.56	13.0
Velvick	20	260 a	265 a	5.07 a	4.35	18.1	11	7.85	32.6
Zutano	11	225 bc	246 abcd	3.67 bc	3.93	15.9	8	5.41	21.9

¹ means of trees from all rows in the trial,

² means of trees in rows 5-10, which were not severely frost-damaged during flowering in 2014

n = number of replicate trees

Within each column, means followed by the same letter are not significantly different P<0.05

Table 5. Growth and yield of Hass trees grafted to different rootstocks recorded in September 2016, nearly 4 years after planting at Waikerie, SA

Rootstock	n	% survival	Height (cm)	Canopy diam (cm)	Canopy volume (m ³)	Yield (kg/tree)	Fruit no.
AA1	10	90	291 cd	330 ab	8.67 ab	5.57	24.8
A8	8	62	311 abc	318 ab	8.40 ab	6.73	28.6
A10	11	100	289 cd	303 b	7.58 b	6.41	26.4
Ashdot	3	30	256 de	293 abc	6.04 bc	0.69	2.67
Reed	6	75	333 ab	330 ab	9.57 ab	3.62	16.2
SHSR02	12	86	296 bcd	310 b	7.54 b	4.06	17.7
TT	7	70	237 e	246 c	3.84 c	0.22	0.86
Velvick	20	100	334 a	343 a	10.69 a	2.76	11.1
Zutano	10	77	321 abc	314 ab	8.46 ab	5.65	24.1

n= number of replicate trees

Within each column, means followed by the same letter are not significantly different P<0.05

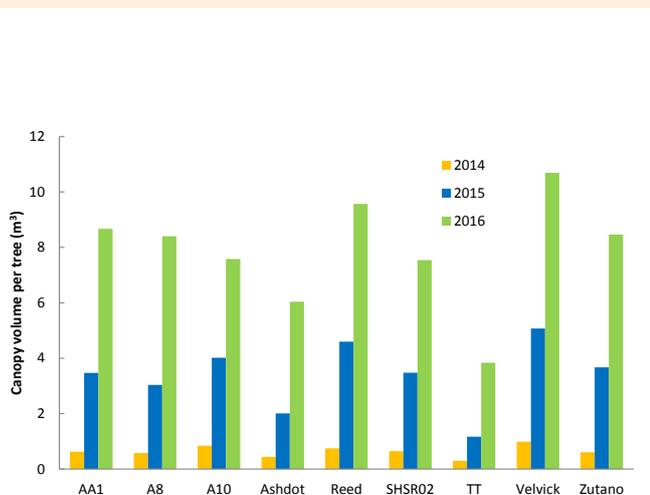


Figure 1. Canopy volume (m³ per tree) of 'Hass' trees grafted to different rootstocks planted at Waikerie, SA, in October 2012

Figure 1. Canopy volume

2015 when it was the highest yielding rootstock (after omitting trees frosted at flowering in spring 2014). Cumulative yield (total yield for 2015 and 2016) was greatest for trees grafted to Zutano rootstock, at nearly 10kg/tree, and also high for A10 at over 9kg/tree. AA1, A8, Ashdot and Velvick trees had yields of 7-8kg/tree, while Reed and SHSR02 yields were 6.5 and 5.6kg/tree, respectively. TT rootstock had the lowest yields at just over 1kg/tree. Canopy volume and yield increases for each rootstock across the years can be easily visualised in Figure 1 and Figure 2.

The circumference of the trunk above and below the graft was measured each year from 2014 to check for scion or rootstock overgrowth as an indicator of physiological incompatibility. Average scion:rootstock circumference ratios were between 0.96 and 1.06 (indicating that graft unions were very uniform), and there were no consistent or obvious trends of incompatibility across years or among rootstocks.

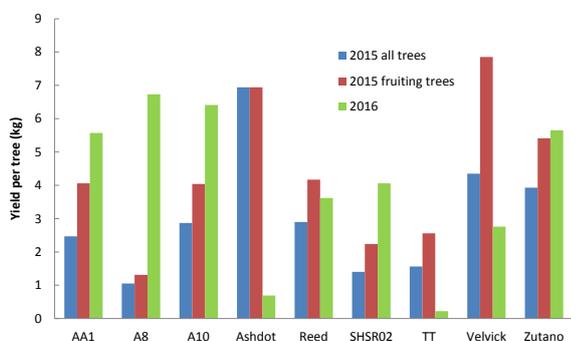


Figure 2. Yield (kg per tree) of 'Hass' trees grafted to different rootstocks planted at Waikerie, SA, in October 2012. In 2015 the blue bars show average yields for trees in all rows, while the red bars include only trees in Rows 6-10 which were not as severely frost damaged at flowering in 2014.

Figure 2. Yield (kg per tree) of Hass trees

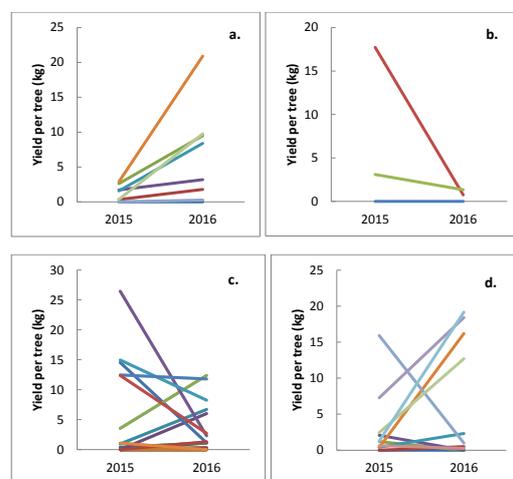


Figure 3. Hass fruit yields from individual trees harvested in 2015 and 2016 from four rootstocks, (a) A8, (b) Ashdot, (c) Velvick and (d) A10

Figure 3. Hass fruit yields



Figure 4. Waikerie rootstock trial, a) August 2013 and



b) August 2015

Summary of growth and yield data from the Waikerie rootstock trial continued

It will be interesting to track individual trees' yield performance over the next few years. Although yield data has only been collected for 2015 and 2016, there are indications of an alternate bearing pattern occurring within some individual trees. The ideal pattern is for young trees to increase their production each year (for example in A8 rootstock trees in Figure 3a), however a few individual trees had very low yields in 2016 after cropping well in 2015, e.g. Ashdot (Figure 3b), Velvick (Figure 3c) and A10 (Figure 3d). All of the trees in this trial were propagated from seedling rootstocks, which have high genetic variability and it is thus reasonable to expect large tree-to-tree variation. It is hoped that the rootstock trial and data collected so far will be utilised in a new industry-funded project investigating factors affecting fruit abscission and the irregular/alternate bearing response in avocado, to be led by Dr Harley Smith, CSIRO Agriculture and Food, Adelaide.

Acknowledgements

This project is jointly supported by the Department of Agriculture and Fisheries and the University of Queensland. Projects AV08000 and AV13018 were funded by Horticulture Innovation Australia Limited (previously Horticulture Australia Ltd) using the avocado levy and funds from the Australian Government.

Tony Whaley, Sunshine Horticultural Services, prepared trees and planted the trial in 2012, in collaboration with Kym and Craig Thiel (Waikerie). Kym and Craig have been extremely supportive and helpful with site visits, data collection and local industry issues. The South Australian Avocado Growers Association have demonstrated their continued support for rootstock evaluation in their district, and are thanked for providing funds for data collection in 2016. David Armour, Louisa Parkinson, Rachel Abel, Paulo de Souza, Simon Newett and Harley Smith assisted with data collection from the trial.



Dr Paulo de Souza, a visiting scientist from Brazil, assisted with data collection in September 2016



Lessons from the pack shed and ripener facility checks – 2014-2016

By Noel Ainsworth, Principal Supply Chain Horticulturist, Queensland Department of Agriculture and Fisheries

During the period of 2014 to 2016 inclusive, the successive supply chain improvement projects (AV12012 and AV15004) included a small component to undertake voluntary audits of avocado packing sheds and wholesale ripener facilities and procedures. These projects were funded by Horticulture Innovation Australia Limited using the avocado levy with matching funding from the Australian Government and co-investment from Avocados Australia and the Queensland Department of Agriculture and Fisheries.

Forty-six operators, including 33 pack shed managers and 13 wholesale ripeners, voluntarily had their facilities audited across Qld, WA, NSW, Vic and SA. The audit process was developed using the experience of a sizable team from the Queensland Department of Agriculture and Fisheries encapsulated in the reference:

Hofman, P, Ledger, S, Newett, S, Campbell, T, Campbell, J and Barker, L. (2009) Best practice for Hass avocado seafreight, draft recommendations to optimise quality on the export retail shelf.



Typical avocado grading line

The State of Queensland, Department of Employment, Economic Development and Innovation.

The voluntary audits were scheduled by Avocados Australia staff, while the actual audit was conducted and the subsequent reports were written and sent to the facility managers by Queensland Department of Agriculture and Fisheries staff.

Pack shed results

The audits of pack sheds highlight a number of recurring issues in which many pack shed managers could improve. Some of the issues were common across the range of pack shed sizes while others were only relevant to the smaller or larger pack sheds. These included:

- Dry matter testing
- Retention samples
- Machine improvements
- Post-harvest fungicide application
- Staff training
- Cooling of fruit
- Communication, and
- The use of sanitiser.

Dry matter

Fruit maturity assessment, measured through dry matter testing, is an issue that still requires attention irrespective of the facility size. It is important to test blocks both in leading up to harvest in order to properly schedule the harvest, as well as to test blocks at harvest to be able to provide maturity data to others in the supply chain. This maturity influences the holding and ripening temperatures used by the storage facility operators and ripeners. More detailed dry matter testing may be required by larger facilities if they are dealing with greater maturity variation from a range of grower suppliers and if they are supplying a large wholesaler or retailer with a narrow tolerance for fruit maturity.

Retention samples

Assessing the ripening performance of each block using retention samples is another improvement area. These retention samples, or library trays, undergo a ripening test to indicate how successful a growers' orchard management programme has been in relation to shelf life, eating quality, skin colour, diseases and flesh disorders. Retention samples may also be used to support complaint investigations down the supply chain.

A typical retention test involves selecting at least 10 avocados from trees scattered throughout the block that are representative of the fruit that may be ready for harvest. The sampled fruit should show no sign of broken skin, insect stings or disease.

Lessons from the pack shed and ripener facility checks – 2014-2016 continued



Pack shed fruit drop bin

For a retention test taken from the pack shed, sampling frequency is often simply one tray a day, but could increase or decrease depending on:

- the perceived risk of problems emerging including reported incidence from previous periods or grower suppliers, or prevailing conditions e.g. recent wet weather,
- if you have a new supplier or production block where there is little prior history,
- volume of fruit being packed through the shed (number of field bins or trays/cartons packed), and
- variety or potential variability of fruit being packed (number of growers or blocks passing through the shed that day).

The fruit are ripened at room temperature (ideally about 22°C), and examined and tasted when ready to eat. Mature fruit usually ripen within 10-15 days without shrivelling, and will have good flavour. Rots should account for less than 10% of fruit to meet consumer expectations.

Machine improvements

Most pack shed managers have scoured the design of their machines to remove any points at which fruit drop more than 100mm. This is to reduce the risk of fruit bruising and to reduce the risk of skin damage and entry points for diseases. The recent attention on excessive drops has developed innovations in the bin dumping area of the pack shed including wet dumps and immersion dumps.

Postharvest fungicide application and sanitiser

While most pack sheds operated timed, run-to-waste fungicide sprays to reduce the incidence of fruit rots, there was some variability in whether the spray solution was pH checked and adjusted if necessary as well as whether the spray was applied before or after the polishing brushes. There was also some variability in whether pack sheds used sanitiser over the initial brushes and which sanitiser was in use.

Cooling of fruit

There continues to be considerable variation in pack shed fruit temperature management. While many pack sheds ensured that fruit were packed within 24 hours of harvest, few monitored fruit temperatures on arrival and departure from the shed.

Too many sheds also neglected to consistently reduce fruit temperatures down to recommended storage temperatures (5-7°C) prior to dispatch to maximise supply chain flexibility. Even within the supply chain in transport, or in storage at wholesalers, some fruit were held at higher than ideal temperatures i.e. 10°C rather than 6°C, thus potentially reducing shelf life in the chain.

Communication and staff training

One area for improvement irrespective of pack shed size was in communication through the supply chain. Most communication problems were associated with breakdowns in fruit quality and the price agreed for the consignment. This reduced the opportunity to promote the flow of information about consumer preferences and market dynamics back to the grower supplier.

The opportunity to take advantage of the industry Best Practice Resource training materials for new and existing staff was greater for the larger sheds that sometimes had greater levels of staff turnover.

Ripener and wholesaler audits

The wholesaler/riper audits highlighted that they were largely competent in maintaining optimal cool chain and ripening conditions for fruit, but there was some variability between ripeners in relation to:

- sophistication and monitoring of ripening facilities,
- fruit assessment/quality control processes, and
- the documentation/communication systems used.

Given the current high prices for avocado, most supply chain members have adopted risk management procedures to limit exposure. As a result there is little trust and communication through the chain with inefficient and duplicative quality checks done through the supply chain, some within hours of each other as the fruit changes custody. There is also a lack of integration of the recording systems between supply chain members, especially between the grower pack shed, ripener, distribution centre and retailer.

Audit methodology, its strengths, weaknesses and opportunities for improvement

Strengths

- The voluntary nature of the involvement in the audits process meant pack shed and ripener operators were seeking improvements to their existing procedures.
- Pack shed managers were keen to receive the written report from the audit/inspection to record the areas for improvement and more readily share with other staff in the business or supply chain.

Weaknesses

- Undertaking consistent audits of pack sheds and ripeners across the production districts and centres that handle avocados with experienced personnel is logistically difficult and resource intensive to undertake.
- Naturally it was preferable to undertake audits while sheds were in operation to identify operational weaknesses, but in many circumstances pack shed managers felt they were too busy at that time to undertake the audit with the DAF Queensland officer.
- It would have been ideal to follow up the initial audit with a follow up visit but the constraints on resources made this difficult within the existing projects (AV12012 and AV15004).
- The audits of the individual facilities made it difficult to identify potential efficiencies from greater integration with other businesses in that chain.

Opportunities for improvement

Problem

- To minimise the fruit age when the fruit reaches the wholesaler, particularly from small suppliers and early and late in the season, partial loads are consigned in refrigerated transport. This can also result from the complexity, uncertainty and short response times of order sizes for retailers resulting in fruit from both pack sheds and wholesalers being split to meet the immediate needs of retailers. This can result in isolated pallets or partial pallets being transported with other produce that have varying temperature requirements. This can compromise the avocado cool chain and provide retailers with fruit that will ripen at different rates producing variability in the fruit ripeness in store, even within the same order.

Suggested solution

- Investigate a significant number of Australian domestic supply chains scoping the significance of this issue, the costs to the industry and the opportunity for using consolidators.

Problem

- There is room for better integration of data recorded at the different stages in the supply chain. This identifies inefficiencies and duplication (waste) but also identifies areas for improvement in supply chain communication and relationships.

Suggested solution

- Investigate opportunities for quality control parties in avocado supply chains to use similar software or systems and then opportunities to share the data along the supply chain to reduce duplication and waste, and enhance



New innovation pack shed immersion dump to reduce fruit damage.

opportunities to improve consistency of product quality.

Problem

- Ripeners have to chase pack shed managers and grower suppliers for consignment dry matter results to inform ripening processes. This an area for improved efficiency as well as encouraging better dry matter monitoring and attainment of minimum dry matter levels for more reliable eating quality for consumers.

Suggested solution

- Investigate quality control systems that could be common across the pack sheds and ripeners to more readily share dry matter results with greater consignment traceability.

Problem

- Combining the facility checks with value chain analysis of a number of supply chains could add significant value to future avocado R&D projects. This would also drive gains particularly in the communications and relationships and hence the opportunity for innovation in the avocado supply chains.

Suggested solution

- Put forward submissions for relevant EOIs in avocado supply chain management.

Problem

- Some pack shed managers and ripeners suggested that there would be a higher level of participation in the voluntary audit process if there were stronger incentives such as industry recognition or accreditation of sheds that had gone through the audit process.

Suggested solution

- This was not pursued due to the likely need for a minimum performance standard and a requirement for regular reviews, the cost of which would have to be borne by the participating business. It might also be seen to be controlling business activities and stifling industry innovation.

Training our export partners to appreciate Australian Avocados

By Jenny Margetts, P2P Business Solutions

Avocados Australia is working with Australian exporters and partners in Singapore and Malaysia to develop training for supply chain parties in these countries. "Our aim is to ensure Australian avocados are reaching consumers in the best condition and are ready to eat," said John Tyas, CEO Avocados Australia.

"Our intent is to build the presence of Australian avocados by offering a consistent 'ready to eat' offering in these markets. We know from market research in other countries that providing 'ready to eat' fruit for consumers can significantly increase product sales.

"Apart from building and testing the processes to deliver a 'ready to eat' product with selected supply chain parties and retailers in these markets, we also want to evaluate how the market responds to a program and if we see the increase in sales that is evident in other markets. Feedback from the market indicates that there is demand for 'ready to eat' avocados at retail, so it will be good to test this demand.

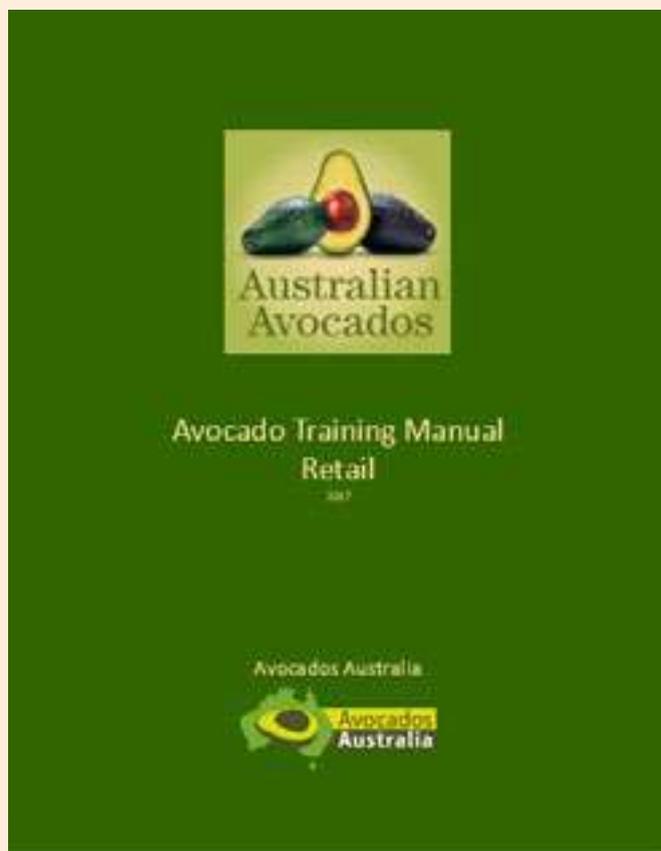
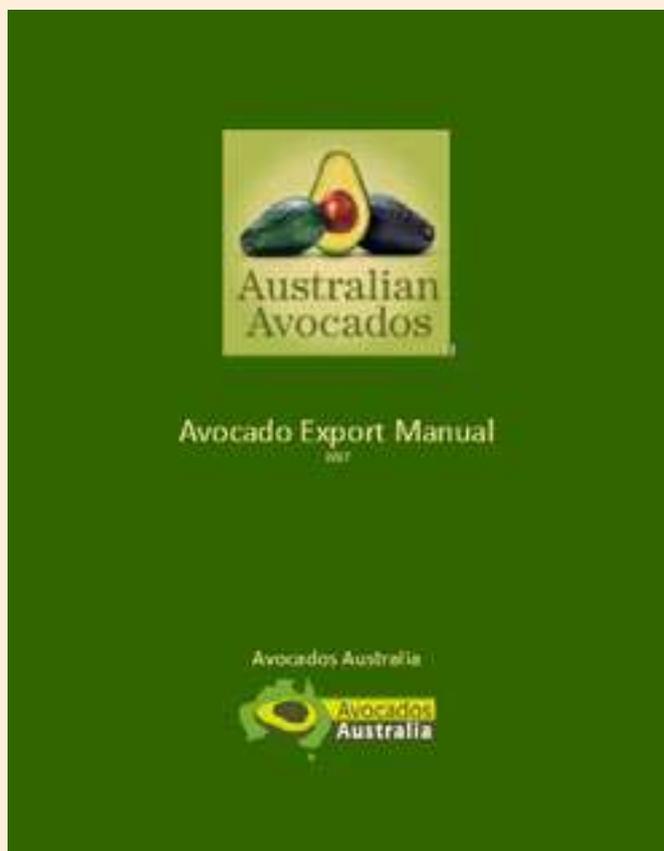
"The training material currently being developed builds on previous industry work and will target importers, ripeners,

wholesalers and retailers. It aims to build the skills of these supply chain parties in handling and ripening 'ready to eat' avocados so that so they are managed and presented in the best possible condition for consumers."

In addition to the training material, an Industry Export Manual is being developed to capture the process and procedures that growers and packers need to adopt to underpin successful export. The Manual focuses on the production, harvesting, handling practices, cool chain maintenance, packing, transporting and quality requirements relevant to export trade.

As supply volumes increase in coming years it is more important than ever that the Australian industry begins to build export markets and robust supply chains to support these markets. To position Australian product at the premium end of the market, there is a need to ensure that we are meeting customer requirements in terms of quality and convenience – and having a 'ready to eat' product available in the market is an important part of the offering.

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



Snapshots - International Avocado Research Update

These snapshots are compiled from abstracts of published scientific papers collated in the CAB Direct database and from research presentations delivered at the 2015 World Avocado Conference (Peru). Dates provided reflect the date research was published or presented.

If you would like a copy of the abstract related to these snapshots please contact Jenny Margetts, P2P Business Solutions, at jmargetts@bigpond.com or 0418215276.

Production

Bacterial inoculation to mitigate water shortage and salt stress in an avocado nursery

Chile (2016): Chile's avocado production in recent years has diminished due to abiotic stresses such as drought and soil salinity. An evaluation of the contribution of bacterial consortia to water shortage and salt stress tolerance of avocado seedlings under field conditions was undertaken. The study showed the favourable effect of bacterial inoculation on avocado trees in nursery conditions under water shortage and salt stress, and identified consortia that potentially could be used as avocado bio fertilisers.

Pre and postharvest interaction

Identification of preharvest factors determining postharvest ripening behaviours in Hass

Chile (2017): A major challenge for the global avocado industry is to provide a homogenous product in terms of fruit-ripening behaviour, especially considering the significant variability in quality that can be found within a box or pallet of the fruit. The broad range of conditions under which trees are grown, particularly with regard to climate, soil and agronomical management, can influence this ripening variability. The aims of this study were (i) to determine the variability in fruit ripening among Hass avocado grown under different conditions in Chile and (ii) to understand the postharvest fruit-ripening behaviour of Hass avocado due to the combined effect of several preharvest variables. Analysis showed that the seasonal mean minimum air temperature, seasonal degree-days, trunk diameter and fruit firmness at harvest had a proportional relationship with postharvest softening rate and change in peel colour during storage and a significant inverse relationship with ready-to-eat stage. Conversely, the leaf area index, number of plants per hectare, and irrigation management at the bloom stage had a proportional relationship with ready-to-eat stage and an inverse relationship with softening rate and change in peel colour. Moreover, all of the three postharvest ripening behaviour indicators were significantly estimated by predictive models considering preharvest variables. Therefore, attempting to predict postharvest behaviour by considering only a single preharvest variable could be a misleading simplification of reality because several factors, including climate/environmental, agronomic management and physiological variables, influence the ripening behaviour of Hass avocado fruit.

Factors associated with postharvest ripening heterogeneity of Hass avocados

Chile (2016): The increase in demand for 'ready-to-eat' avocados is being impacted by variable postharvest ripening or ripening heterogeneity which creates logistical problems for marketers and inconsistent quality of fruit delivered to consumers. Dry matter content of fruit is extensively used as a proxy for guaranteeing consumer satisfaction, however this measure does not correlate on a fruit-to-fruit basis with time to reach edible ripeness. This paper explores modern approaches based on studying the composition of individual fruits displaying contrasting postharvest ripening behaviour, combined with non-destructive phenotyping techniques, to offer a practical solutions for delivering a fresh supply chain of avocados sorted on their ripening capacity.

Effect of preharvest calcium spraying on ripening and chilling injury in Hass

Mexico (2016): Exporting avocado involves a number of postharvest problems because the fruit has a limited shelf life and marked sensitivity to development of chilling injury when using low temperatures to prolong its useful life. This study aimed to evaluate the effect of preharvest spraying of calcium on the postharvest physiology of cv. Hass fruits stored at 5°C and room temperature for five weeks. Product was applied by air every six weeks until harvest, totalling six applications. The variables evaluated were: ethylene production, respiration rate, calcium concentration in the exocarp and mesocarp, firmness, polyphenol oxidase activity, weight loss and chilling injury. It was found that calcium application decreased the respiratory rate and ethylene production during storage at room temperature and under chilling conditions. In general, calcium sprays decreased weight loss, polyphenol oxidase activity and chilling injury.

Genetics

Exploring genetic variation in avocado from north western Mexico

Mexico (2017): Five local varieties from northwest Mexico that grow in high temperatures regimes in unfertilised soils and without any agronomic management were assessed for their nutritional traits and genetic diversity. Significant phenotypic variability in oil and a-tocopherol components in different accessions of the avocados were determined. The variation observed at the genetic, morphologic and nutritional levels provide significant new information that may be valuable in selecting and developing avocado genotypes adapted to high-temperature environments.

Use of by-products

Chemical and technological properties of avocado seed fibrous residues

Mexico (2016): Fibrous residues of avocado seed showed

relatively high proportions of soluble dietary fibre, neutral detergent fibre and hemicellulose. They are also shown to be able to retain four times their weight in water and six times their weight in oil. These properties make these residues promising technological ingredients in industrial food systems.

Health

Influence of avocado on obesity and type 2 diabetes management

Canada (2016): A range of foods, including avocados, appear to influence the secretion of GLP-1 (glucagon-like peptide-1) in the gastrointestinal tract. GLP-1 is known to have a positive influence on blood glucose homeostasis and appetite sensations. Hence the stimulation of endogenous GLP-1 secretion by manipulating the diet may be a relevant strategy for obesity and type 2 diabetes management. A better understanding of the dose-dependent effects as well as the synergistic effects of nutrients and whole foods is needed in order to develop recommendations to appropriately modify the diet to achieve the effects required.

Effect of an avocado oil-enhanced diet on sucrose-induced insulin resistance in rats

Mexico (2016): The aim of this work was to evaluate the effect of avocado oil on sucrose-induced insulin resistance in Wistar

rats. The rats were randomly assigned into six groups and fed a different diet over an 8-week period. The control group was given a standard diet, and the other five groups were given the standard feed plus sucrose with the addition of avocado oil at 0%, 5%, 10%, 20%, and 30%, respectively. Rats that were given diets with 10% and 20% avocado oil showed lower insulin resistance and the addition of 5-30% avocado oil lowered high sucrose diet-induced body weight gain in the rats. It was concluded that glucose tolerance and insulin resistance induced by high sucrose diet in rats can be reduced by the dietary addition of 5-20% avocado oil.

Antibacterial activity of avocado extracts against Streptococcus

Brazil (2016): Interest in plant extracts with antimicrobial properties has increased as a result of the indiscriminate use of antibiotics, leading to the emergence of resistant bacterial strains. This study evaluated the antimicrobial activity of two extracts (ethanol and dichloromethane) from avocado seeds, 'Margarida' variety, against isolates of Streptococcus agalactiae, which is the cause of infections in humans, cattle and fish. The extracts were shown to have different levels of antimicrobial activity against isolates of S. agalactiae, depending on the host source.

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Avocado supply chain improvement projects are well underway

By Adam Goldwater, Applied Horticultural Research and Produce Marketing Australia

It is estimated that 20% of avocados – a whole 1 in 5 of carefully harvested, packed, transported and ripened fruit – is already damaged by the time it gets into the consumers shopping basket.

Reducing this damage would mean more happy customers, and more avocados purchased. Progress is now well underway to finding ways to reduce the level of damaged avocado fruit at retail, with the aim to limit bruising, rots and other postharvest injuries to no more than 10% within three years.

Two projects on supply chain quality improvement are being undertaken by Applied Horticultural Research (AHR) and Produce Marketing Australia (PMA).

Retail improvements

One of the immediate issues the team has examined is how consumers choose avocados, and how many they purchase. Consumer research was undertaken across 32 supermarkets and independents across Sydney, where shopper behaviour was examined when selecting avocados. The number of fruit squeezed and purchased by each shopper was recorded. This was compared in stores with good quality displays that were sorted by ripeness and contained ripe fruit, or stores with unsorted displays, and those with hard fruit only.

One of the immediate issues the team has examined is how consumers choose avocados, and how many they purchase.

The first thing a consumer does when they reach the avocado



Figure 2. TOP: this avocado display is difficult for consumers to select fruit from, resulting in more fruit squeezed, and less purchased. BOTTOM: by sorting fruit by ripeness, consumers can select fruit more easily, reducing squeezing and increasing sales.

display is to pick up a fruit and squeeze it. Work conducted by DAF Queensland has shown that squeezing fruit results in bruises. They have also shown that these bruises are not visible immediately but develop over several days – right when the fruit is eaten.

Consumers can end up squeezing many fruit before they decide to buy. We saw one customer squeeze 27 avocados before making a purchase decision. Many squeezed at least 10, and a few squeezed up to 20 and then walked away empty handed.

The factors that most increased squeezing were displaying all

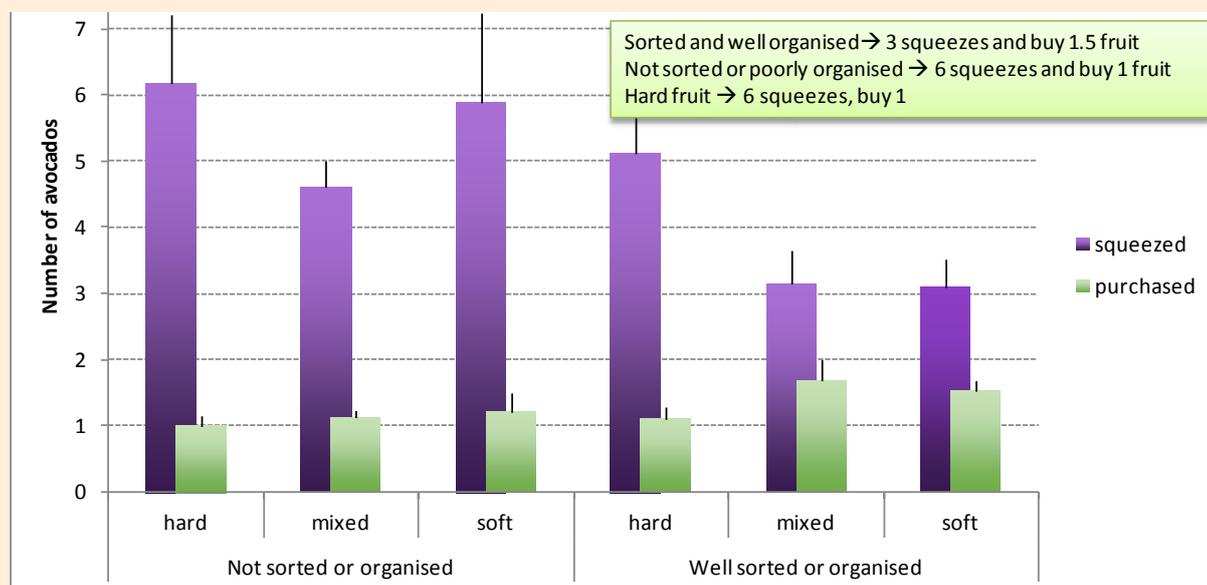


Figure 1. Consumers squeeze fewer avocados and purchase more when displays with mixed ripeness fruit are sorted by firmness, are well organised, and ripe fruit is available. Well organised means that displays had fruit neatly arranged to a maximum of 2 layers, as opposed to fruit randomly scattered or piled up.

hard fruit, and not sorting the display. Both of these factors meant that consumers squeezed an average of six fruit. They then purchased either one hard fruit, or one to two fruit when displays of mixed ripeness were available (Figure 1).

Nearly 40% of consumers didn't buy any avocados at all when the only option was hard fruit.

In contrast, if the display had a mix of hard and ripe fruit, or all ripe fruit, then 75–80% of consumers bought avocados. Consumers nearly always bought two avocados from mixed ripe displays if the fruit was arranged to make this easy. However, if the display was unsorted, they only bought two avocados about half the time.

It seems clear that sorting displays into ripe and unripe fruit helps consumers choose avocados, increasing purchases and reducing damage from squeezing.

In the coming phase of the project, sorted displays marked with header cards with "Eat now", "Eat later" will be implemented in a number of retailers. Staff training will be provided on managing the displays, with independent assessment of how well they manage the different ripeness categories. The research team will also examine how this changes consumer behaviour in terms of both squeezing and purchase size. Both major and



Figure 3. Growing practices and temperature control from orchard through to retail are the focus of the cool chain best practice adoption project.

independent retailers have been strongly supportive of these retail merchandising concepts. After all, a happy customer is going to come back for more avocados!

Cool chain improvements

Naturally, quality at retail is also affected by what happens while fruit is growing, and how it is managed during and after harvest. Poor orchard practices, rough handling, and poor temperature management, inevitably increase postharvest rots and internal quality issues (Figure 3).

AHR has undertaken a comprehensive review of research on factors that affect retail quality. This details how everything from soil preparation to drops during harvest affect the end product. Copies of the complete review are available on request for interested growers and packers (please email: sandra.marques@ahr.com.au).

Best practices identified through the review, as well as by working with growers and packers, will be detailed in a new cool chain best practice document. In brief, recommendations include:

Preharvest: reduce risk of postharvest rots through an effective fungicide program and maintain healthy trees;

Harvest: avoid dropping fruit, avoid picking when fruit are wet, clip rather than snap pick if disease pressure is high;

Packhouse: avoid delays in cooling between harvest and packing, use postharvest fungicide immediately after harvest, pick and pack within 24hrs, immediately forced-air cool fruit to 5–7°C;

Transport: minimise breaks in the cool chain, maintain 5–7°C, use temperature loggers to verify the system is working;

Wholesaler: minimise fruit age (days from harvest);

Ripener: ripen between 16–20°C, using the lower end of the range for mature fruit at risk of rots, store sprung fruit at 5°C, and minimise holding time;

Retail: store ripe fruit at 5°C and minimise storage time.

The coming phase of the project involves working with packhouses around Australia to discuss these best practice recommendations, and identify feasible improvements that can be made, particularly around cooling practices. To request a visit from the project team, please contact Adam Goldwater (details below).

Acknowledgement:

Projects AV15010 Cool Chain Best Practice Adoption and AV15011 Retailer Point of Purchase Improvements are funded by Horticulture Innovation Australia Ltd using the Avocado industry levy and funds from the Australian government.

For more information contact: Adam Goldwater from Applied Horticultural Research at adam.goldwater@ahr.com.au or phone + 61 2 8627 1040; or John Baker from Produce Marketing Australia, john@producemarketing.com.au or phone +61 2 9642 1555

Avocado

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STRATEGIC INVESTMENT PLAN 2017-2021 AT A GLANCE

OUTCOMES	STRATEGIES
By 2021, increase domestic demand for Australian avocados has increased by at least 20%	Domestic marketing services that elevates value to consumers for Australian avocados while encouraging them to buy more avocados more often
	Establish strategic relationship management with the major supermarket chains
	Modern production and market information collection, analysis and sharing across value chain
	Improve the reliability and consistency of year round supply of Australian avocados to replace the reliance on imported fruit
By 2021, over 90 per cent of avocados received by consumers will meet or exceed their expectations of quality	Collect and promote evidence of industry practices that strengthen the reputation of value chain businesses and avocado products
	Establish objective evidence and understanding of the primary sources of continued quality issues
	Quantify the levels of quality variability between farms and across value chains to consumers
	Develop targeted programs to implement best practice in those areas identified as being the highest risk/lowest performance
By 2021, over 10 per cent of production will be exported to markets where customers have a willingness and capacity to pay a premium for Australian avocados	Collection and sharing of information on performance in the supply of consistent quality avocados at point of sale
	Develop trade with existing export markets
	Improve the reliability and consistency of year round supply of Australian avocados
	Gain technical access in high value markets as defined by avocado exporters
	Coordinate integrated industry response to expand exports into newly accessed high value markets
	Value chain collaboration for gathering and sharing of market intelligence on existing and new export markets

POTENTIAL IMPACT OF THIS PLAN



Based on an estimated investment of \$31.48 million over the next five years

OUTCOMES	STRATEGIES
By 2021, productivity (marketable yield per hectare) has improved by 15 per cent on average, without increased production costs per kilogram	Establish and share baseline and time series information on farm productivity by growing region
	Promote uptake of established on-farm good practice tailored to variety/region
	Facilitate access to crop protectants and regulants of high value to growers
	Identify and use proven technologies and automation that reduces costs and improves marketable yields
	Review and prioritise the main constraints (e.g. irregular bearing, pest and disease, rootstock selection, nutrition, irrigation management) to increasing farm productivity and address those with the greatest national impact
	Maintain and improve biosecurity

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Avocado

STRATEGIC INVESTMENT PLAN

2017-2021 AT A GLANCE

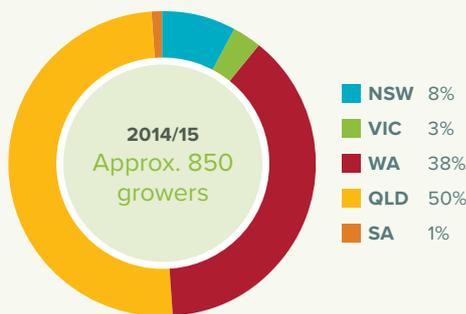
Major opportunities

- Increase in supply provides capacity to meet demand in export markets
- Improve access to existing and new export markets
- Awareness of/interest in Australian avocados in overseas markets
- Import displacement to ensure year round consumption of Australian product
- Health conscious consumers interested in new food experiences
- Increasing consumer demand for safe, clean food
- Consumer awareness/expectation of environmentally sustainable production
- Growing recognition by consumers of the positive health attributes of avocados
- Smaller size fruit preferred in Asian markets complements domestic market preference for larger fruit
- Value chain desire for strategic industry engagement
- Supermarkets seeking security of supply
- Access to technology providing new avenues for data collection, analysis, information sharing and communications
- Information and Communications Technology is enabling rapid and global information flows between consumers, community, businesses and governments.

Major challenges

- Major increases in avocado supply could exceed consumer demand and cause prices to fall
- Consumer trust in the product erodes with experiences of inconsistent quality
- Well-resourced overseas competitors, with the ability to compete on the basis of lower price
- Potential market access for Mexican avocados could impact on Australian price and market share
- Industry environmental practices (or perceptions of) come under public scrutiny
- Biosecurity risks to plant health status
- Limited restrictions on imported processed avocado products
- Supermarket private labels eroding food supplier brands
- Rising production places pressure on current infrastructure and cool chain capacity
- Climate change and variability in growing conditions
- Irregular bearing is a significant threat to the industry.

Industry size and production distribution



Avocado supply chain and value 2014/15



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Mecanil Grapple Saws

By Don Horton, Managing Director Vicon International

Mecanil's elite Grapple Saws are the safest, most efficient way to remove stubborn trees and branches from difficult positions.

Extremely user-friendly, and able to simply attach to your excavator, wheel loader, skid steer or crane, Grapple Saws range from small lightweight models to large, industrial, heavy-duty machines.

Gordon Burch, who owns Waterfall Avocados just outside of Port Macquarie, recently started using a Mecanil Grapple Saw and can't speak highly enough about how this modern piece of machinery has helped his business. "It's been excellent - it's like a pair of giant hands," he gloated. With rows and rows of avocado trees to prune right back, Gordon would usually have to employ multiple staff and still wouldn't be able to get through all the work. "We had to reach into quite complex trees to do the job we're doing," he continued. "We would have never accomplished such a big task. Judging on what we've done in the past, it would have taken four men a whole week to do what the grapple saw did in about three to four hours. It has huge labour-saving benefits."



Doing the maths, Gordon said that in his orchard each row has about 50 trees, and they cut about 16 rows, so that's around 800 trees in just over two weeks. And that's with some branches being up to 500 millimetres thick. "We never would have been able to do this as efficiently and as cost effectively as we were able to do it with this grapple saw."

The safety implications are also highly beneficial. "It's so dangerous having multiple staff with chainsaws in tight rows dropping down trees that are 12 to 15 metres high," Mr Burch outlined. "This Mecanil Grapple Saw is also such a safe operation."

You too could discover all the advantages of how a Mecanil Grapple Saw can improve your business. Cangini Australia & New Zealand proudly brings Mecanil to you. For more information call their NSW or QLD office on 0408 233 337, or visit www.cangini.net.au.

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SG220	320	X		X
SG280	370	X		X
SG210	235		X	
SG270	280		X	
SG270HD	300		X	
SAW CASSETTE				
SK500	85	MOUNTS TO YOUR GRAPPLE, 550, 630 BAR		
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Extremely user-friendly and able to simply attach to your excavator, wheel loader, skid steer or crane, Grapple Saws range from small lightweight models to large, industrial, heavy-duty machines. Gordon Burch, who owns Waterfall Avocados just outside of Port Macquarie, recently started using a Mecanil Grapple Saw and can't speak highly enough about how this modern piece of machinery has helped his business. Gordon said "It's been excellent: it's like a pair of giant hands for pruning our trees."

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Hortlink - See your levy in action!

By Lauren Monaghan, Communication Manager – Content and Campaigns, Hort Innovation Australia Ltd.

Hortlink is Horticulture Innovation Australia's quarterly publication delivering a detailed overview of your levy at work. The latest edition (2017, edition 1) is out now and packed with essential, easy-to-read info for growers, including...

- Details of new, ongoing and recently completed R&D projects for each levy industry
- Results and resources that can be used in growers' businesses
- Updates on industry marketing activity and results
- Case studies featuring growers, researchers and more.

Check it out at

www.horticulture.com.au/hortlink-2017-edition-1/.

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Shot Hole Borer (Ambrosia) Beetles and Fusarium Dieback Disease: The California Experience

Tim Spann, PhD, Research Program Director, California Avocado Commission

In February 2012, a backyard avocado tree in Los Angeles County, California was found to be declining for an unknown reason. Dr Akif Eskalen, Plant Pathologist at the University of California Riverside (UCR), identified a novel *Fusarium* species as the cause of the decline. Further investigation by Dr Richard Stouthamer, Professor of Entomology UCR, identified a shot hole borer beetle as the carrier of the *Fusarium* sp.

The California Avocado Commission immediately recognised the threat of this new pest-disease complex to our industry and immediately provided funding to UCR researchers to identify the beetle, the *Fusarium* pathogen, their origins and the extent of the infestation.

The beetle was initially identified morphologically as the tea shot hole borer (TSHB), *Euwallacea fornicatus*, but this beetle, which is widely distributed around the world, had never been identified as problematic outside of tea. Genetic analysis revealed that although the beetle was physically identical to the TSHB, in California was a different species of *Euwallacea*. Further genetic analysis revealed that this species of *Euwallacea* originated from Southeast Asia, most likely Vietnam and southern China. It most likely arrived in the United States on infested wood packing material through the ports of Los Angeles and Long Beach, the country's two busiest shipping ports.

Survey results from 2012 indicated that the beetle infested a significant portion of Los Angeles County and northern Orange County (Figure 1). Host trees included a diverse range of more than 25 species from numerous plant families, including common landscape trees, native species as well as avocado. This diversity of hosts gave rise to the common name of the beetle in California, the polyphagous shot hole borer (PSHB; poly = many, phagous = feeding on). Since these initial surveys in 2012, the host list has grown to almost 50 species (identified here: www.eskalenlab.ucr.edu/shotholeborerhosts.html).

Research into the fungal symbionts of PSHB identified two more novel species in addition to the *Fusarium*. These three fungi have been identified as: *Fusarium euwallacea*, *Graphium euwallacea*, and *Paracremonium pembeum*, all of which are pathogenic. The exact roles of each of these fungi are still uncertain, but *F. euwallacea* appears to be the primary food source for the adult beetles and *G. euwallacea* the primary food source for the larvae.

Through 2013 and 2014, the beetle continued to spread throughout Southern California and the first infested commercial avocado grove was found in late 2014 in San Diego County (Figure 2). However, much to everyone's surprise, the beetle in San Diego County turned out to be yet another new species,

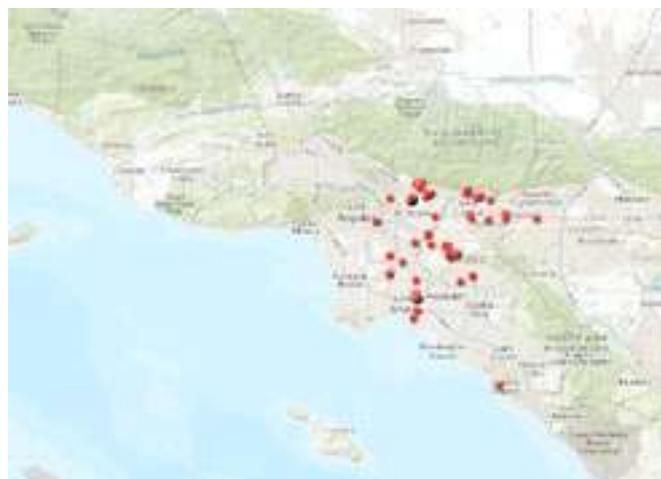


Figure 1. The distribution of polyphagous shot hole borer in Los Angeles and Orange Counties of Southern California at the end of 2012.

identifiable as different from TSHB and PSHB only by genetic analysis. This species originates from Southeast Asia as well, likely from the islands of southern Japan and Taiwan. This species has been given the common name Kuroshio shot hole borer (KSHB) for the ocean current surrounding the southern islands of Japan.

Analysis of the fungi carried by KSHB have shown that, like PSHB, it carries a *Fusarium* and *Graphium* species, but these are different species from those of PSHB and they are still being described and named, and both are pathogenic.

Effects on Avocados

The original avocado tree that was infested in Los Angeles County was in quite poor health when it was discovered. Based

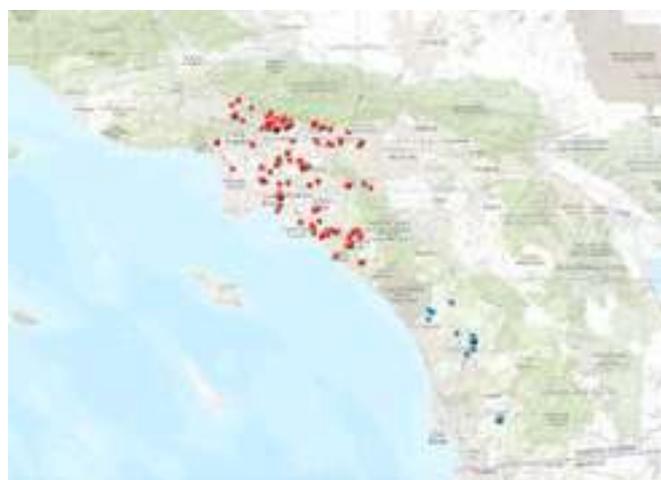


Figure 2. The distribution of polyphagous (red dots) and Kuroshio (blue dots) shot hole borers in Southern California at the end of 2014.

on feedback from the homeowner, this decline was attributed to the beetle and its fungi. Thus, in late 2014 when the first infestation in a commercial avocado grove was found the industry was extremely concerned.

When an avocado tree is infested, small branches in the upper canopy begin to die, thus the common name of fusarium dieback disease. It was assumed that this dieback would progress through the canopy and eventually lead to tree death. However, much to the industry's surprise, the avocado trees appear to tolerate this pest and pathogen quite well and the beetles seem to prefer other hosts more.

We have observed that, in well-managed avocado groves, after the initial branch dieback the trees regrow and there don't appear to be long term negative effects. The groves that were originally found infested in 2014 are today doing very well. In fact, some of the original avocado trees that were found infested in 2012 and 2013 were at the Huntington Botanical Gardens and they are very healthy trees today despite large beetle populations in the gardens (Figure 3). There doesn't appear to be any difference between whether trees are attacked by PSHB or KSHB; both beetles and their fungi act similarly in the field.

It seems that after a few generations in avocado trees, most of the beetles disperse to other host species, and the few that remain in the avocado trees are easily tolerated by the avocados. The unanswered question today is what will happen if the other host species die out and avocado trees are the only remaining host?



Figure 3. An avocado tree at the Huntington Botanical Gardens in Los Angeles, California July 2016. The tree was heavily infested with polyphagous shot hole borers in 2012 and showed symptoms of canopy dieback, but has since recovered. No treatments were applied to attempt to control the beetles.



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Shot Hole Borer (*Ambrosia*) Beetles and *Fusarium* Dieback Disease continued

Current Situation

The beetles are currently widespread in all but the most northern part of the California avocado growing region (Figure 4). Despite our initial fears, this pest has not turned out to be the threat to avocados that we once thought. However, it is proving to be quite destructive to landscape and native trees.



Figure 4. The distribution of polyphagous (red dots) and Kuroshio (blue dots) shot hole borers throughout Southern California as of March 2017.



Figure 5. The Tijuana River Valley in May 2015 (top) and February 2016 (bottom) showing the death of numerous willow trees from Kuroshio shot hole borer. Photos courtesy of John Boland, Southwest Wetlands Interpretive Association.

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In Los Angeles County, box elder (*Acer negundo*) was a very common street tree five years ago, but is virtually non-existent today. Likewise, sycamore (*Platanus* species), both native and non-native species are declining rapidly. Perhaps most hard hit are native willows (*Salix* species), which are a key component of riparian forests in Southern California. In the Tijuana River valley along the Mexican border more than 100,000 willow trees died in less than a year (Figure 5).

These invasive beetles and their fungal symbionts will drastically change the landscape of Southern California. When coupled with other invasive beetles like the goldspotted oak borer (*Agrilus auroguttatus*) and natives such as pine bark beetles that are no longer kept in check by winter cold due to climate change, the threat to California's forests is huge. And the effects that will have on the water cycle, future droughts and continued climate change is probably a greater threat to avocados and agriculture in general than any one invasive species. But for now, the shot hole borers look to be a bullet that the avocado industry has dodged.

An Australian Perspective

The Queensland Department of Agriculture and Fisheries (DAF) in Mareeba is currently investigating this issue in Far North Queensland. A survey of local orchards is currently underway to understand the commercial significance of these Ambrosia beetles and whether further research is warranted. A summary of these results will be published in the next edition of Talking Avocados.

Hort Innovation Marketing Update

By Claire Tindale-Penning, Marketing Manager, Hort Innovation Australia Ltd

The love of avocados continues to grow with consumers buying more often, consuming more and then telling everyone about it! Our social channels are abuzz with conversations of adoration of the fruit as well as genuine interest in the varieties, where they come from and how they grow. To keep up this momentum, we need to ensure we are aware of buying trends, barriers and drivers to purchase and offering new ideas to continue to inspire consumption and build confidence in selection. We do this by ongoing monitoring and evaluation.

Nielsen data reporting

*Source: Nielsen Homescan® Aus

The recent home scan data from Nielsen (to February 2017) continues to demonstrate the popularity of avocados with consumers. There were more Avocado-buying households in the latest year with households purchasing a greater volume and spending more on average when compared with a year ago.

71.5% of Australian households (Moving Annual Total (MAT) 27.02.17) bought avocados compared to 68.1% for the same period the year before.

Average annual weight of purchase per household is up 730g to 5.57kg and average amount spent per household per year is up \$2.05 to \$37.96.

Consumers are shopping for avocados 9.8 times per year which is up from only 8.6 times per year last year.

Volume per occasion remains the same at 600g.

All retail channels achieved volume growth, with an increase of 23.4% at the national level. 'Other Supermarkets' experienced an outstanding 51% volume growth.

Social Media

With the Shepard variety being in season, it was the perfect opportunity to educate consumers about the features of this variety.

There were 2 video posts during January to March dedicated to raising awareness around the Shepard variety to help drive sales. To view these videos, please visit the Australian Avocados Facebook page www.facebook.com/AustralianAvocados/

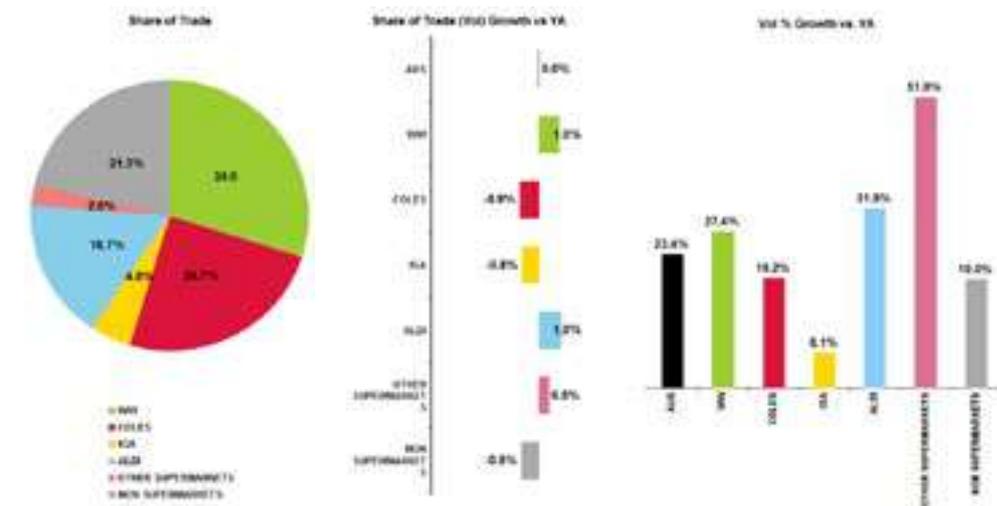
Digital Media

The launch of the new Avocados Australia website for industry has seen the move of the consumer website to a new domain www.australianavocados.com.au. This will have some effect on the Google ranking and web traffic initially, but tactics are being used to mitigate the impact.

In February, social media platforms were the top referral, providing 52% of total traffic to the website. This is largely due to copy optimisation made on the Facebook ads to provide a much clearer path to the website. The second top referral was Organic Search with 17% of total traffic coming from Search.

The 'Avocado & Brown Rice Bowl' recipe page was the most visited page during February with 17% of total traffic. Ninety

Share of Trade for Avocados sold ALL SHOPPERS moving annual total to 25/02/2017 - based on volume of avocados sold (000'S)1000



Source: ACNielsen | Homescan Australia

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Hort Innovation Marketing Update continued

percent of visitors found the recipes through the Facebook ad proving that delicious, seasonal and simple recipes resonate really well amongst the audience and Facebook once again seems to be a great referral for all the delicious avocados recipes.

Tracking consumer sentiment and attitudes

Every 6 months' quantitative research is carried out to determine the sentiment by Australian consumers toward the marketing campaign – are they aware of it and does it resonate with them? The research also includes a review of the drivers and barriers to purchase avocados. These insights are used to keep track of the behaviours of consumers and to influence strategy and planning for the marketing campaign to ensure our messaging and our methods of communication are reaching the targets.

The study is carried out with a nationally representative sample of 1,337 people via a 15 minute online survey. These campaign awareness and behavioural studies have been carried out since

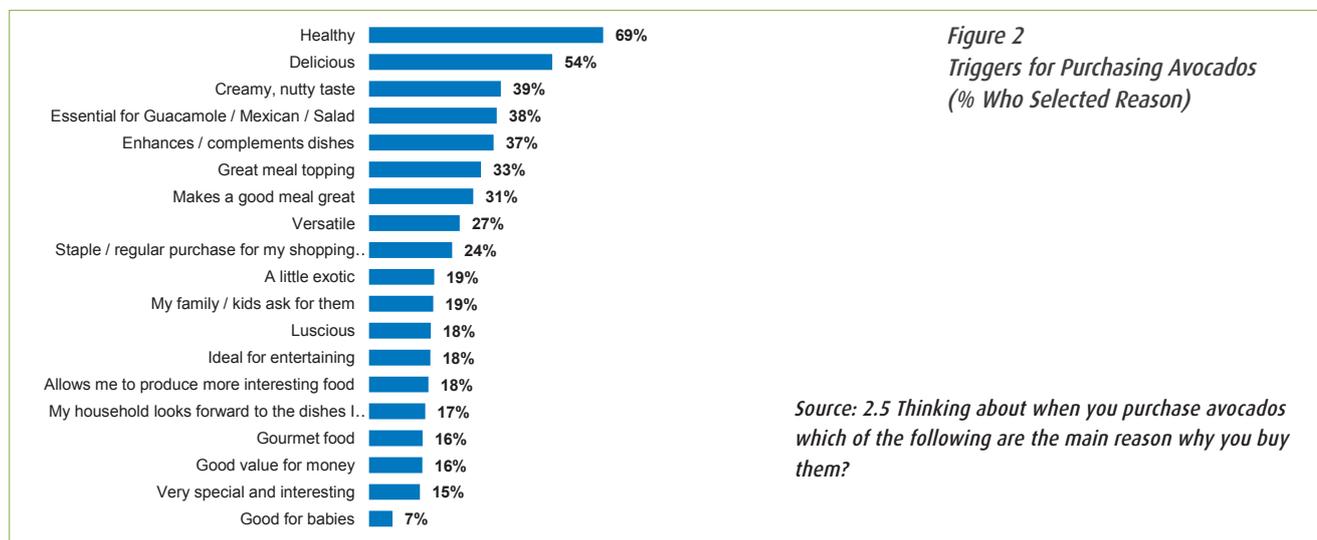
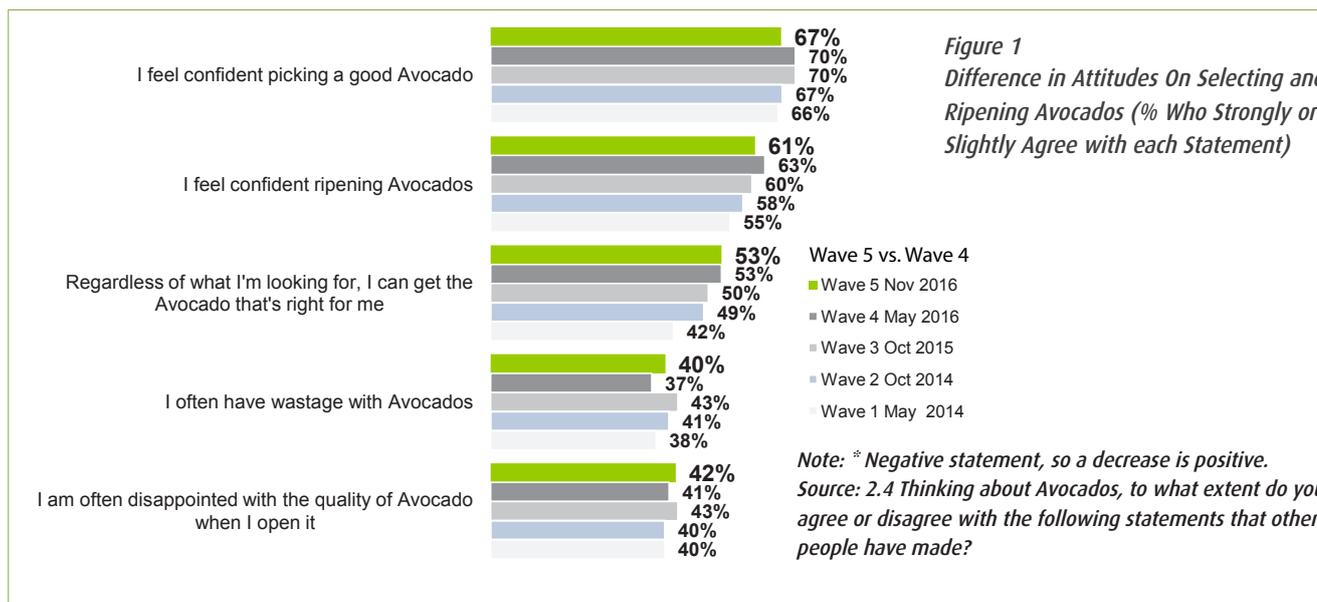
July 2014.

The audience is segmented into groups depending on their purchase frequency and a number of behavioural factors. The segments are defined as follows:

- Lovers
- Enthusiasts
- Challenged
- Functional
- Supportive

The following are results from the recent study carried out in November 2016.

- Confidence in selecting and ripening avocados slightly declined this wave, reversing the improvements over the last two waves (Figure 1).
- Healthy and delicious remain the key purchase triggers, but there has been a decline across the board (Figure 2).



- Price and product quality remain the key barriers; there has been an improvement in price perceptions and quality/ripeness (Figure 3). However, quality perceptions has become a larger barrier for lovers in this wave (Figure 4).
- Prompted ad recall for the television commercial “Love that avocado feeling” improved slightly for all segments reversing the decline in Wave 5 (Figure 5).
- While the ad has good ‘attention – getting’ qualities, it has declined since May 2016 amongst most sub-groups. (Figure 6).

Further research into the barrier and triggers for purchase was carried out in November last year via focus groups with Heavy, Medium and light buyers and the same challenges appeared

(Figures 7 and 8).

Put simply, the difference between heavy buyers and light-medium buyers was their lack of confidence in selecting the right avocado and storing it. Light buyers also had significantly less ideas on how to use avocados compared to heavy users.

There was quite clear agreement across the buying groups about why they did buy avocados; health benefits, making food more special and taste.

These consumer insights will be used to help form the strategy for the avocado marketing plan for the next three years.

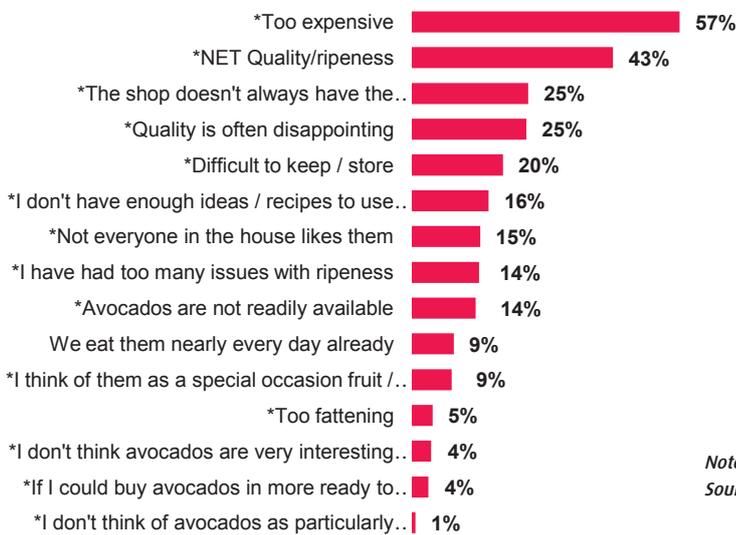
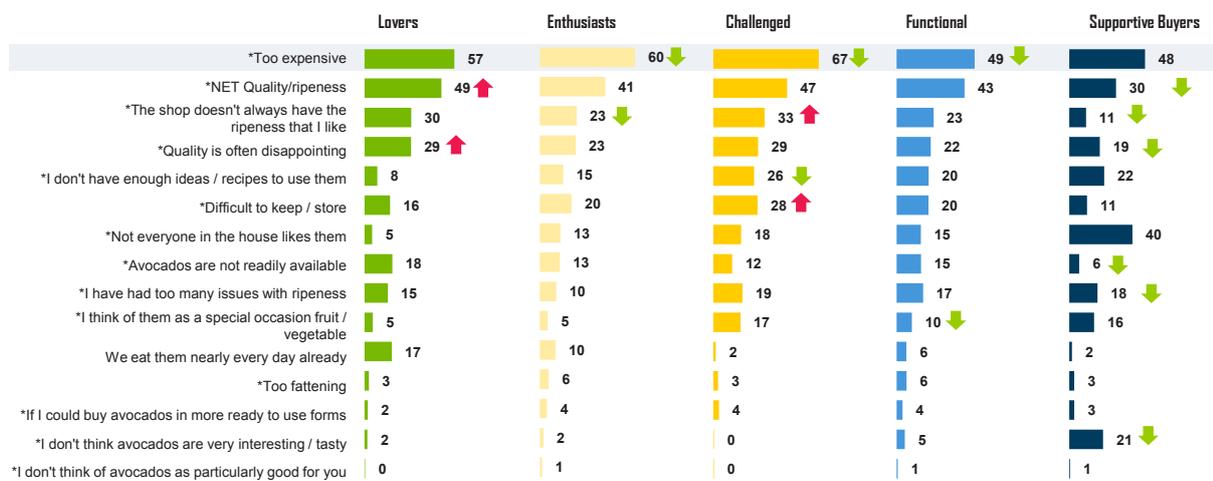


Figure 3 Barrier to Purchasing Avocados More Often (% Who Selected Reason)

Note: * An increase is negative, hence reason for red shading. Source: 2.6 What prevents you from buying avocados more often?

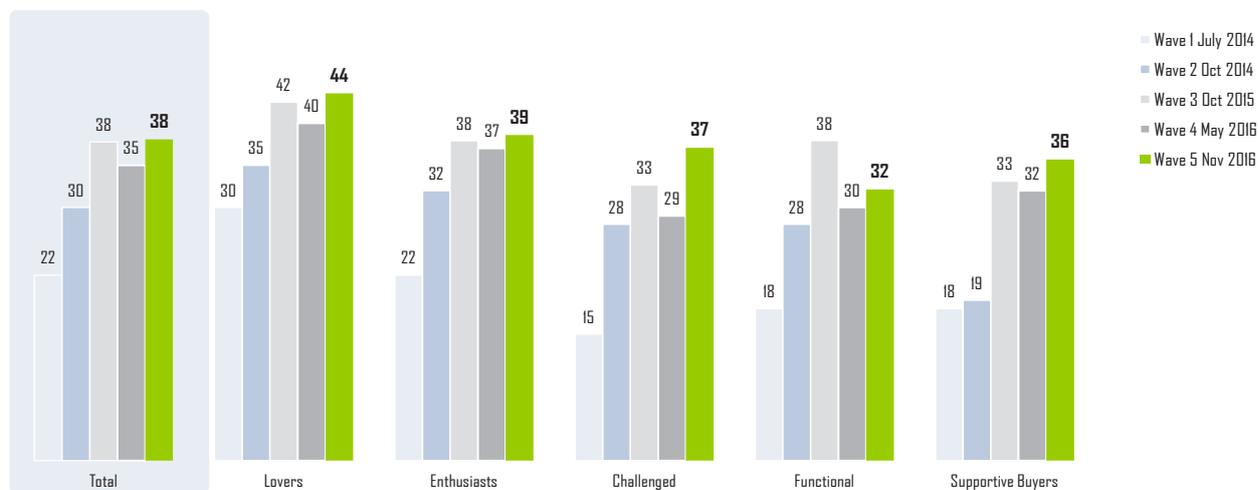
Figure 4 Barrier to Purchasing Avocados More Often by Segment (% Who Selected Reason)



↑ W5 score >5% higher than W4 score ↓ W5 score >5% lower than W4 score

Note: * An increase is negative, hence reason for red shading. Base: W5 Avocados Buyers (n=1,337) Lovers (n=315), Enthusiasts (n=472), Challenged (n=186), Functional (n=100), Supportive buyers (n=100). Source: 2.6 What prevents you from buying avocados more often?

Figure 5 Prompted Advertising recognition (% Avocado buyers)



Source: 4.6 Before today, had you seen this ad on TV?

Figure 6 Noticeability of the Ad (% Recognised the Ad)



Source: 4.8 If you were sitting in front of the TV later tonight and this ad came on, would you take notice of it?

NO.	REASONS TO NOT BUY AVOCADOS (All buyers)	REASONS TO NOT BUY AVOCADOS (All buyers)			
		All buyers	Heavy buyers	Medium buyers	Light buyers
1	I am nervous that I will buy some and they will be black/blemished inside	67%	6%	72%	71%
2	Once I cut open an avocado, I have to use the whole thing because it goes off if I try to store it.	49%	17%	61%	50%
3	Avocados are too expensive and not good value for money	38%	37%	50%	31%
4	I don't know any/many ways to use avocados in meals	36%	15%	33%	7%
5	I can't seem to find a good one—they are usually either too hard or brown and soft inside	30%	0%	17%	44%
6	I/my family don't like the taste of avocados	11%	0%	11%	25%
7	I/my family don't like the texture of avocados	9%	0%	6%	13%
8	They are difficult to cut open and remove the seed and skin	9%	0%	6%	19%
9	When I cook with them, they taste really bitter	6%	0%	6%	19%
10	I think they have too much fat and aren't good for me/my family.	6%	0%	0%	6%

Figure 7 Reasons to not buy avocados

NO.	REASONS TO BUY AVOCADOS (All buyers)	REASONS TO BUY AVOCADOS (All buyers)			
		All buyers	Heavy buyers	Medium buyers	Light buyers
1	I believe avocados are great for me/my family's health	92%	85%	100%	88%
2	They make other food more special – even a simple piece of toast	90%	85%	94%	88%
3	I/my family really like the taste of avocados	85%	85%	89%	82%
4	I can use avocados in all sorts of different recipes	75%	77%	89%	55%
5	I know how to cut them open and remove the seed and skin	73%	69%	83%	55%
6	I like to use them to replace butter on a sandwich	72%	69%	89%	5%
7	I feel confident I know how to select a ripe one	52%	0%	56%	30%
8	They are easy to store for later, even after I cut them	33%	0%	28%	29%
9	They are great value for money	27%	31%	22%	20%
10	I know how to cook with them so they don't taste bitter.	17%	0%	11%	6%

Figure 8 Reasons to buy avocados

Source: Review Partners Nov 2016

News from Around the World

News from Around the World contains reproduced articles that have been published by various international news sources.

Korea fastest growing market for NZ avocados

The world's avocado production is increasing every year but according to those within the industry demand is still far higher than supply. The Australians are renowned for their love of the avocado, this is music to the ears of both Australian and New Zealand producers.

Australia continues to be the largest market for both the New Zealand industry and grower and marketer Just Avocados, typically taking between 75% to 85% of national crop each season.

The New Zealand industry delivered a record crop of just over 4.7 million export trays, well up on the previous seasons 2.5 million and close to 300,000 export trays more than the previous record harvest achieved in the 2014 season. "The volume handled by Just Avocados was also significantly over 75% greater than the prior season with a volume of around 700,000 trays exported to customers in eight different markets," according to Steve Trickett, General Manager Sales & Marketing at the company.

Just Avocados is investing in additional resources and infrastructure designed to see a progressive increase in volume over 5 years, generated from its current 15% share of industry crop up to 20%+. The acquisition and leasing of further avocado orchards combined with the expected lift in grower productivity through the additional technical transfer advice provided to supplying growers will underpin the projected growth.

"To ensure we do not become over-dependent on the Australian market, we continue to pursue new market development initiatives in a number of Asian markets, with particular focus on Japan, Korea and Thailand as well as more recent penetration into emerging markets such as Taiwan. Once access is gained into mainland China, Just Avocados will be on the front foot there exploring new niche market opportunities such as those identified in the E-Commerce space."

"In new and emerging markets particularly in North and South East Asia, there is an ongoing need to invest in consumer education around the nutritional benefits avocados offer as well as how to handle the fruit and the wide variety of ways to incorporate it into the menu," explains Steve. "Market-specific recipe development to meet different ethnic tastes and cooking styles will play a big part in that education."

"The South Korean market has demonstrated the fastest growth in recent years," according to Steve. "It gained No.2 spot after Japan in the markets served by New Zealand outside of Australia. Korean consumers are very health

conscious and a significant percent of the population have good disposable incomes so are willing and able to pay the premium commanded for New Zealand origin fruit. From a supplier perspective this market is also a priority as it prefers the medium to larger sized fruit that New Zealand typically grows more of compared to other key Southern Hemisphere competitors such as Mexico."

Just Avocados is one of 12 New Zealand exporters and so a key point of difference for both grower suppliers and international customers alike is the fact they are an "avo-centric" business which is also fully integrated as a grower-packer-exporter-marketer service company able to seamlessly deliver product to the end-customer and more quickly respond to changing market dynamics.

"Just Avocados has always been a significant contributor to the drive for developing new markets and pioneering new technologies involved in serving these markets. Being internationally connected with leading players in the global fruit trade enables us to share and trial marketing ideas that work elsewhere."

www.darlinggroup.co.nz

www.freshplaza.com/article/171220/Korea-fastest-growing-market-for-NZ-avocados

China: Mr. Avocado Ripe Center opened in Shanghai

California-based Mission Produce's joint venture with Lantao International in China has now taken on a fresh dimension with the incorporation of retailer Pagoda Stores, a new ripening center and a new brand Mr. Avocado.

Mission Produce yesterday announced construction had been completed on the Mr. Avocado Ripe Center, which is strategically located near Yangtze River delta and the Port of Shanghai.

The facility has four ripe rooms with a total capacity of 80 pallets of ripening space, and each room features two-tier racking systems.

The ripe rooms were constructed under the supervision of Mission's engineering team, and are duplicates of the energy-efficient, high air-flow, temperature-controlled rooms the company uses in its eight ripening centers in the United States.

Mission Produce claim the center is the first avocado-specific ripening facility ever built in China.

"We are very excited about the growth we've seen in China over the past several years," said Mission CEO Steve Barnard.

"By opening the Mr. Avocado Ripe Center in Shanghai, we will be able to provide ripe fruit to the market and accelerate that growth.

"Our partnership with Lantao and Pagoda to develop the Mr.

Avocado brand for ripe fruit strengthens our leadership position in China.”

While Mission Produce is a U.S. company, U.S. avocados do not yet have access to the Chinese market. Instead, the company is sourcing fruit from Mexico, Peru and Chile.

Lantao CEO John Wang said more and more consumers were accepting and recognizing the fruit, and the time was right for rolling out the Mr. Avocado brand for the ripe program.

“After years of promoting and developing avocados in the Chinese market, we have reached a turning point. Because there has been only hard fruit available, customers had to ripen on their own,” Wang said.

“The U.S. market began to develop rapidly over 20 years ago when Mission started ripening fruit for retailers. We are following the same format now in China.

“Through our Mr. Avocado partnership, we constructed the first ripening center in China, supplying professionally-crafted, ready-to-eat avocados to the Chinese market. I believe Mr. Avocado will be the leading avocado brand in China.”

Pagoda is one of China’s largest fruit specialty stores, with over 1,800 shops and a presence across the country.

The retailer has expanded rapidly in recent years through the opening of new stores and acquisitions. Like the Mission and Lantao representatives, Pagoda chairman Yu Huiyong was also excited about the new partnership.

“We now have more than 1,800 stores all over China. We hope to continue to open 10,000 stores by 2020. By developing the fruit industry, we hope to better serve the world, in a sense,” Yu said.

“Because we have so many fruits and vegetables in the category—but so far there are very few recognized brands—we feel that this is a very big opportunity for the next decade to come.

“I told my team three years ago that we need to pay special attention to avocados. If we lose avocados, we would lose half of the fruit category. So, I have been looking for the opportunity to form a partnership with the best worldwide avocado company.”

www.freshfruitportal.com/news/2017/04/10/china-mr-avocado-ripe-center-opened-shanghai/

Overview Global Avocado Market

April marks a transition in the supply of avocados. After Chile stops exporting, there is a gap in the market. South Africa and Peru are still unready to meet the huge demand, and this, in combination with the bad weather in Peru, has delayed the supply and made it difficult to find sufficient volumes; therefore, skyrocketing prices have been recorded worldwide.

An importer submitted the following list of seasons and the

gaps in the market:

- Spain, Morocco and Israel: The Hass season ends in week 13-14.
- Kenya: Fruit ready to be ripened is available from half April.
- South Africa: First shipments of Maluma in week 14, and of Hass on week 15.
- Peru: Due to the current climatic disaster, various production areas have been affected and the first harvest has been delayed.
- Colombia: Preparations are underway for their second harvest season, which will become available from week 14. Again, three weeks late.
- Chile: Last shipments are only just arriving.
- Mexico: 30% lower production; they are the main supplier of the US and due to the shortage the fruit remains largely in the domestic market.
- US: They get high prices in the local market, so no exports to Europe.
- Brazil: Harvest starting in late March, but the country remains a small supplier.

Rain delayed Peruvian supply

Before the country was hit by heavy rains, the prospects for the campaign were really good. What is certain now, in any case, is that there will be a delay because of the damages caused to infrastructure. In a crisis of such magnitude, all efforts concentrate primarily on humanitarian aid.

“The US will have a deficit and there is a good profit to be made in the dollar markets,” predicts a Peruvian trader. For the Euro and Pound countries, the impact will be reduced due to the low exchange rate.

Peru had already been on the market for some time, but the peak in the supply has been delayed by the bad weather. There is export potential, because not all production areas have been affected by the rain; however, the damaged infrastructure will remain a challenge.

The price in the Euro countries is expected to increase. The exporter wonders how far the price can rise before consumption drops. “South Africa and Peru will therefore not be affected, as there is sufficient demand in the world,” states the trader.

Last year, the export up until week 11 stood at 445 containers. This year, the volume has been 20% lower, with 352 containers. On the bright side, the hard skin of avocados makes them tougher and will allow producers to harvest them later.

Mexico keeping avocados for Easter

Growers are trying to keep some production in order to extend the season. The new campaign won’t kick off until June and Easter is an important moment, as the demand for avocados peaks at the major tourist cities. Normally, the avocados supplied here have no export license, but because this volume

is small, avocados intended for export are also placed on the domestic market. This results in shortages in the US.

A trader confirmed that they expect shortages in the supply of the fruit. For the current season, production prospects point to 200,000 tonnes, probably barely enough to meet US demand. Besides the US market, exports go also to Japan, Europe, Canada and China. Consequently, shortages are expected over the next three months. This situation is unlikely to change until the new harvest gets going in July.

Deficit in US market

The supply in the US is slow because Mexico is exporting a smaller volume. This results in a tight market. The demand is high. Cinco de Mayo (a Mexican and American holiday) has reached a status similar to that of the Super Bowl. There is worldwide demand for avocados. “The price is high and will remain high,” states a trader. The smaller supply of California avocados is taking a toll on the market. The demand for organic avocados, for which the market depends on Mexico and Peru, is on the rise.

“Fantastic season” in Israel

The season has almost come to an end. A trader reports that they shipped the last container about two weeks ago and affirms that “it’s now as good as over.” He assures that “we have had a fantastic season, with a great volume, and it has also been the third or fourth year in a row with good prices. We are now expecting a gap.” There are also changes as far as the varieties are concerned. While in the past everyone asked for Hass, the demand for green skin avocados is now also increasing. The Israeli sector is benefiting from the growing demand in Europe, where health trends have boosted the popularity of avocados.

The Hass, Fuerte, Ettinger and Nabal are the most commonly grown varieties in Israel. Their seasons slightly overlap with each other, so the entire campaign lasts for about ten months. In many other production areas, the seasons are shorter. Exporters also benefit from the relative proximity to the European market. The avocados reach the plates of European consumers after just four or five days.

Last year, a total of 100,000 tonnes of avocados were harvested, half of which was intended for export. Last year, because of the impact of a storm in the winter months, the export volume was 3,000 tonnes lower than in the previous season. Europe is the main export destination, accounting for 80% of the volume. France is by far the largest market, accounting for a third of the exports. Spain is threatening to become a competitor for the Israeli production, as there is increasing interest in the production of avocados.

Morocco focuses on exports

A trader tells us that the volumes are smaller than in previous years. There are also smaller calibres available. “The demand in the coming weeks will remain high, especially given the

expected gap in the supply after Easter, until the Peruvian production hits the market. In that period, almost no avocados will be left on the European market,” predicts the Moroccan trader.

The Moroccan season normally lasts from 15 February to 15 April. This is a period when none of the major producing countries are on the market. The hot summer and cold winter, however, have had some consequences. There are hardly any large sizes available. The main varieties are the Hass and green skinned. Exporting is so lucrative that exporters barely pay attention to the domestic market, with the result that Spanish exporters are aiming to fill this gap.

Spain benefits from sky-high price

With only a month to go before the end of the season, the price of Hass avocados from Malaga has reached a record high level. The price at origin stands at between 2.30 and 3 Euro per kilo, a record for this time of the year. The Lamb Hass and Reed avocados will follow later.

Spanish exporters benefit from the delays affecting avocados in the southern hemisphere. Moreover, the campaign in other countries around the Mediterranean is also passed its peak.

Netherlands: Avocado prices even higher due to weather in Peru

The success of avocados is an ‘ongoing story’, with structurally high prices this season as a result. Despite the fact that the volume planted worldwide is growing, the market is still easily absorbing the production. Currently, the prices are extremely high everywhere. The supply has been reduced due to the impact of the extreme weather conditions in Peru. Prices for the packaged product stand at about 18 to 18.50 Euro, which is nearly 1 Euro per piece. Importers state that, at the moment, the most unusual requests are being made, but no one is able to cover the demand. Prospects point to the situation not being resolved until a few weeks from now, as the shortages from Peru can hardly be replaced. This is done by shipping Mexican avocados by air, and the first Brazilian Hass avocados are now also on the market. Chile’s campaign has already come to a close and its avocados are not expected to be back on the European market until August. In this transitional period, the gap is partly filled by countries like Colombia, Israel and Spain, which have achieved a significant development in recent years, especially Colombia. The lack of rainfall in Africa is leading to the production of smaller avocados, mostly due to the fact that these trees get less rain. A positive development is that the increasing demand for packaged avocados also results in smoother sales for these small sizes.

Skyrocketing prices in Belgium

The Belgian market is feeling the effects of the storm in Peru. The supply is low, so prices have consequently gone up and they are not expected to fall again in the short term. In fact, with Easter around the corner, the prospect is actually that prices will continue to rise. The season in the Mediterranean countries

(Spain, Morocco and Israel) is coming to an end, and the first significant volumes from South Africa won't be arriving until week 15. Other countries on the market are Mexico, Kenya, Brazil and Colombia. The most cautious forecasts from traders point to the situation becoming normal again around May.

Good market in Italy

Last year, the first batches from Peru hit the market in early March; however, this year's first air shipments are not expected until late March or early April. The last containers from Israel have already arrived and it will take about three weeks before South Africa comes on the market. There is also some supply from other African countries, such as Kenya. These countries are investing in the fruit's export. Other than this, the situation is good, according to a trader. The most demanded of all green avocados is the Pinkerton. Imports from Israel consist of Ardith and Arad avocados, among other varieties. Peru mainly supplies the Fuerte, Ettinger and Zutano.

Avocados have become immensely popular over the past five to six years and the exotic has earned its own place in the market. The demand increases ahead of the summer. Prices are already high and stand at almost 80 cents per piece.

According to a trader, there are two types of consumers. One of them prefers the harder avocados that ripen more slowly and for those the ideal choice is the Pinkerton. The second group demands a ripe avocado and for those the Hass is the most suitable option.

Investment in laser labels in Sweden yet to pay off

It will take some time before the investment made in laser labels, whose use started only recently, pays off. The volume of avocados featuring such labels is still limited. The organic avocados with this label are regularly sold as conventional because the customers place the fruit in bags and the cashier does not see the laser tag.

The avocado market is growing rapidly. The volume has increased by 15 to 20%. Last year, a historic volume was sold despite the rising prices.

China is an import market

The Asian country imports its avocados from Chile and Mexico, and since 2015 also from Peru. Currently, New Zealand is trying to gain access to the Chinese market. Since 2014, the import volume has increased explosively. That year, imports grew from 32 tonnes to 1,500 tonnes.

Besides the foreign supply, there is also a domestic production in the regions of Yunnan, Guanxi, Sichuan and Hainan. While avocados have been grown since the 20's of the previous century, there is no commercial cultivation; therefore, the quality is too poor; this offers opportunities for exporters in producing countries.

www.farmingportal.co.za/index.php/farmingnews/farmer-john-says/item/10091-overview-global-avocado-market



Grower Member Application Form

Avocados Australia Limited

ACN 105 853 807

The Australian avocado industry is a growing, successful and progressive industry. As the Australian avocado industry's peak industry body we work closely with all of the stakeholders that can have a direct impact on the marketplace. If you are looking to gain the maximum benefit from being a part of the Australian avocado industry we recommend that you become a member of Avocados Australia.

Avocados Australia provides online and offline information, programs, materials and events to advance the industry. On top of this there are other services we can provide that are only made possible through the support of our members. Join today. All membership enquiries can be directed to admin@avocado.org.au or call toll free 1300 303 971.

For Associate and Affiliate membership application forms please go to: www.avocado.org.au or call **07 3846 6566**

Member Details

Business name
and/or trading name:

ABN:

Key contacts:

Preferred address
(postal):

Address of property
(if different):

Contact Details

Business phone:

Home phone:

Fax:

Mobile:

Email:

Grower Member Application Form continued

Corporate Structure

How would you describe the nature of your operations (please tick)?

- Individual Partnership Company
 Trust Lessee Cooperative
 Other (please specify) _____

Please indicate the area of property that you crop for avocados (please tick)

- 0.5 - 5 ha 6-19 ha 20-49 ha
 50-99 ha 100-149 ha 150-199 ha
 200-499 ha 500 ha+

Payment Options

Grower Membership of Avocados Australia is **\$250 pa** (+ GST).

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News from Around the World continued

Michoacán counts cost of illegal avo plantings

Deforestation threatens to cause serious water shortage as demand for the ‘green gold’ surges.

The Mexican state of Michoacán is home to between 30,000ha and 45,000ha of illegal avocado orchards according to a leading academic.

Alberto Gómez Tagle Rojas from the Institute of Research on Natural Resources (Inirena) at the Michoacán University of San Nicolás de Hidalgo estimates that on top of the 150,000ha of registered avocado production in the state, there could be an additional 30 per cent that do have the required permits, many hidden within forests.

Speaking to Mexican news agency Quadratin, Gómez warned that the problem is not confined to Michoacán but also causing deforestation in other states including Jalisco, Colima, Mexico and Morelos.

He noted that the exponential growth in production, from around 3,000ha in 1963 to just under 200,000ha in 2017 was due to a lack of adequate planning and a failure to take into account the damage caused to forest land.

“This is a mistake that Mexico has repeated over and over again – with coffee, sugar cane and corn and now with avocados,” Gómez said.

“The Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (Sagarpa) saw an opportunity to make a lot of money and invested in programmes to develop production but it failed to take into account the other side of the situation, with the resulting environmental consequences.”

One of the most worrying effects has been the impact on water availability, with deforestation dramatically reducing the number of water-capturing trees like pine trees. This in turn affects weather patterns, altering rainy and dry periods.

“Rainfall has become more concentrated in the summer months (June, July and August), making the other months drier than they once were – it rains the same, but in a shorter period,” Gómez explained.

Studies show that a mature avocado tree consumes the same amount of water that 14 pine trees are capable of capturing.

The academic added that avocado production would increasingly compete with humans for water resources, creating a “delicate situation”.

www.fruitnet.com/americafruit/article/171746/michoacn-counts-cost-of-illegal-avo-plantings



Mexico: Parts of Michoacan and Jalisco free from avocado pests

The Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) declared a municipality in Jalisco and three municipalities of Michoacan as free of various pests that affect avocado, giving producers the opportunity to market their products in more favorable conditions in the domestic and international markets.

According to the declarations published in the Official Journal of the Federation (DOF), the municipalities of Quitupan, Jalisco; Charo, New Urecho and Tangancicuaro in the state of Michoacan, are free of the large avocado seed weevil (*Heilipus lauri*), the small avocado seed weevil (*Conotrachelus aguacatae* Y C. perseae) and the avocado seed borer (*Stenoma catenifer*).

This recognition positively impacts the producers of these municipalities, as it eliminates the phytosanitary restrictions for national mobilization and export of avocados applied to regions with a presence of well known pests, such as the avocado seed borers.

The declaration of a free zone improves the phytosanitary status of the avocado producing areas in Mexico and gives producers the opportunity to market their products on more favorable terms, both in the international and domestic markets, as it gives them opportunity to export this fruit as Made in Mexico.

Meanwhile, experts from the Directorate General of Plant Health, the National Health Service, Food Safety and Quality (SENASICA), and delegations of SAGARPA in Jalisco and Michoacan, conducted phytosanitary measures to determine the absence of avocado seed borers, based on assessments of the pest status in these regions.

They confirmed that producers were complying with the provisions of the Official Mexican Standards NOM-066-FITO-2002 and NOM-069-FITO-1995. To maintain the status and protect the areas free of the avocado seed borers, producers must implement the measures set out in the standards.

Source: cambiodemichoacan.mx

www.freshplaza.com/article/172295/Mexico-Parts-of-Michoacan-and-Jalisco-free-from-avocado-pests

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