MangoMatters

JULY **2020** / VOLUME **FORTY**

WINTER **ISSUE**

2019 *it's a wrap!*

The past three seasons have delivered the largest crops in the history of Australian Mangoes. *(page 14)*

PLUS

Congratulations to Australia's Mr Mango

Australian mango industry pioneer Ken Rayner was recognised with a Medal of the Order of Australia (OAM) for service to horticulture in June.

MORE ON PAGE 30

Australian Mango Industry Association (AMIA) Contact Details

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WANT TO CONTRIBUTE?

If you would like to submit pictures and story ideas to AMIA, or provide feedback, please contact the AMIA team via the details listed on this page.

CEO'S REPORT

Robert Gray
Chief Executive Officer, AMIA

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"I am confident that with a little extra planning the 2020-2021 mango season can be a successful one."

- Robert Gray

With another season about to begin, I appreciate many industry stakeholders may be feeling a little apprehensive about their preparations, given the COVID-19 pandemic. I would like to allay this apprehension and assure you that our team is here to help you through this, and I am confident that with a little extra planning the 2020-2021 mango season can be a successful one.

The mango team has already been hard at work to keep you up to date with relevant information and assist your planning with; extra weekly newsletters published since the end of last season, the creation of a dedicated COVID-19 resource page on our website, development of a COVID-19 Grower Guide and hosting a webinar for NT growers.

Our Industry Development Officers, Sarah and Marine, have also been busy answering any questions. We are already planning other online information sessions for other growing regions and plan to translate the COVID-19 Grower Guide into Vietnamese. If you would like access to any of these materials, or have any questions, please don't hesitate to get in touch with our team.

As part of the mango levy funded Hort Innovation project MG17000 Building Best Management Practice Capacity for the Australian Mango Industry (BPR project), the best practice resource team has also been hard at work reviewing current resources and developing new resources. This includes building a new website that will make information easier to find. The baseline practice survey that was conducted last season will assist with the development of these resources. You can read more about this survey on page 28.

The BPR project has also already delivered many services to industry including a temperature monitoring project (which will continue this season). An updated report on what the temperature monitoring project uncovered can be found on page 26.

You may be aware that the second three-year marketing plan finished at the end of the 2019-2020 season. A report on this data can be found on page 14.

Following the AMIA Annual General Meeting (AGM) we would like to welcome to the board, Leo Skliros and Nino Niceforo. We would also like to congratulate Karl Gygar on retaining his position as Director for Southern Queensland and New South Wales.

Finally we would like to thank outgoing Director Han Shiong Siah for his service to the industry over the past six years.

On a final note, I would like to update you about some changes to our executive team. We firstly welcome Niamh Sullivan to the role of Communication Manager, as Jessica Mitchell commences maternity leave again. We are also excited to announce that Marine Empson will also commence maternity leave later this year and we are currently recruiting for her maternity leave cover. We are also still recruiting for an Industry Development Manager and hope to have an update for your soon.

I wish everyone a good season ahead.

CHAIRMAN'S REPORT

Ben Martin
Chairman, AMIA

Email: bjmenterprises@live.com
Mob: 0400 125 928

> "This season will be more important than ever to connect with our Australian consumers and encourage them to buy more Australian mangoes."
>
> *- Ben Martin*

The industry has been recently involved in protocol negotiations regarding export of mangoes to the Japanese market. Although we did not achieve all of the outcomes that we would have liked, we have managed to secure some positive outcomes from this process. Robert and I were in constant discussions with the Department of Agriculture, Water and the Environment during this process and I would like to thank David Ironside and his team for their help and support. We are currently in the process of submitting more market access proposals for several other key markets.

We recently met to discuss the marketing plan, which is going to be extended for another 12 months so that the review can align with the research and development (R&D) plan review. There will be more information to come on this as we move closer to these reviews and an opportunity for input from industry stakeholders. During this meeting we also looked at data on the last few seasons from Nielsen Homescan and I was disappointed with some of the results that were presented—the average price per mango falling last year by around 3%, with some varieties falling a lot more. This needs to be a focus moving forward, to ensure that the industry is sustainable for all growers.

Flowering has started on some farms in the Bowen/Burdekin region, but the majority of trees have not started yet. This timing looks about normal. Hopefully we will get some good weather throughout flowering and will be in for a good season.

We are concerned about access to export markets this season but are working with both State and Federal Government to secure transport (flights) for mangoes throughout the season. We are also aware of the high cost of some of these flights, even with the Federal Government's support package, and are looking into solutions to make it more cost effective.

This season will be more important than ever to connect with our Australian consumers and encourage them to buy more Australian mangoes.

On a final note, I would like to thank Han Shiong Siah for his service to the board over the last six years. He did a great job for not just the Northern Territory mango industry, but indeed the whole mango industry during his time on the board, and will be missed. I would also like to welcome Leo Skliros and Nino Niceforo to the board and I look forward to working with the both of them.

DIRECTOR REPORTS

NORTHERN TERRITORY & NORTHERN WESTERN AUSTRALIA

Han Shiong Siah
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E: han.siah@tropicalprimary.com

(outgoing)

I am proud about the recent news regarding the Northern Territory (NT) producing 52% of the 2019-2020 season's mango crop. Congratulations to NT growers and keep up the good work!

The nights are getting cooler as the 2020 dry season is settling in, mango flowering in the NT is starting now, with many farmers out there spraying to induce flowers. There are also reports that some green eating Asian culinary mango varieties, from the region, are currently heading to wholesale markets in Sydney and Melbourne.

2020 is shaping up to be a year that we wish we could forget. COVID-19 appeared in January 2020 and is now declared a pandemic around the world, including in Australia. The NT like many other regions in the world has been affected. Medical and economic changes were put in place, including border closures to reduce the spread of COVID-19. Likewise, the fresh perishable product industry was drastically impacted in late March 2020; while restaurants and pubs went into lockdown. Prices of fresh products in the wholesale markets collapsed and many farmers lost a lot of dollars.

While we need to consider the impacts of COVID-19 on our industry; including potential labour shortages and border closures, for the coming 2020-2021 mango season, at the time of writing (end of May 2020), NT has been spared the worst of COVID-19 and the 'new normal' is coming into effect with social distancing. As shops and restaurants begin to re-open, markets are also showing signs of resurgence.

Though there is some uncertainty in the current climate, with planning, I am confident growers can make the most of the coming season. I advise growers to listen to your wholesaler regarding current supply and demand and to pick and send the best quality fruit to market. We need to think differently this season to market and promote Australian mangoes.

Businesses (including farms) around the region and the country have also been advised to get a COVID-19 Management Plan through their local health department. If you unsure how to proceed, ask your Australian Mango Industry Association (AMIA) Industry Development Officer, Sarah or Marine, for guidance and templates, as well as your local farming industry bodies and government bodies.

This is my last board report after six years. It has been a journey of development and improvement for me on the AMIA Board. I would like to thank all my fellow, past and present, board directors for their wisdom and guidance. Geoff, you always been my mentor from the beginning in Brazil, thank you so much for that. Furthermore, I would also like thank the team at AMIA for the strong working relationship we developed, especially Jess who edits all my board reports to make them readable. Thank you Jess and congratulations on baby number two. To the growers, my phone number above is always available to take your calls.

It may be a difficult year ahead, but I hope all growers, wholesalers, retailers, and readers stay safe. Look after each other and I will see you on the other side stronger. Oh and eat a few mangoes while you are at it.

Thank you, Han.

Geoff Warnock
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E: gullivers@wn.com.au

KUNUNURRA: During mid-February it appeared the region was going to have a very similar wet season to the previous year (2019). Fortunately, at the end of February we were blessed with a cyclone which improved the situation considerably and brought rainfall up to the yearly average for the region.

As a result, the trees are looking good and after a number of recent cool nights, buds are beginning to push out with the odd tree showing patches of flower. Early indications are that the production from the region this year could be considerably greater than last year.

We trust the influence of the COVID-19 pandemic will not have an effect on the market for fruit, but there is every indication there could be a problem in procuring sufficient labour to pick and pack the crop.

The other area we experienced difficulties in last season was with finding sufficient transport to get the crop to market. This was due to the downturn in development in the region. I suppose we will cross these bridges when we come to them.

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FAR NORTH QUEENSLAND & NORTH QUEENSLAND

John Nardi
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E: john@favcoqld.com.au

After a reasonable wet season, it seems that we are starting to see some cold weather just about to set in. Most growers will be well into their winter pruning programs and will be watching the trees closely as the cold sets in going forward. With some recent rain before the cold, we are hopeful this does not bring on a flush and instead the trees settle and switch into flowering mode. Hopefully we do not see the late frosts and hail storms that affected the area last year.

As everyone is aware, we are in difficult times at the moment with the COVID-19 pandemic and I hope everyone stays safe, well and protected. In this edition of *Mango Matters* and in weekly newsletter *My Mango*, Australian Mangoes have provided information regarding implementing a COVID-19 Management Plan for businesses. This is a Government requirement and all states have their own version of the requirements. Please be aware of the requirements for your state and seek advice if you need any assistance, as there are fines in place for breaches of the requirements. The COVID-19 situation raises concerns for obtaining and managing labour for the coming season and I urge all growers to plan as well ahead as you can for your labour requirements. Hopefully this will all settle down soon and we do not see a major impact for growers but unfortunately, I think all businesses are now facing the prospect of having new measures permanently in place to deal with such circumstances, if it ever happens again in the future.

Here's hoping for a good flowering for all followed by a good fruit set and coming season.

John Nucifora
M: 0418 193 885
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I hope we are all getting through these tough times in good health and strong spirit.

I've been speaking to growers in my region and nobody is confident about the up and coming season, due to the unknowns surrounding the COVID-19 pandemic. Some of us experienced great losses with the late varieties due to the pandemic. We were extremely lucky that it only occurred during the late part of the season, but it still had an impact. Let's hope that it doesn't follow through to next season.

The cold weather has well and truly set in and this is very favourable for flowering at this stage. Trees are looking very good and I think flowering should be strong.

Still it is too early to tell how the season will pan out.

I would like to wish all a good season ahead.

SOUTHERN QUEENSLAND & NEW SOUTH WALES

Karl Gygar
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With restrictions on travel still in place (due to the COVID-19 pandemic at the time of writing) the upcoming mango season may see many growers selling their fruit into a very different marketplace. I strongly recommend all growers review their marketing strategy and think about the impacts the changed world will have on their business.

For those who export, locking in freight early and speaking to your exporter/freight forwarder is imperative. If you market domestically—I strongly encourage you to get in contact with your market agent and customers to discuss their thoughts on what the season may hold.

Labour should also be focus. The Pacific Labour Scheme is still in limbo and as the season ramps up more and more growers will be looking for workers from an ever-decreasing pool.

Consumables is another area to focus on. Many suppliers are reporting long delays in getting products from China. It is, therefore, imperative to place orders early and stay in contact with your consumable suppliers to ensure you don't go short on critical items in the packing shed.

With cool temperatures sweeping through the region at the moment, it is hoped a strong flowering will be triggered. This should set the region up for a great crop and fantastic season. Having strong plans in place well before the season starts will ensure that the most can be made from what could be a great year.

SOUTHERN WESTERN AUSTRALIA

David Morcombe
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E: dw.morcombe@gmail.com

Following the AGM there have been some board changes. I'd like to thank outgoing director Han for his contribution and look forward to working with new directors Nino and Leo.

It's the quiet time of year in the south with care and maintenance being the main activities. It is important for growers to spray copper following rain events, especially in the south where pseudomonas can be an issue.

In Gingin there has been a bit of unwanted flowering heading into winter. This was probably the result of a long warm summer followed by chilly autumn nights.

We are experiencing some stormy weather at the moment which will hopefully carry some good rain with it and help guarantee Carnarvon's water supply for the next year.

I'd like to thank the AMIA team for their work into establishing workflows for the coming season in regards the COVID-19 pandemic. We all hope that the Darwin growers, being the first to deal with it for the new season, can manage to get their fruit harvested and marketed successfully.

Good luck to all growers for the coming season.

AMIA & INDUSTRY NEWS

COVID-19 resources

Over the past few months, as the COVID-19 (coronavirus) pandemic has evolved, Australian Mangoes have been keeping industry stakeholders up to date with regular communication.

We have the following resources available:

- Copies of our weekly newsletter *My Mango* with updates, can be found on our website at; https://www.industry.mangoes.net.au/my-mango.
- A dedicated COVID-19 resources web-page; https://www.industry.mangoes.net.au/covid19-resources—which includes a COVID-19 manual, has been created as a one-stop shop for relevant resources. We urge you to take a look if you haven't already.
- A recording of a webinar we hosted to assist industry stakeholders with preparing for their upcoming season in light of requirements in place due to the COVID-19 pandemic. While this session was targeted at NT growers and stakeholders, as NT specific requirements were discussed, other interested stakeholders were welcome to join.

We plan to host future events for growers in other regions and are also developing a translated version of the COVID-19 manual for Vietnamese growers.

Staff and Board update

Following the AMIA Annual General Meeting (AGM) we would like to welcome to the board, Leo Skliros and Nino Niceforo as Directors' for Northern Western Australia and Northern Territory. We would also like to congratulate Karl Gygar on retaining his position as Director for Southern Queensland and New South Wales. Finally, we would like to thank outgoing Director Han Shiong Siah for his service to the industry over the past six years.

Leo and Nino are both dedicated mango growers and look forward to representing growers from their regions.

We would also like to welcome to our executive team Niamh Sullivan. Niamh will be the Communication Manager, while Jessica Mitchell is on maternity leave.

Niamh was previously a TV reporter in Taree, which saw her working closely with the agricultural industry and local farmers. She has also worked across a range of industries in different communications roles domestically and internationally. Niamh, who is now based in Brisbane, is already loving learning more about all things mango and is looking forward to meeting you in the coming months—virtually and hopefully in-person!

Clockwise from top left: Leo Skliros, Niamh Sullivan, Arminio (Nino) Niceforo.

AMIA TEAM (NEW MEMBER)			
Niamh Sullivan	Communication Manager	**M:** 0458 803 220	**E:** com@mangoes.net.au
AMIA Board			
Ben Martin	Chairman Far North Queensland / North Queensland	**M:** 0400 125 928	**E:** bjmenterprises@live.com
John Nucifora	Deputy Chairman Far North Queensland / North Queensland	**T:** 07 4093 2272 **M:** 0418 193 885	**E:** flossndeb@bigpond.com
Karl Gygar	Southern Queensland / New South Wales	**M:** 0481 591 470	**E:** kgygar@gmail.com
John Nardi	Far North Queensland / North Queensland	**T:** 07 3717 1500 **M:** 0408 334 266	**E:** johnn@favcoqld.com.au
David Morcombe	Western Australia	**M:** 0414 240 709	**E:** dw.morcombe@gmail.com
Arminio (Nino) Niceforo	Northern Western Australia and Northern Territory	**M:** 0417 834 185	**E:** nino67@live.com
Leo Skliros	Northern Western Australia and Northern Territory	**M:** 0407 919 942	**E:** sklirosleo@gmail.com
Geoff Warnock	Northern Western Australia and Northern Territory	**M:** 0438 884 842	**E:** gullivers@wn.com.au

Chemical updates

There have been a number of chemical updates over the past few months.

GRANT RECEIVED

2019/20 AgVet Grant received for DC-154 (Sivanto) Flupyradiforone Group 4D – Label Registration

Assorted tropical and sub-tropical fruits - inedible peel – Fruit spotting bugs (FSB) and Banana spotting bugs (BSB).

As part of Round 2 of the *Assistance Grants – Access to Industry Priority Uses of Agvet Chemicals* program, Hort Innovation received 14 grants to fund projects which will improve the access to agricultural chemicals. One of these projects will fund trials to generate the data required for a potential label registration of Bayer's Sivanto for Assorted tropical and sub-tropical fruits - inedible peel – FSB and BSB.

FSB and BSB are a major impediment to the commercial production of most tree fruits and nuts, and some vine fruits.

Growers have recorded crop losses of well over 30% due to FSB damage. FSB attack at least 22 different types of commercial fruits and nuts. Economic losses from FSB could amount to tens of millions of dollars each year in the Australian fruit and nut industries.

SIVANTO® prime is non-hazardous to bees making it a desirable solution with flexible application methods and timing. A modern insecticide with an excellent safety profile for the control of major sucking pests. Its selectivity to most beneficials in fruit crops provides a perfect fit for Integrated Pest Management (IPM) programs that industries are seeking.

Bayer have a broad distribution of Maximum Residue Levels (MRLs) and import tolerances around the world for SIVANTO® prime, which will help to harmonise trade.

The ST19020 Project will be contracted in June 2020 and trials will commence this season for a Crop Group - Assorted tropical and sub-tropical fruits - inedible peel Label Registration with Bayer. The project activities will be completed within 3 years and the data will be then provided to Bayer for a label extension.

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CANCELLATION & PERMITS

METHIDATHION (Suprathion 400 EC Insecticide) - Cancellation of product registration and label approvals by Adama effective 4 February 2020.

At the request of Adama Australia Pty Ltd, the APVMA has cancelled the product registration and associated label approvals of Suprathion 400 EC Insecticide.

A person may continue to use the cancelled product according to its label instructions until **4 February 2021**.

See APVMA gazette (p25-26).

CARBARYL

The following permit has been extended by the Australian Pesticides and Veterinary Medicines Authority (APVMA):

Permit ID: PER13484 Version 3

Description: Carbaryl / Mango / Mango Leafhoppers

Date Issued: 01-Jul-12

Expiry Date: 30-Apr-25

Permit Holder: Hort Innovation

To view this permit click here**.**

TRICHLORFON

The following permit has been extended by the Australian Pesticides and Veterinary Medicines Authority (APVMA):

Permit ID: PER14743 Version 3

Description: Trichlorfon / Custard Apple, Lychee, Mango & Persimmon / Flatid planthopper, Flower eating caterpillar, Looper & Yellow peach moth. Suppression only: Fruit-spotting bug, Banana spotting bug, Green vegetable bug and Lychee stink bug.

Date Issued: 01-Jun-14

Expiry Date: 30-Jun-25

Permit Holder: Hort Innovation

To view this permit click here**.**

METHOMYL

The following emergency permit has been issued by the Australian Pesticides and Veterinary Medicines Authority (APVMA):

Permit ID: PER89293

Description: Methomyl / Various Fruit, Nuts, Vegetables, Turf and Non-bearing Ornamentals / Fall Armyworm

Date Issued: 10-Apr-20

Expiry Date: 30-Apr-23

Permit Holder: Hort Innovation

To view this permit click here**.**

Please follow all directions on the permits and the product labels.

All efforts have been made to provide the most current, complete and accurate information on these permits, however we recommend that you confirm the details of these permits at the following APVMA website: https://portal.apvma.gov.au/permits.

Hort Innovation have also advised that a Non-Performance Reporting Form for Horticultural Pesticides* (available here) should be completed when an adverse experience occurs as a result of using the permit and returned to: jodie.pedrana@horticulture.com.au.

If you require any 'non-performance' information to be provided to the APVMA, please complete their Adverse Experience Report Form. This can be found at: http://apvma.gov.au/node/311 or https://portal.apvma.gov.au.

Users are advised that while the pesticide can be applied legally under the APVMA minor use permit, there can be a significant delay until the MRL gazetted by the APVMA is adopted in the Australia New Zealand Food Standards Code.

Until this occurs the MRL may not be recognised and a zero tolerance may be imposed for residues of the pesticide resulting from its use according to the APVMA permit.

Please be aware that in the absence of an MRL in the Food Standards Code, the use of the pesticide according to the permit may result in the suspension of the produce in the marketplace. Please check the FSANZ website or the Australian Government ComLaw website: https://www.legislation.gov.au/Series/F2015L00468 to confirm if there are MRL established by the Australia New Zealand Food Standards Code.

** A 'non-performance' is an unintended or unexpected effect on plants, plant products, animals, human beings or the environment, including injury, sensitivity reactions or lack of efficacy associated with the use of an agricultural chemical product(s) when used according to label (or permit) directions.*

Export information—season 2020/21 export registrations now open

Export registrations for international protocol markets are now open. Refer to Industry Advice Notice 2020-25 on the Department of Agriculture, Water and the Environment (DAWE) website.

ONLINE REGISTRATION

The online registration system is now open. Growers are only required to register their orchards and packhouses for China, Korea and the USA. Please note that registration is NOT required for orchards and packhouses exporting to Japan and New Zealand.

Applications MUST be completed by 26 July 2020.

HOW TO ACCESS THE ONLINE REGISTRATION WEBSITE

If you did not register last season, please forward your name, trading name, preferred email address and previous US export registration number (if applicable) to our Industry Development Officer at marine@mangoes.net.au. A no-reply email will be sent to you with a temporary password so that you can login and set up your account. If after 24 hours, you have not received the no-reply email, please check your Junk folder. If you still haven't received it, please contact marine@mangoes.net.au.

If you registered last season, your login details are the same. Your username should be your email address. If you have forgotten your password, please click on "Forgot password" and follow the prompts. Completing and submitting the online registration each year is still necessary. If your export application is identical to last season, please contact marine@mangoes.net.au and we will arrange for your application to be duplicated. If any changes have occurred (new contact details, new blocks, etc), you will need to complete a new application in full. If your block boundaries and packhouse haven't changed, the same registration numbers will apply. Growers will be able to access last year's application through the system.

Sign into the export application website here. Please use a supported web browser such as Google Chrome.

Click here to download a flow chart to guide you through the export registration process.

A step-by-step guide for the online export application process is available here.

To access relevant workplans and protocols for any of the above countries, please register for access to DAWE's MICoR database via this link.

The cost for registering is $220 (incl. GST, additional fees may apply).

CROP MONITOR ONLINE COURSE

Certain protocol markets (China, Korea and USA) are required to have a qualified Crop Monitor. To complete the compulsory Crop Monitor online course, please follow this link, register and complete the online training. Please note that the Crop Monitor online course needs to be completed each year. The following crop monitoring templates can be used by crop monitors and must be retained by growers for auditing purposes:

- Crop Monitor form – Mangoes – China
- Crop Monitor form – Mangoes – Korea
- Crop Monitor form – Mangoes – USA
- Crop Monitor form – Mangoes – Combined for all three markets.

As long as forms contain the same pest monitoring information, alternative templates may be used.

Training must be completed before flowering (budburst) when crop monitoring needs to start. The course quiz will remain open until 30 September 2020. The course content will be made accessible for reference throughout the season.

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KEY DATES SUMMARY

WHO	WHAT	KEY DATE	RELEVANT MARKETS
Growers and Packhouses	Apply online to register orchards/packhouses for relevant export markets	26 July 2020	China, Korea and USA
Crop Monitors	Complete crop monitor training	Before flowering (budburst) when crop monitoring needs to start	China, Korea and USA
Growers and Packhouses	Prepare audit, conducted by DAWE	*For new or previously non-compliant businesses:* **Pre-season audits:** • w/c 24 August 2020 for Northern Territory • w/c 5 October 2020 for Queensland *For accredited and compliant businesses (from last season):* **In-season audits:** • TBC during the season	China, Korea and USA

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AUDITS

If you were not accredited or were non-compliant for the 2019/20 season, you will be audited before your season starts (week commencing 24 August 2020 for Northern Territory and week commencing 5 October 2020 for Queensland).

If you were compliant last season, you will be audited in-season. DAWE will conduct a desktop audit pre-season so that you can be accredited and allowed to export before your in-season audit takes place.

DAWE's instructional material is available on the Plant Export Operations Manual (PEOM) to support industry in understanding their roles and responsibilities relating to the export of plants and plant products from Australia.

TREATMENT FACILITIES (VHT AND IRRADIATION)

Treatment facilities previously registered as an accredited property with DAWE, transitioned automatically to become a registered establishment at the start of the year. They will not need to re-apply as the registration is ongoing. However, they will be audited annually against the new policy. Registered establishments should have received a certificate of registration of an export registered establishment sent out by DAWE. This certificate includes your 4-digit registration number. This factsheet on the DAWE Plant Export Operations Manual, outlines the requirements under the new plant export registered establishment policy and includes references to the relevant instructional material (which can be found here under 'Establishments').

If you want to apply to become a registered establishment for either:

- Irradiation treatment of mangoes for export to the USA or New Zealand, or
- Vapour heat treatment of mangoes for export to China, South Korea and Japan.

You must download and complete the *Application form for registration as a horticulture export treatment facility*, and forward it to DAWE's Audit and Assurance Group. You must be audited and approved by the department and the importing country where required.

Growers should contact their preferred treatment facility to confirm that they are a registered establishment and approved for the required treatment function.

For any other enquiries, please contact one of the Australian Mangoes team members:

NT/WA regions:
Sarah Hain
E: sarah@mangoes.net.au
M: 0457 555 939

QLD/NNSW regions:
Marine Empson
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M: 0457 555 838

PR & MARKETING

2019 *it's a wrap!*

The past three seasons have delivered the largest crops in the history of Australian Mangoes.

10.6 million trays were sent to market in 2019* which was slightly less (2.8%) than the crop of 2018 (10.9 million trays). However, there was a noticeable difference in the size profile and flow of the crop. The crop profile skewed towards smaller fruit, contributing to a 10.8% increase in the number of mangoes sold through the domestic retail channel and the crop flow delivered a less compressed season than 2018. The value of the mangoes sold in the domestic retail market in 2019 grew by 7.3% over the previous season and mangoes outperformed the total fruit category which grew by just 2.1%.

The consumer drivers of growth in the retail market were:

1. An increase in the number of occasions people purchased mangoes up 5.1%, equalling **2.8 million more purchase occasions**.
2. An increase in the number of households that purchased mangoes up 3.1%, an **additional 177 thousand households**.
3. An increase in the number of mangoes purchased on each occasion up 2.3%, totally an average of **2.6 mangoes per purchase**.

Our vision is to make Australian mangoes the most iconic and loved fruit on earth—an irresistible, everyday, affordable treat! We want to attract new buyers to the category and most importantly we want to move them up the 'ladder of love' and into the 'wedded buyer' segment. We divide mango buying households into five distinct segments based on their loyalty, measured by the number of occasions a household buys mangoes during a single season, and we refer to the transition in customer loyalty as the 'ladder of love'.

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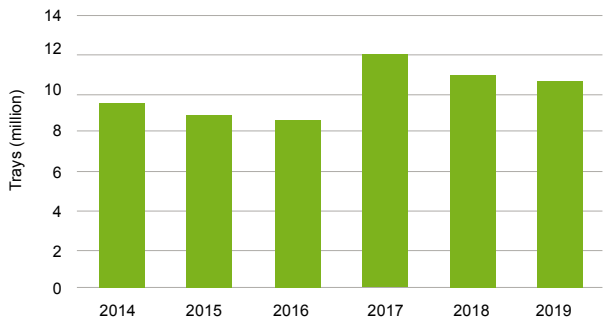
The last three seasons have been the largest in history.

Season Trends - Supply

Levy Data - 7kg tray equivalents



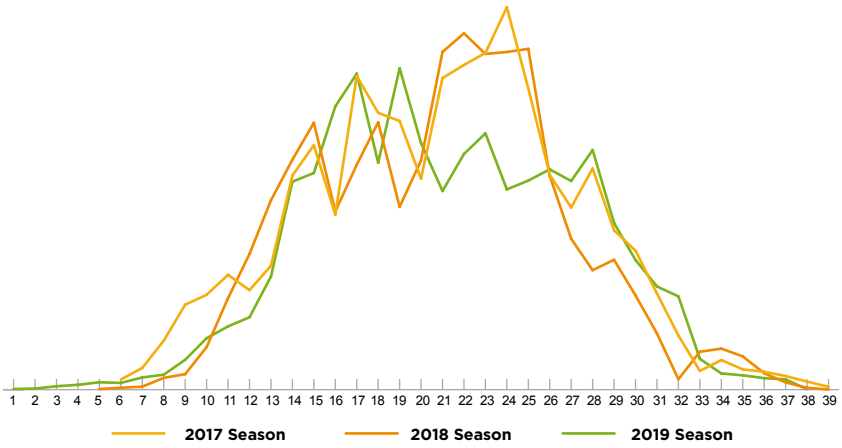
Season	# Trays (Millions)	# Weeks >100k	# Weeks >500k	Season Profile Supply
2014	9.4	18	8	High volume & pearks, moderately compressed season
2015	8.7	25	5	Long, flatter, less compressed season
2016	8.6	20	7	Lower volume, highly compressed season
2017	12	25	12	Highest volume to date, with long compressed season
2018	10.9	21	10	High volume, more compressed season than 2017
2019	10.6 (est.)	23	4	High volume, less compressed season

Source (trays): Levy Data 2019 is ETF as June data will need to be included
Source (weeks): AMIA grower crop flow data

The 2019 season was less compressed.

Season Trends - Supply

Supply Trends



Data source: Nielsen Homescan Mango Database

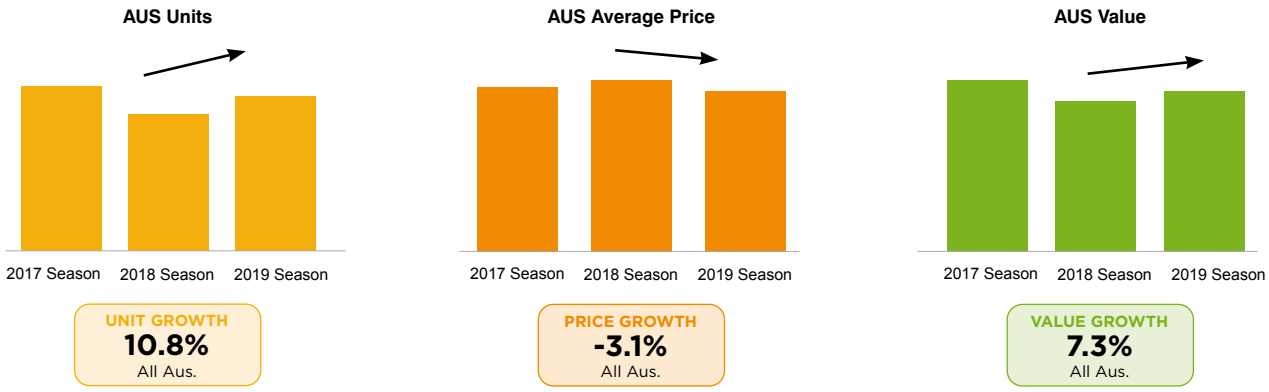
** 2019 refers to 2019/2020 season.*

Continued from page 14

The last three seasons have been the biggest mangoes have had in terms of value and volume.

Growth Trends - Retail

Levy Data - 7kg tray equivalents



Our job as an industry is to move households up the ladder from 'flirting buyers' on the bottom rung (households who buy on 1.6 occasions during the season on average) through to 'wedded buyers' on the top rung—in 2019 (on average) 'wedded buyer' households purchased on 13.8 occasions.

Last season we attracted more households to the category and saw positive growth in all buying segments including the 'wedded buyers' which grew by 4% over the previous year. These buyers were responsible for 51% of the dollars spent on mangoes and on average they paid more for their mango than any other segment.

During all of 2019 mangoes were ranked number one in the share of voice (SOV) prominence across print advertisements, maintaining this SOV throughout the season was also a key factor in driving growth.

Our mantra of "Impulse is King" and "Quality is Queen" continue to be the primary motivation for consumers to buy mangoes. Having highly visible, large luscious displays of beautiful, quality mangoes that look fresh and vibrant and are packed with that unique mango flavour is the cornerstone for building sustainable profitable growth.

For further information please contact Treena Welch, Australian Mangoes Marketing Manager:
P: 0417 001 253
E: marketing@mangoes.net.au

Hort Innovation

Growth Trends - Retail	2018 Season vs 2017	2019 Season vs 2018
% Units Change	-15.2%	10.8%
% Average Price Change	2.0%	-3.1%
% Value Change	-13.5%	7.4%

Last season, mango category value growth significantly outperformed total fruit.

National Benchmark

Total Fruit

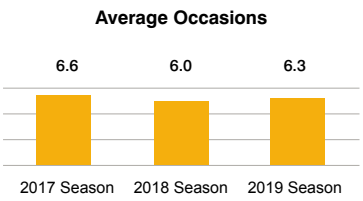
Continued page 16

Data source: Nielsen Homescan Mango Database

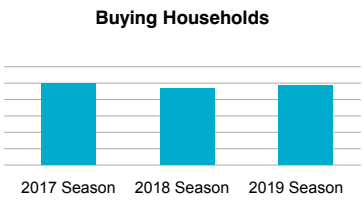
Continued from page 15

Mangoes are in long term category growth.

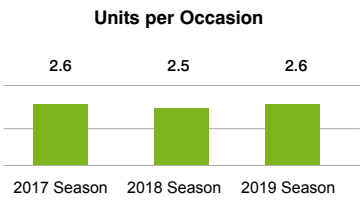
5.1% increase
2.8 million more occasions



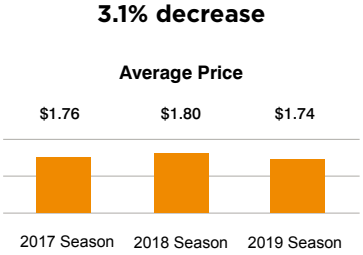
3.1% increase
177k more households



2.3% increase

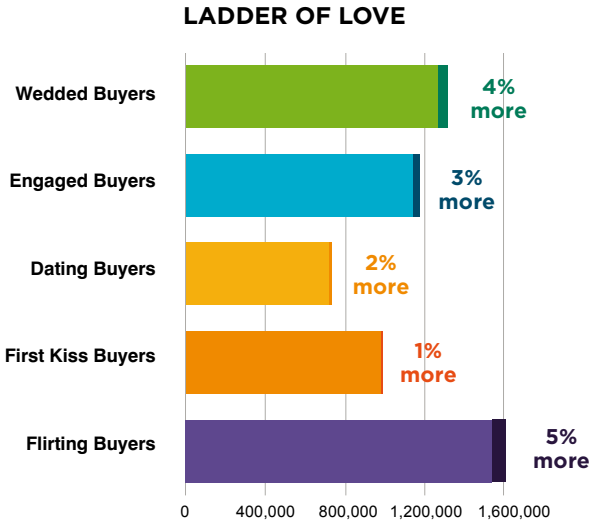


3.1% decrease



10.8% unit growth
7.4% value growth

Mangoes continue to move consumers up the ladder of love, gaining growth across all buyer segments.



WEDDED BUYERS
PAY MOST
per mango

FLIRTING BUYERS
PAY LEAST
per mango

Wedded Buyers
Purchased Mangoes and accounted for 50% of trips

Engaged Buyers
Purchased Mangoes and accounted for 24% of trips

Dating Buyers
Purchased Mangoes and accounted for 10% of trips

First Kiss Buyers
Purchased Mangoes and accounted for 9% of trips

Flirting Buyers
Purchased Mangoes and accounted for 7% of trips

WEDDED BUYERS
Percent of total buyers increasing

WEDDED BUYERS
PURCHASE 51.2%
of the mangoes dollars in 2019 season

WEDDED BUYERS
Purchased on average
13.8 times
in 2019 season

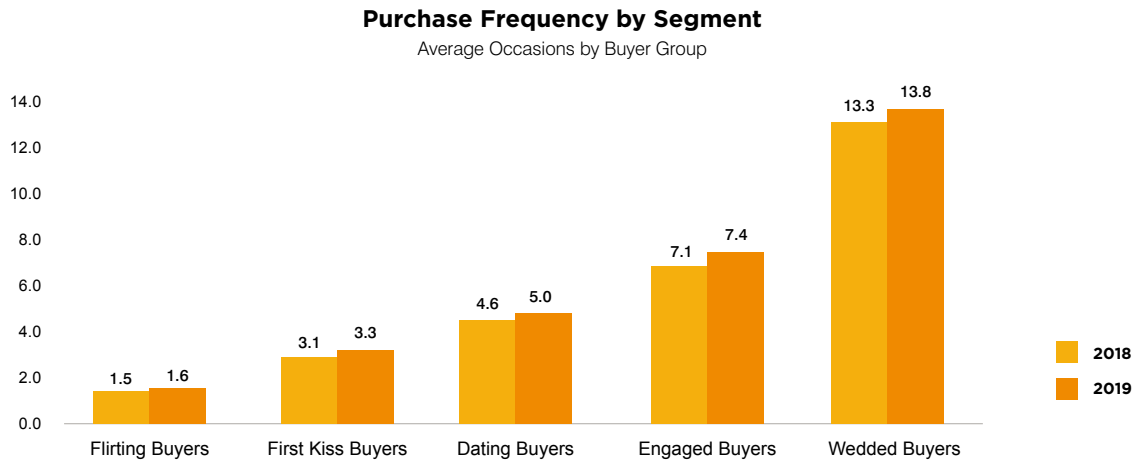
WEDDED BUYERS
Purchase less per occasion but purchase more frequently

Continued page 17

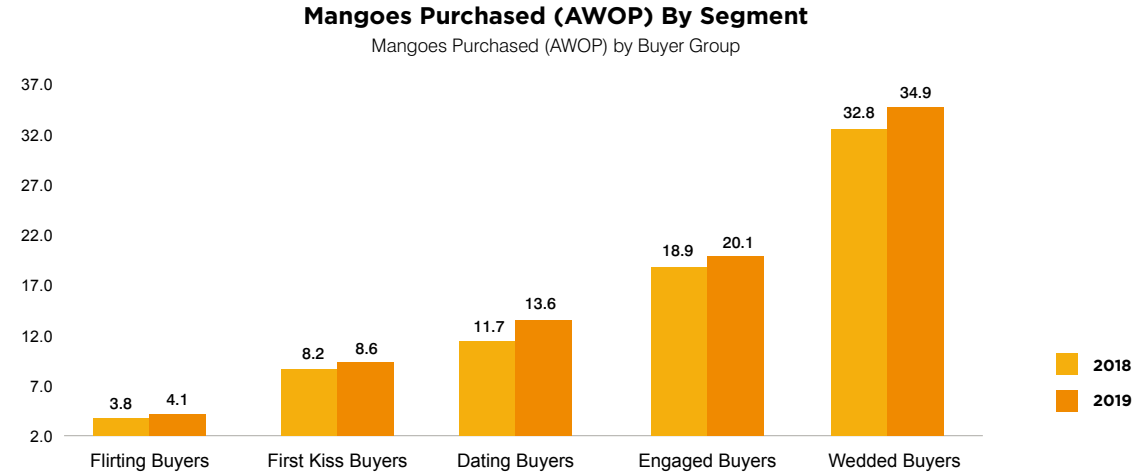
Data source: Nielsen Homescan Mango Database

Continued from page 16

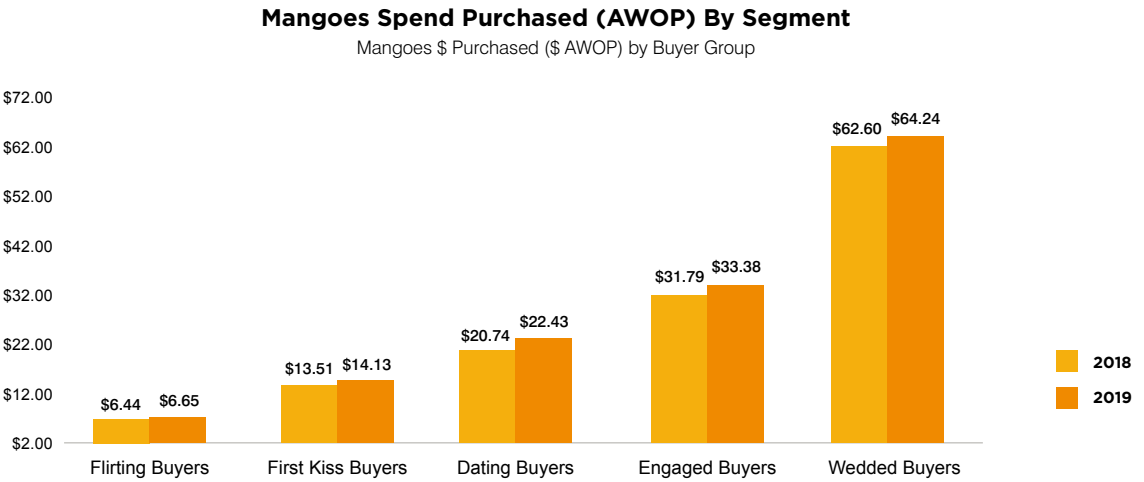
**Creating more wedded buyers remains our focus.
2019 saw an increase in the buying frequency of this segment.**



On average wedded buyers purchased 35 mangoes in 2019.



On average wedded buyers spent $64 on mangoes in 2019.



Continued page 18

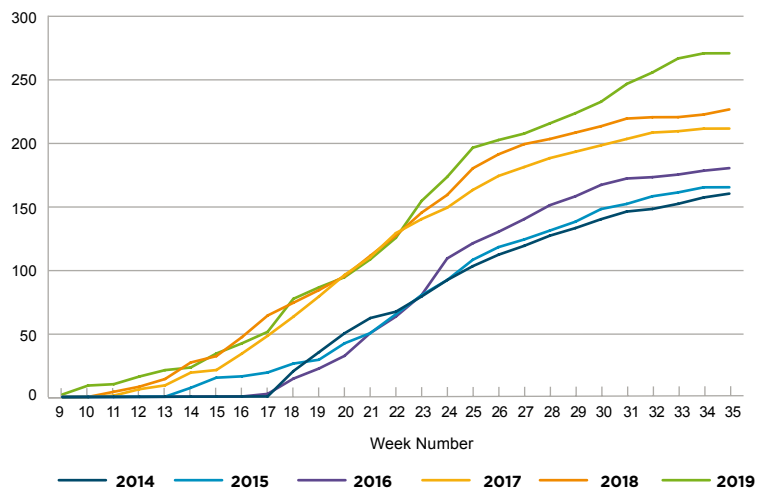
Data source: Nielsen Homescan Mango Database

Continued from page 17

Mangoes share of print advertisements.

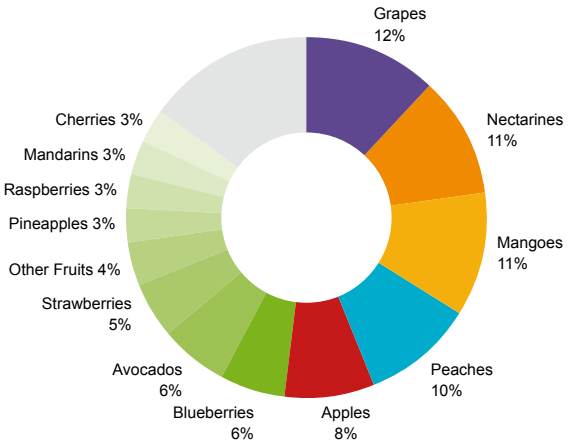
Cumulative Number of Mango Adverts

By Season



MANGOES
Achieved more ads later in the season

Share of Adverts 2019

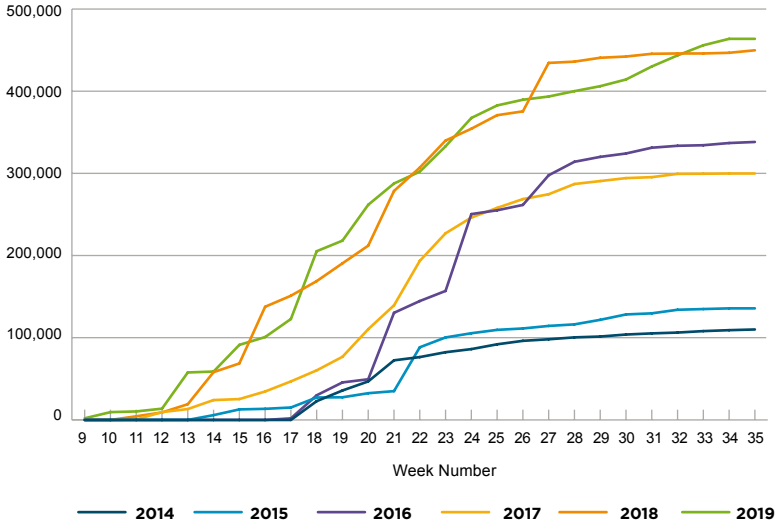


MANGOES
Maintained share of fruit ads

Mangoes share of print advertisement prominence (share of voice).

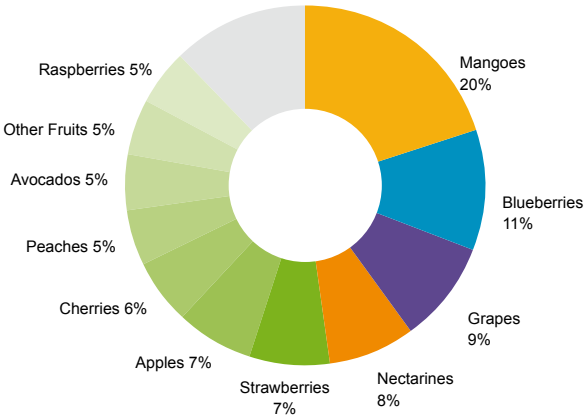
Cumulative SOV Score for Mango Adverts

By Season



MANGOES
Maintained SOV throughout season

Share of Voice



MANGOES
2019 was highest SOV score ever

Data source: Nielsen Homescan Mango Database

STOPPING SPOTTING BUGS WITH TRANSFORM™

Fruit Spotting Bug (FSB) and Banana Spotting Bug (BSB) are key pests in mango crops. They cause damage which can result in significant yield loss.

FSB are native pests to Australia and are distributed between Northern NSW and Northern QLD, preferring crops that thrive in sub-tropical conditions. Their development from egg to adult takes approximately 45 days and their appetite is insatiable. Both adult and developing nymph feed from the sap of young shoots and fruits, causing widespread damage in relatively low numbers. The FSB is a member of the Hemiptera (sucking mouth parts) insect family and it is this method of feeding that causes crop devastation.

Mangoes, being a thin-skinned fruit, are susceptible to spotting bug damage throughout all phases of growth. Small, immature fruits are usually dropped within days of an FSB attack. In some crops, no external marks are evident, and the fruit must be dissected to observe the lesions. Mature fruits can manifest symptoms that appear to look like stem-end cavity disorder; however, on closer inspection FSB damage will have a clear boundary where the damaged tissue meets the healthy tissue.

Mature fruits may also show scarring from feeding that occurred earlier in the season. Damage can also be observed in growing tips where damage is visible as dieback, lesions and sometimes distorted growth.

Over the years, FSB and BSB have been controlled by using broad spectrum chemicals which can cause significant disruption to beneficial insects. More recently, growers have realised that maintaining the natural balance of insects within the orchard is imperative for reducing the dependence on chemical controls.

Maintaining beneficial insect populations can be particularly effective at reducing the number and frequency of sprays needed during a season by keeping low to moderate insect infestations below threshold limits. Beneficial insects should be considered the ultimate mode of action compared to chemical controls as insect pests will never develop resistance to them, they are free, and self-sustaining.

Recently, Hort Innovation acquired a permit with the Australian Pesticides and Veterinary Medicines Authority that allows growers to use Transform Insecticide on mango crops for the control of FSB and BSB. Permit number: PER85397.

Transform is active on many species of sap-feeding bugs and has demonstrated activity on fruit spotting bug and banana spotting bug in registered crops including avocados and macadamia. Transform provides control of pests resistant to other insecticides and is known to have minimal impact on key beneficial predators and parasitoids. Given its low toxicity to beneficial insects, Transform is the ideal Integrated Pest Management tool for the control of spotting bugs.

Repeated field trials conducted across NSW and QLD demonstrated that Transform is fast to knock-down FSB and was successful in controlling populations compared to current commercial standards.

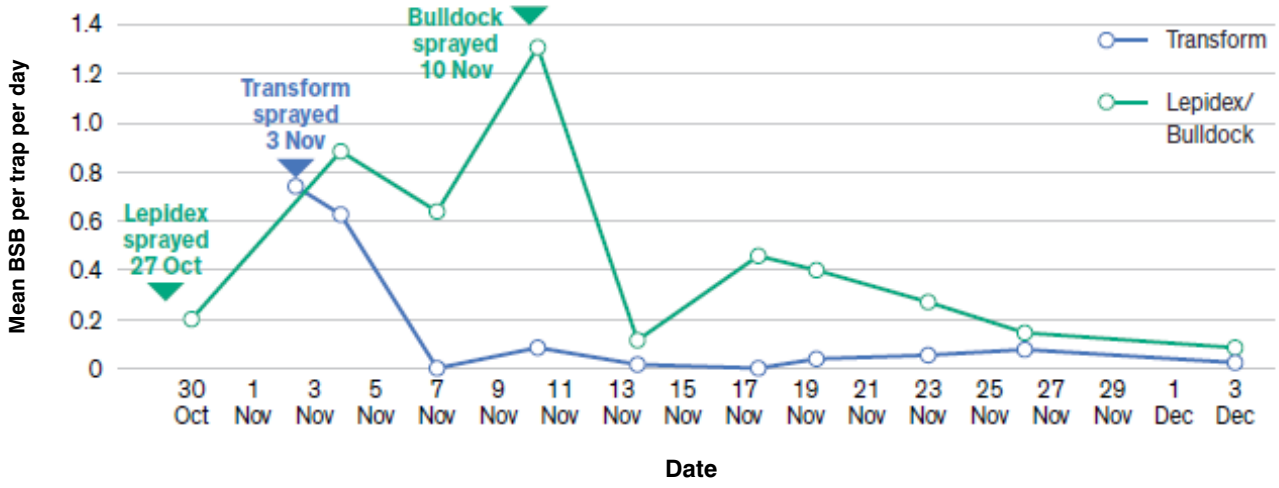


Figure 4. *Transform with rapid onset and longer residual control performed to higher degree than commercial standards.*

BIOSECURITY, RESEARCH & POLICY

Biosecurity—mango leaf gall midge

As part of our commitment to represent the biosecurity interests of the Australian mango industry, Australian Mangoes (AMIA) will bring you more regular information about pests and diseases to look out for on farm. We will now provide you with an article in each edition of *Mango Matters*.

This edition, we look at the mango leaf gall midge. Information has been prepared by Biosecurity Queensland, Department of Agriculture and Fisheries.

Mango leaf gall midge (MLGM) (*Procontarinia pustulata*) is a tiny fly, similar to a mosquito, that is found in Papua New Guinea, on some Torres Strait islands and on the Australian mainland near the tip of Cape York Peninsula. To date, MLGM has not been detected in Australian mango production areas.

MLGM larvae feed within plant tissue causing abnormal growth called galls on leaves.

The MLGM lifecycle starts when the female fly lays eggs, one at a time, under the surface of tender young mango leaves. After only a few days, the egg opens inside the leaf and a distinctive hollow gall forms around the hatched larva. When the larva matures, it exits the gall through a tiny hole and descends to the ground where it pupates in the soil. Following pupation, the adult fly emerges, and the lifecycle begins again. MLGM is capable of completing its lifecycle several times each year.

Severe MLGM infestations can result in over 100 galls per leaf, causing leaf deformation, reduced photosynthesis and leaf drop. As a consequence, fruit production may be affected.

Continued page 21

A young mango leaf infested with MLGM. © Department of Agriculture and Fisheries.

Leaf galls caused by MLGM are roundish, raised, about 2-3 mm in diameter and can be different colours, depending on their age. © Department of Agriculture and Fisheries.

Continued from page 20

Closer view of mature MLGM leaf galls.© Department of Agriculture and Fisheries.

Be suspicious if there is more leaf drop from your mango trees than usual or if leaves are misshapen or have roundish holes.

HOW DO I LOOK FOR MLGM?

Be suspicious if there is more leaf drop from your mango trees than usual or if leaves are misshapen or have roundish holes. If you notice high levels of leaf drop, inspect the leaves for the presence of galls.

Visible on both sides of the leaf, each gall is rounded, like a blister, approximately 2–3 mm in diameter and 0.4–0.7 mm high. The galls can be green, yellow, red or brown to brown-black in colour depending on their age. Old leaf galls eventually fall out, leaving holes in the leaves (sometimes called shot holes).

WHAT COULD MLGM BE CONFUSED WITH?

The fungal disease mango scab could be confused with MLGM because scab also causes roundish raised leaf spots on both sides of the leaves. Scab is generally brown-black, sometimes with a yellow halo, and usually turns grey with age.

If you are unsure or suspect mango leaf gall midge, report it to the Exotic Plant Pest Hotline on 1800 084 881.

HOW CAN I PROTECT MY ORCHARD?

Growers can protect their farms by practising good farm biosecurity. Always buy high quality plant propagation material from a trusted source and check the plants before you buy them or on arrival to ensure they are pest and disease free.

Monitor the health of your orchard. As part of your pest management program, look for galls on leaves. If you suspect MLGM, report it.

In partnership with Plant Health Australia, the Australian Mango Industry Association (AMIA) have produced the *Orchard Biosecurity Manual for the Mango Industry*; which provides excellent advice to growers on practical ways to implement effective biosecurity measures on farms. The Farm Biosecurity website also contains many useful resources to assist commercial growers to protect their orchards.

ABIDE BY MOVEMENT RESTRICTIONS

Be aware of and comply with biosecurity movement conditions relevant to the state you are in. Movement of mango fruit, plant material and associated soil may be restricted. For information about interstate requirements go to the Australian Interstate Quarantine website.

In Queensland, the far northern biosecurity zones limit the movement of MLGM. Observe movement restrictions if you are travelling to or around the Cape York Peninsula, or if you live there.

If you suspect MLGM, you must report it. Contact the Exotic Plant Pest Hotline on 1800 084 881.

Developing a solution for Queensland Fruit Fly

Costing millions of dollars in management and lost market opportunities, Australian growers are all too familiar with the damage caused to their businesses by Queensland Fruit Fly (Qfly). However, an ambitious research program is taking on the challenge and developing novel solutions to the Qfly issue.

Qfly is one of Australia's most significant endemic plant pests, costing growers millions of dollars every year and hampering efforts to access domestic and international markets. The significant host range, mobility and capacity of Qfly to produce multiple generations in a season makes managing Qfly challenging to say the least.

In recent years control options for managing Qfly have decreased as key chemical-based tools have been removed from accepted use. Supported through the Hort Frontiers Fruit Fly Fund, this research investment aims to address this lack of management options by delivering a cost effective and sustainable solution for Qfly.

A significant focus of this research investment is the Sterile Insect Technique (SIT) and its application to Qfly, along with a range of supporting research activities seeking to refine and enhance SIT use.

STERILE INSECT TECHNIQUE

With over 50 years of use, SIT is a proven pest management tool which has been successfully employed against a range of pest insects. SIT involves the mass rearing and deliberate release of male insects which have been sterilised via irradiation. The goal of the release is to overflood and outcompete the local pest insect population, with sterile male insects breeding with the wild female pest insects. As no offspring result from these unions, the breeding cycle is disrupted and this in turn causes a dramatic fall in population numbers.

SIT has a range of positive benefits; such as no off-target impacts on other native or beneficial insects because it is species specific. Because of this SIT is highly compatible with growers established integrated pest management (IPM) programs. Unlike other classical biological control releases, under SIT the released insects are sterile, so they do not persist or become established long term in the environment.

As a tool SIT can be employed in a range of different ways to prevent, contain, suppress or eradicate pest populations, however for maximum effect it is best used in combination with an Area Wide Management (AWM) program.

AREA WIDE MANAGEMENT

Most growers are familiar with and regularly employ IPM approaches in their production system. AWM applies the IPM concept further, employing it across a defined geographic area including all pest habitats rather than just individual farms. Collaboration between growers and the broader community is an essential requirement for AWM to work effectively. So too is the promotion and use of best management practices commonly employed, namely monitoring, baiting and hygiene.

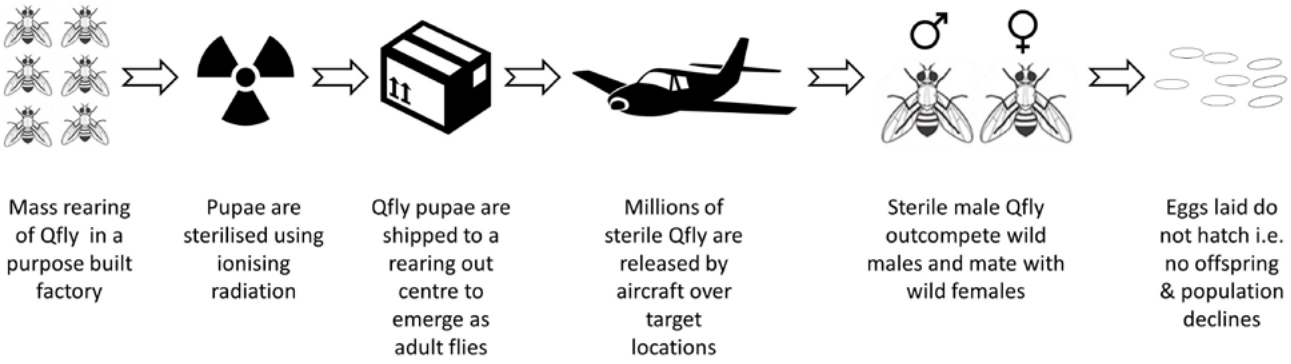
AWM is very suited to managing insects with multiple hosts (polyphagous) and that are mobile such as Qfly. This is achieved through managing the sources of reinfestation and addressing the areas of greatest pest risk across a region.

AWM can work synergistically with SIT by reducing initial pest population loads and managing the sources of reinfestation. Doing this increases the ratio of sterile to wild insects, which improves the likelihood of sterile mating and reduced offspring, which in turn improves the effectiveness of other control measures. Further information on AWM can be found at the website: www.area-wide-management.com.au.

TRIAL RELEASE PROGRAM

As part of the research program sterile Qflies, which are produced in a dedicated factory in Port Augusta (SA) and shipped to rearing out centres in Tatura (VIC) and Yanco (NSW), have been released weekly in two trial locations. The locations in Hillston (NSW) and Cobram (VIC), receive an aerial drop of two million flies per release.

Continued page 23



The sterile insect technique (SIT) involves several distinct processes.

Unlike other classical biological control releases, under SIT the released insects are sterile, so they do not persist or become established long term in the environment.

Monitoring of both wild and sterile Qfly is achieved using a dedicated trapping grid.

Continued from page 22

The 2019/20 season of releases started in September 2019 and continued through to April 2020, with further releases planned in the 20/21 and 21/22 seasons. The focus of the releases are the urban areas near productive horticultural operations. By releasing in these areas, Qfly population reservoirs, such as unmanaged backyard fruit trees or feral trees can be effectively controlled before they become a source of reinfestation onto farms during the cropping season.

Whilst still needing further analysis, initial observations of the data gained to date are positive, with most sterile fly recaptures within a 3km radius of the centre of the drop zones, and very low wild fly captures. This suggests a positive level of fly dispersion and prevalence across the site.

Apart from assisting these regions to combat Qfly the trial releases will generate significant amounts of information, providing further opportunities to refine and improve the process.

Post Factory Pilot of SITplus Fly Production (FF17001) is funded by the Hort Frontiers Fruit Fly Fund, part of the Hort Frontiers strategic partnership initiative developed by Hort Innovation, with co-investment from Macquarie University, South Australia Research Development Institute, New South Wales Department of Primary Industries, Agriculture Victoria Research, Plant & Food Research Australia, and The Tasmanian Department of Primary Industries, Parks, Water and Environment, and contributions from the Australian Government.

Article prepared by Chris O'Connor, SITplus Post-production Pilot Project, Macquarie University. For further information contact P: 02 9850 8143 or E: chris.oconnor@mq.edu.au.

Mango pollination: how important are alternative flower visitors?

Pollination services in the majority of fruit crops rely heavily on a single major pollinator (European honey bee, Apis mellifera). However, there has been increasing pressure on honey bee populations recently due to multiple stresses, including the devastating Varroa mite. Australia is currently free from Varroa mite infestation, but an invasion is highly likely in the near future and could have severe consequences for Australian fruit growers. Therefore, it is time to investigate the pollination potential of alternative pollinators, such as native stingless bees, in tropical crops like mango, avocado and lychee. This will help prepare for any Varroa mite invasion, as over-reliance of crops on a single pollinator species is risky.

Pollination is an important issue and previous work suggests that various insects—including flies, bees and beetles—can be mango pollinators, but key pollinators may vary across locations. Native sugarbag bees or stingless bees may be excellent candidates for mango pollination owing to their small size and require further studies in key regions like the Northern Territory (NT). Our research focuses on investigating the pollination efficiency of stingless bees and other wild pollinators in mangoes.

Over June and July 2019, we performed floral visitor surveys on plantations of Kensington Pride mangoes at six field sites near Darwin and two sites near Katherine in the NT.

Preliminary results show that NT mango farms are frequently visited by wild stingless bees, hoverflies, blowflies and several species of native solitary bees (shown in images above). In both Darwin and Katherine regions, stingless bees were the dominant flower-visiting group, comprising almost half of the total insect visitation. They readily visited mango flowers in large numbers and collected nectar as well as pollen. Surprisingly, only a few honey bees were observed during our survey days across the eight farms, which suggests that mango flowers may not be a first choice food for honey bees.

Insect visitations and the number of different insect species both significantly declined with distance from the crop border. We also noticed a strong edge effect in the spatial distribution of stingless bees, with around half of all stingless bee visitations recorded on the edge trees alone and no stingless bees recorded beyond 300m into the crop. Similarly, solitary bees were more or less completely confined to edge trees. In contrast, hoverflies and blowflies were spread more evenly across the orchards.

Common visitors to mango flowers in the Northern Territory.

Stingless and solitary bees actively forage for both nectar and pollen, while blowflies and hoverflies visit for nectar only. Stingless bees spent the longest time on each flower, but hoverflies visited more flowers per minute. Owing to their small size, stingless bees fit completely inside the middle of mango flowers and they repeatedly walk around and across the flowers with their abdomen and legs making contact with reproductive parts of the flowers. We observed a positive relationship between fruit set and visitation by stingless bees and blowflies which shows that insect visitations significantly increase fruit set in mango orchards.

Our results demonstrate the overall importance of insect flower visitors but proving the relative importance of different individual insect species requires further studies. In the upcoming mango flowering season, we will assess the pollination efficiency of stingless bees in comparison with other major flower-visiting insects to help inform effective pollination management in mango orchards.

Article prepared by Mr Gaurav Singh and Dr James Makinson from Hawkesbury Institute for the Environment, Western Sydney University. For further information please contact Gaurav on P: 02 4570 1294 or E: g.singh4@westernsydney.edu.au.

Acknowledgements:

"Stingless bees as effective managed pollinators for Australian horticulture" is funded by the Hort Frontiers Pollination Fund, part of the Hort Frontiers strategic partnership initiative developed by Hort Innovation, with co-investment from Syngenta Asia-Pacific, Olam International, Griffith University and contributions from the Australian Government.

We would like to express our sincere thanks to the staff and management of Cheeky Farms, Jenko's Mangoes, Skliros Produce, Tou's Garden Pty Ltd, Manbullo Ltd, and PTA Docking Pty Ltd, for allowing us to work and stay on their properties.

Warming temperatures and mango flower induction—impact on cultivars in the Northern Territory

How will rising temperatures in the Territory affect the viability of key commercial mango cultivars?

New research shows how flower induction in key Northern Territory mango cultivars could be impacted by warming temperatures.

Recently completed research by the Northern Territory's Department of Primary Industry and Resources (DPIR) and Earth Systems and Climate Change Hub of the National Environmental Science Program looked at projected future temperatures around Darwin, Katherine, Kununurra and Central Australia to see when temperature thresholds for flower induction will be crossed. The study looked at Kensington Pride, Calypso® and Honey Gold, as well as cultivars 1201, 1243 and 4069 from the National Mango Breeding Program.

THE RESULTS

In the **near future (2020–2045)**, all cultivars except Calypso® may become vulnerable to the impacts of the declining number of inductive days between May and August. The Darwin growing region will be more vulnerable than Katherine and Kununurra. The number of inductive days in Central Australia may begin to increase.

Towards the **middle of the century (2036–2065**), production in Katherine and Kununurra could become more vulnerable but not to the same degree as in Darwin. All cultivars may experience a marked reduction in inductive days, while the other effects of warmer conditions on pollen viability, fruit set and fruit growth are likely.

In a high emissions world, **late in the century (2056–2085)**, mango production is likely to be drastically impacted, with the maximum number of inductive days reduced to approximately 40 per cent in some areas. Under a lower emissions scenario, Calypso® may experience enough inductive days to flower but only in the Kununurra region.

At the end of the century (2075–2104), the cultivars assessed are all expected to be severely limited by extreme reductions in inductive days. Only under a lower emissions scenario will conditions allow for some flowering in Calypso® in the Kununurra and Katherine regions.

While only considering the impact of rising temperatures on flower induction, this research shows that growers must get on the front foot to respond to the changing climate if enterprises are to remain sustainable.

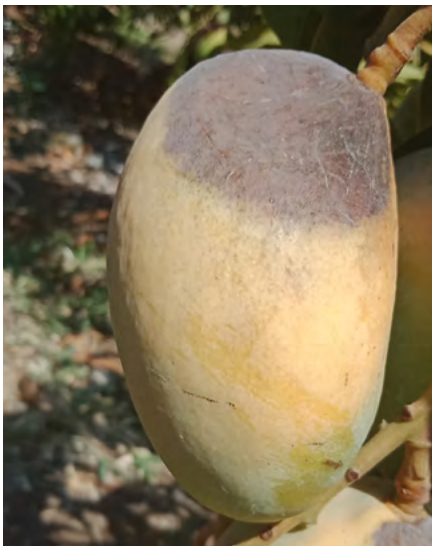
Contact Maddison Clonan (DPIR) on 08 8999 2293 or maddison.clonan@nt.gov.au or Mandy Hopkins (NESP Earth Systems and Climate Change Hub) on 03 9239 4649 or mandy.hopkins@csiro.au for more information. The full report is available at www.nespclimate.com.au.

Dicarboxylic acids have no effect on sunburn

As reported in the October 2019 *Mango Matters* edition that Department of Primary Industries and Regional Development Western Australia (DPIRD) Research Scientist Tara Slaven was conducting a trial to reduce sunburn of mango fruit. Our trial showed no evidence that dicarboxylic acids reduced the amount of sunburn on fruit. While southern facing fruit had significantly less sunburn, north facing fruit had more.

Dicarboxylic acids were applied fortnightly to NMBP-1243 trees five times during fruiting, starting on 23 August 2019. The first and third applications included fungicide azoxystrobin as per label instructions. The first three applications were applied without wetter.

Plans are being made to repeat the trial this season. Improvements to trial design will include starting applications seven days after first flowering petal drop and ensuring wetter is applied every time with the dicarboxylic acids. Hopefully this will increase the efficiency of the product.



Severe sunburn damage of NMBP-1243 fruit on the northern side of the tree.

Temperature management throughout the supply chain—how is industry tracking

Last season Australian Mangoes, with the assistance of Escavox, tracked 82 mango consignments to gain a better understanding of the conditions in which mangoes travel on their journey from the packhouse to the main markets across Australia.

Last season was the first in a three-season initiative which seeks to improve overall supply chain performance of the industry. The data generated by tracking mangoes on their journey from packhouse to the supply chain over these three years will inform and guide industry in the development of Best Practice Resources.

LOCATIONS AND TRANSIT DWELL TIME

21 growers from most of the key growing regions were involved (see Graph 1) in this initiative this season. The end destinations included all the major markets with consignments reaching Brisbane, Sydney, Melbourne, Perth, Adelaide and even Alice Springs.

As expected, the average transit dwell time from packhouse to ripening was the highest at 4.1 days for Darwin, followed by Katherine and Mareeba/Dimbulah at 3 and 2.9 days respectively and Kununurra and Bowen/Burdekin sitting at 1.7 and 1.4 days respectively (see Graph 2).

TEMPERATURE PERFORMANCE

Each track was assessed against the industry recommended temperature range for the three key legs in the supply chain:

- At packhouse: minimum 12˚C[1]
- Packhouse to ripener (via transport): 12˚C-18˚C
- At ripener (storage and ripening process): 12˚C-22˚C.

The data shows supply chain performance across the tracks ranged from very poor, where the product was not pre-cooled and travelled outside optimum conditions for the complete journey to ideal tracks.

Only 15% (12 of 82 tracks) of consignments stayed within the recommended temperature range throughout the whole journey. More than three quarters of all tracks experienced temperature issues that were inconsistent with best practice.

Overall, of the 82 tracks analysed, in terms of temperature performance the following assessments have been made:

- 49% were very poor to poor (40 of 82 tracks)
- 15% were average (12 of 82 tracks)
- 22% were good to very good (18 of 82 tracks)
- 15% were perfect (12 of 82 tracks).

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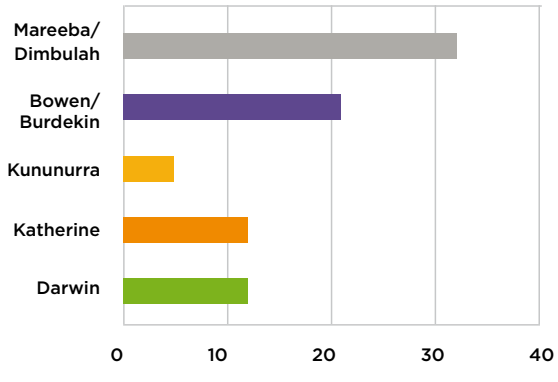
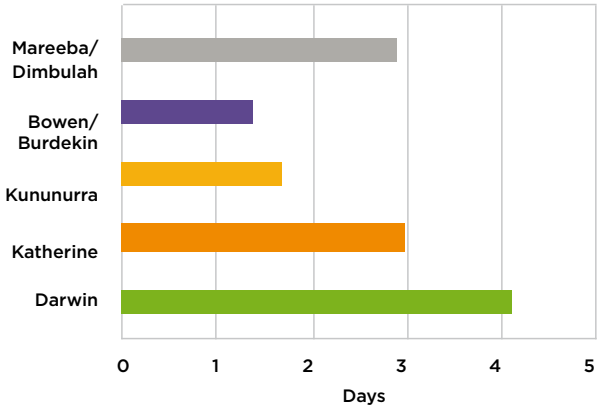
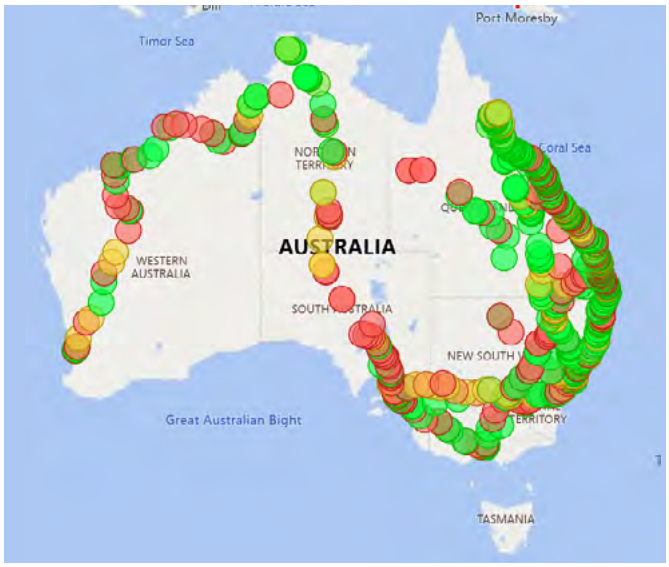
Graph 1: Number of consignments tracked by region



Graph 2: Average transit dwell days (packhouse to ripening) by region



Overall heat map of all tracks



Green dot: *Optimum condition.*
Orange and red dots: *Outside the recommended temperature range.*

[1]*Note: In measuring performance of the supply chain, a maximum of 40˚C is used as the upper limit for temperature in the packhouse leg of the supply chain. This recognises the practical limitations of the supply chain in that fruit is unavoidably exposed to ambient conditions at different times in the packhouse.*

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PACKHOUSE

Lack of pre-cooling of fruit was identified as a key imperative to poor temperature performance; with almost half of all loads not pre-cooled sufficiently (see Graph 3). For a couple of growers, pre-cooling was taking place at the transporter's depot.

Pre-cooling is critical to help preserve quality and prolong shelf life. Even if fruit is to be partially ripened in-transit, it should be cooled down to 18°C.

TRANSPORT AND RIPENING

Consignments during transport (Graph 4) and ripening (Graph 5) performed similarly with almost half of all tracks performing poorly to very poorly. Industry needs to get a greater understanding of what the impact and ultimately what the cost of this non-compliance is on growers' bottom line. Australian Mangoes will investigate the options to best collect this type of information for the upcoming season.

ABOUT THE TRACKING PROCESS

By monitoring temperature across existing and new supply chains, growers are able to identify where best practice isn't followed and any critical control points where change is required to ensure best practice temperature is followed. If you wish to be involved next season, please contact your local Industry Development Officer (IDO).

The process of tracking products is simple. Your IDO will provide you with Escavox trackers that simply need to be included in pallets at the packhouse. Instructions will be given on where to place trackers in the pallet and number of trackers per load, as well as stickers for identification of trays so trackers can be easily extracted after the ripening/transit process.

Participating growers/packers receive their own reports on the performance of their supply chain. There are procedures in place to protect your data, knowing that some data is commercially sensitive.

This activity is being undertaken as part of MG1700 Building Best Management Practice Capacity for the Australian Mango Industry which is being funded by Hort Innovation, using the mango industry research and development levy and contributions from the Australian Government. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

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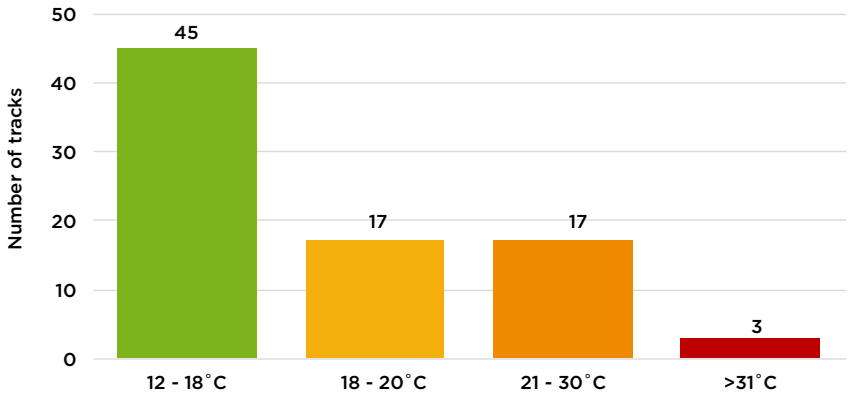
Here's what one of our growers had to say about participating in the project last season:

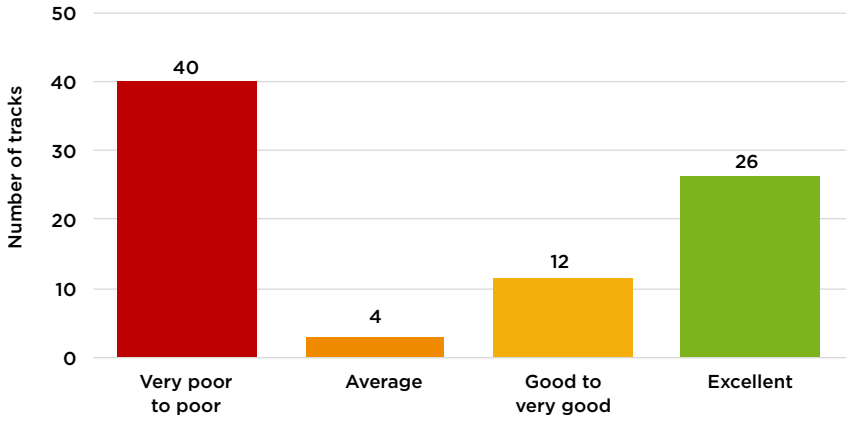
"It is very important to deliver consistent fresh quality products to market and using data loggers allows us to track time, temperature and the track journey. For our business, using data loggers ensures that all links in the supply chain are performing consistently. Rocky Creek Orchards NQ consider the use of data loggers to be a very valuable form of insurance, not only to help protect our brand but to also provide a consistent quality product to the consumer.
We would definitely recommend using any form of logger to keep an eye on how the supply chain is performing."

Lorraine Stopford from Rocky Creek Orchards NQ in Mareeba/Dimbulah

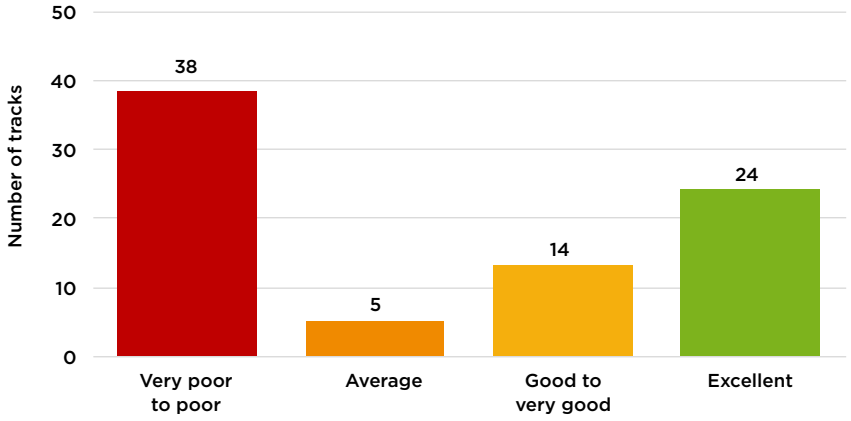
Graph 3: Pre-cooling at packhouse



Graph 4: Performance during transport



Graph 5: Performance during ripening



MG17000: industry snapshot and best pratice resource survey

As part of the Hort Innovation project 'Building Best Management Practice Capacity for the Australian Mango Industry' (MG17000/BPR), a baseline practice survey was conducted with growers. Respondents that participated were from a diverse mix of orchards from across the Australian mango industry. All up 36 mango growers (representing about 20% of Australia's mango production) were surveyed between September 2019 and April 2020 by the two Australian Mangoes Industry Development Officers. The surveys were conducted either face-to-face or by phone.

The purpose of this survey was to define the baseline practices for orchard management, harvesting and temperature management throughout the supply chain.

Australian Mangoes, along with its project partners: Queensland, Northern Territory and West Australian state agriculture departments, Central Queensland University and NT Farmers, has been collating and curating best practice content around our key topic areas which are detailed in Table 1. The survey results will assist the BPR team in; identifying the most appropriate communication and extensions methods, prioritising sub-topics for the development of resources and workshop/ webinar content, and to provide a benchmark of current production practices.

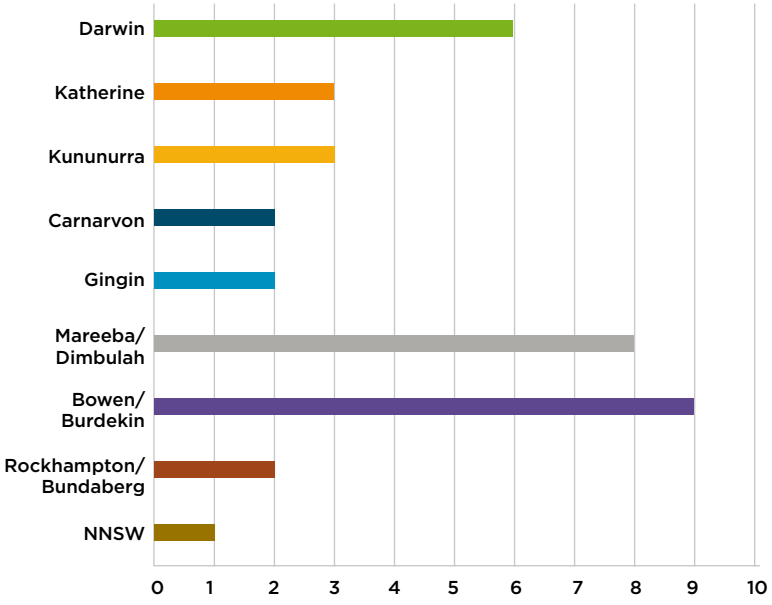
Table 1. BPR project key topics.

TOPIC	SUB-TOPIC
Orchard management	Canopy management
	Nutrition
	Irrigation
Harvest practices	Pest and disease management
	Water hygiene
	Forecasting
Temperature management (across the supply chain)	Harvest
	Postharvest

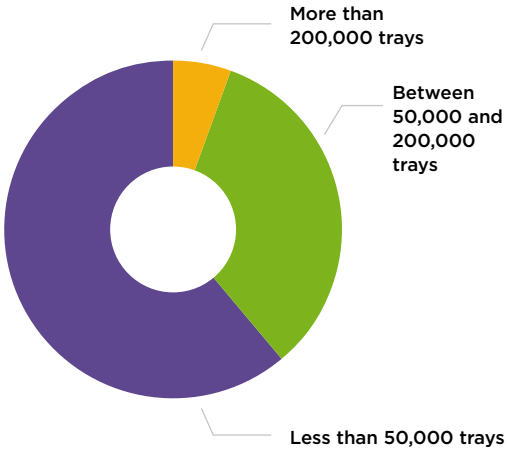
KEY STATISTICS

Demographics

Graph 1. A number of growers were surveyed throughout the major growing regions of Australia, capturing regionally specific demographics and management practices.



Graph 2. A range of small, medium and large businesses were surveyed.



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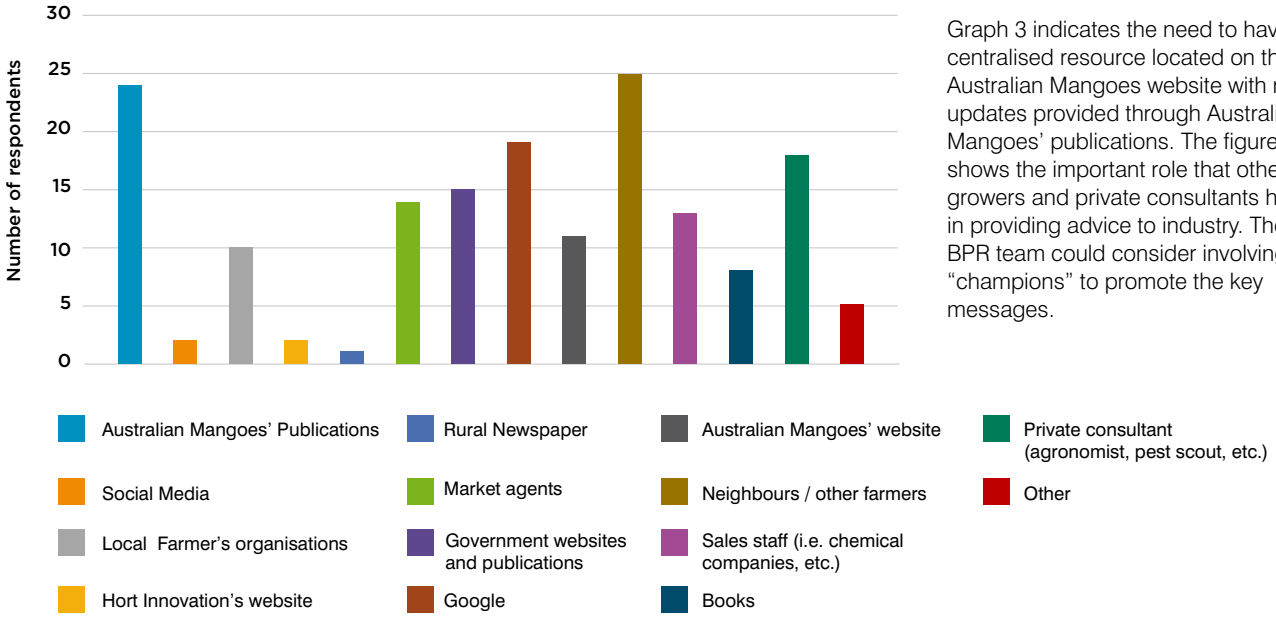
Learning Preferences

Graph 3. Where do growers seek / find out information relating to the mango industry?



Graph 3 indicates the need to have a centralised resource located on the Australian Mangoes website with regular updates provided through Australian Mangoes' publications. The figure also shows the important role that other growers and private consultants have in providing advice to industry. The BPR team could consider involving "champions" to promote the key messages.

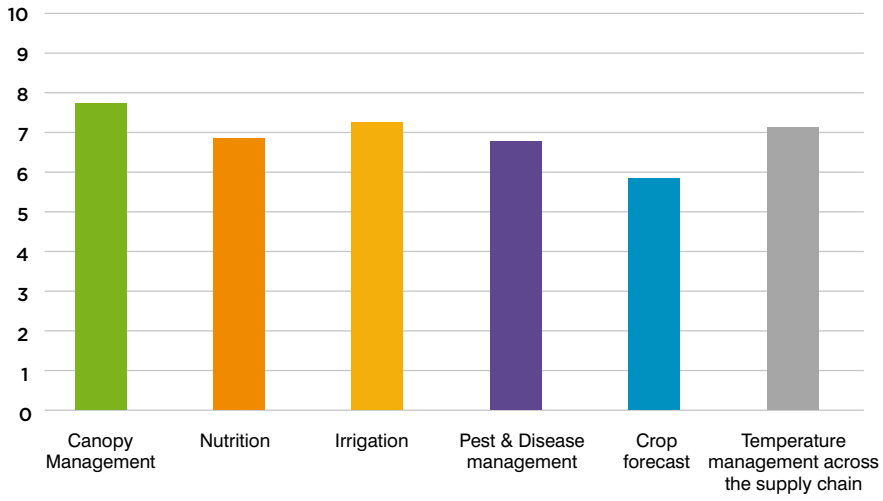
Graph 4. What are growers' preferred method(s) to develop their understanding and skills?

ANSWER CHOICES	RESPONSES	
Attending field days	30	83%
Talking to family/friends/neighbours	20	56%
Getting involved in an on-farm research project	18	50%
Attending a one-off information session	16	44%
Obtaining advice/help from a professional	16	44%
Undertaking own or group research	13	36%
Belonging to a special interest group or network	8	22%
Attending a formal education or training program	6	17%
Enrolling in an online course	6	17%
None of the above	0	0%

These answers indicate that the BPR team should ensure field days are conducted throughout the life of the project. It would also be useful to include presentations from trusted growers, as most growers like practical based learning such as observing others' on-farm practices or seeing technology/ ideas in action.

Production practices

Graph 5. Average knowledge and confidence score.



Respondents were asked to rate their knowledge and confidence on a range of topics from 1 to 10 (with 1 being very poor and 10 being excellent). Growers rated their confidence/knowledge of crop forecasting the lowest (5.9) and canopy management the highest (7.8). These results will assist the BPR team in prioritising the development of resources and workshop content. For example, it would seem that growers would appreciate guidance on predicting their crop forecast.

For further information about the survey/project, please contact Industry Development Officer Sarah Hain on P: 0457 555 939 or E: sarah@mangoes.net.au.

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PEOPLE & EVENTS

Australia's Mr Mango honoured for breeding fruit for the world

Australian mango industry pioneer Ken Rayner was recognised with a Medal of the Order of Australia (OAM) for service to horticulture in June. Ken has cross-pollinated mango trees around Katherine for more than three decades, and his mangoes are now grown around the world. His Lady Jane and Lady Grace varieties are grown in 12 countries, including some regions not previously known for the fruit.

Mr Rayner was also the recipient of an Australian mango industry award last year, which was presented to him at the 12th Australian Mangoes Conference.

Congratulations Ken on this fantastic achievement.

Ken Rayner has been recognised with a Medal of the Order of Australia (OAM). Picture credit: AAP.

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