

# Mango Matters

JULY 2022 | VOLUME 48

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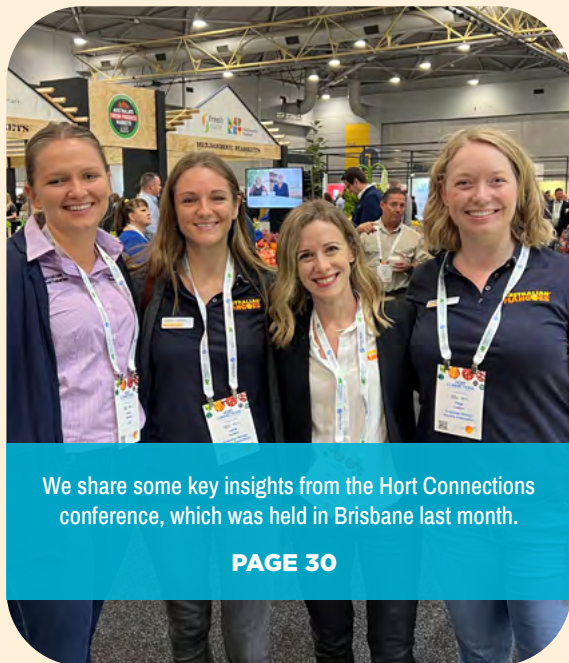
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We share some key insights from the Hort Connections conference, which was held in Brisbane last month.

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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.*

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*Mango Matters* has been funded by Hort Innovation, using the mango 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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# CEO'S REPORT

## Brett Kelly

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I hope all our growers, members and other industry stakeholders have had a chance to relax, recharge and start planning for the upcoming season. All feedback I have received to date from growers is a quiet optimism for a good season to come. At the time of writing this report we are still waiting for the final levy statistics from last season. These statistics will be available via our industry communication once released. The Kensington Pride variety was down on previous seasons in terms of volume due to seasonal issues, however the Calypso variety was more than previous seasons, so it all balanced out in terms of total volume. Quality feedback across all varieties from retailers was overall very good. Please check you are ready for both domestic and export requirements ahead of the coming season. All information can be found on the AMIA industry website: [www.industry.mangoes.net.au](http://www.industry.mangoes.net.au).

As mentioned in my last update we have been in the process of securing ongoing levy funded projects through Hort Innovation. I am very excited to confirm your AMIA has secured \$2.7 million dollars in funding for the next five years through the projects; *Building the Australian mango industry's innovative culture and capability (MG21002)* and *Mango Industry Communications Program (MG21001)*. AMIA are also currently continuing to deliver the *Supply Chain Engagement Project (MG21500)*, which works closely with Hort Innovation's marketing team. We are in the process of working to extend this contract as well. I will update you on this in my next report. *The Mango Export Strategy Project (MG21000)* (also funded by the Hort Innovation Mango

*"I am very excited to confirm your AMIA has secured \$2.7 million dollars in funding for the next five years"*

.....  
- BRETT KELLY

Fund) has also now been completed and the export strategy and final report from this project can be viewed via our website: [www.industry.mangoes.net.au](http://www.industry.mangoes.net.au).

The AMIA has a great team on the ground of experienced Industry Development Officers backed up by a very experienced Industry Development Manager. We also have a highly experienced Communication Manager, Finance Manager and Supply Chain Engagement Manager. The team is here to help and can be contacted for any queries again via our website.

I have been doing extensive grower visits across all our main growing regions with some still to conduct at the time of writing this report. The objective has been to give an update on what the AMIA has achieved over the past 12 months to growers/members, get their feedback, and also discuss the AMIA Internal Strategic Plan. Thank you to all those I have met to date on farm for your time and great feedback. I look forward to updating you on further progress at the next Pre-Season Roadshows later in the year. I have mentioned how important it is to not only have best practice on farm and throughout the supply chain, but to also be clearly focused on the front end of your business in terms of channels to markets, strategy, and business planning.

I have listed below some of the questions I have presented at recent meetings for our growers to ask themselves regarding the front end:

- What is your business point of difference and competitive edge, not based on price?

- Where do you fit in the channels to market?
- Who specifically is the customer you sell to?
- Do you have a business plan based on your strategy, both short term and long term?
- Do you have a cost of production/cost of business that links to your business plan? (AMIA is currently drafting a cost of production template that will be made available to members when finalised)
- Do you know your absolute bottom-line costs and profitability?

These are some of the questions we need to answer in order to have a clear view of where we are going with our businesses. It is not enough anymore to just be a great farmer/grower. We must work towards getting more control and being better at understanding the front end as well, in terms of improving pricing, profit and sustainability. The AMIA is working through introducing more tools, resources, and training as per our Internal Strategic Plan that will be made accessible to members once it has been finalised. As I continue to visit growers, I will elaborate on this and update you on our progress. Please feel free to contact me anytime if you have any questions.

I look forward to meeting more of you in person shortly.

# CHAIRMAN'S REPORT

## Ben Martin

Chairman, AMIA

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With the federal government changing from liberal to labour, we are working hard to ensure that the new government understands the priorities of the Australian Mango Industry. With this change I would like to formally congratulate the Hon Minister Murray Watt on his appointment as the new Federal Minister for Agriculture Fisheries and Forestry.

AMIA and I have also been working on developing new and improving existing market access protocols. This is important for the industry when considering the forecasted increase in volume. Market access will become more important than ever to ensure a sustainable industry moving forward. This is a slow process that requires a lot of work from industry but nevertheless is very important for the future of our industry.

Flowering has been slow in North Queensland. There are a handful of orchards that have had some early flowering as well as some flush, however most orchards are just starting to push buds now. The rain event that occurred in June has had an impact on this, however looking forward there seems to be some good signs appearing for most growers that I have spoken to.

With the high input costs that growers are facing we are continually raising this with the government and other parts of the industry. This conversation is important now more than ever leading into the season.

I would also like to welcome Mitchael Curtis onto the board. Mitchael will be representing the Katherine region in The Northern Territory (NT) and brings a wealth of knowledge on the mango industry. I would like to also thank Han Shiong Siah for filling in the vacant position as well. Han as always put his best foot forward for the NT while he filled in. Thank you, Han.

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# DIRECTORS' REPORTS

## Northern Territory & Northern Western Australia\*



**Han Shiong Siah (Outgoing Director)**

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Days are now getting longer as we approach dry season. It has been a rough few months, we have had an extremely hotter than normal May and June with above average maximum and minimum temperatures. We even had an impressive storm in early June, in the rural area of Darwin, I don't think I have ever seen a storm of that intensity in June. However, it was only a few days later the first ray of dry season weather finally arrived. Now where is my jumper?

With this hotter than normal weather, mango flowering has been delayed on most farms in The Top End. Some farms have only seen bursting buds in mid to late June, while others at the time of writing have no flower, especially the Kensington Pride/R2E2 varieties. I am hoping this cool dry season weather will help make those stubborn trees flower and make growers happy again after two bad years of production for some.

On the other hand, I have seen and heard that early fruit (mostly green eating varieties) has hit the wholesale market in April and May from The Northern Territory. However, it is not looking the best in terms of quality, mainly due to cold weather. This is not enticing consumers to buy and eat these mangoes, particularly as consumers become cost conscious due to the current economic climate affecting spending. The returns to these growers have not been what they expected, with some growers even been told not to pick any more fruit to send down to the markets.

Since my last report, there have been more hurdles to overcome for many growers. New piece rate rules and wage increases have come into effect, and prices of supplies and fuel are continuing to go up. There are also challenges in finding some supplies. As we know, fresh produce prices are largely based on supply and demand, so we may not be able to pass these additional costs of production onto consumers when the demand is low. Growers should revisit their costs of production and consider these price rises. They should then use this information to determine what price is feasible to ensure a profit and keep an eye on the supply and demand in the marketplace throughout the season. Perhaps there are other ways of selling your fruit to consider, that will give you better returns?

\* Note – No report received from Leo Skiros.

My short temporary term is up on the board, as we have now found a Katherine based grower to fill it. Mitchael Curtis from King Producers has agreed to take over my position. It was great to see some familiar faces again. I can see the spirit of the mango industry still burning strong and hope it always stay lit. I thank the AMIA staff and directors for having me back on the board for this short time.

Next year will be rough for growers, we need to bunker down and fight through these tough times. It won't be easy however we have been through it before, and we will prevail. I wish all growers' luck with the forthcoming season, and I will see you in the neighbourhood.



**Geoff Warnock**

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After a reasonable wet season, the mango trees in the region are looking good.

The nights during the past week or so have been cooling nicely and the trees are responding with a push out of flowers, although this is occurring a little later than the first flowering last season.

There is still evidence of a shortage of labour in the region, hopefully this situation will change as we get closer to picking.

Growers are looking forward to the upcoming roadshows to catch up on current industry information.

Hoping all growers experience a good season with less stress than last year.

## Far North Queensland & North Queensland



**John Nucifora**

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Another season is about to begin, it only seems like yesterday that the 2021/2022 season finished. Flowering in the region has been slow and is about to start. The weather has been very cool, and this will aid the trees in flowering. I'm hearing that at this point trees are looking good across all areas, but we hope the rain leaves through the flowering period.

One of the pests I'd be on the lookout for is the mango shoot looper, especially during flowering. If you see something unusual you can report it to the Exotic Plant Pest Hotline on 1800 084 881.

Continued page 7



One of my biggest fears is the cost of production sky rocketing. There has been some of the highest increases I've ever seen. This has me worried for the future of our industry and across the board in all industries. Let's hope we can recoup this cost for growers to be viable.

I'd like to wish all growers the very best in the up-and-coming season.



**John Nardi**

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Most growers will be well into their pruning programs at the time of writing. We have recently seen some wet weather in the region which may result in upsetting what seemed to be settled trees. It now looks like some colder weather is starting to set in which is good timing. Hopefully we do not see frosts follow. I think the labour situation should hopefully ease a little for the coming season and I urge growers to get in and start organising their staff as early as possible to ensure they get the best opportunity to meet their requirements. The long-term weather forecast is indicating a high chance of a very wet summer. Hopefully this changes and it will not affect our harvest if it does come to fruition.

Growers of all crops are seeing significant increases in costs of supplies; the major ones being diesel, fertiliser, and chemicals. We will also likely see an increase in labour costs with the new federal government increasing minimum award rates. So overall there is a lot of increased production costs.

As growers we need to be vigilant on working to be as efficient as possible to offset these costs as much as we can. Hopefully weather will be good to us, and we all see a good crop from successful flowering and fruit set.

## Southern Queensland & New South Wales



**Karl Gygar**

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At the time of writing, we are heading into the start of another season. Flowers and buds are starting to push and, with a snap of cold weather across many areas, fingers crossed a good flowering will occur. I wish everyone the best of luck.

As everyone would be aware the costs of doing business are rising. Record inflation and increasing interest rates combined with supply chain issues have seen input costs soar. The cost of labor has also increased with the minimum wage being raised. I strongly encourage everyone to make sure they are across the new minimum requirements for pay.

This also impacts piece work with new changes coming into effect that need to be fully understood to ensure you are complying. Some time spent now understanding the new requirements will ensure a smooth season.

The board is, as always, pushing for access to new export markets. We have recently had some excellent meetings with the federal government looking at ways to increase market access. New markets are vital to our industry's health – the more opportunities to move fruit around the world we have, the more opportunities we will have to stay profitable in what are tough business conditions.

Once again best of luck to everyone this season.

## Southern Western Australia



**David Morcombe**

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After a very hot summer the temperatures through autumn have returned to the long-term average. Hopefully that trend will continue.

The mango industry is changing. In terms of the varieties making up the national crop last season, we have continued to see a reduction in the percentage of Kensington Pride (KP) and an increase in Calypso and Honey Gold (cultivars protected under plant breeder's rights (PBR)). It seems that the reliability, productivity, and scale of these plantings along with their marketing and distribution is working well for growers of these varieties.

There is also the increased cost of doing business, hopefully some of these costs will be resolved in the short term, however most costs will not decrease. So, for KP growers on traditional orchards the outlook may not be good.

Applying new technologies like high density, trellis, or perhaps molecular research to your orchard may help improve productivity and reliability. You may also want to consider other varieties, such as those from The National Mango Breeding Program (NMBP), though they are still a bit of an unknown. We still do not know how accessible they will be to the average grower.

What we have seen in the past is that PBR varieties get mainly planted by a few large-scale growers who can return good royalties to the marketers/PBR owners—as is their reward for producing the new varieties, for 25 years from registration. That brings us to another looming change when, during the next five years or so, Calypso and Honey Gold varieties will finish their honeymoon period of varietal cultivar protection.

It is all food for thought, and with agriculture the expectation seems to be to be able to produce more for less as time passes, so expecting a dramatic increase in price may be too optimistic. It may be better to plan for what is ahead and within your control.

# AMIA & INDUSTRY NEWS

## Welcome to the new Minister

Welcome to the new Minister for Agriculture, Fisheries and Forestry Murray Watt. The mango industry looks forward to working with the Minister and is glad to see he has already been out on farm and attended the Hort Connections conference.



Photo source: <https://queenslandlabor.org/murray-watt/>

## Fair Work updates

As you would be aware the new minimum wage guarantee and new record-keeping requirements for pieceworkers under the Horticulture Award, came into effect at the end of April.

The National Minimum Wage has also increased by 5.2%, which amounts to \$40 a week and award minimum wages have increased by 4.6%, which is subject to a minimum increase for award classifications of \$40 per week and based on a 38-hour week for a full-time employee. These changes came into effect on Friday, 1 July, following the Annual Wage Review 2022.

For further information and the latest newsletter from the Fair Work Ombudsman visit: <https://www.fairwork.gov.au/newsroom/news>.

## MMD Decision

The National Management Group has endorsed the Consultative Committee of Emergency Plant Pests' (CCEPP) recommendation that *Fusarium mangiferae* is not technically feasible to eradicate from the Northern Territory.

*Fusarium mangiferae* is one of the causal agents of mango malformation disease (MMD) which induces vegetative and floral abnormalities in mango trees and reduces the tree's yields.

MMD is a fungal disease of mango. It occurs throughout many mango-production areas in the world. It causes abnormal flower and leaf development, resulting in reduced plant growth and fruit yield.

The disease can remain dormant for several years before symptoms appear.

In Australia there is no evidence to date of MMD causing regional or national economic impacts. Despite this, early detection and management of the disease is important in maximising the chance of controlling its spread, both within and between orchards.

Check plants regularly for signs of pests and disease, and if you suspect you have found something new or unusual, report it to the Exotic Plant Pest Hotline on 1800 084 881.



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## New projects kick off

We are happy to announce that Australian mango growers are set to benefit from a \$2.7M injection into extension and communication to help improve grower productivity and profitability. Being delivered through Hort Innovation by Australia's peak industry body for mangoes, Australian Mango Industry Association (AMIA)/Australian Mangoes, the two five-year projects build upon previous communication and capacity building work.

AMIA Chief Executive Officer (CEO), Brett Kelly, said each project would provide invaluable benefits to the mango industry.

"Through working together on these initiatives, the AMIA, our research partners\* and Hort Innovation will continue to get great results for industry that tie into the Mango Strategic Investment Plan (2022-2026)," he said.

The projects will integrate extension and communication to foster innovation and build capability to maximise yield, optimise quality and create demand. The extension project will work with growers to raise awareness of and support adoption of practices that will contribute to increasing productivity and profitability.

The communication project will produce an industry magazine, newsletters, social media, and website content to keep industry up to date with the latest research, marketing, and other industry news.

Hort Innovation Head of Extension, Jane Wightman, said during the recent Strategic Investment Plan (2022-2026) renewal consultations, the Australian mango industry advised it valued its extension program and prioritised its continuation.

"The Australian Mango Industry has high aspirations for improved domestic and international demand and increased profitability, efficiency, and sustainability," she said.

"These aspirations are founded on the generation and use of research and development, the benefits of which are maximised through an innovative culture, fostering continuous improvement and proactive risk management."

One of the first activities of both projects is to form a joint project reference group (PRG). This group will be instrumental in guiding the project teams and activities over the next five years. **Australian Mango Industry stakeholders that are interested in joining the PRG, can find an Expression of Interest, in AMIA's July edition of *The Slice* (available on our website). If industry stakeholders don't already subscribe, they can do so via: <https://www.mangoconnect.com.au/>.**

Stay tuned for updates on these projects.

*\*Research partners include Queensland Department of Agriculture and Fisheries, Northern Territory Department of Industry, Tourism and Trade, Western Australia Department of Primary Industries and Regional Development, NT Farmers and Central Queensland University.*

*These projects 'Extension to build innovative culture and capability in the Australian mango industry (MG21002)' and 'Mango industry communications program (MG21001)' have been funded by Hort Innovation using the mango 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.*

## Export registrations and strategy

### REGISTRATIONS

Export registrations for international protocol markets are now open.

You can find further information via the [Export Industry Advice Notice 2022-31](#) on the Department of Agriculture, Water and the Environment (DAWE) website.

Or on our website here: <https://www.industry.mangoes.net.au/resources/resources-library/export-registrations-now-open>.

If you missed the export information session held at the end of May, a recording of the session is available at: <https://www.industry.mangoes.net.au/resources/resources-library/australian-mangoes-export-information-session-2022/>.

The session covered an 2021/2022 season export wrap-up, relevant export updates for the 2022/2023 mango season, online registration system upgrades and the [Plant Export Operations Manual](#) (PEOM).

Export registration work is part of 'Extension to build innovative culture and capability in the Australian mango industry (MG21002)'.

### STRATEGY

A new mango export strategy project (MG21000) was launched in early 2022. The project has now finished and a copy of the market prioritisation final report and final export strategy can be found here: <https://www.industry.mangoes.net.au/resources/resources-library/export-strategy-2022/>.

As part of this project a workshop was held in late February with mango industry stakeholders. Thanks to all of those that attended and provided input.

## Chemical updates

For the latest Chemical Update from Hort Innovation head to: <https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/mt20007/>.

It includes an update on Great Britain lowering chlorothalonil maximum residue limits (MRLs).

Permits have been extended for beta-cyfluthrin (bulldock) and maldison.

The following permits have been issued by the Australian Pesticides and Veterinary Medicines Authority (APVMA):

Permit ID	Description	Date Issued	Expiry Date	Permit holder
<a href="#">PER80374 Version 3</a>	Beta-cyfluthrin (Bulldock)/Custard Apple, Lychee, Mango, Persimmon/ Various Insect Pests	1-Oct-15	31-Aug-25	Hort Innovation
<a href="#">PER83998 Version 3</a>	Maldison/Mango/ Fruit Fly	15-Aug-17	30-Jun-23	Hort Innovation

Continued page 10

## YOUR LEVY AT WORK

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*Continued from page 9*

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>.

A Non-Performance Reporting Form for Horticultural Pesticides\* should be completed when an adverse experience occurs as a result of using the permit.

Please return the Non-Performance Reporting Form for Horticultural Pesticides to:  
[jodie.pedrana@horticulture.com.au](mailto:jodie.pedrana@horticulture.com.au).

If you require any 'non-performance' information to be provided to the APVMA, please complete their On-Line 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.

*These Chemical Updates are part of 'Mango industry minor use program MG16004'.*

*\*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.*



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## Our season in review

The 2021-22 season was hampered by continuing issues generated from the COVID-19 pandemic and the associated national and state/territory government's regulations. These challenges ranged from staff shortages and cost increases, to the inability to travel, and state and international freight hurdles.

We can all proudly look back and congratulate ourselves on how we adapted, found alternatives, and steered our way through some very difficult circumstances, to ensure our fruit delivered again, to the delight of millions of consumers within Australia and abroad.

In this report, we will discover and present (via the charts pictured):

1. How our season performed.
2. From intel provided by Nielsen Home Scan; consumer buying trends and mango category performance.
3. How our retail partners drove awareness and sales through their specific campaigns.

### 1. OUR SEASON

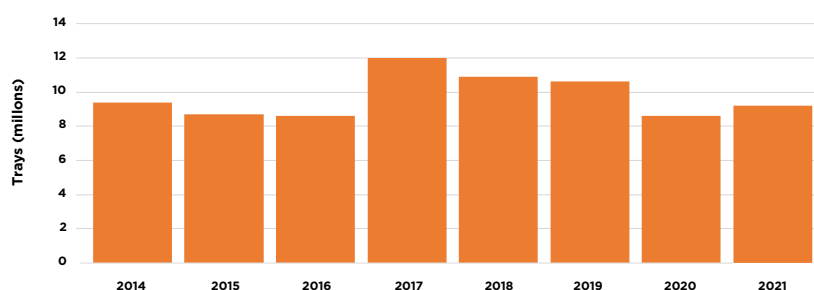
At the time of writing the full final season volume was yet to be confirmed with some outstanding levy data to be provided, however our estimated volume for the 21-22 season is 9.2 million trays.

The season started in early July, finishing up in late March. Darwin volume decreased around week 17 whilst Katherine volume declined around week 22. The Bowen/Burdekin and Mareeba/Dimbulah regions all started well however tailed off much quicker than previous seasons as highlighted on the charts, from around week 23-26. From a variety point of view, we saw a decline in Kensington Pride, which usually contributes the most volume. However, supply was sufficiently covered with an increase of R2E2, Calypso and Honey Gold varieties (when compared to previous seasons).

Continued page 13

### Season Trends - Supply

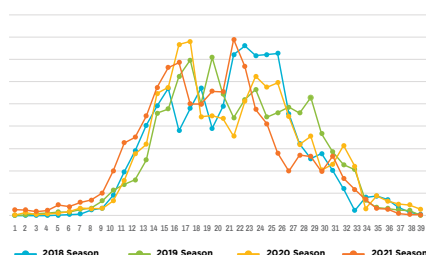
Tray Volume (Levy Data)



Season	# Trays Millions	# Weeks >100k	# Weeks >250k	# weeks > 500k	# Weeks > 750k	Season profile - Supply
2014	9.4	18	15	8	2	High volume & peaks, moderately compressed season
2015	8.7	25	15	5	0	Longer, flatter, less compressed season
2016	8.6	20	15	7	3	Lower volume, highly compressed season
2017	12	25	19	12	3	Highest volume date, long less compressed season
2018	10.9	21	17	10	5	High volume. More compressed season than 2017
2019	10.6	23	20	4	1	High volume. Less Compressed season
2020	8.6	22	17	6	0	Low volume season. Less Compressed season
2021	9.2	23	15	7	0	Similar to 2020 season

Source (trays): Levy Data 2021 is estimated as June data will need to be included.  
Source (weeks): AMIA grower crop flow data – adjusted with levy data.

### 100% Distribution of Season Volume

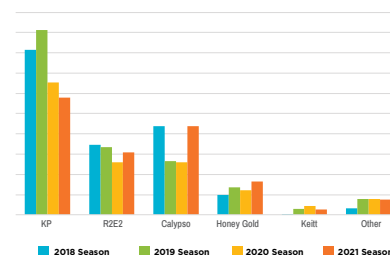


The 2021 season saw more volume earlier and with volume also decreasing earlier in the season:

- This trend is seen across all regions except for Southern Queensland.
- The drop in weeks 17-20 compared to 2018 & 2019 seasons can be attributed to a combination of Darwin finishing earlier and Katherine not achieving the same volume levels.

Source (weeks): AMIA grower crop flow data.

### Reported volume - 7kg trays



Season trends - Variety percent mix by region:  
\*Note: this is based on reported volumes

- Calypso growth strongest in Katherine.
- Katherine saw an increase in KPs not seen in other major regions.
- R2E2 strong in Bowen/Burdekin region.
- Honey Gold saw increases in Katherine and Mareeba/Dimbulah.



## 2. WHAT THE DATA TOLD US

We are fortunate to gain access to Nielsen Homescan\*, to help us understand consumer behaviours and trends.

The fresh results are:

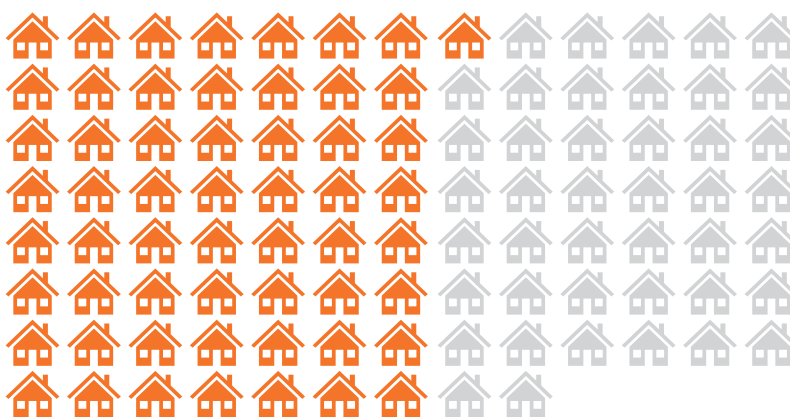
- You may be surprised to learn that out of all the households in Australia, 57% of them purchased at least one of our mangoes during the last season. I personally was a little surprised by that number, however it does highlight a massive opportunity for our industry with plenty available households to convert whilst increasing the consumption of our mango with heavy and light buyers.
- On average, households who are our current mango consumers, purchase 6 kilograms (kgs) of mangoes and spend \$25 per season. We know they buy approx. 1.1kg per shop and do so around 5.3 occasions during the season. They pay on average \$4.70 per occasion. Out of the five focus areas, four of them were just a little under of that for the same time last season (see further details within the chart pictures).
- Out of the 57% of households who do buy mangoes, heavy users (we call them "wedded buyers") represent 50% of the total purchases, they also contribute 80% of the total kgs sold and 80% of the retailer revenue. Within the chart to the right, you will see the importance of "wedded buyers" to our industry. This also highlights the task/opportunity before us to entice lighter users and new users and ultimately increase mango consumption.
- The average retail price paid for our mango dropped slightly overall on the previous season (this season \$4.18 per kg versus \$4.28 per kg last season). The chart pictured provides some details by variety along with some previous season's history.

### \*What is Homescan?

Nielsen IQ Homescan® is a continuous panel of 10,000 households who record all take-home packed and fresh grocery items from all retail outlets. The sample is demographically and geographically representative of the Australian household population.

Each household is equipped with a small handheld terminal through which details of all purchasing is entered—product, quantity, price, and outlet. This information, along with the date of purchase, is linked with demographic details of the household and the household purchasing history. Data is projected for the population as a whole.

### 57% of Australian households purchased Mangoes 21/22



Source: NielsenIQ Homescan

### Mango households buying statistics 21-22 season



Source: NielsenIQ Homescan

#### Purchased 6kgs of mangoes

Vs 6.2kgs 20-21 and 7.3kgs 19-20

#### Spent \$25 per season

Vs \$26.70 20-21 and \$27 19-20

#### Brought 1.1kgs per shop

Vs 1.2kgs 20-21 and 1.3kgs 19-20

#### Shopped 5.3 occasions

Vs 5.3 20-21 and 5.8 19-20

#### Paid \$4.70 per occasion

Vs \$5 20-21 and \$4.60 19-20

**Out of the 57% of Australian households that purchase mangoes, "wedded buyers" represent 50% of the total purchasers. They contribute 80% in kgs and over 80% in dollar sales.**



Heavy Users



Light Users

Buyer Category	% of buying households	Avg buying occasions	Avg spend \$	Avg Kgs purchased
Wedded Buyers	28.40%	8.6	\$41.40	9.6
Engaged Buyers	13.70%	2.9	\$12.50	3.4
Dating Buyers	5.70%	1.7	\$7.00	1.9
First Kiss Buyers	5.10%	1.3	\$4.90	1.4
Flirting Buyers	4%	1	\$3.10	0.9
Non Buyers	43%	0	0	0

Source: NielsenIQ Homescan

The opportunity gap

### Average retail price per kg of mango varieties

Average price KG	19-20	20-21	21-22
Mangoes	\$3.69	\$4.28	\$4.18
KP	\$3.80	\$4.32	\$4.45
Calypso	\$3.73	\$4.31	\$3.89
R2E2	\$4.68	\$5.82	\$5.18
Honey Gold	\$4.45	\$5.33	\$5.48

Source: NielsenIQ Homescan

Continued from page 13

### 3. OUR RETAIL PARTNERS

This season we again received wonderful support by our retail partners. As communicated previously, mangoes are the king of fruits, and all retailers get excited when the season commences. It highlights the start of warmer seasons along with the fresh array of new summer fruits.

We track what the four big retailers do in the way of brochure and online marketing of our mangoes throughout the season. We track all their activity and capture a) the quantity of and b) the size of their images which we call the “share of voice” (SOV).

Overall, there were 493 adverts highlighting mangoes this season versus 476 from the prior season across the big four retailers (with 505 across all retailers). The chart to the right provides you with a breakdown by variety, it is pleasing to see, that all our major varieties obtained excellent exposure throughout the season, with later seasonal varieties receiving support as they reached the market. All retailers engaged in supporting catalogue, events, and exposure, and are frequently advising their consumers of our fresh quality Australian mangoes available within their stores. The numbers are generally strong across the retailer’s footprint both nationally and within each state, however there are opportunities available to continue to grow our exposure within their marketing media.

It is both encouraging and exciting to know that there is so much available scope for the mango market to continue to grow, here within Australia and abroad. We will shortly begin our end of season reviews with our retail partners and start to shape the sales events for the season ahead. This along with a targeted mango marketing approach will aim to drive increased awareness and consumption of our king of fruits—the Australian mango.

I wish you all, the very best for the new season ahead.

**For further information please contact Andrew Burns, AMIA Supply Chain Engagement Manager:**

M: 0428 662 726

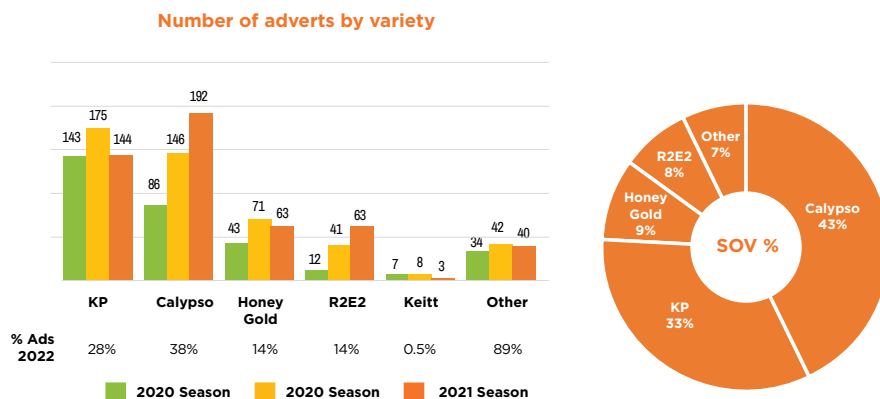
E: [andrew@mangoes.net.au](mailto:andrew@mangoes.net.au)

**Hort  
Innovation**

### Print Media—Australian Mangoes

#### Number of retailer mango adverts and share of voice (SOV) by variety—National (all retailers)

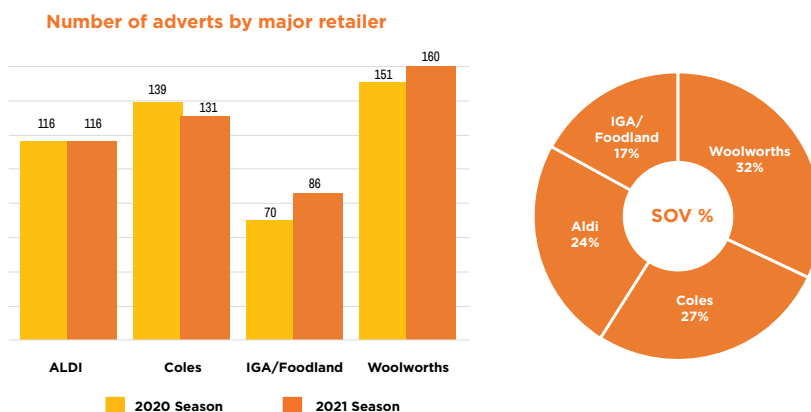
August 2021 to end February 2022



Data Source: Numerator Print Media Database.

#### Number of mango adverts by major retailers

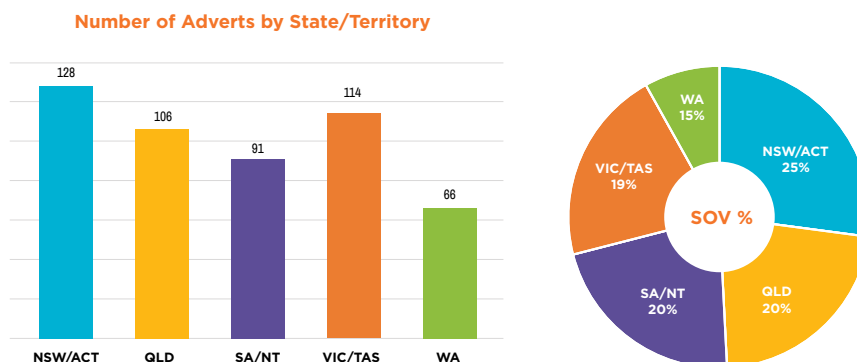
August 2021 to end February 2022



Data Source: Numerator Print Media Database.

#### Number of retailer adverts and SOV (share of voice) by State/Territory

August 2021 to end February 2022



Data Source: Numerator Print Media Database.



## Findings from the Best Practice and Communication Projects

Over the last few years, Australian Mango Industry Association (AMIA) was responsible for delivering the Building Best Management Practice Capacity for the Australian Mango Industry (MG17000) project and the National Mango Industry Communication Program (MG17004).

As you may recall, AMIA conducted industry surveys inviting industry stakeholders to provide feedback on these projects, to understand what went well and what could be improved.

### KEY FINDINGS

Here are some of the key findings captured.

#### Finding information

- 90% of respondents seek/find information relating to the mango industry from Australian Mangoes resources. This shows that we have an engaged Australian Mango Industry that seek information from resources produced by AMIA.
- Online communication is an effective way to communicate with key industry stakeholders, but should not solely be relied upon, considering the make-up of our key industry stakeholders. For example, connectivity in regional areas can be challenging. This is further evidenced by question five in the grower survey where most growers indicated that attending field days was one of the preferred methods to develop understanding and skills. Other survey feedback received also indicated that “roadshows are pretty effective and a good way to communicate updates.”
- Attending field days is the most popular approach for growers to develop their understanding and skills, with 83% and 90% of growers choosing this option in the two grower surveys conducted during the life of the project.

#### Knowledge change

- Survey participants indicated that there was a knowledge change in some areas. For example, over the course of the project a ‘biosecurity’ section was added to Mango Matters and 67% of survey respondents indicated their knowledge on biosecurity and exotic pests increased. This knowledge change was also facilitated by biosecurity workshops and other biosecurity related activities.

#### Engagement

- 62% of respondents agreed or strongly agreed that their engagement with the broader industry has increased through their interactions with AMIA.
- 82% of respondents responded that it was either very good or good having an IDM and two regionally based IDOs.

*Continued page 16*



**62% of respondents**  
*agreed or strongly agreed that their engagement  
with the broader industry has increased through  
their interactions with AMIA.*



**50% of the respondents**  
to the feedback survey rated the on-farm dry matter testing as being very good or good based on the value this activity had on their business.

Continued from page 15

### Crop forecasting

- At the beginning of the project, growers rated their knowledge score for crop forecasting as 5.9, (ranging from 2 to 9; with 1 being very poor and 10 being excellent). This score was the lowest scoring of all topics. The most recent grower survey shows that 50% of growers have either agreed or strongly agreed on the statement regarding an increase in their confidence in crop forecasting. However, 33% remained neutral and crop forecasting remains a challenging task for a large proportion of growers. New technologies such as satellite imaging and machine vision are currently being developed and fine-tuned as part of a Rural R&D for Profit project (ST19011) to improve forecast accuracy. As these new tools become available to growers, extension activities will be required to facilitate industry wide adoption and improve growers' confidence in forecasting.

### NIR technology and dry matter testing

- As a result of work conducted by AMIA and Central Queensland University (CQU), in-field assessment of fruit maturity using NIR technology has been widely adopted with 71% of the industry (by volume) using the Felix Produce Quality Meters. On-farm testing has generally been conducted by IDOs but farming businesses, having recognised the value of the technology, have begun investing in their own machines. Woolworths have now incorporated minimum dry matter standards into their specifications and use their own and third-party machines to assess fruit maturity. It is expected that on-farm dry matter testing will transition to a fee for service type arrangement. However, despite the high adoption rate, AMIA recommends that testing and calibration continues to be provided free of charge to the industry for a couple more years, to allow for a transition strategy to be put in place and guarantee the precision of the predictive models.
- 50% of the respondents to the feedback survey rated the on-farm dry matter testing as being very good or good based on the value this activity had on their business. This question didn't apply to 22% of respondents.
- In the most recent grower survey, 57% of growers indicated that they agreed or strongly agreed to the statement "My ability to decide when to pick has improved" as a result of being involved in AMIA's activities.

### Communication outcomes

- Almost 80% of respondents to the end of project feedback survey agreed that communication project outcomes were met. It is therefore recommended that a similar program be implemented.
- Some industry stakeholders felt communication could be improved and they would like more on-farm visits to communicate directly with the growers. This may be due to lack of face-to-face contact due to COVID-19 restrictions and therefore reinforces the need to keep face to face contact/field days and events. The communication program works alongside the best practice program that delivers these resources and it would be recommended that this face-to-face contact continues, and online communication to not be the only form of communication.

### Social media

- 50% of respondents did not use the industry Facebook page with many not using Facebook/ social media at all. This indicates that although useful to some key industry stakeholders, it should only be used as another tool to extend information and should certainly not be a key focus of the communication program.

### Industry website

- 54% of respondents to the end of project survey rated the industry website [www.industry.mangoes.net.au](http://www.industry.mangoes.net.au) as very good or good, while 16% of respondents had not used the website. Lack of awareness of the website is apparent, therefore a website explainer video was created at the end of the project to increase awareness and show industry stakeholders how to use the website. More work and communication about the website should occur over the next communication program to drive awareness.

### Regular communication material

- 76% of respondents rated *Mango Matters* (this publication) as very good or good.
- 78% of respondents rated *My Mango* as very good or good.
- 70% of respondents rated *The Slice* as very good or very good.

Continued page 17

**Almost 80% of respondents**

to the end of project feedback survey agreed that communication project outcomes were met.



## COMMENTS FROM RESPONDENTS

*"Communication is very good considering the resources."*

.....

*"Information is there for those that want to take the time to read it."*

.....

*"The weekly My Mango has a plethora of information, including for me the key pieces of information from the Australian Mangoes field officers, who compile the crop forecast and growing region updates, to any marketing OOH (out-of-home) that is relevant for me to share with our team and retailers around driving mango sales."*

.....

*"I regularly use the My Mango newsletter for the Crop Flow Forecasts and production comments on the different growing regions as the base for my articles (4-6 times throughout the season). The information is clearly presented, and easily quotable. I like how they include weather and other impacts on production. The charts and tables are well presented, and I am able to clearly see production data for me to understand the weekly trends. Other industries should follow the lead from AMIA and make such information publicly available to public/media."*

Continued from page 16

## RECOMMENDATIONS

Recommendations are as follows:

### Communications

- It is recommended that a similar program should be delivered based on all KPIs being met and feedback received. In particular, the communication program should continue to draw upon partnerships and contributions from the best practice project and other research and marketing projects, industry groups and researchers to ensure efficient and effective communication.
- It is important to find out how we might be able to improve engagement of quarterly magazine and implement these changes. Some topics of interest that could be added to the magazine and communication from the survey feedback include the new varieties, orchard styles and benefits, and managing safety at your property.
- Online communication is an effective way to communicate with key industry stakeholders, but should not solely be relied upon, considering the make-up of our key industry stakeholders and feedback received.
- More work on the website and communication about the website should occur over the next communication program to drive awareness.

### Best practice

- The industry should continue to build upon the strong and trusted networks developed by the Industry Development Manager (IDM) and Officers (IDOs) through the life of next extension project.

- The industry should continue to support its extension assets and capability, particularly the IDM and regionally based IDOs who have fostered strong industry relationships.
- The industry should keep the momentum going and continue the extension and adoption efforts, enhancing the accumulated information in the best practice resources and strengthening the relationships and capacity between growers, AMIA and project partners.
- When new mango related research projects are contracted, extension and grower outcomes should be built into the scope. It is recommended that research contracts have detailed requirements to collaborate with industry development projects such as Communications and Innovation and Adoption. This will assist with the adoption of new R&D outputs and maintain consistency across best practice resources.

To read a more in-depth analysis of what outcomes each project achieved and further findings from measurement and evaluation see the final reports from both projects, which have now been published and are available on the Hort Innovation Mango Fund site: <https://www.horticulture.com.au/growers/mango-fund/resources/>.

We thank everyone that provided project feedback for their time and valuable insights. If there is anything further you would like to discuss with the team, please do not hesitate to get in touch via our contact page on our industry website: <https://www.industry.mangoes.net.au/contact/contact-amia/>.

We thank all current and previous AMIA staff and project partners for their hard work on these projects and hope to make the next best practice and communication projects even better.

*The industry should continue to build upon the strong and trusted networks developed by the Industry Development Manager (IDM) and Officers (IDOs) through the life of next extension project.*



# Australian mangoes export report

**For the past two seasons, Australian mango exported volumes have decreased from around 6,000 tonnes to less than 4,500 tonnes. This trend can be explained by a range of factors including the COVID-19 pandemic and its' impact on airfreight capacity and cost but also because of lower yields.**

Record volumes were sent to New Zealand with more than 1,390 tonnes going across the Tasman Sea exceeding pre-COVID levels.

The data for our international protocol markets (South Korea, China, and the USA) shows promising results with growing demand being met despite airfreight cost and capacity challenges. Targeted marketing campaigns are being run in the USA, South Korea, and New Zealand to help consumers recognise Australian mangoes as a seasonal fruit and promote sales.

With the closure of the grey channel, volumes sent to Hong Kong have more than halved from the 2019/20 season. Qatar and Canada have also halved since 2019/20 but are expected to bounce back when airfreight costs go back to a reasonable level.

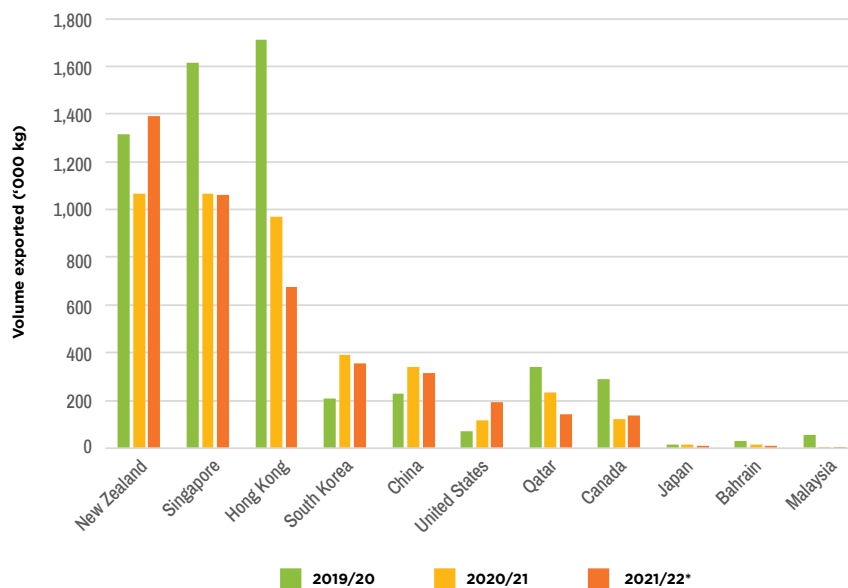
Malaysia saw a drastic reduction in Australian mango imports mainly driven by the loss of direct flights due to the COVID-19 pandemic.

During the 2021/22 season, New Zealand accounted for 33 per cent of all export volumes followed by Singapore with a 25 per cent share. Hong Kong made up 16 per cent and the USA increased from 1 to 5 per cent since the 2019/20 season.

The entire industry appreciates the work of exporters over the past two seasons, who worked through a range of hurdles to supply our existing customers with Australian mangoes.

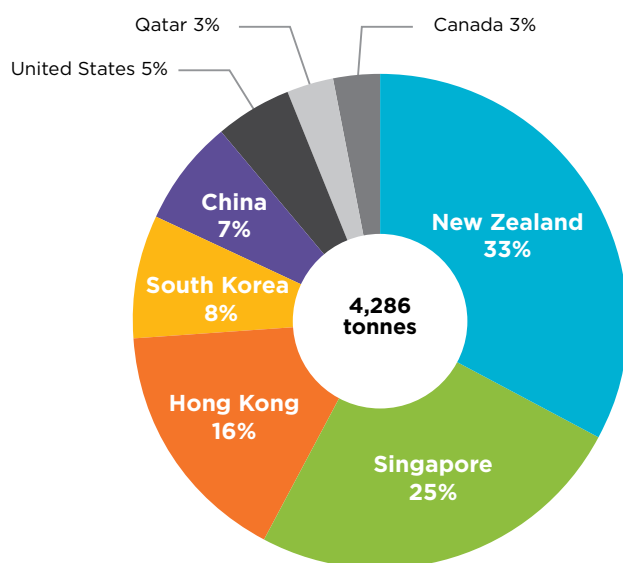
*Continued page 19*

**Mango export to key markets versus two previous seasons (July to June)**



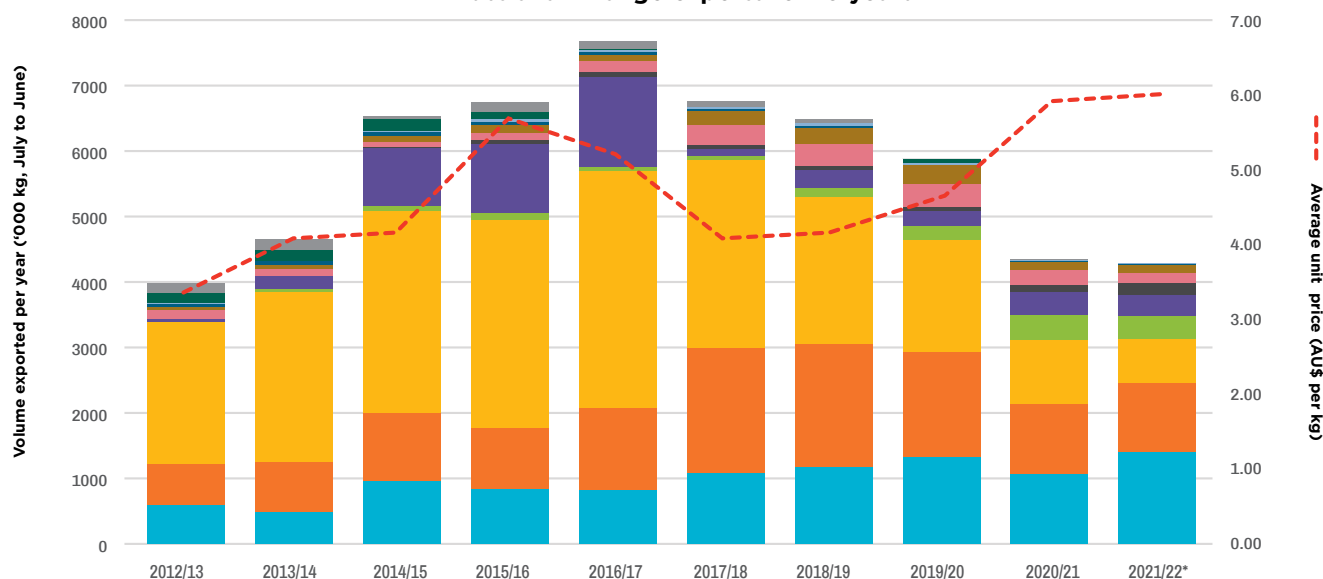
\* Note: 2021/22 season data is from July 2021 to March 2022. The data for some middle eastern countries (UAE, Kuwait, Saudi Arabia, Oman, and Brunei) was unavailable at the time of reporting.

**Mango export by market destination 2021/22 season**





## Australian mango exports for 10 years



TONNES	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22*
New Zealand	595	476	951	837	820	1080	1176	1318	1066	1391
Singapore	613	769	1049	922	1247	1913	1878	1615	1066	1060
Hong Kong	2178	2603	3082	3181	3632	2863	2230	1710	972	673
South Korea	5	31	68	113	60	66	145	208	392	354
China	31	204	901	1041	1364	110	276	227	339	315
United States	-	-	5	74	77	60	64	73	115	193
Qatar	146	112	78	94	169	303	328	341	235	142
Canada	42	61	88	124	100	207	259	287	119	137
Japan	58	55	64	59	45	35	19	15	13	12
Bahrain	14	12	21	35	21	28	47	28	16	8
Malaysia	151	162	169	112	21	9	12	57	3	1
Other countries	151	162	58	149	122	79	47	0	1	0
<b>WORLD</b>	<b>3,985</b>	<b>4,647</b>	<b>6,535</b>	<b>6,743</b>	<b>7,678</b>	<b>6,755</b>	<b>6,481</b>	<b>5,879</b>	<b>4,338</b>	<b>4,286</b>
<b>TOTAL CROP PRODUCTION</b>			<b>66,482</b>	<b>62,222</b>	<b>60,466</b>	<b>83,977</b>	<b>76,709</b>	<b>74,918</b>	<b>62,300</b>	<b>64,400</b>
<b>% OF NATIONAL CROP EXPORTED</b>			<b>10%</b>	<b>11%</b>	<b>13%</b>	<b>8%</b>	<b>8%</b>	<b>8%</b>	<b>7%</b>	<b>7%</b>

\* Note: 2021/22 season data is from July 2021 to March 2022. The data for some middle eastern countries (UAE, Kuwait, Saudi Arabia, Oman, and Brunei) was unavailable at the time of reporting.

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# Real-time temperature data delivers for Burdekin grower

## AT A GLANCE

- Burdekin mango grower Kristian Pucciarmati enhances supply chain performance using real time temperature tracking from Escavox.
- Data from Escavox trackers showed major failures in pre-cooling, contributing to episodes of product downgrading and rejection.
- By acting on the data, Kristian made an informed decision to change his transport operator, resulting in a more streamlined supply chain delivering consistently higher quality fruit with fewer hassles and costs.



Jessica and Kristian Pucciarmati, of Pucciarmati Mangoes, Mount Kelly, Queensland, are impressed with Escavox real-time supply chain tracking, which monitored fruit from their on-farm packhouse to their wholesaler in Brisbane.

Burdekin producer Kristian Pucciarmati had previous experience using data loggers to monitor his freight, but the numbers never gave him the complete story of what his mangoes were experiencing on the journey from his farm in North Queensland to his wholesaler's warehouse in Brisbane.

Signs of freezer burn on his fruit, gave Kristian clear evidence that not all was well within his supply chain. So, he deployed USB loggers in his pallets to trace the source of the issue.

The exercise gave him some answers, but not all. He couldn't pinpoint where the temperature dips were occurring, nor could he accurately correlate the temperature readings with location.

And like all USB loggers, the data was retrieved and read long after the journey was completed.

"It meant we only ever looked at the data after we encountered a problem," Kristian said.

"We weren't using it to fix issues going forward or to make our supply chain better; rather it was a way to work out who was at fault when things had gone wrong."

While the USB exercise produced less than optimum results, it did convince Kristian that maintaining temperature consistency along the length of the supply chain was critical to consistently delivering high quality fruit to the customer.

In the season of 2019-20, Kristian jumped at the chance to use Escavox trackers as part of a two-season trial coordinated by the Australian Mango Industry Association (AMIA) as part of the levy funded project—Building Best Management Practice Capacity for the Australian Mango Industry (MG17000).

Escavox trackers use mobile technology to capture and convey data, so producers like Kristian can see their produce's journey unfold in real time. From a dashboard displayed on his PC or mobile phone, Kristian was able to see where his fruit was travelling and the conditions to which it was exposed.

*Continued page 21*



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*His fruit, he says, is maintaining quality all the way through to store and he has not been hit with a product downgrade or rejection since acting on the Escavox data.*

Continued from page 20

Whether in the orchard or the office, a simple glance at his mobile phone could tell him where his product was and how it was faring on its' 1,200-kilometre journey from his farm near Ayr to the Brisbane Markets.

Kristian and his wife Jessica, marketing as Pucciarmati Mangoes, harvest 6,000 mature trees which they grade and pack at their on-farm packhouse. They freight up to 80,000 trays—about one B-double truck per day—of produce by road over the course of their season.

During the 2019-2020 season when Kristian participated in the trial, his supply chain pathway should have involved a local carrier transporting the mangoes from the Mount Kelly farm to cool rooms in nearby Ayr before loading onto a long-haul truck for Brisbane.

The data from the Escavox trackers revealed that pre-cooling in Ayr was not being done. Subsequent cooling was activated on the Ayr-Brisbane leg, although data also showed the temperature range fluctuating, mostly towards the hotter end of the scale at an average of 25.3 degrees (C).

Transit temperatures from the packhouse to ripening rooms were outside the desired temperature band 100 per cent of the time. It took an average of 1.6 days for his mangoes to reach their destination.

Kristian says the real-time tracking delivered by Escavox, gave him data quickly and easily, while 'verifying and validating' concerns he had about his under-performing supply chain.

"The real-time data really made the difference for us being able to understand what was happening to our fruit and why this was sometimes translating into major problems," said Kristian.

Following the trial, Kristian changed his transport arrangements to a carrier who has made significant investments in upgrading their cool room facilities in town. He is confident the pre-cooling in Ayr is being done by the new carrier, although he did not deploy any Escavox devices during year two of the trial (in the 2020-21 season) and has not monitored his supply chain with real-time trackers since.

His fruit, he says, is maintaining quality all the way through to store and he has not been hit with a product downgrade or rejection since acting on the Escavox data.

He says he will consider further real-time tracking if short-term adjustments or longer-term strategic upgrades to his supply chain arrangements are needed. Accurate, granular data will be critical for informing these decisions, he says.

"I'd certainly recommend to any mango grower that they take an active interest in their supply chain if they want to uphold the quality of their fruit once it leaves the farm. It's definitely worth it," he said.



## PLANTING MANGO TREES?

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NT FARMERS

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of Queensland

This project has been funded by Hort Innovation using the mango 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.

These resources have been created under the strategic levy investment project Building Best Management Practice Capacity for the Australian Mango Industry (MG17000), part of the Hort Innovation Mango Fund.

# When do I harvest – heat units the easy way using Fruitmaps

The estimation of harvest timing using ‘heat units’ has been used in the Australian Mango Industry for decades—with Yan Diczbali (who worked for NTDPIR and who now works for DAF) doing early work in the 1990s. The technique is used in many other crops and works well.

However, existing mango heat unit calculators have been complicated and the use of temperature data from distant regional weather stations (like Bureau of Meteorology) can be misleading for a given farm.

A new and improved heat unit calculator is now available as an online platform: <https://fruitmaps.info>. This site allows calculation of heat units using data from temperature sensors which have been installed in each major mango growing district. These temperature loggers are using wireless technology and cloud computing which remove the need for manual download and streamline the process. The estimated heat units are updated daily with current season temperatures, with forward prediction based on an average of historical daily maximum and minimum temperatures on the

site. Two formulae for calculation of heat units are provided—the Australian standard method which uses a minimum temperature, and a method that also takes into account the negative effect of very high temperatures.

For better and more accurate results, it is recommended to install your own SensorHost sensors, which can be purchased at: <https://shop.sensorhost.com/collections/fruitmaps>.

The site can be used without registration, however if you wish to save your data, you will need to create a free account, as data will be lost when the browser is closed (Figure1).

To start using the website, the date of a flowering event must be entered—this can either be at asparagus stage

or when flowers are two thirds open (Christmas tree stage) (Figure 2).

To view a demonstration of the platform, please click [here](#).

Please email Kerry Walsh from Central Queensland University if you have any questions: [k.walsh@cqu.edu.au](mailto:k.walsh@cqu.edu.au).

*This project was partly funded by Hort Innovation with support from the Australian Government Department of Agriculture, Water, and the Environment as part of its Rural R&D for Profit program with UNE, Australian Mangoes, NT DITT, QDAF, and Central Queensland University. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.*

Article prepared by Marcelo Amaral, Jeremy Walsh, Glendon Turner and Kerry Walsh, Central Queensland University.

## Calculator for Regional Sensors

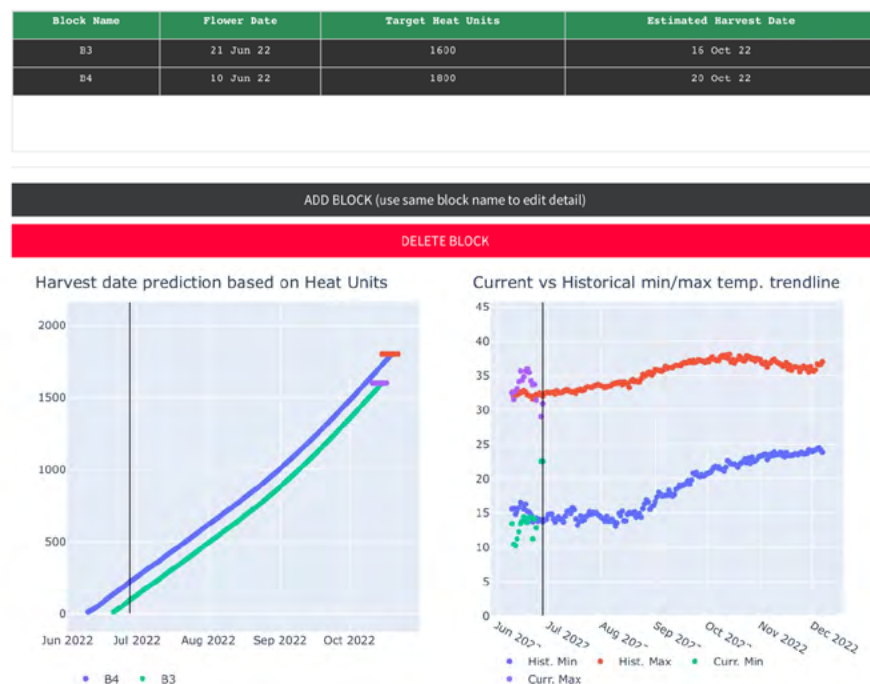


Figure 1. Example display from fruitmaps.info showing entry of data for two blocks (top), harvest date prediction graph and actual and historic average temperatures for one sensor (bottom).

Figure 2. Asparagus and Christmas tree stages of mango panicle development.



# Mango shoot looper found in the Northern Territory

**Mango shoot looper, an invasive pest from Asia, was initially detected in mango orchards in Far North Queensland in September 2021. Increased surveillance took place in the Northern Territory (NT) following the detection in Queensland. Mango shoot looper is similar to five other species of loopers that are found on mangoes in the NT.**

Mango growers were advised to keep an eye out and contact relevant bodies. AMIA works closely with growers to encourage discussions on biosecurity related matters and the reporting of suspicious pests. Looper samples were collected by AMIA and local growers in March 2022 from an orchard in the Darwin region, after growers reported suspicious sightings. The samples were brought to the NT Government entomology laboratory for further identification. DNA testing was conducted to confirm the identification of the mango shoot looper, which was declared present in the NT in April 2022. However, the pest may have been present in the region for a while.

While mango shoot looper has not been declared present in the Katherine region, it is likely that it may have spread to other growing regions in the NT. Due to the proximity with the NT border, mango growers in Kununurra, Western Australia, are also advised to get familiar with the characteristics of the mango shoot looper to support a rapid and effective response, should the pest be detected in the region.

Mango shoot looper larvae are yellow to black in colour with a mottled appearance. It moves in a 'looping' aspect and usually makes silken threads that hang vertically from mango trees. Newly formed pupae have a distinctive triangular shape, are green in colour and darken to brown before adult emergence, while adult moths are very pale brown or cream in colour.

Damage to trees can include leaf defoliation, as the mango shoot looper larvae feed voraciously on leaves and tender shoots, but also on flowers and immature fruit, which can result in a reduced crop.

A reminder that management options can be found on the mango industry website: [www.industry.mangoes.net.au](http://www.industry.mangoes.net.au) and to report any suspected infestation, by phoning the Exotic Plant Pest Hotline on 1800 084 881.

*Biosecurity work is part of 'Extension to build innovative culture and capability in the Australian mango industry (MG21002)' as well as a separate Australian Mango Industry Biosecurity Program project funded by Plant Health Australia and Hort Innovation.*



Looper samples were collected by AMIA and local growers from an orchard in the Darwin region and brought to the NT Government entomology laboratory for further identification.



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Part 2 of the Mango Small Trees Initiative Article Series

# Vigour management a key component for mango orchard intensification

**Tree vigour is one of the major challenges of orchard intensification. Without controlling vigour in high-density orchards trees rapidly outgrow their space and canopy crowding can cause yield decline. The National Intensification in Tree Crops Project (AS18000) aims to explore different ways to control vigour in mangoes and help improve the success of high-density orchards.**

Vigour is essentially growth. An example of different vigour is comparing different varieties, such as the difference in growth potential between a Kensington Pride and a Keitt tree. Vigour can, however, be affected by a large range of factors.

Mango trees require some vigour to grow the tree and renew a healthy canopy to support the crop. However, too much vigorous vegetative growth can compete for resources with flowering and fruit development, reducing tree yields, and increasing tree size. Larger trees require high



*Espalier training system.*

levels of pruning, increasing the cost of maintenance. To control vigour, growers will also often restrict mango production to poorer soils, tightly control nutrition inputs and timing, and impose irrigation related stress on trees.

In high-density, intensive orchards, high-vigour trees rapidly outgrow their allocated space leading to canopy crowding and yield decline. As part of the project our team has been exploring different ways to control vigour in mangoes to reduce canopy crowding and maintain productivity in smaller, more densely planted trees. Below we discuss the major methods of managing mango tree vigour.

## PRUNING


Pruning is currently the main management technique used to control the excessive vigour of mangoes. Pruning can reduce tree size and open up the canopy to allow light and spray penetration, however pruning on its own is unable to sustainably maintain trees small enough for high density orchards without negatively affecting yields. This is especially true for higher vigour varieties. One of the effects of heavy pruning is stimulation of vegetative growth at the expense of plant carbohydrate reserves that reduces availability for flowering and fruit set.

*Continued page 25*



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## VARIETIES

Variety or tree genetics has the greatest influence on tree vigour. As pointed out earlier in this article; the vigour of varieties such as Kensington Pride and Keitt can differ considerably. Some high-vigour varieties are not suitable for high-density orchard systems. Low-vigour, but high-productivity, varieties are preferred for intensive production systems as they require less pruning while still fruiting and flowering strongly. Low-vigour, high-productivity trees are also a major focus of the Queensland Department of Agriculture and Fisheries' (DAF) mango breeding program.

## ROOTSTOCKS

Rootstocks that induce low-vigour and high-productivity are a tool used to successfully reduce tree vigour in temperate tree crops, such as apples. Rootstock development has accelerated the transition to high density production systems in these crops. In mango, the most common rootstock used in the industry is Kensington Pride, which is chosen for its availability and genetic uniformity, rather than inducing any desirable characteristics in scions.

One of the major components of the project is to explore and select vigour reducing rootstock varieties for mango. The first phase of this research screened over 90 rootstock varieties for their effects on vigour and productivity on two scion varieties. Four of the most promising rootstocks have been advanced to second phase field trials, where their effects will be evaluated on a greater number of scion varieties in different growing regions. These regional evaluation trials will evaluate if the rootstock performance is consistent across varieties, soil types, climate zones and management systems.

The drawback to rootstock development, like any varietal development, is that development and evaluation takes time, and it will be at least five years before we can determine the effectiveness of low-vigour, high-productivity rootstocks for Australian mango producers.

## TREE TRAINING

The arrangement or architecture of the branches in a tree not only form a scaffold to hold leaves and fruit but can also influence tree vigour. While branch architecture is mainly dictated by the variety, it can also be influenced by tree training and pruning.

The project research team is investigating novel tree training and branch architectures that reduce tree vigour. One of these systems is the espalier training system, shown in the photos in this article, which is common in temperate crops. Branches are bent, either horizontal or below, by fastening them onto a wire, while retaining a central leader. This training system has kept mango trees smaller than the conventionally trained and pruned trees for the first eight years of this trial. Tree vigour and productivity will continue to be monitored as the orchard ages.

## PLANT GROWTH REGULATORS (PGRS)

All growth events (vegetative flushes and flowering) in a tree involve plant signaling compounds (hormones) for their initiation and growth. PGRs are chemical products that can enhance or block this signaling. PGRs have been used in many crops to influence vigour and other plant functions.

Paclobutrazol, a common PGR, has been used as a soil drench in mangoes for several decades to increase flowering. Current usage only minimally effects tree vigour, though its use for



Espalier training system.

vigour management is being explored. The effect of PGR's can be variable and are typically influenced by variety, tree age, soil type, application timing, nutrition, and water availability.

The DAF mango research team have begun investigating the effects of other PGRs on mango growth to determine their potential use in the management of vigour and productivity.

## GROWING INTO THE FUTURE

The project research on mango tree vigour is leading to more vigour management options that don't compromise production. These options will reduce some of the current vigour barriers to high-density mango production systems, enabling productivity gains to be more easily realised. It is likely that a combination of vigour management tools will be required to sustainably maintain small trees suitable for intensive mango production. Ultimately, successful management of excessive tree vigour will reduce labor and input costs while increasing productivity.

*This article is the second in a series from the AS18000 project outlining some of the key orchard components. If you missed the earlier article on light in the orchard, you can find it the October 2021 (Spring) edition of Mango Matters.*



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This is a project of the National Tree Crop Intensification in Horticulture Program, funded by the Hort Frontiers Advanced Production Systems Fund, part of the Hort Frontiers strategic partnership initiative developed by Hort Innovation, with co-investment from Queensland's Department of Agriculture and Fisheries, Queensland Alliance for Agriculture and Food Innovation- The University of Queensland, Plant & Food Research and the Western Australian Department of Primary Industries and Regional Development, and contributions from the Australian Government.



# Mango pollination: levels of self-pollination and cross-pollination among Kensington Pride and Calypso fruit

Mango flowers can be pollinated by insects such as flies, beetles, and bees. Pollinator populations vary from orchard to orchard, and each type of pollinator may have a different capacity to transfer pollen across long distances from one cultivar to another. Self-pollination occurs when pollen from one mango cultivar is transferred to a flower of the same cultivar, whereas cross-pollination occurs when pollen from one cultivar is transferred to a flower of a different cultivar. Cross-pollinated fruit are often larger than self-pollinated fruit in other tree crops such as avocado, almond and macadamia.

As part of the project 'Increasing yield and quality in tropical horticulture with better pollination, fruit retention and nutrient distribution (PH16001)', we identified insect visitors to flowers in an orchard of Kensington Pride and Calypso fruit, and we determined:

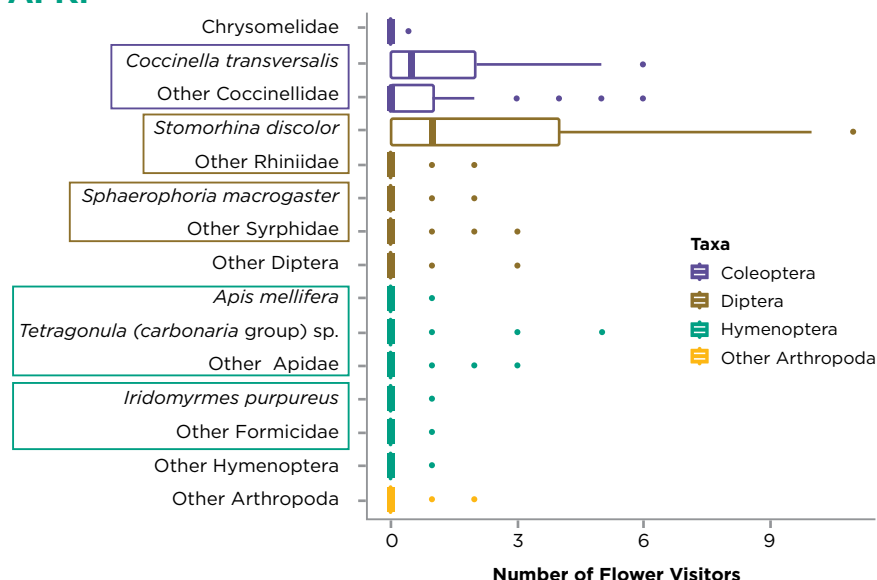
1. How much of each cultivar's crop resulted from self-pollination versus cross-pollination at increasing distances from the other cultivar; and
2. How did cross-pollination affect fruit size, skin colour, and flavour attributes, when compared with self-pollination.

The orchard was at Simpson Farms, near Childers, Queensland. We conducted the study in a 16-row-wide block of Kensington Pride and a 13-row-wide block of Calypso that were planted next to each other. The trees were six years old. Tree spacing was nine metres between rows and 4 metres within rows. No honey bee or stingless bee hives had been introduced to the orchard.

We recorded flower visitors and harvested fruit from trees along six transects per cultivar. A transect consisted of four trees, starting at a tree immediately next to the other cultivar (row one) and then moving away from the other cultivar to trees in rows three, five, and the middle row of the block (row eight for Kensington Pride and row seven for Calypso).

We observed a total of 715 visitors on mango flowers, including 317 Diptera (flies), 288 Coleoptera (beetles) and 92 Hymenoptera (bees, wasps, or ants) (Figure 1). Two of the most common flower visitors were a Rhiniid Fly, *Stomorphina discolor*, and the Small Transverse Ladybird Beetle, *Coccinella transversalis* (Figure 2). Some honey bees (*Apis mellifera*) and stingless bees (*Tetragonula* sp.) were observed on mango flowers, but not in great numbers.

## A: KP



## B: CAL

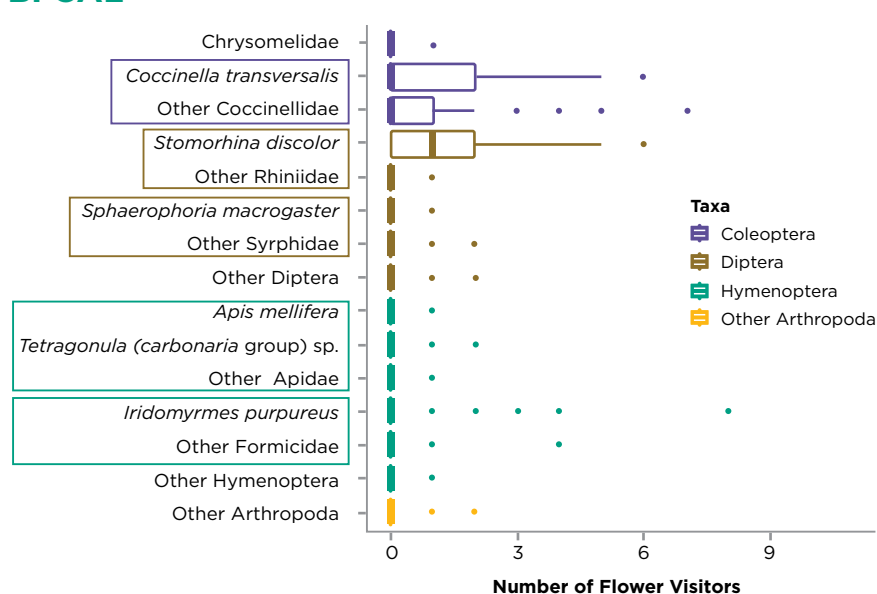


Figure 1. Median number of flower visitors on (A) KP: Kensington Pride and (B) CAL: Calypso flowers.

Continued page 27



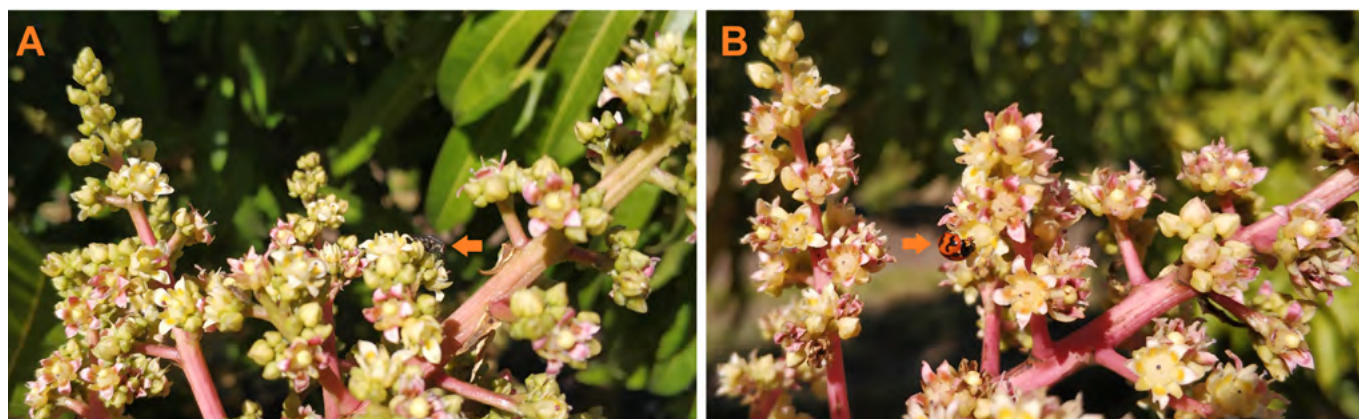


Figure 2. Two of the main insects that visited mango flowers at Simpson Farms near Childers: (A) a rhiniid fly (*Stomorhina discolor*), and (B) the Small Transverse Ladybird Beetle (*Coccinella transversalis*). Arrows indicate the location of each insect.

We harvested 240 mature Kensington Pride fruit on 7 January 2020 and 240 mature Calypso fruit on 20 January 2020. A total of 69% of Kensington Pride fruit and 70% of Calypso fruit resulted from self-pollination and, therefore, 31% of Kensington Pride fruit and 30% of Calypso fruit resulted from cross-pollination (Figure 3). The percentage of self-pollinated Calypso fruit increased significantly from 49% in the first row alongside the Kensington Pride block to 84% in the fifth row into the Calypso block.

We measured fruit mass, length, and width, and we assessed fruit colour using a colorimeter. A section of flesh was squeezed manually through filter paper. Brix and acidity of the juice were determined using a sugar and acidity meter. Brix to acid ratio was calculated for each fruit.

Self-pollinated and cross-pollinated fruit mostly differed little in size, skin colour or flavour attributes (Table 1). However, self-pollinated Calypso fruit were 5% heavier and 2% wider than cross-pollinated Calypso fruit. They also had slightly higher acidity, although the brix to acid ratio did not differ significantly. Self-pollinated Kensington Pride fruit had slightly darker skin than cross-pollinated Kensington Pride fruit but, other than that, there were no significant differences between self-pollinated and cross-pollinated Kensington Pride fruit.

Our results show that Kensington Pride and Calypso flowers are self-fertile, with fruit being produced from either self-pollination by the same cultivar or cross-pollination by another cultivar. A wide diversity of flower visitors was present in the study orchard, and some of these may be efficient at both self-pollination and cross-pollination.

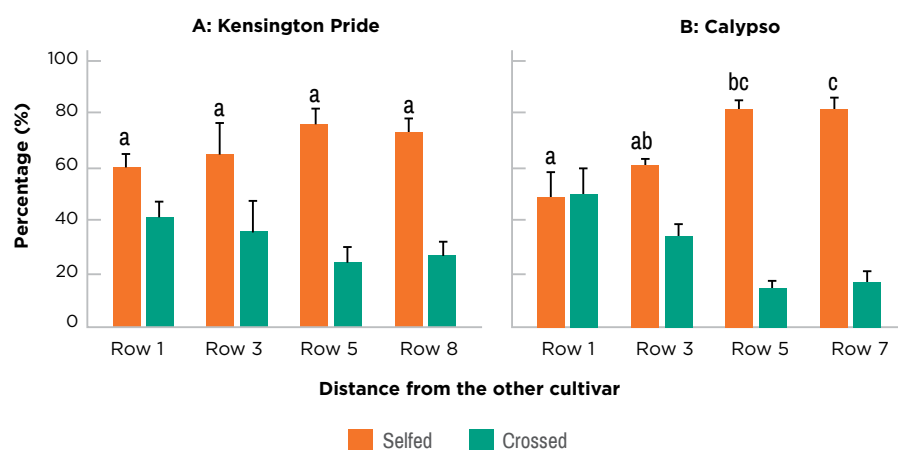


Figure 3. Percentages of self-pollinated (selfed) fruit and cross-pollinated (crossed) fruit of (A) Kensington Pride and (B) Calypso at different numbers of rows from the other cultivar. Means with different letters within a cultivar are significantly different.

	Kensington Pride (KP)		Calypso (CAL)	
	Self-pollinated (KP x KP)	Cross-pollinated (KP x CAL)	Self-pollinated (CAL x CAL)	Cross-pollinated (CAL x KP)
Mass (g)	387 ± 36	386 ± 46	397 ± 23 a	379 ± 17 b
Length (mm)	108 ± 4	110 ± 6	98 ± 2	97 ± 2
Width (mm)	85 ± 3	85 ± 3	90 ± 2 a	88 ± 1 b
Brightness	64.5 ± 1.3 a	65.7 ± 1.7 b	56.6 ± 2.1	56.0 ± 2.5
Redness	6.92 ± 3.4	5.44 ± 3.3	34.5 ± 3.8	36.2 ± 4.7
Yellowness	43.6 ± 2.2	45.1 ± 2.2	30.3 ± 2.7	29.3 ± 3.87
Brix	14.0 ± 0.5	14.0 ± 0.4	14.1 ± 0.5	14.0 ± 0.4
Acidity (mg/g)	0.63 ± 0.07	0.63 ± 0.10	0.44 ± 0.04 a	0.40 ± 0.06 b
Brix to acid ratio	24.3 ± 2.6	23.9 ± 3.4	34.4 ± 3.1	37.7 ± 4.7

Means with different letters within a cultivar are significantly different.

Table 1. Fruit size, skin colour and flavour attributes of self-pollinated and cross-pollinated Kensington Pride (KP) and Calypso (CAL) fruit.

Whatever the main pollinators, it was clear that mango pollen was sometimes only transported effectively across three or four orchard rows, as the level of cross-pollination declined significantly by five rows into the Calypso block. Fortunately, this decline in cross-pollination had little impact on fruit quality because there was very little difference in quality between self-pollinated and cross-pollinated fruit.

We did not monitor yields across the orchard rows. It remains possible that yields decline in the middle of wide single-cultivar mango blocks, as they sometimes do in avocado and macadamia orchards. This could be the case if mango trees hold onto cross-pollinated fruitlets better than self-pollinated fruitlets during the premature fruit drop that occurs after flowering. Growers could monitor yields across the orchard rows to determine whether yields decline at increasing distance from another cultivar. This would indicate that cross-pollination is important to achieve high mango yields but that pollinators are not transporting cross-pollen far enough into wide single-cultivar blocks.

.....  
Article prepared by Dr Wiebke Kämper, Mr Joel Nichols, Dr Chris Burwell, and Professor Stephen Trueman from Griffith University. For further information, please contact Wiebke on [w.kaemper@griffith.edu.au](mailto:w.kaemper@griffith.edu.au)  
.....

#### Acknowledgements:

*We thank Adam Kent from Simpson Farms for advice and access to the farm, and Sascha Kämper (Griffith University) for assistance.*

*Project PH16001 is funded by the Hort Frontiers Pollination Fund, part of the Hort Frontiers strategic partnership initiative developed by Hort Innovation, with co-investment from Griffith University, University of the Sunshine Coast, Plant & Food Research Ltd and contributions from the Australian Government.*



# National Plant Biosecurity Strategy released



**The 2021-2031 National Plant Biosecurity Strategy (NPBS) recently released by Plant Health Australia (PHA) provides a framework to strengthen Australia's plant biosecurity system over the next decade.**

The second-generation strategy outlines four focus areas needed to build a resilient and contemporary national plant biosecurity system that will continue to support Australian plant industries, the economy, environment, and communities.

"Plant biosecurity risks are mounting, as is the challenge of maintaining Australia's pest free status," says PHA Chief Executive Officer, Sarah Corcoran.

"The strategy sets the direction for activities across the system and drives the way for effective collaboration and action by governments, plant industries and the community to protect our producers and the end-to-end supply chain."

Designed to inform investment across all aspects of the system, guide efforts to address the most important priorities and effectively manage current and future biosecurity challenges, the updated NPBS builds on the achievements of the 2010-2020 strategy while remaining agile and responsive to the changing biosecurity environment.

The Australian Government Department of Agriculture, Water, and the Environment (DAWE) will fund PHA to coordinate a National Plant Biosecurity Strategy Implementation Group to oversee implementation of the strategy.

DAWE's Chief Plant Protection Officer, Dr Gabrielle Vivian-Smith, said the investment recognised the importance of effective coordination to successfully implement the strategy.

"Delivery of the strategy requires collective effort nationally. The implementation group will play a key role in aligning efforts of participants across our system and highlights PHA's strong record bringing stakeholders together," Dr Vivian-Smith said.

Australia's Chief Environmental Biosecurity Officer, Dr Robyn Cleland said the strategy recognises the

importance of protecting Australia's environmental assets and highlights the value of collaboration between industry and the community.

"Community awareness and participation are critical in an effective biosecurity system. We all have a role to play in protecting our unique environment and way of life", Dr Cleland said.

Development of the strategy was informed through consultation with a wide range of stakeholders, including governments and plant industry bodies as well as environmental and community groups.

The Plant Industries Biosecurity Committee Chair, John McDonald, said that this new plant biosecurity strategy follows a sturdy, decade long foundation and plant industries are pleased to be participating in guiding the implementation.

"Australia's plant industries play a critical role in our national plant biosecurity system underpinning Australia's high health food, fibre, and foliage production. Through careful implementation of these strategies, we can help safeguard Australia's trade, economy, way of life and the environment."

The NPBS follows the release late last year of national sub-strategies and implementation plans on preparedness, surveillance and diagnostics that sit under the strategy and support its implementation.

#### More information

##### [National Plant Biosecurity Strategy](#)

##### [Sub-strategies](#)

- [National Plant Biosecurity Diagnostic Strategy - Plant Health Australia](#)
- [National Plant Biosecurity Preparedness Strategy - Plant Health Australia](#)
- [National Plant Biosecurity Surveillance Strategy - Plant Health Australia](#)



# Mangoes taste sweeter with Fair Farms

**From humble beginnings in the Northern Territory, Tou's Garden has gone from strength to strength to produce some of the sweetest mangoes in Australia. While there's a heavy focus on producing top-notch fruit, Tou's Garden is also known for being one of the first mango farms to join the Fair Farms program.**

Fair Farms is the only Australian ethical compliance program that offers training and certification. The program has been designed by the horticulture industry for horticulture growers and is currently in its third year of operation.

Kittianant Chaipanukiat (Kit) who looks after Human Resources for Tou's Garden took some time out of his busy schedule to talk about the farm, his role, and the Fair Farms program.

"Tou's Garden started from humble beginnings in 1993 and by the year 2000 had a total of 35,000 mango trees, currently the farm has expanded to cover more than 1,500 acres," he said.

"Tou's Garden is named after one of its owners Tou Saramat Ruchkaew, who is involved in all aspects of the farm's management and owns the farm alongside director Ian Quin."

Kit himself has been with Tou's Garden since mid-2021 and still gets excited walking around the farm and seeing the vibrant fruit they grow.

"Every time I go around our farm to capture a photo for our social media

marketing materials, it is like a daily adventure," he said.

Kit said the decision to join the Fair Farms program came down to ensuring the farm was doing the right thing by its people.

"We are a multicultural workplace at Tou's Garden, each staff member respects and takes care of each other—we're like a family," he said.

"Our directors applied to be a member of the Fair Farms program to ensure that our farm achieves and abides by Australian workplace laws and regulations."

After achieving certification with the program, Kit said Fair Farms now forms part of the farm's commitment to ensuring ethical practices are a part of the farm's daily operation.

The Fair Farms program not only offers a pathway to third-party audit and certification but ensures its members are well prepared for an audit by offering a suite of 13 online learning modules based on the Fair Farms standard.



*Kittianant Chaipanukiat with Sachin Ayachit.*

Fair Farms National Program Manager Sachin Ayachit said the program was only as successful as its grower members.

"Farms like Tou's Garden who take a proactive approach to managing their staff are the true leaders of the horticulture industry," Sachin said.

"Fair Farms exists to recognise and celebrate growers like Tou and farm employees like Kit who want to ensure the success of their people on farm."

Tou's Garden is constantly innovating and finding new ways to grow produce. Recently they started growing a variety of mango called the Maha Chanok.

"It is a sweet and tangy type of mango which is originally from Thailand," Kit said.

"The mango is long-shaped and fibreless with a rich aroma."

For more information about Tou's Garden visit [www.tousgarden.com.au](http://www.tousgarden.com.au), and information about the Fair Farms program visit [www.fairfarms.com.au](http://www.fairfarms.com.au).



*Farm workers from Tou's Garden.*



*Tou Saramat Ruchkaew (middle) with workers.*



## PEOPLE & EVENTS



Jess Mitchell, Samantha Frolov and Nick Miall.

Jane Muller, Trevor Dunmall, Marine Empson, Celine Jordens and Andrew Burns.

# Hort Connections reveals key insights

**AMIA/Australian Mangoes were excited to again be an Industry Partner of Hort Connections. Here are some happy snaps and a summary of the event.**

Hort Connections took place from Monday, 6 to Wednesday, 8 June and saw over 3,000 delegates descend upon Brisbane.

The AMIA/Australian Mangoes team were all in attendance this year and took the opportunity to network with familiar and new faces, visit the trade show which included many of our industry's suppliers and supporters, listen to some fantastic sessions and of course enjoy the fabulous Gala Dinner (which also screened the State of Origin). If you were there, we really enjoyed seeing you (but some of us were not happy about the State of Origin result)!

Some of the highlights from this year's event included a delicious breakfast from one of the event's sponsors Perfection Fresh and some great sessions.

Wednesday morning opened with an address from incoming Federal Minister for Agriculture, Fisheries and Forestry, the Hon. Murray Watt MP, who acknowledged the many challenges, but also opportunities across horticulture industries.

The *State of the Industry* plenary session was a highlight in the program and included a cameo from the mango industry's own, Marie Piccone of Manbulloo. Marie and the other panellists, Craig Taylor from Coles, Darren Keating from The International Fresh Produce Association (IFPA) and Chanal Day from Quantum, discussed key topics for the horticulture industry to be aware of. Technology and sustainability were two of the big discussion points, which probably comes as no surprise.

From a technology perspective, research has found that more consumers want convenience and are shopping online. Fruit and vegetable industries need to be aware of what their value proposition is to these consumers, when they aren't seeing the product in store at the time of purchase as often. It is more important than ever to do everything in your control, to deliver a fantastic product every time, which will encourage repeat purchase. There are also opportunities

for increasing productivity and reducing waste through AgTech by tracking your product or using AgTech for forecasting (see other articles such as the Escavox case study—page 20 and Fruitmaps article—page 22 in this magazine for inspiration). Marie said that Manbulloo utilise AgTech such as satellite imagery, soil moisture monitoring and tracking in the supply chain, which provides them with more control, measurement, and clear results.

Customers that buy fruit and vegetables are also placing importance (during the purchase decision) on companies that are sustainable or that focus on Environmental, Social and Corporate Governance (ESG). So, it's important to do the best that you can in utilising your resources effectively and communicating how you are doing this. Even small things like switching to more sustainable packaging can make a big difference. The panellists mentioned that there is lots of work already happening in this space, at the other end of the supply chain, such as through the Redcycle and SecondBite programs, and telling the story about these great initiatives and what farmers/growers are also doing, is something consumers are responding well to.

*Continued page 31*



Celine Jordens, Marine Empson, Paige Liebich and Brett Kelly.

Marine Empson, Ray Courtice, Michael Munro and Celine Jordens

The Hon. Murray Watt MP.



Marie Piccone presenting to delegates.

Mr Peter Leach (L) is presented his award by Bayer's Head of Customer Marketing for the Crop Science division, ANZ, Tony May. Image credit: Andrew Beveridge, asbCreative



L-R Federal Agriculture Minister Murray Watt, Hort Innovation CEO Brett Fifield, Michael Simonetta from Perfection Fresh. Image credit: Andrew Beveridge, asbCreative

Continued from page 30

Marie also made the point that one of the best investments for any business is (and will always be) in your people. Whilst the panel identified other opportunities for horticulture to include, diversifying your income stream and making fruit and vegetables convenient and readily available in other ways, for example fruit and vegetable offerings at petrol stations.

Darren identified that the mango category has done as great job at growing the value proposition by focusing on eating quality.

If you are interested in reading more about the IFPA Future Trends Report, which discusses these topics and more, you can access it at the IFPA website (highlights from the report are free to access, however you need to become a member of IFPA to access the full report): <https://www.freshproduce.com/resources/consumer-trends/2022-future-trends-report/>.

The session *Growing Australian Horticulture through innovation and sustainability* also reinforced the technology and sustainability messages heard in earlier sessions.

The awards ceremony, which took place during the Gala Dinner, recognised the hard work of many individuals in the horticulture industry. Some of the winners included:

### **Peter Leach - Bayer Researcher of the Year**

For his substantial contribution to research in horticulture. Peter has led a major portfolio of national market access disinfestation projects on fruit fly for more than 25 years. Mr Leach and his team have provided data for the successful negotiation of commercially viable new market access protocols for numerous crops, including mangoes, in Asia, The United States and New Zealand, expanded domestic market access through irradiation and contributed to international standards that guide phytosanitary work worldwide.

### **Michael Simonetta - Hort Innovation Exporter of the Year**

Michael and the Perfection Fresh Export team ship year-round, supplying in-season produce, including mangoes, to key global markets. Markets include The United States, The Middle East,

Asia, New Zealand, Europe, and The United Kingdom. Perfection Fresh has also worked hard to expand its global footprint by participating in the world's most significant food trade shows and exhibitions across Asia and The Middle East. Michael and the Perfection Fresh team are an exemplar of the success that a business can achieve when it embraces the opportunities that are available in export markets.

To read about the other winners head to: <https://ausveg.com.au/media-releases/horticulture-industry-leaders-celebrated-at-hort-connections-national-awards-for-excellence-2/>.

Overall, it was agreed by the team that Hort Connections was a great event.



Paul Joseph, and Adrian and Andrew Musumeci.



Michael Munro, Kerry Walsh and Martina Matzner.



An impressive display of fresh produce in the middle of the trade show.



The best post-harvest  
protection any mango can  
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